



**CONTRACT DOCUMENTS  
AND  
SPECIFICATIONS**

**DEPARTMENT OF GENERAL SERVICES**

**FOR**

**BOILER REPLACEMENT PROJECT**

**Bid No. 123-2019**

**TABLE OF CONTENTS**

**CONTRACT DOCUMENTS**

---

PART I	ADVERTISEMENT FOR BIDS
PART II	INFORMATION FOR BIDDERS
PART III	FORM OF PROPOSAL
PART IV	GENERAL CONDITIONS
PART V	SPECIAL CONDITIONS
PART VI	CONTRACT AGREEMENT
PART VII	PERFORMANCE AND PAYMENT BONDS
PART VIII	ADDENDA
PART IX	TECHNICAL SPECIFICATIONS AND PLANS

**PART 1**

**ADVERTISEMENT FOR BIDS**

**INDEX**

---

1.	INVITATION .....	AB-2
2.	DESCRIPTION OF WORK .....	AB-2
3.	OBTAINING PLANS, SPECIFICATIONS, AND BID DOCUMENTS .....	AB-2
4.	METHOD OF RECEIVING BIDS .....	AB-3
5.	METHOD OF AWARD .....	AB-3
6.	BID WITHDRAWAL .....	AB-3
7.	BID SECURITY .....	AB-3
8.	SUBMISSION OF BIDS .....	AB-3
9.	RIGHT TO REJECT .....	AB-4
10.	NOTIFICATION TO THE LFUCG FOR AFFIRMATIVE ACTION .....	AB-4
11.	NOTICE CONCERNING DBE GOAL .....	AB-4
12.	PRE-BID MEETING .....	AB-5

## ADVERTISEMENT FOR BIDS

### 1. INVITATION

Sealed proposals for the following work will be received by the Lexington-Fayette Urban County Government (LFUCG) until 2:00 p.m., local time, **December 18, 2019**, for furnishing all labor and/or materials and performing all work as set forth by this advertisement, conditions (general and special), IonWave Q&A, specifications, and/or the drawings prepared by Staggs & Fisher Consulting Engineers, Inc. for Lexington-Fayette Urban County Government, Department of General Services. Immediately following the scheduled closing time for reception of bids, all proposals which have been submitted in accordance with the above will be publicly opened and read aloud.

### 2. DESCRIPTION OF WORK

Consisting of the construction and/or furnishing of items as listed in the Bid Schedule beginning on page P-6, Part III, Form of Proposal, of this document, for the Boiler Replacement Project, Lexington-Fayette County, Kentucky.

### 3. OBTAINING PLANS, SPECIFICATIONS, AND BID DOCUMENTS

Specifications, Plans, and Bid Documents may be examined at the following places:

LFUCG  
Division of Central Purchasing  
200 East Main Street, Third Floor, Rm 338  
Lexington, Kentucky 40507  
(859) 258-3320



#### **4. METHOD OF RECEIVING BIDS**

Bids will be received from Prime Contracting firms on a **Lump Sum** for total Project. The Bidder must include a price for all bid items to be considered. Bids shall be submitted in the manner and subject to the conditions as set forth and described in the Instruction to Bidders and Special Conditions.

Sealed bids shall be clearly marked on the outside of the container as follows: Company Name and Address, Bid Invitation Number, and the Project Name. Bids are to remain sealed until official Bid closure time.

Mailed bids/proposals should be sent to the Director, Division of Central Purchasing, 200 East Main Street, Lexington, KY 40507.

#### **5. METHOD OF AWARD**

The Contract, if awarded, will be to the lowest, qualified responsible bidder for the total project whose qualifications indicate the award will be in the best interest of the OWNER and whose bid/proposal complies with all the prescribed requirements. No Notice of Award will be given until the OWNER has concluded such investigation as deemed necessary to establish the responsibility, qualifications and financial ability of Bidders to do the work in accordance with the Contract Documents to the satisfaction of the OWNER within the time prescribed. The OWNER reserves the right to reject the Bid of any Bidder who does not pass such investigation to the OWNER's satisfaction. In analyzing Bids, the OWNER may take into consideration alternate and unit prices, if requested by the Bid forms.

#### **6. BID WITHDRAWAL**

No bidder may withdraw his bid for a period of ninety (90) calendar days after the closing date for receipt of bids. Errors and omissions will not be cause for withdrawal of bid without forfeit of bid bond. Bids may be withdrawn in person prior to the closing date of receipt of bids.

#### **7. BID SECURITY**

If the bid is \$50,000 or greater, bid shall be accompanied by a certified /cashier's check or bid bond payable to the Lexington-Fayette Urban County Government in an amount not less than Five Percent (5%) of the base bid. Bid bond shall be executed by a Surety Company authorized to do business in the Commonwealth of Kentucky and countersigned by a licensed Kentucky Resident Agent, representing the Surety Company. Bid Bonds are not required for bids under \$50,000. A certified check or cashier's check is also acceptable forms of bid security.

#### **8. SUBMISSION OF BIDS**

CONTRACTORS shall submit their bids to the Lexington-Fayette Urban County Government, Division of Purchasing, Third Floor, 200 East Main Street, Lexington, Kentucky 40507. Bids shall be submitted in a sealed envelope not later than 2:00 p.m. local

time, **December 18, 2019**. Sealed proposals shall be clearly marked on the outside of the container as follows: Company Name and Address, Bid Invitation Number, and Project Name to be opened at 2:00 p.m. local time **December 18, 2019**. Bids are to remain sealed until official Bid closure time. Bids received after the scheduled closing time for receipt of bids will not be considered and will be returned unopened.

**9. RIGHT TO REJECT**

The Lexington-Fayette Urban County Government reserves the right to reject any and all bids and to waive all informalities and/or technicalities where the best interest of the Lexington-Fayette Urban County Government may be served.

**10. NOTIFICATION TO THE LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT FOR AFFIRMATIVE ACTION PLAN AND CURRENT WORKFORCE**

The successful bidder must submit with their bid the following items to the Lexington-Fayette Urban County Government:

1. Affirmative Action Plan for his/her firm.
2. Current Workforce Analysis Form.

Failure to submit these items as required herein may result in disqualification of the Bidder from the award of the contract.

All submissions should be directed to:

Lexington-Fayette Urban County Government  
Division of Purchasing  
200 East Main Street, 3<sup>rd</sup> Floor, Room 338  
Lexington, Kentucky 40507

**11. NOTICE CONCERNING MWDBE and Veteran Goals**

Notice of requirement for Affirmative Action to ensure Equal Employment Opportunities and Disadvantaged Business Enterprises (DBE) Contract participation. Disadvantaged Business Enterprises (DBE) consists of Minority-Owned Business Enterprises (MBE) and Woman-Owned Business Enterprises (WBE).

The Lexington-Fayette Urban County Government has set a goal that not less than ten percent (10%) of the total value of this Contract be subcontracted to Disadvantaged Business Enterprises, which is made up of MBEs and WBEs, and set a goal that not less than three percent (3%) of the total value of this Contract be subcontracted to Veteran-Owned Small Businesses. The goals for the utilization of Disadvantaged Business Enterprises and Veteran-Owned Small Businesses as subcontractors are recommended goals. Contractor(s) who fail to meet such goals will be expected to provide written explanations to the Director of the Division of Purchasing of efforts they have made to

accomplish the recommended goal, and the extent to which they are successful in accomplishing the recommended goal will be a consideration in the procurement process. Depending on the funding source, other DBE goals may apply.

For assistance in locating Disadvantaged Business Enterprise and Veteran-Owned Small Businesses as Subcontractors contact:

Sherita Miller, Division of Central Purchasing  
Lexington-Fayette Urban County Government  
200 East Main Street, 3rd Floor, Room 338  
Lexington, Kentucky 40507  
859-258-3323  
[smiller@lexingtonky.gov](mailto:smiller@lexingtonky.gov)

**12. PRE-BID MEETING**

A non-mandatory pre-bid meeting will be held December 4, 2019, 3:00 pm, 200 E Main St, Lexington, KY.

END OF SECTION

**PART II**  
**INFORMATION FOR BIDDERS**

**INDEX**

1.	RECEIPT AND OPENING OF BIDS .....	IB-2
2.	PREPARATION OF BID.....	IB-2
3.	SUBCONTRACTS.....	IB-2
4.	QUALIFICATION OF BIDDER .....	IB-3
5.	BID SECURITY .....	IB-4
6.	LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT.....	IB-4
7.	TIME OF COMPLETION AND LIQUIDATED DAMAGES.....	IB-4
8.	EXAMINATION OF CONTRACT DOCUMENTS AND SITE.....	IB-4
9.	ADDENDA AND INTERPRETATIONS .....	IB-5
10.	SECURITY FOR FAITHFUL PERFORMANCE .....	IB-5
11.	POWER OF ATTORNEY .....	IB-6
12.	TAXES AND WORKMEN'S COMPENSATION .....	IB-6
13.	LAWS AND REGULATIONS .....	IB-6
14.	EROSION AND SEDIMENT CONTROL AND PERMITS .....	IB-6
15.	PREVAILING WAGE LAW .....	IB-6
16.	AFFIRMATIVE ACTION PLAN.....	IB-6
17.	CONTRACT TIME.....	IB-7
18.	SUBSTITUTION OR "OR-EQUAL" ITEMS .....	IB-7
19.	ALTERNATE BIDS.....	IB-7
20.	SIGNING OF AGREEMENT .....	IB-8
21.	ASSISTANCE TO BE OFFERED TO DBE CONTRACTORS.....	IB-8
22.	LFUCG NON-APPROPRIATION CLAUSE.....	IB-10

## PART II

### INFORMATION FOR BIDDERS

#### 1. **RECEIPT AND OPENING OF BIDS**

The Lexington-Fayette Urban County Government (herein called the OWNER) invites bids from firms on the project described in the Advertisement for Bids. The OWNER will receive bids at the Division of Purchasing, at the time and in the manner set forth in the Advertisement for Bids, and the Bids will then be publicly opened and read aloud. The OWNER may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 60 days after the actual time and date of the bid opening, but OWNER may, in its sole discretion, release any bid and return the Bid Security prior to that date.

The Lexington-Fayette Urban County Government assumes no responsibility for bids that are not addressed and delivered as indicated above. Bids that are not delivered to the Division of Central Purchasing by the stated time and date will be rejected.

#### 2. **PREPARATION OF BID**

Each bid must be submitted on the prescribed Form of Proposal. All blank spaces for the bid prices must be filled in, either in ink or typewritten, for both unit prices and extensions. Totals for each bid item must be added to show the total amount of the bid. Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, their address, the name of the project, the invitation number and time and date for which the bid is submitted. Bids must be addressed to the Director of Purchasing, Lexington-Fayette Urban County Government, Third Floor, 200 East Main Street, Lexington, Kentucky 40507. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified above.

#### 3. **SUBCONTRACTS**

The bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the OWNER. All proposed subcontractors must be identified on the Form of Proposal. Prior to the award of Contract, the OWNER or the OWNER'S representative will advise the CONTRACTOR of the acceptance and approval thereof or of any action necessary to be taken. Should any Subcontractor be rejected by the OWNER, the CONTRACTOR shall present a new name and/or firm to the OWNER at no change in the Contract Price.

#### 4. QUALIFICATION OF BIDDER

The OWNER may make such investigations as the OWNER deems necessary to determine the ability of the bidder to perform the Work, and the bidder shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the OWNER that such bidder is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein. Conditional bids will not be accepted.

In evaluating Bids, OWNER shall consider the qualifications of the BIDDERS, whether or not the Bids comply with the prescribed requirements, and alternatives and unit prices, as requested. OWNER may consider maintenance requirements, performance data, and disruption or damage to private property. It is OWNER'S intent to accept alternatives, if requested by the bid forms, in the order in which they are listed in the Bid Form but OWNER may accept or decline them in any order or combination. The contract, if awarded, will be awarded to the lowest, qualified, responsible BIDDER based upon OWNER'S evaluation which indicates that the award will be in the best interest of OWNER and the general public.

In the event there is any question as to the bidder's qualifications and ability to complete the work, a final determination will be made in accordance with a fair evaluation by the Urban County Government of the above listed elements.

- A. If the OWNER requires filling out a detailed financial statement, the bidder may provide its current certified financial statement(s) for the required time interval.
- B. Corporate firms are required to be registered and in good standing with the requirements and provisions of the Office of the Secretary of State, Commonwealth of Kentucky.
- C. Documents Required of CONTRACTOR - (1) A sworn statement signed by the President or owner of the Company regarding all current work in progress anywhere; (2) A document showing the percent of completion of each project and the total worth of each project; and (3) Documentation showing the percentage of the DBE employment levels on each project of the Bidder's current work force, and DBE participation levels for Subcontractors.
- D. Optional OWNER Requirements - The OWNER, at its discretion, may require the BIDDER/CONTRACTOR to provide: (1) a current detailed financial statement for a period including up to 3 prior years; (2) financial security or insurance in amounts and kinds acceptable to the OWNER to meet the financial responsibility requirements for the CONTRACTOR to indemnify the OWNER. (3) Additional information and/or DBE work force data, as well as DBE participation data.

**Each bidder agrees to waive any claim it has or may have against the Owner, the Consultant, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any bid.**

**5. BID SECURITY**

- A. Each bid must be accompanied by a bid bond prepared on a Form of Bid Bond and attached hereto, duly executed by the bidder as principal and having as surety thereon a surety company approved by the OWNER, in the amount of 5% of the bid. Such bid bond will be returned to the unsuccessful bidder(s) only upon written request to the Director of Central Purchasing within seven (7) days of opening of bids. Bid bond shall be made payable to the Lexington-Fayette Urban County Government. Bid security is not required for projects under \$50,000.
- B. Bonds shall be placed with an agent licensed in Kentucky with surety authorized to do business within the state. When the premium is paid for such coverage, the full commission payable shall be paid to such local agent who shall not divide such commission with any person other than a duly licensed resident local agent.

**6. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT**

The successful bidder, upon his failure or refusal to execute and deliver the Contract and bonds required within ten (10) days after he has received notice of the acceptance of his bid, shall forfeit to the OWNER, as liquidated damages for such failure or refusal, the security deposited with his bid.

**7. TIME OF COMPLETION AND LIQUIDATED DAMAGES**

Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" from the OWNER and to fully complete the Project within the time as specified in the Contract. Bidder must agree also to pay \$250.00 per day thereafter deadline for final completion.

**8. EXAMINATION OF CONTRACT DOCUMENTS AND SITE**

- A. It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site(s) to become familiar with local conditions that may affect cost, progress, performance or furnishing of the work, (c) consider Federal, State and Local laws and regulations that may affect cost, progress, performance or furnishing of the work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Consultant of all conflicts, errors or discrepancies in the Contract Documents.
- B. Bidders should examine the requirements of section 4 of the General Conditions for information pertaining to subsurface conditions, underground structures, underground facilities, and availability of lands, easements, and rights-of-way. The completeness of data, presented in the Contract Documents, pertaining to subsurface conditions, underground structures, and underground facilities for the purposes of bidding or construction is not assured. The Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical

conditions (surface and subsurface) which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents. On request in advance, OWNER will provide access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a bid. Bidder shall fill all holes, clean up and restore the site to its former condition upon completion of such explorations.

- C. The submission of a Bid will constitute an incontrovertible representation by the Bidder that Bidder has complied with every requirement of this paragraph 8; that without exception the Bid is premised upon furnishing and performing the Work required by the Contract Documents and such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents; and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## 9. **ADDENDA AND INTERPRETATIONS**

No interpretation of the meaning of the Contract Documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to Central Purchasing, who in turn will have an Addendum issued for the Lexington-Fayette Urban County Government, and to be given consideration must be received prior to the Q&A deadline. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications. Acknowledgement of the receipt of addenda must be included with all submitted bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Contract Documents.

## 10. **SECURITY FOR FAITHFUL PERFORMANCE**

- A. Simultaneously with his delivery of the executed Contracts, the CONTRACTOR shall furnish a surety bond or bonds as security for the faithful performance of this Contract and for payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract, as specified in the General Conditions. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the OWNER and authorized to do business in the Commonwealth of Kentucky.
- B. All bonds required by this Contract and laws of this State shall be placed with agents licensed in the State of Kentucky. When the premium is paid for such coverage's, the full commission shall be paid to such local agent who shall not divide such commission with any person other than a duly licensed resident local agent.
- C. **Contractor shall use standard Performance and Payment Bond forms such as documents provided with this contract book or AIA form A312-1984 (or later). Each document will be for 100% of the Contract Bid Amount.**



**11. POWER OF ATTORNEY**

Attorney-in-fact who signs bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

**12. TAXES AND WORKMEN'S COMPENSATION**

The CONTRACTOR and subcontractor will be required to accept liability for payment of all payroll taxes, sales and use tax, and all other taxes or deductions required by local, state or federal law, such as old age pension, social security, or annuities measured by wages. Each shall carry Workmen's Compensation Insurance to the full amounts as required by Statutes and shall include the cost of all foregoing items in the proposal. The CONTRACTOR will not otherwise be reimbursed or compensated for such tax payments. The CONTRACTOR is urged to ascertain at his own risk his actual tax liability in connection with the execution or performance of his Contract.

**13. LAWS AND REGULATIONS**

The bidder's attention is directed to the fact that all applicable state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout, and they will be deemed to be included in the contract, the same as though herein written out in full.

**14. EROSION AND SEDIMENT CONTROL AND PERMITS**

The CONTRACTOR and Subcontractors performing work on projects on behalf of the OWNER shall also comply with all applicable federal, state, and local environmental regulations and all requirements and conditions set forth in "special" permits including but not limited to Corp of Engineers 404 permits, 401 Water Quality Certifications, Stream Crossing and Floodplain Encroachment Permits as described in Part 4 General Conditions Paragraph 5.17.

**15. PREVAILING WAGE LAW AND MINIMUM HOURLY RATES**

Federal wage rates and regulations, if required for this Project, will be as described in the Special Conditions and appendices.

**16. AFFIRMATIVE ACTION PLAN**

The successful Bidder must submit with their bid, the following items to the Urban County Government:

1. Affirmative Action Plan of the firm
2. Current Work Force Analysis Form
3. Good Faith Effort Documentation

4. List of Disadvantaged Business Enterprise Subcontractors and the Dollar Value of each Subcontract

A Work Force Analysis Form shall be submitted for each Contract. Failure to submit these items as required herein may result in disqualification of the Bidder from award of the Contract.

All submissions should be directed to:

Director, Division of Central Purchasing  
Lexington-Fayette Urban County Government  
200 East Main Street, Third Floor  
Lexington, KY 40507

**17. CONTRACT TIME**

The number of calendar days within which the Work is to be substantially completed and ready for final payment (the Contract Time) is set forth in the Form of Proposal and the Agreement.

**18. SUBSTITUTE OR "OR-EQUAL" ITEMS**

The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by the CONTRACTOR if acceptable to the CONSULTANT and OWNER, application for such acceptance will not be considered by the CONSULTANT and OWNER until after the effective date of the Agreement. The procedure for submission of any such application by the CONTRACTOR and consideration by the CONSULTANT and OWNER is set forth in the General Conditions.

**19. ALTERNATE BIDS**

**Bidders shall submit alternate bids/proposals only if and when such alternate bids/proposals have been specifically requested in an Invitation for Bids.** If alternate bids/proposals are requested in an Invitation for Bids, the form of submission of such alternate bid and the conditions under which such alternate bids will be considered for award of a contract will be established in the Invitation.

Any Bidder who submits a bid incorporating an alternate proposal when alternate bids/proposals have not been requested in the Invitation for Bids shall have his/her bid rejected as non-responsive.

Any Bidder who submits a bid incorporating two (2) or more prices for an item or groups of items (unless such method of pricing is requested in the Invitation for Bids), or which imposes conditions for acceptance other than those established in the Invitation for Bids, shall have their bid rejected as non-responsive.

**20. SIGNING OF AGREEMENT**

When OWNER gives a Notice of Award to the successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within ten days thereafter, CONTRACTOR shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER with the required Bonds, Certificate of Insurance, and Power of Attorney. The OWNER will deliver one fully signed counterpart to CONTRACTOR at such time as it has been signed by the Mayor.

**21. ASSISTANCE TO BE OFFERED TO DISADVANTAGED BUSINESS ENTERPRISE (MWDDBE) CONTRACTORS AND VETERAN OWNED SMALL BUSINESSES**

**A. Outreach for MWDDBE(s) and Veteran Owned Small Businesses (VOSB)**

The Lexington-Fayette Urban County Government (LFUCG) maintains a database of MWDDBE contractors and Veteran Owned Small Businesses. When a LFUCG construction project is advertised for bidding, notices are sent to companies registered at <https://lexingtonky.ionwave.net>. The notices describe the project and indicate the deadline for submitting bids.

If you wish to be added to the LFUCG MWDDBE contractor database, please contact:

Sherita Miller, Division of Central Purchasing  
Lexington-Fayette Urban County Government  
200 East Main Street, Room 338  
Lexington, Kentucky 40507  
[smiller@lexingtonky.gov](mailto:smiller@lexingtonky.gov)

B. Bid Bond Assistance for MWDBE(s)

For those MWDBE contractors who wish to bid on LFUCG project, bid bond assistance is available. This bid bond assistance is in the form of a "Letter of Certification" which is accepted by the LFUCG's Division of Purchasing, in lieu of a bid bond. The "Letter of Certification" must be included in the bid package when it is submitted to the Division of Purchasing. The "Letter of Certification" will reference the specific project for which the bid is being submitted, and the time and date on which the bid is due. Bid bond assistance must be requested from the Lexington-Fayette Urban County Government's Division of Central Purchasing.

C. Eligibility for Bid Bond Assistance for MWDBE(s)

In order to be eligible for any Bid bonding assistance, a MWDBE construction company must be owned or controlled at the level of 51% or more by a member or members of a minority group or females. Prior to receiving assistance, a statement providing evidence of ownership and control of the company by a member or members of a minority group or females must be signed by the Owner or corporate officer and by an attorney or accountant submitted to:

Sherita Miller, Division of Central Purchasing  
Lexington-Fayette Urban County Government  
200 East Main Street, Room 338  
Lexington, Kentucky 40507  
[smiller@lexingtonky.gov](mailto:smiller@lexingtonky.gov)

D. MWDBE and Veteran Subcontractors

The LFUCG will, upon request, assist prime contractors in the procurement of eligible DBE subcontractors in an effort to achieve a 10% minimum MWDBE and a 3% minimum Veteran goal.

For a list of eligible subcontractors, please contact:

Sherita Miller, Division of Central Purchasing  
Lexington-Fayette Urban County Government  
200 East Main Street, Room 338  
Lexington, Kentucky 40507  
[smiller@lexingtonky.gov](mailto:smiller@lexingtonky.gov)

## **22. LFUCG NON-APPROPRIATION CLAUSE**

Contractor acknowledges that the LFUCG is a governmental entity, and the contract validity is based upon the availability of public funding under the authority of its statutory mandate.

In the event that public funds are unavailable and not appropriated for the performance of the LFUCG's obligations under this contract, then this contract shall automatically expire without penalty to the LFUCG thirty (30) days after written notice to Contractor of the unavailability and non-appropriation of public funds. It is expressly agreed that the LFUCG shall not activate this non-appropriation provision for its convenience or to circumvent the requirements of this contract, but only as an emergency fiscal measure during a substantial fiscal crisis, which affects generally its governmental operations.

In the event of a change in the LFUCG's statutory authority, mandate and mandated functions, by state and federal legislative or regulatory action, which adversely affects the LFUCG's authority to continue its obligations under this contract, then this contract shall automatically terminate without penalty to the LFUCG upon written notice to Contractor of such limitation or change in the LFUCG's legal authority.

END OF SECTION

**PART III**  
**FORM OF PROPOSAL**

**INDEX**

1.	FORM OF PROPOSAL .....	P-2
2.	LEGAL STATUS OF BIDDER.....	P-4
3	BIDDERS AFFIDAVIT .....	P-5
4.	BID SCHEDULE – SCHEDULE OF VALUES .....	P-6
5.	STATEMENT OF BIDDER'S QUALIFICATIONS .....	P-8
6.	LIST OF PROPOSED SUBCONTRACTORS .....	P-11
7.	LEXINGTON FAYETTE URBAN COUNTY GOVERNMENT MWDDBE PARTICIPATION GOALS, FORMS, AND GOOD FAITH EFFORTS .....	P-12
8.	AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST.....	P-24
9.	STATEMENT OF EXPERIENCE.....	P-25
10.	EQUAL OPPORTUNITY AGREEMENT.....	P-27
11.	EQUAL EMPLOYMENT OPPORTUNITY AFFIRMATIVE ACTION POLICY .....	P-31
12.	WORKFORCE ANALYSIS .....	P-32
13.	EVIDENCE OF INSURABILITY .....	P-33
14.	DEBARRED FIRMS.....	P-34
15.	DEBARRED CERTIFICATION .....	P-35

**PART III**

---

**Invitation to Bid No. 123-2019**

**Boiler Replacement Project**

**1. FORM OF PROPOSAL**

Place: Lexington, Kentucky

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

The following Form of Proposal shall be followed exactly in submitting a proposal for this Work.

This Proposal Submitted by \_\_\_\_\_

\_\_\_\_\_  
(Name and Address of Bidding Contractor)

(Hereinafter called "Bidder"), organized and existing under the laws of the State of \_\_\_\_\_, doing business as \_\_\_\_\_  
"a corporation," "a partnership", or an "individual" as applicable.

To: Lexington-Fayette Urban County Government  
(Hereinafter called "OWNER")  
Office of the Director of Purchasing  
200 East Main Street, 3rd Floor  
Lexington, KY 40507

Gentlemen:

The Bidder, in compliance with your Invitation for Bids for **Boiler Replacement Project** having examined the Plans and Specifications with related documents, having examined the site for proposed Work, and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the Project in accordance with the Contract Documents, within the time set forth therein, and at the lump sum and/or unit prices stated hereinafter. These prices are to cover all expenses incurred in performing the Work required under the Contract Documents, of which this proposal is a part. The OWNER will issue work orders for work to be performed under this Contract.

The Bidder hereby acknowledges receipt of the following addenda:

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_ Date \_\_\_\_\_

Insert above the number and the date of any Addendum issued and received. If none has been issued and received, the word "NONE" should be inserted.



2. **LEGAL STATUS OF BIDDER**

Bidder \_\_\_\_\_

Date \_\_\_\_\_

- \* 1. A corporation duly organized and doing business under the laws of the State of \_\_\_\_\_, for whom \_\_\_\_\_, bearing the official title of \_\_\_\_\_, whose signature is affixed to this Bid/Proposal, is duly authorized to execute contracts.
- \* 2. A Partnership, all of the members of which, with addresses are: (Designate general partners as such)

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

- \* 3. An individual, whose signature is affixed to this Bid/Proposal (please print name)

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

\*(The Bidder shall fill out the appropriate form and strike out the other two.)

3. **BIDDERS AFFIDAVIT**

Comes the Affiant, \_\_\_\_\_, and after being first duly sworn, states under penalty of perjury as follows:

1. His/her name is \_\_\_\_\_ and he/she is the individual submitting the bid or is the authorized representative of \_\_\_\_\_, the entity submitting the bid (hereinafter referred to as "Bidder").
  2. Bidder will pay all taxes and fees, which are owed to the Lexington-Fayette Urban County Government at the time the bid is submitted, prior to award of the contract and will maintain a "current" status in regard to those taxes and fees during the life of the contract.
  3. Bidder will obtain a Lexington-Fayette Urban County Government business license, if applicable, prior to award of the contract.
  4. Bidder has authorized the Division of Central Purchasing to verify the above-mentioned information with the Division of Revenue and to disclose to the Urban County Council that taxes and/or fees are delinquent or that a business license has not been obtained.
  5. Bidder has not knowingly violated any provision of the campaign finance laws of the Commonwealth of Kentucky within the past five (5) years and the award of a contract to the Bidder will not violate any provision of the campaign finance laws of the Commonwealth.
  6. Bidder has not knowingly violated any provision of Chapter 25 of the Lexington-Fayette Urban County Government Code of Ordinances, known as the "Ethics Act."
  7. Bidder acknowledges that "knowingly" for purposes of this Affidavit means, with respect to conduct or to circumstances described by a statute or ordinance defining an offense, that a person is aware or should have been aware that his conduct is of that nature or that the circumstance exists.
- Further, Affiant sayeth naught.

\_\_\_\_\_  
(Affiant)

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

The foregoing instrument was subscribed, sworn to and acknowledged before me by

\_\_\_\_\_ on this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

My Commission expires: \_\_\_\_\_

\_\_\_\_\_  
NOTARY PUBLIC, STATE AT LARGE

**4. BID SCHEDULE – SCHEDULE OF VALUES**

The Bidder agrees to perform all the Work described in the Specifications and shown on the Plans for the following proposed lump sum and/or unit prices, if applicable, which shall include the furnishing of all labor, materials, supplies, equipment and/or vehicle usage, services, all items of cost, overhead, taxes (federal, state, local), and profit for the Contractor and any Subcontractor involved, within the time set forth herein. If unit prices are applicable, Bidder must make the extensions and additions showing the total amount of bid.

Form of proposal must include unit bid prices written in words, unit price written in numbers and total amount bid (unit price x quantity) per line item OR bid may be considered non-responsive. In case of price discrepancy, unit bid price written in words will prevail followed by unit price written in numbers then total amount bid per line item.

If a discrepancy between the unit price and the item total exists, the unit price prevails except:

If the unit price is illegible, omitted, or the same as the item total, item total prevails and the unit price is the quotient of the item total and the quantity.

If the unit price and the item total are illegible or are omitted, the bid may be determined nonresponsive. If a lump sum total price is illegible or is omitted, the bid may be determined nonresponsive.

For a lump sum based bid, the item total is the bid amount the Division uses for bid comparison.

For a unit price based bid, the sum of the item totals is the bid amount the Division uses for bid comparison.

The LFUCG's decision on the bid amount is final.

Item No.	Description w/Unit Bid Price Written in Words	Unit	Total Bid Amount
1.	Replace existing boilers at Fleet Management, Carnegie Center, and Government Center Annex as per specs and plans for  _____ Dollars  _____ Cents	LS	\$ _____

### LIST OF UNIT PRICES

The following List of Unit Prices is required by the Owner to be completely executed and submitted with each Bidder's Proposal. Each unit price shall include the furnishing of all labor, materials, supplies and services, and shall include all items of cost, overhead and profit for the Contractor and any Sub-Contractors involved, and shall be used uniformly, without modification, for either additions or deductions from the Bid. These unit prices as established shall also be used to determine the equitable adjustment of the Contract Price in connection with changes, or extra work performed under the Contract. The "Rules of Measurement" set forth in the Special Conditions shall govern where volume units are concerned.

DESCRIPTION OF WORK	UNIT PRICE
1. Single 115V circuit with 50' of conduit/wire and connection to existing breaker	\$ _____ ls

Submitted by:

\_\_\_\_\_  
*Firm*

\_\_\_\_\_  
*Address*

\_\_\_\_\_  
*City, State & Zip*

***Bid must be signed:  
(original signature)***

\_\_\_\_\_  
***Signature of Authorized Company Representative – Title***

\_\_\_\_\_  
*Representative/s Name (Typed or Printed)*

\_\_\_\_\_  
*Area Code – Phone – Extension*

\_\_\_\_\_  
*Fax #*

\_\_\_\_\_  
*E-Mail Address*

**OFFICIAL ADDRESS:**

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

(Seal if Bid is by Corporation)

**By signing this form you agree to ALL terms, conditions, and associated forms in this bid package**

**5. STATEMENT OF BIDDER'S QUALIFICATIONS**

The following statement of the Bidder's qualifications is required to be filled in, executed, and submitted with the Proposal:

- 1. Name of Bidder: \_\_\_\_\_
- 2. Permanent Place of Business: \_\_\_\_\_
- 3. When Organized: \_\_\_\_\_
- 4. Where Incorporated: \_\_\_\_\_
- 5. Construction Plant and Equipment Available for this Project:

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

(Attach Separate Sheet If Necessary)

- 6. Financial Condition:

If specifically requested by the OWNER, the apparent low Bidder is required to submit its latest three (3) years audited financial statements to the OWNER'S Division of Central Purchasing within seven (7) calendar days following the bid opening.

- 7. In the event the Contract is awarded to the undersigned, surety bonds will be furnished by:

\_\_\_\_\_ (Surety)

Signed: \_\_\_\_\_ (Representative of Surety)

- 8. The following is a list of similar projects performed by the Bidder: (Attach separate sheet if necessary).

<u>NAME</u>	<u>LOCATION</u>	<u>CONTRACT SUM</u>

9. The Bidder has now under contract and bonded the following projects:

<u>NAME</u>	<u>LOCATION</u>	<u>CONTRACT SUM</u>

10. List Key Bidder Personnel who will work on this Project.

<u>NAME</u>	<u>POSITION DESCRIPTION</u>	<u>NO. OF YEARS WITH BIDDER</u>

11. DBE Participation on current bonded projects under contract:

<u>SUBCONTRACTORS</u> <u>(LIST)</u>	<u>PROJECT</u> <u>(SPECIFIC TYPE)</u>	<u>DBE</u>	<u>% of WORK</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(USE ADDITIONAL SHEETS IF NECESSARY)

12. We acknowledge that, if we are the apparent low Bidder, we may be required to submit to the OWNER within 7 calendar days following the Bid Opening, a sworn statement regarding all current work on hand and under contract, and a statement on the OWNER'S form of the experience of our officers, office management and field management personnel. Additionally, if requested by the OWNER, we will within 7 days following the request submit audited financial statements and loss history for insurance claims for the 3 most recent years (or a lesser period stipulated by the OWNER).



**6. LIST OF PROPOSED SUBCONTRACTORS**

The following list of proposed subcontractors is required by the OWNER to be executed, completed and submitted with the BIDDER'S FORM OF PROPOSAL. All subcontractors are subject to approval of the Lexington-Fayette Urban County Government. Failure to submit this list completely filled out may be cause for rejection of bid.

<b><u>BRANCH OF WORK - LIST EACH MAJOR ITEM</u></b> Such as: Grading, bituminous paving, concrete, seeding and protection, construction staking, etc.	<b><u>SUBCONTRACTOR</u></b>	<b><u>DBE</u></b> <b><u>Yes/No</u></b>	<b><u>% of Work</u></b>
1. _____	Name: _____	_____	_____
	Address: _____		
2. _____	Name: _____	_____	_____
	Address: _____		
3. _____	Name: _____	_____	_____
	Address: _____		
4. _____	Name: _____	_____	_____
	Address: _____		

**LIST OF PROPOSED MATERIALS/MANUFACTURER**

**MANUFACTURER'S REPRESENTATIVE FIRM**

1. _____	Name: _____	_____	_____
	Address: _____		

(Attach additional sheet(s) if necessary.)

**7. Lexington-Fayette Urban County Government  
MWDBE PARTICIPATION GOALS**

**A. GENERAL**

- 1) The LFUCG request all potential contractors to make a concerted effort to include Minority-Owned (MBE), Woman-Owned (WBE), Disadvantaged (DBE) Business Enterprises and Veteran-Owned Small Businesses (VOSB) as subcontractors or suppliers in their bids.
- 2) Toward that end, the LFUCG has established 10% of total procurement costs as a Goal for participation of Minority-Owned, Woman-Owned and Disadvantaged Businesses on this contract.
- 3) **It is therefore a request of each Bidder to include in its bid, the same goal (10%) for MWDBE participation and other requirements as outlined in this section.**
- 4) The LFUCG has also established a 3% of total procurement costs as a Goal for participation for of Veteran-Owned Businesses.
- 5) **It is therefore a request of each Bidder to include in its bid, the same goal (3%) for Veteran-Owned participation and other requirements as outlined in this section.**

**B. PROCEDURES**

- 1) The successful bidder will be required to report to the LFUCG, the dollar amounts of all payments submitted to Minority-Owned, Woman-Owned or Veteran-Owned subcontractors and suppliers for work done or materials purchased for this contract. (See Subcontractor Monthly Payment Report)
- 2) Replacement of a Minority-Owned, Woman-Owned or Veteran-Owned subcontractor or supplier listed in the original submittal must be requested in writing and must be accompanied by documentation of Good Faith Efforts to replace the subcontractor / supplier with another MWDBE Firm; this is subject to approval by the LFUCG. (See LFUCG MWDBE Substitution Form)
- 3) For assistance in identifying qualified, certified businesses to solicit for potential contracting opportunities, bidders may contact:
  - a) The Lexington-Fayette Urban County Government, Division of Central Purchasing (859-258-3320)
- 4) The LFUCG will make every effort to notify interested MWDBE and Veteran-Owned subcontractors and suppliers of each Bid Package, including information on the scope of work, the pre-bid meeting time and location, the bid date, and all other pertinent information regarding the project.

**C. DEFINITIONS**

- 1) A Minority-Owned Business Enterprise (MBE) is defined as a business which is certified as being at least 51% owned, managed and controlled by persons of African American, Hispanic, Asian, Pacific Islander, American Indian or Alaskan Native Heritage.
- 2) A Woman-Owned Business Enterprise (WBE) is defined as a business which is certified as being at least 51% owned, managed and controlled by one or more women.

- 3) A Disadvantaged Business (DBE) is defined as a business which is certified as being at least 51% owned, managed and controlled by a person(s) that are economically and socially disadvantaged.
- 4) A Veteran-Owned Small Business (VOSB) is defined as a business which is certified as being at least 51% owned, managed and controlled by a veteran and/or a service disabled veteran.
- 5) Good Faith Efforts are efforts that, given all relevant circumstances, a bidder or proposer actively and aggressively seeking to meet the goals, can reasonably be expected to make. In evaluating good faith efforts made toward achieving the goals, whether the bidder or proposer has performed the efforts outlined in the Obligations of Bidder for Good Faith Efforts outlined in this document will be considered, along with any other relevant factors.

#### D. OBLIGATION OF BIDDER FOR GOOD FAITH EFFORTS

- 1) **The bidder shall make a Good Faith Effort to achieve the Participation Goal for MWDBE and Veteran-Owned subcontractors/suppliers. The failure to meet the goal shall not necessarily be cause for disqualification of the bidder; however, bidders not meeting the goal are required to furnish with their bids written documentation of their Good Faith Efforts to do so.**
- 2) Award of Contract shall be conditioned upon satisfaction of the requirements set forth herein.
- 3) The Form of Proposal includes a section entitled "MWDBE Participation Form". The applicable information must be completed and submitted as outlined below.
- 4) **Failure to submit this information as requested may be cause for rejection of bid or delay in contract award.**

#### E. DOCUMENTATION REQUIRED FOR GOOD FAITH EFFORTS

- 1) Bidders reaching the Goal are required to submit only the MWDBE Participation Form." The form must be fully completed including names and telephone number of participating MWDBE firm(s); type of work to be performed; estimated value of the contract and value expressed as a percentage of the total Lump Sum Bid Price. The form must be signed and dated, and is to be submitted with the bid.
- 2) Bidders not reaching the Goal must submit the "MWDBE Participation Form", the "Quote Summary Form" and a written statement documenting their Good Faith Effort to do so. If bid includes no MWDBE and/or Veteran participation, bidder shall enter "None" on the subcontractor / supplier form). In addition, the bidder must submit written proof of their Good Faith Efforts to meet the Participation Goal:
  - a. Advertised opportunities to participate in the contract in at least two (2) publications of general circulation media; trade and professional association publications; small and minority business or trade publications; and publications or trades targeting minority, women and disadvantaged businesses not less than fifteen (15) days prior to the deadline for submission of bids to allow MWDBE firms and Veteran-Owned businesses to participate.
  - b. Included documentation of advertising in the above publications with the bidders good faith efforts package

- c. Attended LFUCG Central Purchasing Economic Inclusion Outreach event
- d. Attended pre-bid meetings that were scheduled by LFUCG to inform MWDBEs and/or Veteran-Owned businesses of subcontracting opportunities
- e. Sponsored Economic Inclusion event to provide networking opportunities for prime contractors and MWDBE firms and Veteran-Owned businesses.
- f. Requested a list of MWDBE and/or Veteran subcontractors or suppliers from LFUCG and showed evidence of contacting the companies on the list(s).
- g. Contacted organizations that work with MWDBE companies for assistance in finding certified MWDBE firms and Veteran-Owned businesses to work on this project. Those contacted and their responses should be a part of the bidder's good faith efforts documentation.
- h. Sent written notices, by certified mail, email or facsimile, to qualified, certified MWDBEs and/or Veteran-Owned businesses soliciting their participation in the contract not less than seven (7) days prior to the deadline for submission of bids to allow them to participate effectively.
- i. Followed up initial solicitations by contacting MWDBEs and Veteran-Owned Businesses to determine their level of interest.
- j. Provided the interested MWDBE firm and/or Veteran-Owned business with adequate and timely information about the plans, specifications, and requirements of the contract.
- k. Selected portions of the work to be performed by MWDBE firms and/or Veteran-Owned businesses in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate MWDBE and Veteran participation, even when the prime contractor may otherwise perform these work items with its own workforce
- l. Negotiated in good faith with interested MWDBE firms and Veteran-Owned businesses not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any rejection should be so noted in writing with a description as to why an agreement could not be reached.
- m. Included documentation of quotations received from interested MWDBE firms and Veteran-Owned businesses which were not used due to uncompetitive pricing or were rejected as unacceptable and/or copies of responses from firms indicating that they would not be submitting a bid.
- n. Bidder has to submit sound reasons why the quotations were considered unacceptable. The fact that the bidder has the ability and/or desire to perform the contract work with its own forces will not be considered a sound reason for rejecting a MWDBE and/or Veteran-Owned business's quote. Nothing in this provision shall be construed to require the bidder to accept unreasonable quotes in order to satisfy MWDBE and Veteran goals.

o. Made an effort to offer assistance to or refer interested MWDBE firms and Veteran-Owned businesses to obtain the necessary equipment, supplies, materials, insurance and/or bonding to satisfy the work requirements of the bid proposal

p. Made efforts to expand the search for MWBE firms and Veteran-Owned businesses beyond the usual geographic boundaries.

q. Other--any other evidence that the bidder submits which may show that the bidder has made reasonable good faith efforts to include MWDBE and Veteran participation.

**Note:** Failure to submit any of the documentation requested in this section may be cause for rejection of bid. Bidders may include any other documentation deemed relevant to this requirement which is subject to review by the MBE Liaison. Documentation of Good Faith Efforts must be submitted with the Bid, if the participation Goal is not met.



## MINORITY BUSINESS ENTERPRISE PROGRAM

Sherita Miller, MPA  
Minority Business Enterprise Liaison  
Division of Central Purchasing  
Lexington-Fayette Urban County Government  
200 East Main Street  
Lexington, KY 40507  
[smiller@lexingtonky.gov](mailto:smiller@lexingtonky.gov)  
859-258-3323

**OUR MISSION:** The mission of the Minority Business Enterprise Program is to facilitate the full participation of minority and women owned businesses in the procurement process and to promote economic inclusion as a business imperative essential to the long term economic viability of Lexington-Fayette Urban County Government.

To that end the city council adopted and implemented Resolution 484-2017 – A Certified Minority, Women and Disadvantaged Business Enterprise ten percent (10%) minimum goal and a three (3%) minimum goal for Certified Veteran-Owned Small Businesses and Certified Service Disabled Veteran – Owned Businesses for government contracts.

The resolution states the following definitions shall be used for the purposes of reaching these goals (a full copy is available in Central Purchasing):

***Certified Disadvantaged Business Enterprise (DBE)*** – a business in which at least fifty-one percent (51%) is owned, managed and controlled by a person(s) who is socially and economically disadvantaged as defined by 49 CFR subpart 26.

***Certified Minority Business Enterprise (MBE)*** – a business in which at least fifty-one percent (51%) is owned, managed and controlled by an ethnic minority (i.e. African American, Asian American/Pacific Islander, Hispanic Islander, Native American/Native Alaskan Indian) as defined in federal law or regulation as it may be amended from time-to-time.

***Certified Women Business Enterprise (WBE)*** – a business in which at least fifty-one percent (51%) is owned, managed and controlled by a woman.

***Certified Veteran-Owned Small Business (VOSB)*** – a business in which at least fifty-one percent (51%) is owned, managed and controlled by a veteran who served on active duty with the U.S. Army, Air Force, Navy, Marines or Coast Guard.

***Certified Service Disabled Veteran Owned Small Business (SDVOSB)*** – a business in which at least fifty-one percent (51%) is owned, managed and controlled by a disabled veteran who served on active duty with the U.S. Army, Air Force, Navy, Marines or Coast Guard.

The term “Certified” shall mean the business is appropriately certified, licensed, verified, or validated by an organization or entity recognized by the Division of Purchasing as having the appropriate credentials to make a determination as to the status of the business.

To comply with Resolution 484-2017, prime contractors and minority, women and veteran owned businesses must enroll in the new Diverse Business Management Compliance system, <https://lexingtonky.diversitycompliance.com/>

We have compiled the list below to help you locate certified MBE, WBE and DBE certified businesses. Below is a listing of contacts for LFUCG Certified MWDBEs and Veteran-Owned Small Businesses in (<https://lexingtonky.ionwave.net>)

<b>Business</b>	<b>Contact</b>	<b>Email Address</b>	<b>Phone</b>
<b>LFUCG</b>	Sherita Miller	<a href="mailto:smiller@lexingtonky.gov">smiller@lexingtonky.gov</a>	859-258-3323
<b>Commerce Lexington – Minority Business Development</b>	Tyrone Tyra	<a href="mailto:ttyra@commercelexington.com">ttyra@commercelexington.com</a>	859-226-1625
<b>Tri-State Minority Supplier Diversity Council</b>	Susan Marston	<a href="mailto:smarston@tsmsdc.com">smarston@tsmsdc.com</a>	502-365-9762
<b>Small Business Development Council</b>	Shawn Rogers UK SBDC	<a href="mailto:shawn.rogers@uky.edu">shawn.rogers@uky.edu</a>	859-257-7666
<b>Community Ventures Corporation</b>	Phyllis Alcorn	<a href="mailto:palcorn@cvky.org">palcorn@cvky.org</a>	859-231-0054
<b>KY Transportation Cabinet (KYTC)</b>	Melvin Bynes	<a href="mailto:Melvin.bynes2@ky.gov">Melvin.bynes2@ky.gov</a>	502-564-3601
<b>KYTC Pre-Qualification</b>	Shella Eagle	<a href="mailto:Shella.Eagle@ky.gov">Shella.Eagle@ky.gov</a>	502-782-4815
<b>Ohio River Valley Women's Business Council (WBENC)</b>	Sheila Mixon	<a href="mailto:smixon@orvwbc.org">smixon@orvwbc.org</a>	513-487-6537
<b>Kentucky MWBE Certification Program</b>	Yvette Smith, Kentucky Finance Cabinet	<a href="mailto:Yvette.Smith@ky.gov">Yvette.Smith@ky.gov</a>	502-564-8099
<b>National Women Business Owner's Council (NWBOC)</b>	Janet Harris-Lange	<a href="mailto:janet@nwbo.org">janet@nwbo.org</a>	800-675-5066
<b>Small Business Administration</b>	Robert Coffey	<a href="mailto:robertcoffey@sba.gov">robertcoffey@sba.gov</a>	502-582-5971
<b>LaVoz de Kentucky</b>	Andres Cruz	<a href="mailto:lavozdeky@yahoo.com">lavozdeky@yahoo.com</a>	859-621-2106
<b>The Key News Journal</b>	Patrice Muhammad	<a href="mailto:production@keynewsjournal.com">production@keynewsjournal.com</a>	859-685-8488





**LFUCG MWDBE PARTICIPATION FORM**  
**Bid/RFP/Quote Reference # \_\_\_\_\_**

The MWDBE and/or veteran subcontractors listed have agreed to participate on this Bid/RFP/Quote. If any substitution is made or the total value of the work is changed prior to or after the job is in progress, it is understood that those substitutions must be submitted to Central Purchasing for approval immediately. **Failure to submit a completed form may cause rejection of the bid.**

MWDBE Company, Name, Address, Phone, Email	MBE WBE or DBE	Work to be Performed	Total Dollar Value of the Work	% Value of Total Contract
1.				
2.				
3.				
4.				

The undersigned company representative submits the above list of MWDBE firms to be used in accomplishing the work contained in this Bid/RFP/Quote. Any misrepresentation may result in the termination of the contract and/or be subject to applicable Federal and State laws concerning false statements and false claims.

\_\_\_\_\_  
**Company**

\_\_\_\_\_  
**Company Representative**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Title**





## LFUCG MWDBE SUBSTITUTION FORM

Bid/RFP/Quote Reference # \_\_\_\_\_

The substituted MWDBE and/or veteran subcontractors listed below have agreed to participate on this Bid/RFP/Quote. These substitutions were made prior to or after the job was in progress. These substitutions were made for reasons stated below and are now being submitted to Central Purchasing for approval. By the authorized signature of a representative of our company, we understand that this information will be entered into our file for this project.

SUBSTITUTED MWDBE Company Name, Address, Phone, Email	MWDBE Formally Contracted/ Name, Address, Phone, Email	Work to Be Performed	Reason for the Substitution	Total Dollar Value of the Work	% Value of Total Contract
1.					
2.					
3.					
4.					

The undersigned acknowledges that any misrepresentation may result in termination of the contract and/or be subject to applicable Federal and State laws concerning false statements and false claims.

\_\_\_\_\_  
**Company**

\_\_\_\_\_  
**Company Representative**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Title**



**MWDBE QUOTE SUMMARY FORM**  
 Bid/RFP/Quote Reference # \_\_\_\_\_

The undersigned acknowledges that the minority and/or veteran subcontractors listed on this form did submit a quote to participate on this project. Failure to submit this form may cause rejection of the bid.

<b>Company Name</b>	<b>Contact Person</b>
<b>Address/Phone/Email</b>	<b>Bid Package / Bid Date</b>

MWDBE Company Address	Contact Person	Contact Information (work phone, Email, cell)	Date Contacted	Services to be performed	Method of Communication (email, phone meeting, ad, event etc)	Total dollars \$\$ Do Not Leave Blank (Attach Documentation)	MBE * AA HA AS NA Female	Veteran

(MBE designation / AA=African American / HA= Hispanic American/AS = Asian American/Pacific Islander/ NA= Native American)

The undersigned acknowledges that all information is accurate. Any misrepresentation may result in termination of the contract and/or be subject to applicable Federal and State laws concerning false statements and claims.

\_\_\_\_\_  
**Company**

\_\_\_\_\_  
**Company Representative**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Title**



## LFUCG SUBCONTRACTOR MONTHLY PAYMENT REPORT

The LFUCG has a 10% goal plan adopted by city council to increase the participation of minority and women owned businesses in the procurement process. The LFUCG also has a 3% goal plan adopted by cited council to increase the participation of veteran owned businesses in the procurement process. In order to measure that goal LFUCG will track spending with MWDDBE and Veteran contractors on a monthly basis. By the signature below of an authorized company representative, you certify that the information is correct, and that each of the representations set forth below is true. Any misrepresentation may result in termination of the contract and/or prosecution under applicable Federal and State laws concerning false statements and false claims. Please submit this form monthly to the Division of Central Purchasing/ 200 East Main Street / Room 338 / Lexington, KY 40507.

Bid/RFP/Quote # \_\_\_\_\_  
 Total Contract Amount Awarded to Prime Contractor for this Project \_\_\_\_\_

Project Name/ Contract #	Work Period/ From: _____ To: _____
Company Name:	Address: _____
Federal Tax ID:	Contact Person: _____

Subcontractor Vendor ID (name, address, phone, email)	Description of Work	Total Subcontract Amount	% of Total Contract Awarded to Prime for this Project	Total Amount Paid for this Period	Purchase Order number for subcontractor work (please attach PO)	Scheduled Project Start Date	Scheduled Project End Date

By the signature below of an authorized company representative, you certify that the information is correct, and that each of the representations set forth below is true. Any misrepresentations may result in the termination of the contract and/or prosecution under applicable Federal and State laws concerning false statements and false claims.

\_\_\_\_\_  
 Company

\_\_\_\_\_  
 Company Representative

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Title

**LFUCG STATEMENT OF GOOD FAITH EFFORTS**

**Bid/RFP/Quote #** \_\_\_\_\_

By the signature below of an authorized company representative, we certify that we have utilized the following Good Faith Efforts to obtain the maximum participation by MWDBE and Veteran-Owned business enterprises on the project and can supply the appropriate documentation.

\_\_\_\_\_ Advertised opportunities to participate in the contract in at least two (2) publications of general circulation media; trade and professional association publications; small and minority business or trade publications; and publications or trades targeting minority, women and disadvantaged businesses not less than fifteen (15) days prior to the deadline for submission of bids to allow MWDBE firms and Veteran-Owned businesses to participate.

\_\_\_\_\_ Included documentation of advertising in the above publications with the bidders good faith efforts package

\_\_\_\_\_ Attended LFUCG Central Purchasing Economic Inclusion Outreach event

\_\_\_\_\_ Attended pre-bid meetings that were scheduled by LFUCG to inform MWDBEs and/or Veteran-Owned Businesses of subcontracting opportunities

\_\_\_\_\_ Sponsored Economic Inclusion event to provide networking opportunities for prime contractors and MWDBE firms and Veteran-Owned businesses

\_\_\_\_\_ Requested a list of MWDBE and/or Veteran subcontractors or suppliers from LFUCG and showed evidence of contacting the companies on the list(s).

\_\_\_\_\_ Contacted organizations that work with MWDBE companies for assistance in finding certified MWBDE firms and Veteran-Owned businesses to work on this project. Those contacted and their responses should be a part of the bidder's good faith efforts documentation.

\_\_\_\_\_ Sent written notices, by certified mail, email or facsimile, to qualified, certified MWDBEs soliciting their participation in the contract not less than seven (7) days prior to the deadline for submission of bids to allow them to participate effectively.

\_\_\_\_\_ Followed up initial solicitations by contacting MWDBEs and Veteran-Owned businesses to determine their level of interest.

\_\_\_\_\_ Provided the interested MWBDE firm and/or Veteran-Owned business with adequate and timely information about the plans, specifications, and requirements of the contract.

\_\_\_\_\_ Selected portions of the work to be performed by MWDBE firms and/or Veteran-Owned businesses in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate MWDBE and Veteran participation, even when the prime contractor may otherwise perform these work

items with its own workforce

\_\_\_\_\_ Negotiated in good faith with interested MWDBE firms and Veteran-Owned businesses not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any rejection should be so noted in writing with a description as to why an agreement could not be reached.

\_\_\_\_\_ Included documentation of quotations received from interested MWDBE firms and Veteran-Owned businesses which were not used due to uncompetitive pricing or were rejected as unacceptable and/or copies of responses from firms indicating that they would not be submitting a bid.

\_\_\_\_\_ Bidder has to submit sound reasons why the quotations were considered unacceptable. The fact that the bidder has the ability and/or desire to perform the contract work with its own forces will not be considered a sound reason for rejecting a MWDBE and/or Veteran-Owned business's quote. Nothing in this provision shall be construed to require the bidder to accept unreasonable quotes in order to satisfy MWDBE and Veteran goals.

\_\_\_\_\_ Made an effort to offer assistance to or refer interested MWDBE firms and Veteran-Owned businesses to obtain the necessary equipment, supplies, materials, insurance and/or bonding to satisfy the work requirements of the bid proposal

\_\_\_\_\_ Made efforts to expand the search for MWBE firms and Veteran-Owned businesses beyond the usual geographic boundaries.

\_\_\_\_\_ Other--any other evidence that the bidder submits which may show that the bidder has made reasonable good faith efforts to include MWDBE and Veteran participation.

**NOTE: Failure to submit any of the documentation requested in this section may be cause for rejection of bid. Bidders may include any other documentation deemed relevant to this requirement which is subject to approval by the MBE Liaison. Documentation of Good Faith Efforts must be submitted with the Bid, if the participation Goal is not met.**

The undersigned acknowledges that all information is accurate. Any misrepresentations may result in termination of the contract and/or be subject to applicable Federal and State laws concerning false statements and claims.

\_\_\_\_\_  
Company

\_\_\_\_\_  
Date

\_\_\_\_\_  
Company Representative

\_\_\_\_\_  
Title

8. **AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION, NON-CONFLICT OF INTEREST**

I hereby swear (or affirm) under the penalty for false swearing:

1. That I am the Bidder (if the Bidder is an individual), a partner of the Bidder (if the Bidder is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the Bidder is a corporation);
2. That the attached bid has been arrived at by the Bidder independently, and has been submitted without collusion with, and without any agreement, understanding or planned common course of action, with any other contractor, vendor of materials, supplies, equipment or services described in the Invitation to Bid, designed to limit independent bidding or competition;
3. That the contents of the bid or bids have not been communicated by the Bidder or its employees or agents to any person not an employee or agent of the Bidder or its surety on any bond furnished, with the bid or bids, and will not be communicated to any such person, prior to the official opening of the bid or bids;
4. That the Bidder is legally entitled to enter into the contracts with the Lexington-Fayette Urban County Government, and is not in violation of any prohibited conflict of interest;
5. (Applicable to corporation only) That as a foreign corporation, we are registered with the Secretary of State, Commonwealth of Kentucky, and authorized to do business in the State \_\_\_\_\_ or, that as a domestic corporation, we are in good standing with the Secretary of State, Commonwealth of Kentucky \_\_\_\_\_. Check the statement applicable.
6. This offer is for 60 calendar days from the date this bid is opened. In submitting the above, it is expressly agreed that, upon proper acceptance by the Lexington-Fayette Urban County Government of any or all items bid above, a contract shall thereby be created with respect to the items accepted.
7. That I have fully informed myself regarding the accuracy of the statements made in this statement.
8. That I certify that Subcontractors have not and will not be awarded to any firm(s) that have been debarred from noncompliance with the Federal Labor Standards, Title VI of the Civil Rights Act of 1964 As Amended, Executive Order 11246 As Amended or any other Federal Law.

**9. STATEMENT OF EXPERIENCE**

NAME OF INDIVIDUAL: \_\_\_\_\_

POSITION/TITLE: \_\_\_\_\_

STATEMENT OF EXPERIENCE: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NAME OF INDIVIDUAL: \_\_\_\_\_

POSITION/TITLE: \_\_\_\_\_

STATEMENT OF EXPERIENCE: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NAME OF INDIVIDUAL: \_\_\_\_\_

POSITION/TITLE: \_\_\_\_\_

STATEMENT OF EXPERIENCE: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NAME OF INDIVIDUAL: \_\_\_\_\_

POSITION/TITLE: \_\_\_\_\_

STATEMENT OF EXPERIENCE: \_\_\_\_\_

---

---

NAME OF INDIVIDUAL: \_\_\_\_\_

POSITION/TITLE: \_\_\_\_\_

STATEMENT OF EXPERIENCE: \_\_\_\_\_

---

---

NAME OF INDIVIDUAL: \_\_\_\_\_

POSITION/TITLE: \_\_\_\_\_

STATEMENT OF EXPERIENCE: \_\_\_\_\_

---

---

\* Include all officers, office management's, Affirmative Action officials, and field management personnel. (Attach separate sheets if necessary.)



## 10. EQUAL OPPORTUNITY AGREEMENT

### Standard Title VI Assurance

The Lexington Fayette-Urban County Government, (hereinafter referred to as the "Recipient") hereby agrees that as a condition to receiving any Federal financial assistance from the U.S. Department of Transportation, it will comply with Title VI of the Civil Rights Act of 1964, 78Stat.252, 42 U.S.C. 2000d-4 (hereinafter referred to as the "Act"), and all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, (49 CFR, Part 21) Nondiscrimination in Federally Assisted Program of the Department of Transportation – Effectuation of Title VI of the Civil Rights Act of 1964 (hereinafter referred to as the "Regulations") and other pertinent directives, no person in the United States shall, on the grounds of race, color, national origin, sex, age (over 40), religion, sexual orientation, gender identity, veteran status, or disability be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Recipient receives Federal financial assistance from the U.S. Department of Transportation, including the Federal Highway Administration, and hereby gives assurance that will promptly take any necessary measures to effectuate this agreement. This assurance is required by subsection 21.7(a) (1) of the Regulations.

### The Law

- \* Title VII of the Civil Rights Act of 1964 (amended 1972) states that it is unlawful for an employer to discriminate in employment because of race, color, religion, sex, age (40-70 years) or national origin.
- \* Executive Order No. 11246 on Nondiscrimination under Federal contract prohibits employment discrimination by contractor and subcontractor doing business with the Federal Government or recipients of Federal funds. This order was later amended by Executive Order No. 11375 to prohibit discrimination on the basis of sex.
- \* Section 503 of the Rehabilitation Act of 1973 States:  
*The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap.*
- \* Section 2012 of the Vietnam Era Veterans Readjustment Act of 1973 requires Affirmative Action on behalf of disabled veterans and veterans of the Vietnam Era by contractors having Federal Contracts.
- \* Section 206 (A) of Executive Order 12086, Consolidation of Contract Compliance Functions for Equal Employment Opportunity, states:  
*The Secretary of Labor may investigate the employment practices of any Government contractor or sub-contractor to determine whether or not the contractual provisions specified in Section 202 of this order have been violated.*

The Lexington-Fayette Urban County Government practices Equal Opportunity in recruiting, hiring and promoting. It is the Government's intent to affirmatively provide employment opportunities for those individuals who have previously not been allowed to enter into the mainstream of society. Because of its importance to the local Government, this policy carries the full endorsement of the Mayor, Commissioners, Directors, and all supervisory personnel. In following this commitment to Equal Employment Opportunity and because the Government is

the benefactor of the Federal funds, it is both against the Urban County Government policy and illegal for the Government to let contracts to companies which knowingly or unknowingly practice discrimination in their employment practices. Violation of the above mentioned ordinances may cause a contract to be canceled and the contractor may be declared ineligible for future consideration.

Please sign this statement in the appropriate space acknowledging that you have read and understand the provisions contained herein. Return this document as part of your application packet.

### Bidders

I/We agree to comply with the Civil Rights Laws listed above that govern employment rights of minorities, women, Vietnam veterans, handicapped, and aged persons.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name of Business

The Entity (regardless of whether construction contractor, non-construction contractor or supplier) agrees to provide equal opportunity in employment for all qualified persons, to prohibit discrimination in employment because of race, color, religion, sex (including pregnancy, sexual orientation or gender identity), national origin, disability, age, genetic information, political affiliation, or veteran status, and to promote equal employment through a positive, continuing program from itself and each of its sub-contracting agents. This program of equal employment opportunity shall apply to every aspect of its employment policies and practices.

The Kentucky equal Employment Opportunity Act of 1978 (KRS 45.560-45.640) requires that any count, city, town, school district, water district, hospital district, or other political subdivision of the state shall include in directly or indirectly publicly funded contracts for supplies, materials, services, or equipment hereinafter entered into the following provisions:

During the performance of this contract, the contractor agrees as follows:

- (1) *The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age or national origin;*
- (2) *The contractor will state in all solicitations or advertisements for employees placed by or on behalf of the contractors that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age or national origin;*
- (3) *The contract will post notices in conspicuous places, available to employees and applicants for employment, setting forth the provisions of the non-discrimination clauses required by this section; and*
- (4) *The contractor will send a notice to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding advising the labor union or workers' representative of the contractor's commitments under the nondiscrimination clauses.*

The Act further provides:

KRS 45.610. Hiring minorities – Information required

- (1) *For the length of the contract, each contractor shall hire minorities from other sources within the drawing area, should the union with which he has collective bargaining agreements be unwilling to supply sufficient minorities to satisfy the agreed upon goals and timetable.*
- (2) *Each contractor shall, for the length of the contract, furnish such information as required by KRS 45.560 to KRS 45.640 and by such rules, regulations and orders issued pursuant thereto and will permit access to all books and records pertaining to his employment practices and work sites by the contracting agency and the department for purposes of investigation to ascertain compliance with KRS 45.560 to 45.640 and such rules, regulations and orders issued pursuant thereto.*

KRS 45.620. Action against contractor – Hiring of minority contractor or subcontractor

- (1) *If any contractor is found by the department to have engaged in an unlawful practice under this chapter during the course of performing under a contract or subcontract covered under KRS 45.560 to 45.640, the department shall so certify to the contracting agency and such certification shall be binding upon the contracting agency unless it is reversed in the course of judicial review.*
- (2) *If the contractor is found to have committed an unlawful practice under KRS 45.560 to 45.640, the contracting agency may cancel or terminate the contract, conditioned upon a program for future compliance approved by the contracting agency and the department. The contracting agency may declare such a contractor ineligible to bid on further contracts with that agency until such time as the contractor complies in full with the requirements of KRS 45.560 – 45.640.*
- (3) *The equal employment provisions of KRS 45.560 to 45.640 may be met in part by a contractor by subcontracting to a minority contractor or subcontractor. For the provisions of KRS 45.560 to 45.640, a minority contractor or subcontractor shall mean a business that is owned and controlled by one or more persons disadvantaged by racial or ethnic circumstances.*

KRS 45.630 Termination of existing employee not required, when

*Any provision of KRS 45.560 to 45.640 notwithstanding, no contractor shall be required to terminate an existing employee upon proof that that employee was employed prior to the date of the contract.*

KRS 45.640 Minimum skills

*Nothing in KRS 45.560 to 45.640 shall require a contractor to hire anyone who fails to demonstrate the minimum skills required to perform a particular job.*

It is recommended that all of the provisions quoted above to be included as special conditions in each contract. In the case of a contract exceeding \$250,000, the contractor is required to furnish evidence that his work-force in Kentucky is representative of the available work-force in the area from which he draws employees, or to supply an Affirmative Action plan which will achieve such representation during the life of the contract.

11. EQUAL EMPLOYMENT OPPORTUNITY AFFIRMATIVE ACTION POLICY

It is the policy of \_\_\_\_\_  
to assure that all applicants for employment and all employees are treated on a fair and equitable basis without regard to their race, religion, sex, color, handicap, natural origin or age.

Such action shall include employment, promotion, demotion, recruitment or recruitment advertising, layoff or termination, rates of pay and other forms of compensation, and selection for training, whether apprenticeship and/or on-the-job-training.

Furthermore, this company agrees to make special recruitment efforts to hire the protected class whenever feasible. This company also agrees to adhere to all applicable federal, state, and local laws relating to Equal Employment Opportunity for all individuals.

**12. WORKFORCE ANALYSIS FORM**

Name of Organization: \_\_\_\_\_

Categories	Total	White (Not Hispanic or Latino)		Hispanic or Latino		Black or African-American (Not Hispanic or Latino)		Native Hawaiian and Other Pacific Islander (Not Hispanic or Latino)		Asian (Not Hispanic or Latino)		American Indian or Alaskan Native (not Hispanic or Latino)		Two or more races (Not Hispanic or Latino)		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Administrators																	
Professionals																	
Superintendents																	
Supervisors																	
Foremen																	
Technicians																	
Protective Service																	
Para-Professionals																	
Office/Clerical																	
Skilled Craft																	
Service/Maintenance																	
<b>Total:</b>																	

Prepared by: \_\_\_\_\_  
(Name and Title)

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
Revised 2015-Dec-15

**13. EVIDENCE OF INSURABILITY**

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT CONSTRUCTION PROJECT  
(Use separate form for each Agency or Brokerage agreeing to provide coverage)

Names Insured: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Project to be insured: \_\_\_\_\_

Employee ID: \_\_\_\_\_  
 Phone: \_\_\_\_\_

In lieu of obtaining certificates of insurance at this time, the undersigned agrees to provide the above Named Insured with the minimum coverage listed below. These are outlined in the Insurance and Risk Management of Part V (Special Conditions), including all requirements, and conditions:

Section Items	Coverage	Minimum Limits and Policy Requirements	Limits Provided To Insured	Name of Insurer	A.M. Best's	
					Code	Rating
SC-3, Section 2, Part 4.1 – see provisions	CGL	\$1,000,000 per occ. And \$2,000,000 aggregate	\$			
SC-3, Section 2, Part 4.1 – see provisions	AUTO	\$1,000,000/per occ.	\$			
SC-3, Section 2, Part 4.1 – see provisions	WC	Statutory w /endorsement as noted	\$			

Section 2 includes required provisions, statements regarding insurance requirements, and the undersigned agrees to abide by all provisions for the coverage's checked above unless stated otherwise when submitting.

Agency or Brokerage \_\_\_\_\_  
 Street Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Telephone Number \_\_\_\_\_

\_\_\_\_\_  
 Name of Authorized Representative  
 \_\_\_\_\_  
 Title  
 \_\_\_\_\_  
 Authorized Signature  
 \_\_\_\_\_  
 Date

NOTE: Authorized signatures may be the agent's if agent has placed insurance through an agency agreement with the insurer. If insurance is brokered, authorized signature must be that of authorized representative of insurer.

**IMPORTANT: Contract may not be awarded if a completed and signed copy of this form for all coverage's listed above is not provided with the bid.**

**14. DEBARRED FIRMS**

**PROJECT NAME:** \_\_\_\_\_

**BID NUMBER:** \_\_\_\_\_

**LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT  
LEXINGTON, KY**

All prime Contractors shall certify that Subcontractors have not and will not be awarded to any firms that has been debarred for noncompliance with the Federal Labor Standards, Title VI of the Civil Rights Act of 1964 As Amended, Executive Order 11246 As Amended or any other Federal Law.

All bidders shall complete the attached certification in duplicate and submit both copies to the Owner with the bid proposal. The Owner (grantee) shall transmit one copy to the Lexington-Fayette Urban County Government, Division of Community Development, within fourteen (14) days after bid opening.

The undersigned hereby certifies that the firm of \_\_\_\_\_ has not and will not award a subcontract, in connection with any contract award to it as the result of this bid, to any firm that has been debarred for noncompliance with the Federal labor Standards, Title VI of the civil Rights Act of 1964, Executive Order 11246 as amended or any Federal Law.

\_\_\_\_\_  
Name of Firm Submitting Bid

\_\_\_\_\_  
Signature of Authorized Official

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date



## 15. DEBARMENT CERTIFICATION

All contractors/subcontractors shall complete the following certification and submit it with the bid proposal.

The contractor/subcontractor certifies in accordance with Executive Order 12549 (Debarment and Suspension 2/18/86) that to the best of its knowledge and belief, that it and its principals:

- 1) Are not presently debarred, suspended, proposed for debarment, declared negligible, or voluntarily excluded from covered transactions or contract by any Federal department or agency for noncompliance with the Federal Labor Standards, Title VI of the Civil Rights Act of 1964 as amended, Executive Order 11246 as amended or any other Federal law;
  - a) Have not within a three year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - b) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(a) of this certification; and
  - c) Have not within a three year period preceding this bid has one or more public (Federal, State or local) transactions or contracts terminated for cause or default.
- 2) Where the contractor is unable to certify to any of the statements in this certification, such prospective contractors shall attach an explanation to this certification form.

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

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

Printed Name and Title of Authorized Representative: \_\_\_\_\_

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

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

END OF SECTION

**PART IV**  
**GENERAL CONDITIONS**  
**TABLE OF CONTENTS**

Article Number	Title	Page
1.	DEFINITIONS .....	GC-6
2.	PRELIMINARY MATTERS.....	GC-10
3.	CONTRACT DOCUMENTS: INTENT, CONFLICTS, AMENDING AND REUSE .....	GC-11
4.	AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS .....	GC-13
5.	CONTRACTOR'S RESPONSIBILITIES .....	GC-16
6.	OTHER WORK .....	GC-27
7.	OWNER'S RESPONSIBILITIES .....	GC-28
8.	CONSULTANT'S STATUS DURING CONSTRUCTION .....	GC-28
9.	CHANGES IN THE WORK .....	GC-31
10.	CHANGE OF CONTRACT PRICE.....	GC-32
11.	CHANGE OF CONTRACT TIME .....	GC-39
12.	WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK.....	GC-39
13.	PAYMENTS TO CONTRACTOR AND COMPLETION .....	GC-43
14.	SUSPENSION OF WORK AND TERMINATION .....	GC-47
15.	MISCELLANEOUS .....	GC-50

## DETAILED TABLE OF CONTENTS OF GENERAL CONDITIONS

1. Definitions
2. Preliminary Matters
  - 2.1 Delivery of Bonds
  - 2.2 Copies of Documents
  - 2.3 Commencement of Contract Time; Notice to Proceed
  - 2.4 Starting the Project
  - 2.5 Before Starting Construction
  - 2.6 Submittal of Schedules
  - 2.7 Preconstruction Conference
  - 2.8 Finalizing Schedules
3. Contract Documents, Intent, Conflicts, Amending, and Reuse
  - 3.1 General
  - 3.2 Intent
  - 3.3 Conflicts
  - 3.4 Amending and Supplementing Contract Documents
  - 3.5 Reuse of Documents
4. Availability of Lands, Physical Conditions, Reference Points
  - 4.1 Availability of Lands
  - 4.2 Physical Conditions
  - 4.3 Physical Conditions - Underground Facilities
  - 4.4 Reference Points
5. CONTRACTOR'S Responsibilities
  - 5.1 Supervision
  - 5.2 Superintendence
  - 5.3 Labor
  - 5.4 Start-Up and Completion of Work
  - 5.5 Materials and Equipment
  - 5.6 Adjusting Progress Schedule
  - 5.7 Substitutes or "Or-Equal" Items
  - 5.8 Subcontractors, Suppliers and Others
  - 5.9 Patent Fees and Royalties
  - 5.10 Permits
  - 5.11 Laws and Regulations
  - 5.12 Taxes
  - 5.13 Use of Premises

- 5.14 Record Drawings
- 5.15 Shop Drawings and Samples
- 5.16 Continuing the Work
- 5.17 Erosion and Sediment Control
  
- 6. Other Work
  - 6.1 Related Work at Site
  - 6.2 Other Contractors or Utility Owners
  - 6.3 Delays Caused By Others
  - 6.4 Coordination
  
- 7. OWNER'S Responsibilities
  - 7.1 Communications
  - 7.2 Data and Payments
  - 7.3 Lands, Easements, and Surveys
  - 7.4 Change Orders
  - 7.5 Inspections, Tests, and Approvals
  - 7.6 Stop or Suspend Work
  
- 8. CONSULTANT'S Status During Construction
  - 8.1 OWNER'S Representative
  - 8.2 Visits to Site
  - 8.3 Project Representation
  - 8.4 Clarification and Interpretations
  - 8.5 Authorized Variations in Work
  - 8.6 Rejecting Defective Work
  - 8.7 Shop Drawings
  - 8.8 Change Orders
  - 8.9 Payments
  - 8.10 Determinations for Unit Prices
  - 8.11 Decisions on Disputes
  - 8.12 Limitations on CONSULTANT'S Responsibilities
  
- 9. Changes in the Work
  - 9.1 OWNER May Order Changes
  - 9.2 Claims
  - 9.3 Work Not in Contract Documents
  - 9.4 Change Orders
  - 9.5 Notice of Change

10. Change of Contract Price

- 10.1 Total Compensation
- 10.2 Claim for Increase or Decrease in Price
- 10.3 Value of Work
- 10.4 Cost of the Work
- 10.5 Not to Be Included in Cost of the Work
- 10.6 CONTRACTOR'S Fee
- 10.7 Itemized Cost Breakdown
- 10.8 Cash Allowance
- 10.9 Unit Price Work

11. Change of Contract Time

- 11.1 Change Order
- 11.2 Justification for Time Extension
- 11.3 Time Limits

12. Warranty and Guarantee; Tests and Inspections;  
Correction, Removal or Acceptance of Defective Work

- 12.1 Warranty and Guarantee
- 12.2 Access to Work
- 12.3 Tests and Inspections
- 12.4 OWNER May Stop Work
- 12.5 Correction or Removal of Defective Work
- 12.6 One Year Correction Period
- 12.7 Acceptance of Defective work
- 12.8 Owner May Correct Defective Work

13. Payments to CONTRACTOR and Completion

- 13.1 Schedule of Values
- 13.2 Application for Progress Payments
- 13.3 CONTRACTOR'S Warranty of Title
- 13.4 Review of Application for Progress Payments
- 13.5 Partial Utilization
- 13.6 Final Inspection
- 13.7 Final Application for Payment
- 13.8 Final Payment and Acceptance
- 13.9 CONTRACTOR'S Continuing Obligation
- 13.10 Waiver of Claims

14. Suspension of Work and Termination

- 14.1 OWNER May Suspend Work
- 14.2 OWNER May Terminate
- 14.3 CONTRACTOR'S Services Terminated
- 14.4 Payment After Termination
- 14.5 CONTRACTOR May Stop or Terminate

15. Miscellaneous

- 15.1 Claims for Injury or Damage
- 15.2 Non-Discrimination in Employment
- 15.3 Temporary Street Closing or Blockage
- 15.4 Percentage of Work Performed by Prime CONTRACTOR
- 15.5 Clean-up
- 15.6 General
- 15.7 Debris Disposal

END OF SECTION

## PART IV

### GENERAL CONDITIONS

#### 1. DEFINITIONS

Wherever used in these General Conditions or the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof.

##### 1.1 Addenda

Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bid Documents or the Contract Documents.

##### 1.2 Agreement

The written agreement between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

##### 1.3 Application for Payment

The form accepted by CONSULTANT which is to be used by CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

##### 1.4 Bid

The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

##### 1.5 Bidder

An individual, partnership, or corporation, who submit a Bid for a prime contract with the OWNER, for the Work described in the proposed Contract Documents.

##### 1.6 Bonds

Bid, performance and payment bonds and other instruments of security.

##### 1.7 Calendar Day

A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

##### 1.8 Change Order

A document recommended by CONSULTANT, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

**1.9 Contract Documents**

The Advertisement for Bidders, Information for Bidders, Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR'S Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Special Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements.

**1.10 Contract Unit Price**

The monies payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement. Unit Prices are to be firm for the term of this Contract.

**1.11 Contract Time**

The number of consecutive calendar days between the date of issuance of the Notice to Proceed and the contract completion date.

**1.12 CONTRACTOR**

The person, firm or corporation with whom OWNER has entered into the Agreement.

**1.13 Defective**

An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to CONSULTANT'S recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER).

**1.14 Drawings**

The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by CONSULTANT and are referred to in the Contract Documents.

**1.15 Effective Date of the Agreement**

The date indicated in the Agreement on which it becomes effective.

**1.16 CONSULTANT**

The Lexington-Fayette Urban County Government or its authorized representative.

**1.17 Field Order**

A documented order issued by CONSULTANT which orders minor changes in the Work, but which does not involve a change in the Contract Price or the Contract Time.



**1.18 Giving Notice**

Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

**1.19 Laws and Regulations**

Laws, rules, regulations, ordinances, codes and/or orders.

**1.20 Notice of Award**

The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

**1.21 Notice to Proceed**

A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR'S obligations under the Contract Documents.

**1.22 OWNER**

The Lexington-Fayette Urban County Government.

**1.23 Partial Utilization**

Placing a portion of the Work in service for the purpose for which it is intended (or related purpose) before reaching Completion for all the Work.

**1.24 Project**

The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

**1.25 Inspector**

The authorized representative who is assigned to the site or any part thereof.

**1.26 Shop Drawings**

All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by CONTRACTOR to illustrate material or equipment for some portion of the Work.

**1.27 Specifications**

Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and

workmanship as applied to the Work and certain administrative details applicable thereto.

**1.28 Standard Specifications**

The "Standard Specifications for Road and Bridge Construction", Transportation Cabinet, Department of Highways, Commonwealth of Kentucky, current edition. MUTCD shall refer to the "Manual of Uniform Traffic Control Devices.

**1.29 Subcontractor**

An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

**1.30 Special Conditions**

The part of the Contract Documents which amends or supplements these General Conditions.

**1.31 Supplier**

A manufacturer, fabricator, supplier, distributor, materialman or vendor.

**1.32 Underground Facilities**

All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

**1.33 Unit Price Work**

An amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

**1.34 Work**

The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

**1.35 Time Period**

When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

## 2. PRELIMINARY MATTERS

### 2.1 Delivery of Bonds

When the CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER, such Bonds, Insurance Certificate, and Power of Attorney as CONTRACTOR may be required to furnish.

### 2.2 Copies of Documents

Owner shall furnish to CONTRACTOR up to three copies (unless otherwise specified in the Special Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

### 2.3 Commencement of Contract Time; Notice to Proceed

The Contract Time will commence to run on the day specified in the Notice to Proceed.

### 2.4 Starting the Project

CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

### 2.5 Before Starting Construction

Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to CONSULTANT any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from CONSULTANT before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or CONSULTANT for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

### 2.6 Submittal of Schedules

Within ten days after the effective date of the Agreement (unless otherwise specified) CONTRACTOR shall submit to CONSULTANT for review:

2.6.1 an estimated progress schedule indicating the starting and completion dates of the various stages of the Work;

2.6.2 a preliminary schedule of Shop Drawing submissions; and

2.6.3 a preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into costs per labor and materials by specification

section to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by CONTRACTOR at the time of submission. Schedule of values shall be submitted on AIA G702/703 forms, or approved equal.

**2.7 Preconstruction Conference**

Before CONTRACTOR starts the Work at the proposed site, a conference attended by CONTRACTOR, CONSULTANT, EEO-Affirmative Action Officer, and other appropriate parties will be held to discuss the following issues: (1) The scheduling of the Work to be completed; (2) The procedures for handling shop drawings and other submittals; (3) The processing of applications for payment; (4) The establishment of an understanding among the involved parties in regard to the proposed project; (5) The establishment of procedures for effectively implementing the LFUCG's 10% minimum DBE goals; and (6) Requirement for Mechanic's Lien on Partial Applications for Payment.

**2.8 Finalizing Schedules**

At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, CONSULTANT and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 2.6. The finalized progress schedule will be acceptable to CONSULTANT as providing orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on CONSULTANT responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility thereof. The finalized schedule of Shop Drawing submissions will be acceptable to CONSULTANT as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to CONSULTANT as to form and substance.

**3. CONTRACT DOCUMENTS: INTENT, CONFLICTS, AMENDING AND REUSE**

**3.1 General**

The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

**3.2 Intent**

It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used

to describe Work, materials or equipment such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or CONSULTANT, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to CONSULTANT, or any of CONSULTANT'S consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 8.12.3 or 8.12.4. Clarifications and interpretations of the Contract Documents shall be issued by CONSULTANT as provided in paragraph 8.4.

### **3.3 Conflicts**

If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to CONSULTANT in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from CONSULTANT; however, CONTRACTOR shall not be liable to OWNER or CONSULTANT for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

In resolving such conflicts, errors and discrepancies, the documents shall be given precedence in the following order:

1. Agreement
2. Field and Change Orders
3. Addenda
4. Special Conditions
5. Instruction to Bidders
6. General Conditions
7. Specifications and Drawings

Figure dimension on drawings shall govern over scale dimensions and detailed Drawings shall govern over general Drawings.

**3.4 Amending and Supplementing Contract Documents**

The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof by means of a Change Order or a Field Order. Contract Price and Contract Time may only be changed by a Change Order.

**3.5 Reuse of Documents**

Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of CONSULTANT; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and CONSULTANT and specific written verification or adaptation by CONSULTANT.

**4. AVAILABILITY OF LANDS; PHYSICAL CONDITIONS, REFERENCE POINTS**

**4.1 Availability of Lands**

OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR believes that any delay in OWNER'S furnishing these lands, rights-of-way or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefor as provided in Article 11. CONSULTANT shall determine if the claim is legitimate or not. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

**4.2 Physical Conditions**

**4.2.1 Explorations and Reports**

Reference is made to the Special Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by CONSULTANT in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR'S purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site.

**4.2.2 Existing Structures**

Reference is made to the Special Conditions for identification of those drawings of physical conditions in or relating to existing surface and

subsurface structures (except Underground Facilities referred to in paragraph 4.3 which are at or contiguous to the site that have been utilized by CONSULTANT in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, but not for the completeness thereof for CONTRACTOR'S purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.2.3 Report of Differing Conditions  
If CONTRACTOR believes that:

4.2.3.1 any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2 any physical conditions uncovered or revealed at the site differ materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing and WORK in connection therewith (except in an emergency) notify OWNER and CONSULTANT in writing about the inaccuracy or difference.

4.2.4 CONSULTANT'S Review  
CONSULTANT will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise CONTRACTOR of CONSULTANT'S findings and conclusions.

4.2.5 Possible Document Change  
If CONSULTANT concludes that there is a material error in the Contract Documents or that because of newly discovered conditions a change I the Contract Documents is required, a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6 Possible Price and Time Adjustments  
In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference.

**4.3 Physical Conditions-Underground Facilities**

4.3.1 Shown or Indicated  
The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is

based on information and data furnished to OWNER or CONSULTANT by the owners of such underground facilities or by others. Unless it is otherwise expressly provided in the Special Conditions:

4.3.1.1 OWNER and CONSULTANT shall not be responsible for the accuracy or completeness of any such information or data; and,

4.2.1.2 CONTRACTOR shall have full responsibility for reviewing and checking all such information and data; for locating all underground facilities shown or indicated in the Contract Documents; for coordination of the Work with the owners of such underground facilities during construction; and for the safety and protection thereof and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2 Not Shown or Indicated

If an underground facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and CONSULTANT. CONSULTANT will promptly review the underground facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such underground facility. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any underground facility that was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of.

**4.4 Reference Points**

OWNER shall provide engineering surveys to establish reference points for construction which in CONSULTANT'S judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to CONSULTANT whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by a Registered Land Surveyor.



## 5. CONTRACTOR'S RESPONSIBILITIES

### 5.1 Supervision

CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall assure that all CONTRACTOR personnel (including subcontractors, etc.) conduct themselves in a courteous and respectful manner toward the CONSULTANT and the general public. CONTRACTOR shall keep at the Project Site during the progress of the Work a competent project manager/superintendent and all necessary assistants, all of whom shall be satisfactory to OWNER. OWNER reserves the right to reject CONTRACTOR'S construction superintendent and project management personnel if they are unsatisfactory to OWNER and upon such rejection CONTRACTOR shall designate and provide competent successors. Failure to comply with this condition of the Contract will result in immediate suspension of the Work. Following a review by the Commissioner of Public Works, the Contract may be terminated (see GC section 14). CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Contract Documents.

### 5.2 Superintendence

CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and CONSULTANT except under extraordinary circumstances. The superintendent will be CONTRACTOR'S representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

### 5.3 Labor

CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. OWNER reserves the right to require CONTRACTOR to remove from the Project any of its personnel, or subcontractor's personnel for violating LFUCG Policies, Rules or Regulations. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER'S written consent given after prior written notice to CONSULTANT.

**5.4 Start-Up and Completion of Work**

Unless otherwise specified, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

**5.5 Materials and Equipment**

All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by CONSULTANT, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to CONSULTANT, or any of CONSULTANT'S consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 8.12.3 or 8.12.4.

**5.5.1 Not Clearly Specified or Indicated**

In all instances where materials specified are obtainable in different sizes, weights, trade grades, qualities or finishes, etc., whose weights, trade grades, qualities or finishes, etc., are not clearly specified or indicated on the Drawings, the CONTRACTOR shall notify the CONSULTANT of all such instances at least five (5) days in advance of receiving the proposals. The CONSULTANT will then determine which size, weight, trade grade, quality, finish, etc., is required.

**5.5.2 Coordination of Work**

The CONTRACTOR shall see that for his own Work and for the work of each subcontractor, proper templates and patterns necessary for the coordination of the various parts of the Work are prepared. The CONTRACTOR shall furnish or require the Subcontractor to furnish such duplicates as will enable the Subcontractors to fit together and execute fully their respective portions of the Work.

**5.6 Adjusting Progress Schedule**

CONTRACTOR shall submit to CONSULTANT for acceptance (to the extent indicated in paragraph 2.8) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the Contract Documents applicable thereto.

## 5.7 Substitutes or "Or-Equal" Items

### 5.7.1 General

Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function, and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by OWNER/CONSULTANT if sufficient information is submitted by CONTRACTOR to allow OWNER/CONSULTANT to determine that the material or equipment proposed is equivalent or equal to that named. The procedure for review by OWNER/CONSULTANT will include the following. Requests for review of substitute items of material and equipment will not be accepted by OWNER/CONSULTANT from anyone, other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to OWNER/CONSULTANT for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR'S achievement of completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by OWNER/CONSULTANT in evaluating the proposed substitute. OWNER/CONSULTANT may require CONTRACTOR to furnish at CONTRACTOR'S expense additional data about the proposed substitute.

### 5.7.2 Substitutes

If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to OWNER/CONSULTANT, if CONTRACTOR submits sufficient information to allow OWNER/CONSULTANT to determine that the substitute proposed is equivalent to that indicated or required by the Contract

Documents. The procedure for review by OWNER/CONSULTANT will be similar to that provided in paragraph 5.7.1 as applied by OWNER/CONSULTANT.

5.7.3 OWNER/CONSULTANT'S Approval

OWNER/CONSULTANT will be allowed a reasonable time within which to evaluate each proposed substitute. OWNER/CONSULTANT will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without OWNER/CONSULTANT'S prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute. OWNER/CONSULTANT will record time required by OWNER/CONSULTANT and OWNER/CONSULTANT'S consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not OWNER/CONSULTANT accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of OWNER/CONSULTANT and OWNER/CONSULTANT'S consultants for evaluating each proposed substitute.

**5.8 Subcontractors, Suppliers, and Others**

5.8.1 Acceptable to CONSULTANT

CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and CONSULTANT as indicated in paragraph 5.8.2), whether initially or as a substitute, against whom OWNER or CONSULTANT may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

5.8.2 Objection After Due Investigation

If the Contract Documents require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and CONSULTANT and if CONTRACTOR has submitted a list thereof, OWNER'S or CONSULTANT'S acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute. No acceptance by

OWNER or CONSULTANT of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or CONSULTANT to reject defective Work.

5.8.3 Contractor Responsible for Acts of Subcontractors

The CONTRACTOR shall perform on the site, and with its own organization, work equivalent to at least fifty (50) percent of the total amount of Work to be performed under the Contract. This percentage may be reduced by a supplemental agreement to this Contract if, during performing the Work, the CONTRACTOR requests a reduction and the Urban County project manager determines that the reduction would be to the advantage of the Urban County Government.

The CONTRACTOR shall, at the time he submits his proposal for the Contract, notify the OWNER in writing of the names of Subcontractors proposed for the Work. He shall not employ any Subcontractor without the prior written approval of the OWNER.

CONTRACTOR shall be fully responsible to OWNER and CONSULTANT for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR'S own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or CONSULTANT and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or CONSULTANT to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

5.8.4 Division of Specifications

The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

5.8.5 Agreement Between Contractor and Subcontractors

All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and CONSULTANT.

5.8.6 Statements and Comments by CONTRACTOR

Neither the CONTRACTOR, his employees, nor his subcontractors shall at any time make any statement or comment as

to the project scope, nature, intention, design, or construction method to any third party or parties without the explicit written consent of the OWNER.

Any third party requesting such information shall be referred to the OWNER or his representative.

Should there be any change from the original intent of the project as a result of any statement or comment by the contractor, his employees or subcontractors, contractor shall be held liable for any change in the scope, nature, design, or construction method and shall bear the full cost for the previously mentioned changes.

**5.9 Patent Fees and Royalties**

CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others.

**5.10 Permits**

Unless otherwise provided in the Special conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or if there are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

## **5.11 Laws and Regulations**

### **5.11.1 CONTRACTOR to Comply**

CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor CONSULTANT shall be responsible for monitoring CONTRACTOR'S compliance with any Laws and Regulations.

### **5.11.2 Specifications and Drawings at Variance**

If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give CONSULTANT prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Laws, or Regulations, and without such notice to CONSULTANT, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR'S primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Any party, firm or individual submitting a proposal pursuant to invitation must have paid all taxes owed to the Lexington-Fayette Urban County Government at the time the proposal is submitted, and must maintain a "current" status in regard to those taxes throughout the Contract. If applicable, business must be licensed in Fayette County.

## **5.12 Taxes**

CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. Any party, firm or individual submitting a proposal pursuant to invitation must have paid all taxes owed to the Lexington-Fayette Urban County Government at the time the proposal is submitted, and must maintain a "current" status in regard to those taxes throughout the Contract. If applicable, business must be licensed in Fayette County.

## **5.13 Use of Premises**

### **5.13.1 Project Site**

CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the staging areas or work site areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such

land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER or CONSULTANT by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER and CONSULTANT harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against OWNER or CONSULTANT to the extent based on a claim arising out of CONTRACTOR'S performance of the Work.

#### 5.13.2 Clean UP

During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

#### 5.13.1 Loading of Structures

CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

### 5.14 **Record Drawings**

CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Change Orders, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to CONSULTANT for reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to CONSULTANT for OWNER.

### 5.15 **Shop Drawings and Samples**

#### 5.15.1 Shop Drawing Submittals

After checking and verifying all field measurements and after complying



with applicable procedures specified, CONTRACTOR shall submit to CONSULTANT for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.8), or for other appropriate action if so indicated in the Special Conditions, five copies (unless otherwise specified) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR'S responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as CONSULTANT may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable CONSULTANT to review the information as required.

5.15.2 Sample Submittals

CONTRACTOR shall also submit to CONSULTANT for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR'S responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

5.15.3 Review by CONTRACTOR

Before submission of each Shop Drawing or sample CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

5.15.4 Notice of Variation

At the time of each submission, CONTRACTOR shall give CONSULTANT specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to CONSULTANT for review and approval of each such variation.

5.15.5 CONSULTANT'S Approval

CONSULTANT will review and approve with reasonable promptness Shop Drawings and samples, but CONSULTANT'S review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or

procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by CONSULTANT, and shall return the required number of corrected copies of Shop Drawings and submit, as required, new samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by CONSULTANT on previous submittals.

**5.15.6 Responsibility for Errors and Omissions**

CONSULTANT'S review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called CONSULTANT'S attention to each such variation at the time of submission as required by paragraph 5.15.4 and CONSULTANT has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by CONSULTANT relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 5.15.3.

**5.15.7 Cost of Related Work**

Where a Shop or sample is required by the Specifications, any related Work performed prior to CONSULTANT'S review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

**5.16 Continuing the Work**

CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolutions of any disputes or disagreements, except as permitted by paragraph 14.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

**5.17 Erosion and Sediment Control**

**5.17.1 General Environmental Requirements**

The CONTRACTOR and Subcontractors performing work on projects on behalf of the OWNER shall comply with all applicable federal, state, and local environmental regulations and all requirements and conditions set forth in "special" permits including but not limited to Corp of Engineers 404 permits, 401 Water Quality Certifications, Stream Crossing and Floodplain Encroachment Permits.

Any fines or penalties resulting from the failure to comply with the terms of the federal, state or local permits or perform necessary corrective action are solely the obligation of the CONTRACTOR.

5.17.2 Stormwater Pollution Prevention

A. The CONTRACTOR shall exercise due care to prevent or minimize any damage to any stream or wetland from pollution by debris, sediment or other material. The operation of equipment and/or materials in a jurisdictional wetland is expressly prohibited. Water that has been used for washing or processing, or that contains oils, sediments or other pollutants shall not be discharged from the job site. Such waters shall be collected and properly disposed of by the CONTRACTOR in accordance with applicable local, state and federal law.

B. The CONTRACTOR is solely responsible for securing all required state and local permits associated with stormwater discharges from the project including, but not necessarily limited to the KY Notice of Intent to Disturb (NOI) for Coverage of Storm Water Discharges Associated with Construction Activities under the KPDES Storm Water General Permit KYR100000 and the LFUCG, Land Disturbance Permit. Permit application preparation and all required documentation are the responsibility of the CONTRACTOR. The CONTRACTOR is solely responsible for maintaining compliance with the stormwater pollution prevention plan or erosion and sediment control plan and ensuring the following:

- a. That the Stormwater Pollution Prevention Plan (SWPPP) or erosion control plan is current and available for review on site;
- b. That any and all stormwater inspection reports required by the permit are conducted by qualified personnel and are available for review onsite; and
- c. That all best management practices (BMPs) are adequately maintained and effective at controlling erosion and preventing sediment from leaving the site.

C. The CONTRACTOR shall provide the necessary equipment and personnel to perform any and all emergency measures that may be required to contain any spillage or leakage and to remove materials, soils or liquids that become contaminated. The collected spill material shall be properly disposed at the CONTRACTOR's expense.

D. Upon completion of the work and with the concurrence of the OWNER, the CONTRACTOR must file a Notice of Termination (NOT) of Coverage Under the KPDES General Permit for Storm Water Discharges Associated with Construction Activity with the appropriate local and state authorities.

E. Any fines or penalties resulting from the failure to comply with the terms of the state or local stormwater permits or perform necessary corrective action are solely the obligation of the CONTRACTOR.

## **6. OTHER WORK**

### **6.1 Related Work at Site**

OWNER may perform other work related to the Project at the site by OWNER'S own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work; and, if such performance will involve additional expense to CONTRACTOR or requires additional time, a Change Order to the Contract will be negotiated.

### **6.2 Other Contractors or Utility Owners**

CONTRACTOR shall afford each utility owner and other contractor who is a party to such a direct contract (or OWNER, if OWNER is performing the additional work with OWNER'S employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of CONSULTANT and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

### **6.3 Delays Caused by Others**

If any part of CONTRACTOR'S Work depends for proper execution or results upon the work of any such other contractor or utility owner (or OWNER), CONTRACTOR shall inspect and promptly report to CONSULTANT in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR'S failure so to report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR'S Work except for latent or non-apparent defects and deficiencies in the other work.

### **6.4 Coordination**

If OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Special Conditions, and the specific matters to be covered by such authority and

responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Special Conditions.

## **7. OWNER'S RESPONSIBILITIES**

### **7.1 Communications**

OWNER shall issue all communications to CONTRACTOR through CONSULTANT.

### **7.2 Data and Payments**

OWNER shall furnish the data required of OWNER under the Contract Documents promptly after they are due.

### **7.3 Lands, Easements, and Surveys**

OWNER'S duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER'S identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by CONSULTANT in preparing the Drawings and Specifications.

### **7.4 Change Orders**

OWNER is obligated to execute Change Orders as indicated in paragraph 9.4.

### **7.5 Inspections, Tests and Approvals**

OWNER'S responsibility in respect to certain inspections, tests and approvals is set forth in paragraph 13.3.

### **7.6 Stop or Suspend Work**

In connection with OWNER'S right to stop Work or suspend Work, see paragraph 12.4 and 14.1 Paragraph 14.2 deals with OWNER'S rights to terminate services of CONTRACTOR under certain circumstances.

## **8. CONSULTANT'S STATUS DURING CONSTRUCTION**

### **8.1 OWNER'S Representative**

CONSULTANT will be OWNER'S representative during the construction period. The duties and responsibilities and the limitations of authority of CONSULTANT as OWNER'S representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and CONSULTANT.

### **8.2 Visits to Site**

CONSULTANT will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. CONSULTANT will not be required to make exhaustive or

continuous on-site inspections to check the quality or quantity of the Work. CONSULTANT'S efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations, CONSULTANT will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

**8.3 Project Representation**

CONSULTANT will provide an Inspector to assist CONSULTANT in observing the performance of the Work. If OWNER designates another agent to represent OWNER at the site who is not CONSULTANT'S agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in the Special Conditions.

**8.4 Clarifications and Interpretations**

CONSULTANT will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as CONSULTANT may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

**8.5 Authorized Variations in Work**

CONSULTANT may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order.

**8.6 Rejecting Defective Work**

CONSULTANT will have authority to disapprove or reject Work which CONSULTANT believes to be defective, and will also have authority to require special inspection or testing of the Work as provided in paragraph 12.3, whether or not the Work is fabricated, installed or completed.

**8.7 Shop Drawings**

In connection with CONSULTANT'S responsibility for Shop Drawings and samples, see paragraphs 5.15.1 through 5.16 inclusive.

**8.8 Change Orders**

In connection with CONSULTANT'S responsibilities as to Change Orders, see Articles 10, 11 and 12.

**8.9 Payments**

In connection with CONSULTANT'S responsibilities with respect to Applications for Payment, etc., see Article 13.

### **8.10 Determinations for Unit Prices**

CONSULTANT will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR.

CONSULTANT will review with CONTRACTOR CONSULTANT'S preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise).

### **8.11 Decision on Disputes**

CONSULTANT will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 10 and 11 in respect of changes in the Contract Price or Contract Time will be referred initially to CONSULTANT in writing with a request for a formal decision in accordance with this paragraph, which CONSULTANT will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered to CONSULTANT promptly (but in no event later than thirty days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to CONSULTANT within sixty days after such occurrence unless CONSULTANT allows an additional period of time to ascertain more accurate data in support of the claim.

### **8.12 Limitations on CONSULTANT's Responsibilities**

#### **8.12.1 CONTRACTOR, Supplier, or Surety**

Neither CONSULTANTS authority to act under this Article 8 or elsewhere in the Contract Documents nor any decision made by CONSULTANT in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of CONSULTANT to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

#### **8.12.2 To Evaluate the Work**

Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", or "satisfactory" or adjectives or like "effect" or "import" are used to describe a requirement, direction, review or judgment of CONSULTANT as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign CONSULTANT any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 8.12.3 or 8.12.4.

8.12.3 CONTRACTOR'S Means, Methods, Etc.

CONSULTANT will not be responsible for CONTRACTOR'S means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and CONSULTANT will not be responsible for CONTRACTOR'S failure to perform or furnish the Work in accordance with the Contract Documents.

8.12.4 Acts of Omissions of CONTRACTOR

CONSULTANT will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

**9. CHANGES IN THE WORK**

**9.1 OWNER May Order Change**

Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Change Order. Upon receipt of such notice, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

**9.2 Claims**

Claims for an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Change Order will be settled as provided for in Article 10 or Article 11.

**9.3 Work Not in Contract Documents**

CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraph 3.4, except in the case of an emergency and except in the case of uncovering Work as provided in paragraph 12.3.4.

**9.4 Change Orders**

OWNER and CONTRACTOR shall execute appropriate Change Orders covering:

9.4.1 changes in the Work which are ordered by OWNER pursuant to paragraph 9.1, are required because of acceptance of defective Work under paragraph 12.7 or corrective defective Work under paragraph 12.8, or are agreed to by the parties;



9.4.2 changes in the Contract Price or Contract Time which are agreed to by the parties; and

9.4.3 changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by CONSULTANT pursuant to paragraph 8.11; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and REGULATIONS, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 5.16.

**9.5 Notice of Change**

If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR'S responsibility, and the amount of each applicable Bond will be adjusted accordingly.

**10. CHANGE OF CONTRACT PRICE**

**10.1 Total Compensation**

The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

**10.2 Claim for Increase or Decrease in Price**

The Contract Price may only be changed by a Change Order. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the CONSULTANT promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after such occurrence (unless CONSULTANT allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by CONTRACTOR'S written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of the occurrence of said event.

**10.3 Value of Work**

The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

**10.3.1 Unit Prices**

Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of

the items involved (subject to the provisions of paragraphs 10.9.1. through 10.9.3, inclusive).

10.3.2 Lump Sum

By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 10.6.2.1).

10.3.3 Cost Plus Fee

On the basis of the Cost of the Work (determined as provided in paragraphs 10.4 and 10.5) plus a CONTRACTOR'S fee for overhead and profit (determined as provided in paragraphs 10.6 and 10.7).

**10.4 Cost of the Work**

The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project; shall include only the following items; and shall not include any of the costs itemized in paragraph 10.5:

10.4.1 Payroll Costs

Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

10.4.2 Materials and Equipment Costs

Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

#### 10.4.3 Subcontractor Costs

Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of CONSULTANT, which bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as CONTRACTOR'S Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

#### 10.4.4 Special Consultant Costs

Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

#### 10.4.5 Supplemental Costs

10.4.5.1 The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR'S employees incurred in discharge of duties connected with the Work.

10.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

10.4.5.3 Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of CONSULTANT, and the costs of transportation, loading, unloading, installation, dismantling and removal shall be in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

10.4.5.4 Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

10.4.5.5 Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

10.4.5.6 Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER), provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR'S fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid a fee proportionate to that stated in paragraph 10.6.2 for services.

10.4.5.7 The cost of utilities, fuel and sanitary facilities at the site.

10.4.5.8 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

10.4.5.9 Cost of premiums for additional Bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by OWNER.

**10.5 Not to Be Included in Cost of the Work**

The term Cost of the Work shall not include any of the following:

10.5.1 Costs of Officers and Executives

Payroll costs and other compensation of CONTRACTOR'S officers, executives, principals (of partnership and sole proprietorships), general

managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR'S principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 10.4.1 or specifically covered by paragraph 10.4.4 - all of which are to be considered administrative costs covered by the CONTRACTOR'S fee.

10.5.2 Principal Office

Expenses of CONTRACTOR'S principal and branch offices other than CONTRACTOR'S office at the site.

10.5.3 Capital Expense

Any part of CONTRACTOR'S capital expenses, including interest on CONTRACTOR'S capital employed for the Work and charges against CONTRACTOR for delinquent payments.

10.5.4 Bonds and Insurance

Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 10.4.5.9 above).

10.5.5 Costs Due to Negligence

Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

10.5.6 Other Costs

Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 10.4.

**10.6 Contractor's Fee**

The CONTRACTOR'S Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

10.6.1 a mutually acceptable fixed fee; or if none can be agreed upon,

10.6.2 a fee based on the following percentages of the various portions of the Cost of the Work:

10.6.2.1 for costs incurred under paragraphs 10.4.1 and 10.4.2, the CONTRACTOR'S fee shall be fifteen percent;

10.6.2.2 for costs incurred under paragraph 10.4.3, the CONTRACTOR'S fee shall be five percent; and if a subcontract is on the basis of Cost of the Work Plus a fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen percent;

10.6.2.3 no fee shall be payable on the basis of costs itemized under paragraphs 10.4.4, 10.4.5 and 10.5;

10.6.2.4 the amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR'S Fee by an amount equal to ten percent of the net decrease; and

10.6.2.5 when both additions and credits are involved in any one change, the adjustment in CONTRACTOR'S fee shall be computed on the basis of the net change in accordance with paragraphs 10.6.2.1 through 10.6.2.4, inclusive.

**10.7 Itemized Cost Breakdown**

Whenever the cost of any Work is to be determined pursuant to paragraph 10.4 or 10.5, CONTRACTOR will submit in form acceptable to CONSULTANT an itemized cost breakdown together with supporting data.

**10.8 Cash Allowances**

It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to CONSULTANT, CONTRACTOR agrees that:

10.8.1 Materials and Equipment

The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

10.8.2 Other Costs

CONTRACTOR'S costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

10.8.3 Change Order

Prior to final payment, an appropriate Change Order will be issued as recommended by CONSULTANT to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

**10.9 Unit Price Work**

10.9.1 General

Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by CONSULTANT in accordance with Paragraph 8.10.

10.9.2 Overhead and Profit

Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR'S overhead and profit for each separately identified item.

10.9.3 Claim for Increase in Unit Price

Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 10.

## 11. CHANGE OF CONTRACT TIME

### 11.1 Change Order

The Contract Time may only be changed by a Change Order. Any claim for an extension or shortening of the Contract Time shall be based on written notice delivered to CONSULTANT promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless CONSULTANT allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by CONSULTANT in accordance with paragraph 8.11. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph 11.1.

### 11.2 Justification for Time Extensions

The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if a claim is made therefore as provided in paragraph 11.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing additional work as contemplated by Article 6, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

### 11.3 Time Limits

All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 11 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) for delay by either party.

## 12. WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

### 12.1 Warranty and Guarantee

CONTRACTOR warrants and guarantees to OWNER and CONSULTANT that all Work will be in accordance with the Contract Documents and will not be defective. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 12.

### 12.2 Access to Work

CONSULTANT and CONSULTANT'S representatives, other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.



## 12.3 Tests and Inspections

### 12.3.1 Timely Notice

CONTRACTOR shall give CONSULTANT timely notice of readiness of the Work for all required inspections, tests or approvals.

### 12.3.2 Requirements and Responsibilities

The CONSULTANT may require such inspection and testing during the course of the Work as he/she deems necessary to ascertain and assure the integrity and acceptable quality of the materials incorporated and the work performed. Inspection presence may be either full-time or intermittent, and neither the presence nor absence at any time of the CONSULTANT or the INSPECTOR shall relieve the CONTRACTOR of sole responsibility for the acceptability and integrity of the Work or any part thereof.

The costs of sampling, testing, and inspection on-site to ascertain acceptability of the Work and materials will be borne by the OWNER except as otherwise provided. The OWNER will select a testing laboratory to perform such sampling and testing. Sampling and/or testing required by the CONTRACTOR or necessitated by failure of Work or materials to meet the above acceptability test shall be at the expense of the CONTRACTOR.

Inspection services may be performed by the employees of the OWNER or by others selected or designated by the OWNER or the CONSULTANT.

Sampling and/or testing required for manufacturing quality and/or process control, for certification that raw mineral materials or manufactured products are the quality specified in the contract, or to assure the acceptability for incorporation into the Work shall be borne by the CONTRACTOR or the material supplier.

Cost for inspection, sampling, testing, and approvals required by the laws or regulations of any public body having competent jurisdiction shall be borne by the CONTRACTOR or the material supplier.

Sampling and testing will be in accord with pertinent codes and regulations and with appropriate standards of the American Society of Testing Materials or other specified standards.

### 12.3.3 On-Site Construction Test and Other Testing

All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and CONTRACTOR (or by CONSULTANT if so specified).

#### 12.3.4 Covered Work

If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of CONSULTANT, it must, if requested by CONSULTANT, be uncovered for observation. Such uncovering shall be at CONTRACTOR'S expense unless CONTRACTOR has given CONSULTANT timely notice of CONTRACTOR'S intention to cover the same and CONSULTANT has not acted with reasonable promptness in response to such notice.

#### 12.3.5 CONTRACTOR'S Obligation

Neither observations by CONSULTANT nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR'S obligations to perform the Work in accordance with the Contract Documents.

#### **12.4 OWNER May Stop the Work**

If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any other party.

#### **12.5 Correction or Removal of Defective Work**

If required by CONSULTANT, CONTRACTOR shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by CONSULTANT, remove it from the site and replace it with non-defective Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

#### **12.6 One Year Correction Period**

If within one year after the date of Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER'S written instructions, either correct such defective Work, or, if it has been rejected by OWNER, remove it from the site and replace it with non-defective Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement

(including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service before Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Change Order.

**12.7 Acceptance of Defective Work**

If, instead of requiring correction or removal and replacement of defective Work, OWNER prefers to accept it, OWNER may do so. CONTRACTOR shall bear all direct, indirect and consequential costs attributable to OWNER'S evaluation of and determination to accept such defective Work (such costs to be approved by CONSULTANT as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals).

**12.8 OWNER May Correct Defective Work**

If CONTRACTOR fails within a reasonable time after written notice of CONSULTANT to proceed to correct and to correct defective Work or to remove and replace rejected Work as required by CONSULTANT in accordance with paragraph 12.5, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR'S services related thereto, take possession of CONTRACTOR'S tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER'S representatives, agents and employees such access to the site as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by CONSULTANT, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR'S defective Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER'S rights and remedies hereunder.

### 13. PAYMENTS TO CONTRACTOR AND COMPLETION

#### 13.1 Schedule of Values

The schedule of values established as provided in paragraph 2.8 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to CONSULTANT. Progress payments on account of Unit Price Work will be based on the number of units completed.

#### 13.2 Application for Progress Payment

At least ten days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to CONSULTANT for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER'S interest therein, all of which will be satisfactory to OWNER. OWNER shall, within thirty (30) calendar days of presentation to him of an approved Application for Payment, pay CONTRACTOR the amount approved by CONSULTANT. Monthly progress payments shall be ninety (90) percent of the sum obtained by applying the respective bid unit prices to the approved estimated quantities of work completed by the Contractor during the preceding month. The remaining ten (10) percent will be held by the Owner, as retainage. At such time as the CONSULTANT deems appropriate - based on the quality of work performed, progress of cleanup, and other pertinent factors - the rate of retainage, or the total amount retained, may be reduced; although, any reduction in retainage, below the ten (10) percent level, is made solely at the CONSULTANT's discretion. All remaining retainage held will be included in the final payment to the Contractor.

##### 13.2.1 Waivers of Mechanic's Lien

With each Application for Payment OWNER may require CONTRACTOR to submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

13.2.1.1 Requirement for waivers of Mechanic's Lien on Partial Applications for Payment will be determined and communicated at the Preconstruction Conference.

13.2.1.2 Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

13.2.1.3 When an application shows completion of an item, submit conditional final or full waivers.

13.2.1.4 Owner reserves the right to designate which entities involved in the Work must submit waivers.

13.2.1.5 Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

### **13.3 CONTRACTOR'S Warranty of Title**

CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

### **13.4 Review of Applications for Progress Payment**

#### **13.4.1 Submission of Application for Payment**

CONSULTANT will, after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER, or return the Application to CONTRACTOR indicating in writing CONSULTANT'S reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

#### **13.4.2 CONSULTANT'S Recommendation**

CONSULTANT may refuse to recommend the whole or any part of any payment, if, in CONSULTANT'S opinion, it would be incorrect to make such representations to OWNER. CONSULTANT may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in CONSULTANT'S opinion to protect OWNER from loss because:

13.4.2.1 the Work is defective, or completed Work has been damaged requiring correction or replacement;

13.4.2.2 the Contract Price has been reduced by Written Amendment or Change Order;

13.4.2.3 OWNER has been required to correct defective Work or complete Work in accordance with paragraph 12.8; or

13.4.2.4 of CONSULTANT's actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.2.1 through 14.2.9 inclusive.

**13.5 Partial Utilization**

OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and has been completed. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER that said part of the Work is complete and request that a Certificate of Completion be issued for that part of the Work.

**13.6 Final Inspection**

Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, CONSULTANT will make a final inspection with CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

**13.7 Final Application for Payment**

After CONTRACTOR has completed all such corrections to the satisfaction of CONSULTANT and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 5.14) and other documents - all as required by the Contract Documents, and after CONSULTANT has indicated that the Work is acceptable (subject to the provisions of paragraph 13.10), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER'S property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor or Supplier fails to

furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

### **13.8 Final Payment and Acceptance**

#### **13.8.1 CONSULTANT'S Approval**

If, on the basis of CONSULTANT'S observation of the Work during construction and final inspection, and CONSULTANT'S review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, CONSULTANT is satisfied that the Work has been completed and CONTRACTOR'S other obligations under the Contract Documents have been fulfilled, CONSULTANT will, after receipt of the final Application for Payment, indicate in writing CONSULTANT'S recommendation of payment and present the Application to OWNER for payment. Thereupon CONSULTANT will give written notice to OWNER and CONTRACTOR that the Work is acceptable, subject to the provisions of paragraph 13.10. Otherwise, CONSULTANT will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application.

#### **13.8.2 Delay in Completion of Work**

If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, OWNER shall, upon receipt of CONTRACTOR'S final Application for Payment and recommendation of CONSULTANT, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 10 of Part II, Information for Bidders, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to CONSULTANT with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

#### **13.8.3 Retainage**

**Retainage is not applicable to this project.**

### **13.9 CONTRACTOR'S Continuing Obligation**

CONTRACTOR'S obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by CONSULTANT, nor the issuance of a certificate of Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by OWNER, nor any act of acceptance by OWNER nor any failure to do so, nor any review and

approval of a Shop Drawing or sample submission, nor any correction of defective Work by OWNER will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR'S obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 13.10).

**13.10 Waiver of Claims**

The making and acceptance of final payment will constitute:

**13.10.1** a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from defective Work appearing after final inspection or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights in respect of CONTRACTOR'S continuing obligations under the Contract Documents; and

**13.10.2** a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

**14. SUSPENSION OF WORK AND TERMINATION**

**14.1 OWNER May Suspend Work**

OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and CONSULTANT which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 10 and 11.

**14.2 OWNER May Terminate**

The OWNER may terminate the Work upon the occurrence of any one or more of the following events:

**14.2.1** if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

**14.2.2** if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against



CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

**14.2.3** if CONTRACTOR makes a general assignment for the benefit of creditors;

**14.2.4** if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR'S creditors;

**14.2.5** if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

**14.2.6** if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.8 as revised from time to time);

**14.2.7** if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

**14.2.8** if CONTRACTOR disregards the authority of CONSULTANT, or

**14.2.9** if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR'S tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) such excess will be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the

difference to OWNER. Such costs incurred by OWNER will be approved as to reasonableness by CONSULTANT and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

**14.2.10** If safety violations are observed and brought to the Contractors attention and Contractor fails to take immediate corrective measures any repeat of similar safety violations, Owner will order an immediate termination of contract. Note: it is the Contractor's responsibility to know proper safety measures as they pertain to construction and OSHA.

**14.2.11** This contract may be canceled by either party thirty (30) days after delivery by canceling party of written notice of intent to cancel to the other contracting party.

**14.2.12** This contract may be canceled by the Lexington-Fayette Urban County Government if it is determined that the Bidder has failed to perform under the terms of this agreement, such cancellation to be effective upon receipt of written notice of cancellation by the Bidder.

**14.3 CONTRACTOR'S Services Terminated**

Where CONTRACTOR'S services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

**14.4 Payment After Termination**

Upon seven days' written notice to CONTRACTOR, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, CONTRACTOR shall be paid for all Work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs).

**14.5 CONTRACTOR May Stop Work or Terminate**

If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or CONSULTANT fails to act on any Application for Payment within sixty days after it is submitted, or OWNER fails for sixty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and CONSULTANT, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if CONSULTANT has failed to act on an Application

for Payment or OWNER has failed to make any payment as aforesaid, CONTRACTOR may upon seven days' written notice to OWNER and CONSULTANT stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 5.16 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

## **15. MISCELLANEOUS**

### **15.1 Claims for Injury or Damage**

Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 15.1 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

### **15.2 Non-Discrimination in Employment**

The CONTRACTOR shall comply with the following requirements prohibiting discrimination:

**15.2.1** That no person (as defined in KRS 344.010) shall bid on Lexington-Fayette Urban County Government construction projects, or bid to furnish materials or supplies to the Lexington-Fayette Urban County Government, if, within six months prior to the time of opening of bids, said person shall have been found, by declamatory judgment action in Fayette Circuit Court, to be presently engaging in an unlawful practice, as hereinafter defined. Such declamatory judgment action may be brought by an aggrieved individual or upon an allegation that an effort at conciliation pursuant to KRS 344.200 has been attempted and failed, by the Lexington-Fayette County Human Rights Commission.

**15.2.2** That it is an unlawful practice for an employer:

**15.2.2.1** to fail or refuse to hire, or to discharge any individual or otherwise to discriminate against an individual, with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, sex, age, or national origin; or

**15.2.2.2** to limit, segregate or classify his employees in any way which would deprive or tend to deprive an individual of employment opportunities or otherwise adversely affect his status as an employee because of such individual's sex, race, color, religion, age, or national origin.

**15.2.3** That it is an unlawful practice for an employer, labor organization, or joint-labor management committee controlling apprenticeship or other training or retraining, including on-the-job training programs to discriminate against an individual because of his race, color, religion, sex, age, or national origin in admission to, or employment in, any program established to provide apprenticeship or other training.

**15.2.4** That a copy of this Ordinance shall be furnished all suppliers and made a part of all bid specifications.

**15.2.5** This Ordinance shall take effect after it is signed, published and recorded, as required by law.

**15.3 Temporary Street Closing or Blockage**

The CONTRACTOR will notify the CONSULTANT at least 72 hours prior to making any temporary street closing or blockage. This will permit orderly notification to all concerned public agencies. Specific details and restrictions on street closure or blockage are contained in the Special Conditions.

**15.4 Percentage of Work Performed by prime CONTRACTOR**

The CONTRACTOR shall perform on site, and with its own organization, Work equivalent to at least fifty (50%) percent of the total amount of Work to be performed under the Contract. This percentage may be reduced by a supplemental agreement to this Contract if, during performing the Work, the CONTRACTOR requests a reduction and the CONSULTANT determines that the reduction would be to the advantage of the OWNER.

**15.5 Clean-up**

Cleanup shall progress, to the greatest degree practicable, throughout the course of the Work. The Work will not be considered as completed, and final payment will not be made, until the right-of-way and all ground occupied or affected by the Contractor in connection with the Work has been cleared of all rubbish, equipment,

excess materials, temporary structures, and weeds. Rubbish and all waste materials of whatever nature shall be disposed of, off of the project site, in an acceptable manner. All property, both public and private, which has been damaged in the prosecution of the Work, shall be restored in an acceptable manner. All areas shall be draining, and all drainage ways shall be left unobstructed, and in such a condition that drift will not collect or scour be induced.

**15.6 General**

The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 12.1, 12.3.5, 13.3, and 15.2 and all of the rights and remedies available to OWNER and CONSULTANT thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.

**15.7 Debris Disposal**

For all LFUCG projects any trash, construction demolition debris, yard waste, dirt or debris of any kind that is removed from the project site must be disposed of in accordance with local, state, and federal regulations. The disposal site or facility must be approved in advance by the LFUCG and disposal documentation is required. The Contractor will be responsible for payment of any fines associated with improper disposal of material removed from the project site.

END OF SECTION

PART V  
SPECIAL CONDITIONS  
INDEX

- 1 BLASTING
- 2 RISK MANAGEMENT PROVISIONS –  
INSURANCE AND INDEMNIFICATION
- 3 WAGE SCALE (if applicable)
- 4 WEATHER RELATED DELAYS

1. **BLASTING** – not applicable.

2. **RISK MANAGEMENT PROVISIONS**  
**INSURANCE AND INDEMNIFICATION**

**INDEMNIFICATION AND HOLD HARMLESS PROVISION**

- (5) It is understood and agreed by the parties that Contractor hereby assumes the entire responsibility and liability for any and all damages to persons or property caused by or resulting from or arising out of any act or omission on the part of Contractor or its employees, agents, servants, owners, principals, licensees, assigns or subcontractors of any tier (hereinafter "CONTRACTOR") under or in connection with this agreement and/or the provision of goods or services and the performance or failure to perform any work required thereby.
- (6) CONTRACTOR shall indemnify, save, hold harmless and defend the Lexington-Fayette Urban County Government and its elected and appointed officials, employees, agents, volunteers, and successors in interest (hereinafter "LFUCG") from and against all liability, damages, and losses, including but not limited to, demands, claims, obligations, causes of action, judgments, penalties, fines, liens, costs, expenses, interest, defense costs and reasonable attorney's fees that are in any way incidental to or connected with, or that arise or are alleged to have arisen, directly or indirectly, from or by CONTRACTOR's performance or breach of the agreement and/or the provision of goods or services provided that: (a) it is attributable to personal injury, bodily injury, sickness, or death, or to injury to or destruction of property (including the loss of use resulting therefrom), or to or from the negligent acts, errors or omissions or willful misconduct of the CONTRACTOR; and (b) not caused solely by the active negligence or willful misconduct of LFUCG.
- (7) In the event LFUCG is alleged to be liable based upon the above, CONTRACTOR shall defend such allegations and shall bear all costs, fees and expenses of such defense, including but not limited to, all reasonable attorneys' fees and expenses, court costs, and expert witness fees and expenses, using attorneys approved in writing by LFUCG, which approval shall not be unreasonably withheld.
- (8) These provisions shall in no way be limited by any financial responsibility or insurance requirements, and shall survive the termination of this agreement.
- (9) LFUCG is a political subdivision of the Commonwealth of Kentucky. CONTRACTOR acknowledges and agrees that LFUCG is unable to provide indemnity or otherwise save, hold harmless, or defend the CONTRACTOR in any manner.

**FINANCIAL RESPONSIBILITY**

BIDDER/CONTRACTOR understands and agrees that it shall, prior to final acceptance of its bid and the commencement of any work, demonstrate the ability to assure compliance with the above Indemnity provisions and these other risk management provisions.



## **INSURANCE REQUIREMENTS**

YOUR ATTENTION IS DIRECTED TO THE INSURANCE REQUIREMENTS BELOW, AND YOU MAY NEED TO CONFER WITH YOUR INSURANCE AGENTS, BROKERS, OR CARRIERS TO DETERMINE IN ADVANCE OF SUBMISSION OF A RESPONSE THE AVAILABILITY OF THE INSURANCE COVERAGES AND ENDORSEMENTS REQUIRED HEREIN. IF YOU FAIL TO COMPLY WITH THE INSURANCE REQUIREMENTS BELOW, YOU MAY BE DISQUALIFIED FROM AWARD OF THE CONTRACT.

### **Required Insurance Coverage**

BIDDER/CONTRACTOR shall procure and maintain for the duration of this contract the following or equivalent insurance policies at no less than the limits shown below and cause its subcontractors to maintain similar insurance with limits acceptable to LFUCG in order to protect LFUCG against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by CONTRACTOR. The cost of such insurance shall be included in any bid:

<b><u>Coverage</u></b>	<b><u>Limits</u></b>
General Liability aggregate (Insurance Services Office Form CG 00 01)	\$1 million per occurrence, \$2 million or \$2 million combined single limit
Commercial Automobile Liability occurrence (Insurance Services Office Form CA 0001)	combined single, \$1 million per
Worker's Compensation	Statutory
Employer's Liability	\$100,000.00
Excess/Umbrella Liability	\$5 million

The policies above shall contain the following conditions:

- a. All Certificates of Insurance forms used by the insurance carrier shall be properly filed and approved by the Department of Insurance for the Commonwealth of Kentucky (DOI). LFUCG shall be named as an additional insured in the General Liability Policy and Commercial Automobile Liability Policy using the Kentucky DOI approved forms.
- b. The General Liability Policy shall be primary to any insurance or self-insurance retained by LFUCG.
- c. The General Liability Policy shall include a Products and Completed Operations endorsement or Premises and Operations Liability endorsement unless deemed not to apply by LFUCG.

- d. LFUCG shall be provided at least 30 days advance written notice via certified mail, return receipt requested, in the event any of the required policies are canceled or non-renewed.
- e. Said coverage shall be written by insurers acceptable to LFUCG and shall be in a form acceptable to LFUCG. Insurance placed with insurers with a rating classification of no less than Excellent (A or A-) and a financial size category of no less than VIII, as defined by the most current Best's Key Rating Guide shall be deemed automatically acceptable.

#### Renewals

After insurance has been approved by LFUCG, evidence of renewal of an expiring policy must be submitted to LFUCG, and may be submitted on a manually signed renewal endorsement form. If the policy or carrier has changed, however, new evidence of coverage must be submitted in accordance with these Insurance Requirements.

#### Deductibles and Self-Insured Programs

**IF YOU INTEND TO SUBMIT A SELF-INSURANCE PLAN IT MUST BE FORWARDED TO LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT, DIVISION OF RISK MANAGEMENT, 200 EAST MAIN STREET, LEXINGTON, KENTUCKY 40507 NO LATER THAN A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO THE RESPONSE DATE.** Self-insurance programs, deductibles, and self-insured retentions in insurance policies are subject to separate approval by Lexington-Fayette Urban County Government's Division of Risk Management, upon review of evidence of BIDDER/CONTRACTOR's financial capacity to respond to claims. Any such programs or retentions must provide LFUCG with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance coverage. If BIDDER/CONTRACTOR satisfies any portion of the insurance requirements through deductibles, self-insurance programs, or self-insured retentions, BIDDER/CONTRACTOR agrees to provide Lexington-Fayette Urban County Government, Division of Risk Management, the following data prior to the final acceptance of bid and the commencement of any work:

- a. Latest audited financial statement, including auditor's notes.
- b. Any records of any self-insured trust fund plan or policy and related accounting statements.
- c. Actuarial funding reports or retained losses.
- d. Risk Management Manual or a description of the self-insurance and risk management program.
- e. A claim loss run summary for the previous five (5) years.
- f. Self-Insured Associations will be considered.

### Safety and Loss Control

CONTRACTOR shall comply with all applicable federal, state, and local safety standards related to the performance of its works or services under this Agreement and take necessary action to protect the life, health and safety and property of all of its personnel on the job site, the public, and LFUCG.

### Verification of Coverage

BIDDER/CONTRACTOR agrees to furnish LFUCG with all applicable Certificates of Insurance signed by a person authorized by the insurer to bind coverage on its behalf prior to final award, and if requested, shall provide LFUCG copies of all insurance policies, including all endorsements.

### Right to Review, Audit and Inspect

CONTRACTOR understands and agrees that LFUCG may review, audit and inspect any and all of its records and operations to insure compliance with these Insurance Requirements.

### **DEFAULT**

BIDDER/CONTRACTOR understands and agrees that the failure to comply with any of these insurance, safety, or loss control provisions shall constitute default and that LFUCG may elect at its option any single remedy or penalty or any combination of remedies and penalties, as available, including but not limited to purchasing insurance and charging BIDDER/CONTRACTOR for any such insurance premiums purchased, or suspending or terminating the work.

00470806

3. **WAGE SCALES** – not applicable.

#### 4. WEATHER RELATED DELAYS

- A. The Project Completion date shall be established with the understanding that no extension of time will be granted for weather related delays that are within the average temperature or number of rain or snow days within a particular month. The average weather conditions shall be established by referencing the records of the National Oceanic and Atmospheric Administration (NOAA) and as defined herein.
- B. Extensions of inclement weather shall be granted only when the work affected must be on schedule at the time of delay. No time will be granted for work which is behind schedule in excess of the actual delay caused by the weather, assuming the work had been on schedule.
- C. Time granted for weather delays shall be requested on a monthly basis.
- D. The weather experienced at the project site during the contract period must be found to be unusually severe, that is more severe than the adverse weather anticipated for the project location during any given month. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.
- E. The anticipated adverse weather delays shall be based on the National Oceanic and Atmospheric Administration (NOAA) climatology ten year average for the Lexington Bluegrass Airport KY US location. The Mean Number of Days of daily precipitation using  $\geq 0.10$  will determine the base line for monthly anticipated adverse weather evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities. Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the contractor will record the occurrence of actual adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical path activities for 50 percent or more of the contractor's scheduled work date. The number of actual adverse weather delay days shall be calculated chronologically from the first to the last day of each month, and be recorded as full days. The number of actual adverse weather days greater than the number of anticipated adverse weather days, listed above, shall be the number of unusually severe weather days for the purposes of any contract extensions (actual adverse weather days - anticipated adverse weather days = unusually severe weather days.)
- F. Definitions:
1. "Unusually severe weather" - weather that is more severe than the adverse weather anticipated for the season or location involved.
  2. "Adverse weather" - atmospheric conditions at a definite time and place that are unfavorable to construction activities.

END OF SECTION

**PART VI**  
**CONTRACT AGREEMENT**  
**INDEX**

1.	SCOPE OF WORK.....	CA-2
2.	TIME OF COMPLETION.....	CA-2
3.	ISSUANCE OF WORK ORDERS .....	CA-2
4.	THE CONTRACT SUM .....	CA-2
5.	PROGRESS PAYMENTS .....	CA-3
6.	ACCEPTANCE AND FINAL PAYMENT.....	CA-3
7.	THE CONTRACT DOCUMENTS.....	CA-3
8.	EXTRA WORK.....	CA-3
9.	ENUMERATION OF SPECIFICATIONS AND DRAWINGS.....	CA-4

**PART VI**

**CONTRACT AGREEMENT**

THIS AGREEMENT, made on the 11<sup>th</sup> day of February, 2020, by and between **Lexington-Fayette Urban County Government**, acting herein called "OWNER" and C3 Mechanical, doing business as \*(an individual) (~~a partnership~~) (a corporation) located in the City of Bardstow, County of Nelson, and State of Kentucky, hereinafter called "CONTRACTOR."

WITNESSETH: That the CONTRACTOR and the OWNER in consideration of Two hundred twenty-one thousand Dollars and Zero Cents (\$ 221,000.00 ) quoted in the proposal by the CONTRACTOR, dated \_\_\_\_\_, hereby agree to commence and complete the construction described as follows:

**1. SCOPE OF WORK**

The CONTRACTOR shall furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions, and the Special Conditions of the Contract, the Specifications, IonWave Q&A and Contract Documents therefore as prepared by Paladin Engineering for Lexington-Fayette Urban County Government for Installation of Water and Gas Lines for Material Recycling Facility project.

**2. TIME OF COMPLETION**

The time period estimated and authorized by the OWNER for the proper execution of the Work by the Contract, in full, is hereby fixed as one hundred twenty (120) calendar days to substantial completion and seven (7) days thereafter to final completion. The time shall begin in accordance with the Notice to Proceed provided by OWNER.

**3. ISSUANCE OF WORK ORDERS**

Notice to begin Work will be given in whole or for part of the Work as determined by the OWNER pending the availability of funds. The order of construction will be as determined by the Engineer after consultation with the CONTRACTOR and the OWNER.

**4. THE CONTRACT SUM**

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the Contract, as quoted in the proposal, subject to any additions and deductions, as provided therein.

## **5. PROGRESS PAYMENTS**

The OWNER shall make payments on account of the Contract, as provided in accordance with the General Conditions, as estimated by the Engineer, less the aggregate of previous payments.

## **6. ACCEPTANCE AND FINAL PAYMENT**

Final payment shall be due within ninety (90) days after completion of the Work, provided the Work be then fully completed and the Contract fully accepted.

Before issuance of final certificate, the CONTRACTOR shall submit evidence satisfactory to the Engineer that all payrolls, material bills, and other indebtedness connected with the Work has been paid.

If, after the Work has been substantially completed, full completion thereof is materially delayed through no fault of the CONTRACTOR, and the ENGINEER so certifies, the OWNER shall upon certificate of the ENGINEER, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

## **7. THE CONTRACT DOCUMENTS**

The Advertisement for Bids, Information for Bidders, the General Conditions, Performance and Payment Bonds, Contract Agreement, Special Conditions, Technical Specifications, any and all Addenda, IonWave Q&A, and Proposal, and Plan Drawings form the Contract, and they are fully a part of the Contract as if hereto attached or herein repeated.

## **8. EXTRA WORK**

The OWNER, without invalidating the Contract, may order extra work or make changes by altering, adding to or deducting from the Work, the Contract Sum being adjusted accordingly. All such Work shall be executed and paid for in accordance with the General Conditions, which is a part of this Contract.



9. THE FOLLOWING IS AN ENUMERATION OF THE SPECIFICATIONS AND DRAWINGS (CONTRACT DOCUMENTS):

**SPECIFICATIONS**

SECTION NO.	TITLE	PAGES
I	Advertisement for Bids	AB 1 thru 5
II	Information for Bidders	IB 1 thru 10
III	Form of Proposal	P 1 thru 35
IV	General Conditions	GC 1 thru 52
V	Special Conditions	SC 1 thru 8
VI	Contract Agreement	CA 1 thru 6
VII	Performance and Payment Bonds	PB 1 thru 7
VIII	Addenda	AD 1 thru 1
IX	Technical Specifications	

<u>Special Conditions</u>	<u>PAGES</u>
Section 01 0000 - Special Conditions.....	1 - 6

<u>DIVISION 23 – HVAC</u>	<u>PAGES</u>
Section 23 0000 - General Provisions for HVAC Systems .....	1 - 20
Section 23 0517 - Sleeves and Sleeve Seals for HVAC Piping.....	1 - 1
Section 23 0519 - Meters & Gauges for HVAC Piping .....	1 - 6
Section 23 0523.12 Ball Valves for HVAC Piping.....	1 - 6
Section 23 0529 - Hangers & Supports for HVAC Piping & Equipment .....	1 - 12
Section 23 0553 - Identification for HVAC Piping & Equipment.....	1 - 8
Section 23 0593 - Testing, Adjusting, & Balancing for HVAC .....	1 - 13
Section 23 0700 - HVAC Insulation.....	1 - 21
Section 23 2113 - Hydronic Piping .....	1 - 11
Section 23 2116 - Hydronic Specialties.....	1 - 6
Section 23 2123 - Hydronic Pumps .....	1 - 4
Section 23 5216 - Fire-Tube Condensing Boilers – Annex Building.....	1 - 12
Section 23 5216 - Fire-Tube Condensing Boilers – Carnegie Center .....	1 - 10
Section 23 05233.19 Copper Water-Tube Boilers – Fleet Management.....	1 - 10

<u>DIVISION 26 – ELECTRICAL</u>	<u>PAGES</u>
Section 26 0000 - General Electrical Provisions .....	1 - 11
Section 26 0500 - Common Work Results for Electrical .....	1 - 2
Section 26 0519 - Low Voltage Electrical Power Conductors and Cables.....	1 - 3
Section 26 0529 - Hangers and Supports for Electrical Systems.....	1 - 3
Section 26 0533 - Raceway and Boxes for Electrical Systems .....	1 - 5
Section 26 0553 - Identification for Electrical Systems .....	1 - 5

**PLAN DRAWINGS –**

- M000 – MECHANICAL LEGEND AND GENERAL NOTES**
- M001 – GOVERNMENT ANNEX – FLOOR PLAN**
- M002 – FLEET MANAGEMENT – FLOOR PLAN**
- M003 – CARNEGIE CENTER – FLOOR PLAN**
- M101 – GOVERNMENT ANNEX FLOW DIAGRAM**
- M102 – FLEET MANAGEMENT FLOW DIAGRAM**
- M103 – CARNEGIE CENTER FLOW DIAGRAM**
- M201 – MECHANICAL SCHEDULES & DETAILS**

IN WITNESSETH WHEREOF, the parties hereto have executed this Contract as of the date and year above written.

(Seal)

Lexington-Fayette Urban County Government.  
Lexington, Kentucky  
(Owner)

ATTEST:

Mackenzie Sommer  
Clerk of the Urban County Council

BY: Linda Gorton  
Linda Gorton MAYOR

Office Manager  
(Witness)

General Manager  
(Title)

(Seal)

C-3 MECHANICAL  
(Contractor)

Charina Dyer  
(Secretary)\*

BY: Jim Coomes

Arita Coomes  
(Witness)

J M  
(Title)

166 Buchanan Ave. Bardstow, KY 40004  
(Address and Zip Code)

IMPORTANT: \*Strike out any non-applicable terms.

Secretary of the Owner should attest. If the CONTRACTOR is corporation, Secretary should attest. Give proper title of each person-executing Contract.



# AIA Document A312™ - 2010

Bond # GRKY45545

## Performance Bond

**CONTRACTOR:**

*(Name, legal status and address)*

**Olympic Construction, LLC**  
216 Brome Dr.  
Nicholasville, KY 40356

**OWNER:**

*(Name, legal status and address)*

**Lexington-Fayette Urban County Government**  
200 E. Main St., 3rd Fl  
Lexington, KY 40507  
CONSTRUCTION CONTRACT

Date:

Amount: **\$50,200.00**

**SURETY:**

*(Name, legal status and principal place of business)*

**Granite Re, Inc.**  
14001 Quailbrook Dr  
Oklahoma City, OK 73134

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

AIA Document A312-2010 combines two separate bonds, a Performance Bond and a Payment Bond, into one form. This is not a single combined Performance and Payment Bond

Description: **CONCRETE SLAB REPLACEMENT - FIRE STATIONS 16**

*(Name and location)*

**BOND**

Date:

*(Not earlier than Construction Contract Date)*

Amount: **\$50,200.00**

Modifications to this Bond:  None  See Section 16

**CONTRACTOR AS PRINCIPAL**

**Olympic Construction, LLC**  
Company: (Corporate Seal)

And Title: By: 

*(Any additional signatures appear on the last page of this Performance Bond)*

*(FOR INFORMATION ONLY— Name, address and telephone)*

**AGENT or BROKER:**

**Van Meter Insurance Group**  
1240 Fairway St  
Bowling Green, KY  
(270)781-2020

**SURETY**

**Granite Re, Inc.**  
Company:

(Corporate Seal)

And Title: By: 

Attorney-in-Fact

**OWNER'S REPRESENTATION:**

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- ..2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 the Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

#### § 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

<b>CONTRACTOR AS PRINCIPAL</b>	<b>SURETY</b>
Company: _____ (Corporate Seal)	Company: _____ (Corporate Seal)
Signature: _____	Signature: _____
Name and Title: _____	Name and Title: _____
Address: _____	Address: _____
Caution: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will be not be obscured.	

AIA Document A312™ — 2010. The American Institute of Architects 4



# AIA Document A312™ – 2010

Bond # GRKY45545

## Payment Bond

**CONTRACTOR:**

*(Name, legal status and address)*

**Olympic Construction, LLC**  
216 Brome Dr.  
Nicholasville, KY 40356

**OWNER:**

*(Name, legal status and address)*

**Lexington-Fayette Urban County Government**  
200 E. Main St., 3rd Fl  
Lexington, KY 40507  
CONSTRUCTION CONTRACT

Date:

Amount: **\$50,200.00**

**SURETY:**

*(Name, legal status and principal place of business)*

**Granite Re, Inc.**  
14001 Quailbrook Dr  
Oklahoma City, OK 73134

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

AIA Document A312-2010 combines two separate bonds, a Performance Bond and a Payment Bond, into one form. This is not a single combined Performance and Payment Bond

Description: **CONCRETE SLAB REPLACEMENT - FIRE STATIONS 16**

*(Name and location)*

**BOND**


Date:  
*(Not earlier than Construction Contract Date)*

Amount: **\$50,200.00**

Modifications to this Bond:  None  See Section 16

**CONTRACTOR AS PRINCIPAL**

**Olympic Construction, LLC**  
Company: \_\_\_\_\_ (Corporate Seal)

And Title: By:   
*(Any additional signatures appear on the last page of this Performance Bond)*

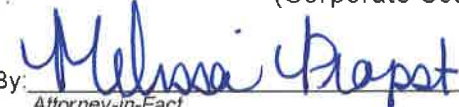
*(FOR INFORMATION ONLY— Name, address and telephone)*

**AGENT or BROKER:**

**Van Meter Insurance Group**  
1240 Fairway St  
Bowling Green, KY  
(270)781-2020

**SURETY**

**Granite Re, Inc.**  
Company: \_\_\_\_\_ (Corporate Seal)

And Title: By:   
*Attorney-in-Fact*

**OWNER'S REPRESENTATION:**

*(Architect, Engineer or other party)*



§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- 1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- 2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to

Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

#### § 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- 1 the name of the Claimant;
- 2 the name of the person for whom the labor was done, or materials or equipment furnished;
- 3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- 4 a brief description of the labor, materials or equipment furnished;
- 5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- 6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- 7 the total amount of previous payments received by the Claimant; and
- 8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)	
<b>CONTRACTOR AS PRINCIPAL</b>	<b>SURETY</b>
Company: _____ (Corporate Seal)	Company: _____ (Corporate Seal)
Signature: _____	Signature: _____
Name and Title: _____	Name and Title: _____
Address: _____	Address: _____
Caution: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will be not be obscured.	
AIA Document A312™ — 2010. The American Institute of Architects	
<b>8</b>	

# GRANITE RE, INC.

## GENERAL POWER OF ATTORNEY

**Know all Men by these Presents:**

That GRANITE RE, INC., a corporation organized and existing under the laws of the State of OKLAHOMA and having its principal office at the City of OKLAHOMA CITY in the State of OKLAHOMA does hereby constitute and appoint:

STEVEN M. BAAS; BRIAN L. SEWELL; MELISSA PROPST; BENJAMIN P. DYCUS; ADAM HARRIS; KENNY ALBERT; LAKALA CARTER its true and lawful Attorney-in-Fact(s) for the following purposes, to wit:

To sign its name as surety to, and to execute, seal and acknowledge any and all bonds, and to respectively do and perform any and all acts and things set forth in the resolution of the Board of Directors of the said GRANITE RE, INC. a certified copy of which is hereto annexed and made a part of this Power of Attorney; and the said GRANITE RE, INC. through us, its Board of Directors, hereby ratifies and confirms all and whatsoever the said:

STEVEN M. BAAS; BRIAN L. SEWELL; MELISSA PROPST; BENJAMIN P. DYCUS; ADAM HARRIS; KENNY ALBERT; LAKALA CARTER may lawfully do in the premises by virtue of these presents.

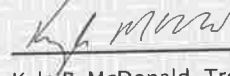
In Witness Whereof, the said GRANITE RE, INC. has caused this instrument to be sealed with its corporate seal, duly attested by the signatures of its President and Secretary/Treasurer, this 14<sup>th</sup> day of June, 2017.

STATE OF OKLAHOMA )  
                                  ) SS:  
COUNTY OF OKLAHOMA )



  
\_\_\_\_\_

Kenneth D. Whittington, President

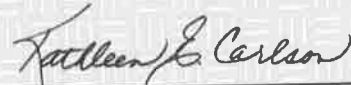
  
\_\_\_\_\_

Kyle P. McDonald, Treasurer

On this 14<sup>th</sup> day of June, 2017, before me personally came Kenneth D. Whittington, President of the GRANITE RE, INC. Company and Kyle P. McDonald, Secretary/Treasurer of said Company, with both of whom I am personally acquainted, who being by me severally duly sworn, said, that they, the said Kenneth D. Whittington and Kyle P. McDonald were respectively the President and the Secretary/Treasurer of GRANITE RE, INC., the corporation described in and which executed the foregoing Power of Attorney; that they each knew the seal of said corporation; that the seal affixed to said Power of Attorney was such corporate seal, that it was so fixed by order of the Board of Directors of said corporation, and that they signed their name thereto by like order as President and Secretary/Treasurer, respectively, of the Company.

My Commission Expires:  
August 8, 2021  
Commission #: 01013257



  
\_\_\_\_\_

Notary Public

### GRANITE RE, INC.


#### Certificate

THE UNDERSIGNED, being the duly elected and acting Secretary/Treasurer of Granite Re, Inc., an Oklahoma Corporation, HEREBY CERTIFIES that the following resolution is a true and correct excerpt from the July 15, 1987, minutes of the meeting of the Board of Directors of Granite Re, Inc. and that said Power of Attorney has not been revoked and is now in full force and effect.

"RESOLVED, that the President, any Vice President, the Secretary, and any Assistant Vice President shall each have authority to appoint individuals as attorneys-in-fact or under other appropriate titles with authority to execute on behalf of the company fidelity and surety bonds and other documents of similar character issued by the Company in the course of its business. On any instrument making or evidencing such appointment, the signatures may be affixed by facsimile. On any instrument conferring such authority or on any bond or undertaking of the Company, the seal, or a facsimile thereof, may be impressed or affixed or in any other manner reproduced; provided, however, that the seal shall not be necessary to the validity of any such instrument or undertaking."

IN WITNESS WHEREOF, the undersigned has subscribed this Certificate and affixed the corporate seal of the Corporation this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_



  
\_\_\_\_\_

Kyle P. McDonald, Secretary/Treasurer

IN WITNESS WHEREOF, this instrument is executed in \_\_\_\_\_ each one of which shall be  
deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.  
(number)

ATTEST:

\_\_\_\_\_  
(Principal) Secretary

\_\_\_\_\_  
Principal

BY: \_\_\_\_\_ (s)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
Witness as to Principal

\_\_\_\_\_  
(Address)

ATTEST:

\_\_\_\_\_  
(Surety) Secretary

\_\_\_\_\_  
Surety

BY: \_\_\_\_\_  
Attorney-in-Fact

\_\_\_\_\_  
(Address)

(SEAL)

\_\_\_\_\_  
Witness as to Surety

\_\_\_\_\_  
(Address)

TITLE: \_\_\_\_\_  
Surety

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

NOTE: The number of executed counterparts of the bond shall coincide with the number of executed counterparts of the Contract.

**PART VII**  
**PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENT: that

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

a \_\_\_\_\_, hereinafter  
(Corporation, Partnership or Individual)

called Principal, and \_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT  
200 East Main Street, Third Floor  
Lexington, Kentucky 40507

Obligee, hereinafter called OWNER, for the use and benefit of claimants as hereinafter defined, in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal by written agreement is entering into a Contract with OWNER for \_\_\_\_\_ (project name) in accordance with drawings and specifications prepared by: \_\_\_\_\_ (the Engineer) which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

- I. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the OWNER that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The OWNER shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
  - (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: The Principal, the OWNER, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the Work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the Work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, OWNER, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.
  - (b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
  - (c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.
4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

IN WITNESS WHEREOF, this instrument is executed in \_\_\_\_\_ counterparts, each one of  
(number)

which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

ATTEST:

\_\_\_\_\_  
(Principal) Secretary

\_\_\_\_\_  
(Principal)

(SEAL)

BY: \_\_\_\_\_ (s)

\_\_\_\_\_  
(Address)  
\_\_\_\_\_

\_\_\_\_\_  
(Witness to Principal)

\_\_\_\_\_  
(Address)  
\_\_\_\_\_

ATTEST:

\_\_\_\_\_  
(Surety)

\_\_\_\_\_  
(Surety) Secretary

BY: \_\_\_\_\_  
(Attorney-in-Fact)

(SEAL)

\_\_\_\_\_  
Witness as to Surety

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Address)  
\_\_\_\_\_

NOTE: The number of executed counterparts of the bond shall coincide with the number of executed counterparts of the Contract.

END OF SECTION



**PART VIII**

**ADDENDA**

All addenda issued during the bidding of the Project will be reproduced in the signed Contract Documents, on the pages following this heading sheet.

<u>Addendum Number</u>	<u>Title</u>	<u>Date</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

## IX. TECHNICAL SPECIFICATIONS

- H. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm unless equipment is provided with its own identification.
1. Labeling Instructions:
    - a. Indoor Equipment: Engraved, laminated acrylic or melamine plastic label, punched or drilled for mechanical fasteners. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
    - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label
    - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    - d. Unless labels are provided with self-adhesive means of attachment, fasten them with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
  2. Equipment To Be Labeled:
    - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a [self-adhesive, engraved,] [engraved,] laminated acrylic or melamine label.
    - b. Enclosures and electrical cabinets.
    - c. Switchgear.
    - d. Switchboards.
    - e. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
    - f. Substations.
    - g. Enclosed switches.
    - h. Enclosed circuit breakers.
    - i. Enclosed controllers.
    - j. Variable-speed controllers.
    - k. Push-button stations.

END OF SECTION 26 0553

- B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase-[ and Voltage-Level] Identification, 600 V or Less: Use colors listed below for ungrounded [service] [feeder] [and] [branch-circuit] conductors.
    - a. Color shall be factory applied.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
    - c. Colors for 480/277-V Circuits:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
- C. Install instructional sign, including the color code for grounded and ungrounded conductors using adhesive-film-type labels.
- D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker-tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
  - 1. Limit use of underground-line warning tape to direct-buried cables.
  - 2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- F. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- G. Arc Flash Warning Labeling: Self-adhesive thermal transfer vinyl labels.
  - 1. Comply with NFPA 70E and ANSI Z535.4.
  - 2. Comply with Section 260574 "Overcurrent Protective Device Arc-Flash Study" requirements for arc-flash warning labels.

### 3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- G. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- H. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- I. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench [or concrete envelope] exceeds 16 inches (400 mm) overall.

### 3.3 IDENTIFICATION SCHEDULE

- A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high black letters on 20-inch (500-mm) centers. Stop stripes at legends. Apply stripes to the following finished surfaces:
  - 1. Floor surface directly above conduits running beneath and within 12 inches (300 mm) of a floor that is in contact with earth or is framed above unexcavated space.
  - 2. Wall surfaces directly external to raceways concealed within wall.
  - 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

## 2.2 LABELS

### A. Self-Adhesive Labels:

- 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
- 2. Preprinted 3-mil- (0.08-mm-) thick, [vinyl flexible label with acrylic pressure-sensitive adhesive.
  - a. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized to fit the raceway diameter, such that the clear shield overlaps the entire printed legend.

## 2.3 Signs

### A. Laminated Acrylic or Melamine Plastic Signs:

- 1. Engraved legend.
  - 2. Thickness:
    - a. For signs up to 20 sq. inches (129 sq. cm), minimum 1/16-inch- (1.6-mm-).
    - b. For signs larger than 20 sq. inches (129 sq. cm), 1/8 inch (3.2 mm) thick.
    - c. Engraved legend with black letters on white face.
    - d. Punched or drilled for mechanical fasteners.
    - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Fasteners for Labels and Signs: Stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

## SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Warning labels and signs.
5. Instruction signs.
6. Miscellaneous identification products.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.

- C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

- D. Delegated-Design Submittal: For arc-flash hazard study.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1 and IEEE C2.
- B. Comply with NFPA 70.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 0533



- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- G. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- K. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- L. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- M. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- N. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- O. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- P. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 18 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC.
- Q. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

### PART 3 - EXECUTION

#### 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
  2. Concealed Conduit, Aboveground: GRC.
  3. Underground Conduit: RNC, Type EPC-40-PVC
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  5. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. All locations: GRC. Raceway locations include the following:
  2. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
  2. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- F. Install surface raceways only where indicated on Drawings.

#### 3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

- D. EMT: Comply with ANSI C80.3 and UL 797.
- E. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
  - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
  - 2. Fittings for EMT:
    - a. Material: Steel.
    - b. Type: Compression type for Conduit sizes 2-1/2" and smaller, set-screw or compression type for conduit sizes larger than 2-1/2".
- G. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## 2.2 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
  - 1. Adalet.
  - 2. Cooper Technologies Company; Cooper Crouse-Hinds.
  - 3. EGS/Appleton Electric.
  - 4. Erickson Electrical Equipment Company.
  - 5. FSR Inc.
  - 6. Hoffman.
  - 7. Hubbell Incorporated.
  - 8. Milbank Manufacturing Co.
  - 9. Mono-Systems, Inc.
  - 10. O-Z/Gedney.
  - 11. RACO; Hubbell.
  - 12. Robroy Industries.
  - 13. Spring City Electrical Manufacturing Company.
  - 14. Stahlin Non-Metallic Enclosures.
  - 15. Thomas & Betts Corporation.
  - 16. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

## SECTION 26 0533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Metal conduits, tubing, and fittings.
  - 2. Boxes, enclosures, and cabinets.
- B. Related Requirements:

#### 1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

### PART 2 - PRODUCTS

#### 2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
  - 1. Allied Tube & Conduit.
  - 2. O-Z/Gedney.
  - 3. Republic Conduit.
  - 4. Robroy Industries.
  - 5. Thomas & Betts Corporation.
  - 6. Western Tube and Conduit Corporation.
  - 7. Wheatland Tube Company.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.

Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To New Concrete: Bolt to concrete inserts.
  2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  3. To Existing Concrete: Expansion anchor fasteners.
  4. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.
- F. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 0529

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
5. Hanger Rods: Threaded steel.

### PART 3 - EXECUTION

#### 3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems unless requirements in this Section are stricter.
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for conduit as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 50 percent in future without exceeding specified design load limits.
  1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

#### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, RMCs may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits.

## SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

A. Section Includes:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame Rating: Class 1.
2. Self-extinguishing according to ASTM D 635.

#### 2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4 factory-fabricated components for field assembly.
1. Material: Galvanized steel.
  2. Channel Width: 1-5/8 inches (41.25 mm).
  3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  4. Channel Dimensions: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
- G. Complete cable tray systems installation according to Section 260536 "Cable Trays for Electrical Systems" prior to installing conductors and cables.

### 3.3 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

### 3.4 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

END OF SECTION 26 0519



- B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2

## 2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Gardner Bender.
  - 3. Hubbell Power Systems, Inc.
  - 4. Ideal Industries, Inc.
  - 5. IlSCO; a branch of Bardes Corporation.
  - 6. NSi Industries LLC.
  - 7. O-Z/Gedney; a brand of the EGS Electrical Group.
  - 8. 3M; Electrical Markets Division.
  - 9. Tyco Electronics.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

## 2.3 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid or stranded for No. 12 AWG and smaller; stranded for No. 8 AWG and larger.

### 3.2 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

## SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

##### A. Section Includes:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

##### B. Related Requirements:

1. Section 260513 "Medium-Voltage Cables" for single-conductor and multiconductor cables, cable splices, and terminations for electrical distribution systems with 2001 to 35,000 V.

#### 1.3 DEFINITIONS

- A. VFC: Variable frequency controller.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

### PART 2 - PRODUCTS

#### 2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpha Wire.
2. Belden Inc.
3. Encore Wire Corporation.
4. General Cable Technologies Corporation.
5. Southwire Incorporated.

- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

END OF SECTION 26 0500

## SECTION 26 0500 - COMMON WORK RESULTS FOR ELECTRICAL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Electrical equipment coordination and installation.
- 2. Common electrical installation requirements.

#### 1.3 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:

- 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
- 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
- 3. To allow right of way for piping and conduit installed at required slope.
- 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

- B. Coordinate sleeve selection and application with selection and application of firestopping.

### PART 2 - PRODUCTS

### PART 3 - EXECUTION

#### 3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

airtight rooms. Seal penetrations both above and below suspended ceilings. Seal any openings left by removal of any existing or new work. Caulking used shall be the same type as specified in the Architectural Specifications.

- B. Patch around rough openings of penetrations to form a tight fit before caulking.

#### 1.44 LINTELS:

- A. General: Provide lintels for penetration of electrical systems through masonry walls if not provided elsewhere in these specifications. Lintels shall be type and size required to span the required openings.
- B. Lintels will not be required for openings 16 inches length or less.

#### 1.45 ELECTRICAL WORK IN EXISTING (RENOVATED) AREAS

- A. In existing areas where new work is shown, remove all existing exposed conduits, wiremold, surface and flush outlet boxes, wiring devices, fixtures, panels, etc., not required for new arrangement.
- B. Maintain and restore, if interrupted by removals or in path of new construction, all circuits, conduits and feeders passing through and serving undisturbed areas (shown or not shown).
- C. Install all new work as indicated. Flush outlet boxes may be reused if at proper height, location and in good condition. Existing concealed conduits may be reused if in good condition, circuitry shown on plans shall govern. All other materials removed shall be removed from the job site or turned over to the Owner.
- D. Where any existing outlet (electric, telephone, nurse call, TV, etc.) is noted or required to be removed, the Contractor under this Division shall connect conduit, pull in new conductors and reconnect as required for feed-thru of circuits to ensure all circuits downstream from removed outlets will remain operational.

#### PART 2 - PRODUCTS

- 2.1 Not Applicable

#### PART 3 - EXECUTION

- 3.1 Not Applicable

END OF SECTION 26 0000

1.38 STRUCTURAL RESPONSIBILITY

- A. The Contractor shall be responsible for properly shoring, bracing, supporting, etc., any existing and/or new construction to guard against cracking, settling, collapsing, displacing, or weakening. No structural member shall be cut or otherwise weakened in any manner without the written consent of the Architect/Engineer.
- B. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Owner or Architect/Engineer, without cost to either the Owner or the Architect/Engineer.

1.39 HAZARDOUS MATERIALS

- A. Refer to Special Conditions, Section 00801.

1.40 ASBESTOS

- A. If during the course of his work the Contractor observes the existence of asbestos, or asbestos-bearing materials, the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Engineer, determine a further course of action.

1.41 OWNER INSTRUCTION

- A. Conduct a full-day walk-through instruction seminar for the Owner's personnel to be involved in the continued operation and maintenance of mechanical equipment and systems. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.
- B. All training shall be video recorded for future use by the Owner in training new personnel.

1.42 OWNER OCCUPANCY

- A. Full Owner Occupancy: The Owner will occupy the site and building surrounding construction area during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work to minimize interference with the Owner's operations. Perform portions of work on premium time if required to do so by the Owner.

1.43 PROVIDING AIRTIGHT SPACES

- A. In rooms where room walls extend above ceiling to the floor or roof above, caulk around all new and existing penetrations through walls, ceilings, floors and/or roofs to make completely

### 1.33 ELECTRICAL DRAWINGS AND SPECIFICATIONS

- A. The Drawings and Specifications are intended to cover all work enumerated under the respective headings. The Drawings are diagrammatic only. The Contractor shall not take advantage of conflict or error between the Drawings and Specifications, but shall request a clarification of such before making his proposal.

### 1.34 ARCHITECTURAL DRAWINGS AND SPECIFICATIONS

- A. The Contractor shall refer to the Architectural and Structural Drawings and Specifications for the general construction of the building, for floor and ceiling heights, for location of walls, partitions, beams, etc., and shall be guided accordingly for the setting of all sleeves, inserts and equipment.
- B. Under no circumstances shall a Contractor scale the Drawings for the location of equipment and work.

### 1.35 DISCREPANCIES

- A. If any discrepancies occur between the accompanying Drawings and these Specifications and Drawings and Specifications covering other Contracts, report such discrepancies to the Architect/Engineer far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of piping, ductwork, conduit and equipment not installed in accordance with the above instructions, and which interferes with work and equipment of other Contractors.

### 1.36 RESTORATION OF SURFACES

- A. The Contractor shall restore to their original conditions all paving, curbing, sidewalks, surfaces, drainage ditches, and structures, fences, shrubs, and other items damaged or removed by his operations. Replacement and repairs shall be in accordance with good construction practice and shall match material employed in the original construction of the item to be replaced.

### 1.37 SHOP DRAWINGS

- A. Equipment and material shop drawings, catalog sheets and descriptive data shall be submitted, each with a cover sheet first listing the project name, the Contractors, Architect and Engineer, and date of submittal. Next the section of the Specifications shall be listed stating the section for which the equipment is being proposed. Next, outline equipment showing compliances to the specification requirements, such as capacities, special accessories, options, model, sizes, etc. Reverse side of cover sheet shall be left for Contractors' stamps showing review and space for Engineers' review stamp. Catalog sheets shall be marked showing equipment proposed.
- B. Materials submitted without cover sheet or Contractor review stamp and without required information will be returned to the Contractor.

1.30 SUPERVISION

- A. The Contractor shall personally supervise the work or have a competent superintendent, satisfactory to the Architect/Engineer and Owner on the work at all times during progress with full authority to act.
- B. The Contractor shall lay out his work and be responsible for any necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so. Work at the site of the project shall be observed by the Architect/Engineer or his representative.
- C. Final Inspection: At the time of final inspection of the work performed under this Contract, systems shall be complete in every respect and in perfect operating condition. Surplus materials of every character resulting from work of this section shall have been removed. Sanitary sewers shall be free from sand, silt or other obstructions. Any defect discovered in the utilities subsequent to this inspection shall have been corrected.

1.31 INTERPRETATIONS

- A. Wherever in these Specifications, the term "General Contractor" is used, it shall be understood to mean the Contractor engaged in the general construction portion of the work. Similarly, wherever the "Heating and Air Conditioning Contractor," "Plumbing Contractor," "Sprinkler Contractor," or "Contractor for Division 26" is mentioned as such, it shall be understood to refer to the Contractor engaged in that particular branch of the work.
  - 1. It shall also be clearly understood that all Contractors for all branches of the work shall cooperate with each other in the coordination of the construction.
  - 2. It shall also be clearly understood that the entire construction is one responsibility and all Contractors for all branches of the work shall cooperate with each other in the coordination of the construction.

1.32 WORKING DRAWINGS

- A. Scale of drawings is approximate. Do not scale the drawings to determine locations of electrical work. Exact locations, dimensions and elevations shall be governed by field conditions. Make field measurements of building before fabricating or installing equipment or materials.
- B. Drawings are based on physical dimensions of one or more manufacturer's equipment. Other approved equipment shall be of such dimensions that it can be readily installed in available space, leaving ample clearance for proper maintenance.
- C. Intent of drawings is to show systems and sizes. Drawings do not necessarily show all required offsets. Work shall be installed to conform with space limitations. Offsets, transitions, fittings, etc., shall be provided as part of the Contract where required to attain this objective.



1.25 REMOVAL OF EXISTING EQUIPMENT AND SALVAGE

- A. The Contractor for this Division shall remove all exposed electrical equipment and materials that are not to be reused in the new electrical arrangement.
- B. All other equipment and materials shall become the property of the Contractor and shall be removed from the site.

1.26 ALTERNATES

- A. The Contractor under this Division shall refer to Division 1 of the Specifications for a complete description of the Alternates. Note that all alternates are ADDITIVE (DEDUCTIVE). The work detailed on the Drawings and specified are for the complete project, including all Alternates.

1.27 CLEANING

- A. After the Architect /Engineer has completed examination, the Contractor shall remove all stickers, tags, etc., and shall thoroughly clean all equipment, fixtures and materials installed under his section of the work.
- B. Surplus material, rubbish and equipment resulting from the work shall be removed from the building and premises by the respective Contractors upon completion of the work in accordance with the General Conditions.

1.28 PAINTING

- A. All exposed conduit and equipment installed under this Division, where required, shall be thoroughly cleaned and readied for painting.
- B. Painting in new areas and in existing building areas shown to be remodeled on the Architectural Drawings will be done by the Contractor under Division 9.
- C. Painting in all other areas of the existing building which have been cut and patched under this Division shall be painted to match exactly the existing adjacent surfaces. Where a match cannot be made, the entire surface shall be repainted. All painting shall be performed in strict accordance with the Specifications in Division 9. All exposed electrical work in these areas shall also be painted to match adjacent surfaces.

1.29 WORKMANSHIP

- A. Work shall be performed by mechanics skilled in their respective trades and shall present appearance typical of best trade practice. Work not installed in this manner shall be repaired, removed or replaced, or otherwise remedied as directed by the Architect/Engineer.

1.21 WORKMANSHIP

- A. Competent workmen shall be employed on all phases of the work. Poor workmanship will be rejected and will constitute cause for removal of the individual performing the work.

1.22 COOPERATION WITH OTHER CONTRACTORS

- A. Each Contractor shall demand and examine all Drawings and Specifications pertaining to the construction before installing the work described and shown under these Drawings and Specifications. Each Contractor shall cooperate with all other Contractors in locating piping, conduit, openings, chases and equipment in order to avoid conflict with any other Contractor's work. All work installed above a lay-in ceiling must be coordinated and installed so there is a minimum of 4 inches between the top of the ceiling grid and the bottom of the installation.
- B. If any discrepancies occur between the accompanying Drawings and these Specifications and Drawings and Specifications covering other Contracts, each Contractor shall report such discrepancies to the Engineer far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of piping, ductwork, conduit and equipment not installed in accordance with the above instructions, and which interferes with work and equipment of other Contractors.

1.23 MAINTAINING EXISTING FACILITIES

- A. The existing services to and within the building shall be maintained during the construction without interruption, except for short periods of time that may be required to make changeover connections. The Architect /Engineer shall be notified in advance and an agreement reached as to when the connections are to be made and the length of time the particular facility will be out of service.
- B. All temporary connections that may be necessary to continue these services shall be properly made and maintained in a safe and substantial manner until the permanent facilities are activated. Upon completion, remove all temporary work, and completely restore all areas that may be affected.
- C. At any time the existing building facilities are interrupted, the Contractor shall work continuously until the permanent services are restored. The Contractor shall pay for all premium time necessary to comply with these requirements.

1.24 GUARANTY CERTIFICATES

- A. Certificates of guaranty accompanying those items of mechanical and electrical equipment on which manufacturer's guarantees have been specified, or are normally provided, shall be completely executed by the Contractor and delivered to the Architect before completion of the work.

#### 1.18 PERMITS, CODES AND APPROVALS

##### A. Permits

1. All permits necessary for the complete Electrical systems shall be obtained by the Contractor for Division 26 from the authorities governing such work. The cost of all permits shall be borne by this Contractor.

##### B. Codes and Rules and Regulations

1. The minimum standard for all electrical work shall be the latest revision of the National Electrical Code. Whenever and wherever state and/or local laws and/or regulations require a higher standard than the current National Electrical Code, then these laws and/or regulations shall be followed.

##### C. Approvals

1. All work must be approved by the Architect /Engineer and the Owner before final payment will be made.

#### 1.19 INSPECTIONS

- A. Electrical inspections will be performed throughout the course of construction by an electrical inspector from the State Fire Marshal's office. Upon project completion, and when wiring, equipment and fixtures have been installed, inspected and found to be in compliance with the National Electrical Code, the inspector will issue a certificate of compliance to the Owner. The cost of the Electrical Inspection is the responsibility of Contractor.
- B. The Contractor under this Division shall furnish electrical inspection by the inspection agency having jurisdiction. The Electrical Inspector shall be notified in writing immediately upon the start of the work and a copy of the notice shall be sent to the Architect/Engineer. All costs incidental to the electrical inspection shall be paid by the Contractor for Division 26.
- C. The inspection shall be scheduled for rough as well as finished work. The rough inspection shall be divided into as many inspections as may become necessary to cover all roughing-in. A punch list inspection shall be scheduled with a representative of the Architect /Engineer present. The punch list inspection shall be made with panelboard and junction box covers removed.
- D. Before final acceptance, the Contractor for Division 26 shall furnish a Certificate of Final Approval by the Electrical Inspector to the Architect /Engineer and the Owner.

#### 1.20 UL LISTINGS

- A. Materials and appliances for the type for which there are Underwriters' Laboratories standard requirements listings and labels, shall have listing of Underwriters' Laboratories and shall be so labeled, or shall conform to their requirements, in which case certified statements to that effect shall be furnished by the manufacturer with a copy of an examination report by a recognized testing laboratory acceptable to the Engineer.

- C. Brochures shall be provided with tabbed index and complete Table of Contents. The page after index of each tab shall contain a summary schedule listing checks and maintenance functions required for each piece of equipment. The schedule shall be divided into daily, weekly, monthly and annual time frames as required.
- D. Brochures shall be submitted to the Architect /Engineer prior to final inspection of the building.

#### 1.14 SPECIAL NOTE

- A. All openings in electrical equipment, enclosures, cabinets, outlet and junction boxes shall be by means of standard knockouts, or shall be sawed or drilled. The use of a cutting torch is prohibited.

#### 1.15 EQUIPMENT IDENTIFICATION

- A. The Contractor for this Division shall furnish and install on all electrical equipment such as switches, starters, panelboards, etc., a nameplate giving its name and function.
- B. Nameplates shall be engraved bakelite (white letters on black background) and shall be equal to Seton Nameplate, C. H. Hanson or Identifications.

#### 1.16 MOTOR PROTECTION INFORMATION

- A. The Contractor for this Division shall provide the following information for each motor installed on this project, regardless of the supplying Contractor:
  - 1. Motor full load current
  - 2. Motor starter heater size - where applicable
  - 3. Fuse size
- B. This information shall be provided in tabulation form before final payment will be made to the Contractor.

#### 1.17 EQUIVALENT MATERIAL AND EQUIPMENT

- A. The material and equipment described herein have been specified according to particular trade names or makes; however, the Contractor may offer substitute material and equipment in lieu of that specified, provided such material and equipment meet all the requirements of those specified and are approved by the Architect. /Engineer. The manufacturer's warranty covering each item of substituted material or equipment shall be equal to the warranty covering the material or equipment specified.
- B. Where equipment is approved which requires different arrangement of connections from those shown, it shall be the responsibility of the Contractor to install the equipment to operate properly and in harmony with the intent of the Drawings and Specifications, and to make all changes in the work required by the different arrangement of connections.

1.9 EQUIPMENT CONNECTIONS

- A. Make connections to equipment furnished by others whenever such equipment is shown on any part of the drawings or mentioned in any section of the specifications.
- B. Verify equipment locations and the sizes, number, locations, and types of connections to be made before installation of any such equipment.

1.10 OPENINGS

- A. The Contractor under this Division shall be responsible for the openings he may require in floors, walls or ceilings of any type construction whether or not shown on the Architectural and/or Structural Drawings.
- B. Openings that have been shown on the Architectural and/or Structural Drawings will be provided under other Divisions; however, the responsibility for the correct size and location of such openings shall be that of the Contractor under this Division.
- C. Openings that have not been shown on the Architectural and/or Structural Drawings shall be provided by the Contractor under this Division as directed by the Architect.

1.11 SINGULAR NUMBER

- A. In all cases where a device or piece of equipment is referred to in the singular number (such as a light fixture, etc.), it is intended that such reference shall apply to as many such items as are required to complete the installation.

1.12 CONNECTION TO EXISTING ELECTRICAL SYSTEMS

- A. The Contractor under this Division shall make all necessary electrical connections to all undisturbed existing electrical systems, as shown on the Drawings and/or required for their proper operation with the new system.

1.13 CATALOG DATA FOR THE OWNER

- A. The Contractor under this Division shall prepare four (4) loose-leaf, plastic bound brochures.
- B. Each brochure shall contain the following information:
  - 1. Name and address of Consulting Engineer, Contractor and index of equipment, including vendor (name and address).
  - 2. Complete brochures, descriptive data, etc., on each piece of equipment, including all reviewed and stamped shop drawings.
  - 3. Complete maintenance and operating instructions and parts list, prepared by the manufacturer, on each major piece of equipment.
  - 4. All wiring diagrams for equipment and systems and control schematics.

5. Panelboards
6. Unit Substations
7. Motor Control Centers
8. Transfer Switches
9. Enclosed Bus Assemblies
10. Power Distribution Units

#### 1.4 PROTECTION

- A. All work, equipment and materials shall be protected at all times. All conduit openings shall be closed with caps or plugs during construction. All equipment and accessories shall be tightly covered and protected against dirt, water or other injury during the period of construction.

#### 1.5 AUTOMATIC TEMPERATURE AND ASSOCIATED SYSTEMS CONTROLS

- A. All wiring associated with the automatic temperature controls system and all associated conduit not specifically designated to be provided shall be included by others and specified under division of these specifications including motor starter interlock wiring.

#### 1.6 EQUIPMENT FURNISHED BY OTHERS

- A. It shall be the responsibility of this Contractor to check voltage and current ratings of motors, relays, starters, switches, etc., of equipment furnished by others not connected under this section of the specifications. Nominal motor voltage ratings should be as follows:
  1. For connection to 480V system – NEMA 460 volts
  2. For connection to 208V system - NEMA 200 volts.
  3. For connection to 110 volt system - NEMA 115 volt.
- B. Motors not conforming to these ratings shall be called to the attention of the related subcontractor and the Owner/Architect.

#### 1.7 EQUIPMENT INSTALLATION INSTRUCTIONS

- A. Install electrical conduit, wiring and equipment in strict accordance with manufacturer's recommendations. Provide equipment accessories necessary for proper operation or recommended by the manufacturer, even if such accessories are not shown on the drawings or mentioned in the specifications.

#### 1.8 INSTALLATION OF EQUIPMENT

- A. All appliances, materials and equipment shall be installed and connected in accordance with the best engineering practice and in accordance with manufacturers' instructions and recommendations. All electrical connections, etc., recommended by the manufacturer or required for proper operation shall be furnished and installed complete.

## SECTION 26 0000 – GENERAL ELECTRICAL PROVISIONS

### PART 1 - GENERAL

#### 1.1 GENERAL

- A. The General Conditions, Special Conditions, Supplemental Conditions, Instructions to Bidders, and other Contract Documents apply to this branch of the work as well as to the other branches.
- B. The Contractor shall familiarize himself with the work of all other trades, general type construction, and the relationship of his work to other sections. He shall examine all working drawings, specifications and conditions affecting his work. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, verify all dimensions in the field and advise the Engineer of any discrepancy before fabricating or performing any work.
- C. The work shall include complete testing of all equipment, conduit and wiring at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment.
- D. Perform any necessary temporary work during construction.
- E. Work under this section shall conform to governing codes, ordinances and regulations of the City, County and State.
- F. The Contractor shall be responsible for any errors in fabrication, for the correct fitting, installation and erection of the various electrical systems.

#### 1.2 SCOPE

- A. Furnish and install all wiring devices and equipment, etc., unless otherwise indicated, for the complete electrical systems. It is the intent that the entire electrical work and all electrical systems shall be complete in every respect and that all outlets, receptacles, fixtures, motors, equipment, devices, etc., shown, noted, or required shall be completely connected from source of power to final connection, ready for satisfactory operation.

#### 1.3 ELECTRICAL MATERIALS

- A. It is the intent of these specifications that the conductive materials used in the manufacture of, but not limited to, the following types of equipment be of copper construction:
  - 1. Transformers (medium voltage and low voltage)
  - 2. Electrical Power Conductors and Cables (all voltages)
  - 3. Switchgear (all voltages)
  - 4. Switchboards

2. Boilers shall comply with performance requirements indicated, as determined by field performance tests. Adjust, modify, or replace equipment to comply.
  3. Perform field performance tests to determine capacity and efficiency of boilers.
  4. Repeat tests until results comply with requirements indicated.
  5. Provide analysis equipment required to determine performance.
  6. Provide temporary equipment and system modifications necessary to dissipate the heat produced during tests if building systems are not adequate.
  7. Notify Architect in advance of test dates.
  8. Perform a combustion analysis after installation and adjust gas valve per the Installation and Operations manual and note in startup report.
  9. Document test results in a report and submit to Architect.
- E. Include all equipment-level configuration settings and initial settings for every menu item in the O&M Manual.

### 3.5 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. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23 5233.19



- E. Connect hot-water piping to supply and return boiler tapplings with shutoff valve and union or flange at each connection.
- F. Install piping from safety relief valves to nearest floor drain.
- G. Boiler Venting:
  - 1. Install flue venting kit and combustion-air intake.
  - 2. Connect full size to boiler connections. Comply with requirements in Division 23 Section "Breechings, Chimneys, and Stacks."
- H. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- I. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

#### 3.4 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.
- D. Performance Tests:
  - 1. Engage a factory-authorized service representative to inspect component assemblies and equipment installations, including connections, and to conduct performance testing.

- C. Allow Owner access to source quality-control testing of boilers. Notify Architect 14 days in advance of testing.

### PART 3 - EXECUTION

#### 3.1 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.

#### 3.2 BOILER INSTALLATION

- A. Install equipment on 4" concrete housekeeping pad.
- B. Install gas-fired boilers according to NFPA 54.
- C. Assemble and install boiler trim.
- D. Install electrical devices furnished with boiler but not specified to be factory mounted.
- E. Install control wiring to field-mounted electrical devices.
- F. Install control wiring to boiler pumps and all relays/control devices required to start the pumps on command from boiler.

#### 3.3 CONNECTIONS

- A. Install boilers level on concrete bases. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- D. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of equipment connection. Provide a reducer if required.

## 2.5 ELECTRICAL POWER

- A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.
- B. Single-Point Field Power Connection: Factory-installed and factory-wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.
- C. Electrical Characteristics:
  - 1. See Drawings
  - 2. Standard Voltages
    - a. 120 Volt, single phase
  - 3. Frequency: 60 Hz

## 2.6 VENTING

- A. Exhaust flue must be a Category II or IV stainless steel and dependent upon the orientation of the vent intake and exhaust locations and venting distances shown in the Installation and Operation manual.
- B. Intake piping for all models must be of approved material as listed in the Installation and Operations manual.
- C. Boiler venting and intake piping configuration shall be installed per one of the approved venting methods shown in the Installation and Operation manual.
- D. Boiler shall come standard with a flue sensor to monitor and display flue gas temperature on factory provided LCD display.
- E. Boilers using common venting must contact the factory for sizing.
- F. Refer to manufacturer's Installation and Operations manual for detailed venting instructions and approved manufacturers.
- G. Provide manufacturer's standard sidewall air inlet and vent caps.

## 2.7 SOURCE QUALITY CONTROL

- A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.
- B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.

5. Rotation of lead boiler: The Control module shall change the lead boiler every hour for the first 24 hours after initializing the Cascade. Following that, the leader will be changed once every 24 hours.
- C. Boiler operating controls shall include the following devices and features:
1. Set-Point Adjust: Set points shall be adjustable.
  2. Operating Pressure Control: Factory wired and mounted to cycle burner.
  3. Sequence of Operation: Factory installed controller to modulate burner firing rate to maintain system water temperature in response to call for heat.
  4. Sequence of Operation: Boilers shall be enabled when outside air temperature is below 60 deg F.
  5. Sequence of Operation: Factory installed controller to control burner firing rate to reset supply-water temperature based on the outdoor-air temperature. At 10 deg F outside-air temperature, set supply-water temperature at 180 deg F; at 60 deg F outside-air temperature, set supply-water temperature at 140 deg F.
  6. Boilers shall enable their respective boiler pump. Provide all wiring, relays, programming, etc.
- D. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.
1. High Temperature Limit: Automatic and manual reset stops burner if operating conditions rise above maximum boiler design temperature. Limit switch to be manually reset on the control interface.
  2. Low-Water Cutoff Switch: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be manually reset on the control interface.
  3. High and Low Gas Pressure Switches: Optional pressure switches shall prevent burner operation on low or high gas pressure. Pressure switches to be manually reset on the control interface.
  4. Blocked Drain Switch: Blocked drain switch shall prevent burner operation when tripped. Switch to be manually reset on the control interface.
  5. Blocked Flue Switch: Pressure switches shall prevent burner operation on a blockage in the flue pipe. Switch to be manually reset on the control interface.
  6. Audible Alarm: Optional factory mounted on control panel with silence switch; shall sound alarm for any lockout conditions.
- E. Building Automation System Interface: Include BACnet MSTP communication protocols to communicate with future building automation system. Points available to monitor to include: boiler status, rotation, setpoint firing rate, inlet temp, outlet temp, flue temp flow switch, gas switch, flame detector alarm diagnostic code/text Points available to override to include: status (enable or disable) force rotation (of lead boiler) setpoint (constant value).

11. Time clock: Boiler shall have an internal time clock with the ability to time and date stamp lock-out codes and maintain records of runtime.
  12. Service reminder: Boiler shall have the ability to display a yellow colored service notification screen based upon months of installation, hours of operation, and number of boiler cycles. All notifications are adjustable by the installer.
  13. Three pump control: Boiler shall have the ability to control the boiler pump, system pump and the domestic hot water pump.
  14. Anti-cycling control: Boiler shall have the ability to set a time delay after a heating demand is satisfied allowing the boiler to block a new call for heat. The boiler will display an anti-cycling blocking on the screen until the time has elapsed or the water temperature drops below the anti-cycling differential parameter. The anti-cycling control parameter is adjustable by the installer.
  15. Night setback: Boiler may be programmed to reduce the space heating temperature set point during a certain time of the day.
  16. Freeze protection: Boiler shall turn on the boiler and system pumps when the boiler water temperature falls below 45 degrees. When the boiler water temperature falls below 37 degrees the boiler will automatically turn on. Boiler and pumps will turn off when the boiler water temperature rises above 43 degrees.
  17. 3-way valve control: Boiler shall have the ability to control a 3-way motorized control valve to maintain return water temperatures above 140°F.
  18. BMS integration with 0-10V DC input: The Control shall allow an option to Enable and control set point temperature or control firing rate by sending the boiler a 0-10V input signal.
  19. Data logging: Boiler shall have non-volatile data logging memory including last 10 lockouts, hours running and ignition attempts and should be able to view on boiler screen.
- B. The boiler shall have a built in Cascade controller to sequence and rotate lead boiler to ensure equal runtime while maintaining modulation of up to 8 boilers of different btu inputs without utilization of an external controller. The internal cascade controller shall include:
1. Lead lag: The Control module shall allow the "Lead" boiler to modulate with demand to capacity. As demand increases, additional boilers fire and modulate to capacity. This continues, with additional boilers firing and modulating to capacity until all units are operating.
  2. Efficiency optimization: The Control module shall optimize the modulation capabilities of all the Boiler Plant while evenly distributing run time across all cascaded boilers.
  3. Cascade redundancy: If the Leader boiler shall lose communication with the members an alternate member will become the Leader until the original lead boiler regains communication.
  4. Front end loading: The Control module shall allow a Condensing boiler to be cascaded with a non-condensing boiler with a Smart System control with no third party cascading or communication devices. A call for heat will allow the Condensing boiler to fire first and bring the non-condensing boiler on when the demand is needed.

## 2.3 TRIM

### A. Safety Relief Valve:

1. Size and Capacity: 50 psi
2. Description: Fully enclosed steel spring with adjustable pressure range and positive shutoff; factory set and sealed.

### B. Pressure Gage: Minimum 3-1/2 inch diameter. Gage shall have normal operating pressure about 50 percent of full range.

### C. Drain Valves: (2) 3/4" NPS

## 2.4 CONTROLS

### A. Boiler controls shall feature a standard, factory installed 8" LCD full color screen display with the following standard features:

1. Control module shall include the CON-X-US mobile communication platform for remote access via a smart phone or Tablet. This will allow the ability to monitor and manage multiple Crest boilers and send alerts via text or e-mail notifying of changes in system status. A user shall have the ability to check system status or re-program any boiler function remotely.
2. Password Security: Boiler shall have a different password security code for the User and the Installer to access adjustable parameters.
3. Outdoor air reset: Boiler shall calculate the set point using a new field installed, factory supplied outdoor sensor and an adjustable reset curve. Existing sensor shall not be reused.
4. Pump exercise: Boiler shall energize any pump it controls for an adjustable time if the associated pump has been off for a time period of 24 hours.
5. Ramp delay: Boiler may be programmed to limit the firing rate based on six limits steps and six time intervals.
6. Boost function: Boiler may be programmed to automatically increase the set point a fixed number of degrees (adjustable by installer) if the setpoint has been continuously active for a set period of time (time adjustable by installer). This process will continue until the space heating demand ends.
7. Domestic hot water priority: Boiler shall make the domestic hot water call for heat a priority over any space heating call and adjust the boiler set point to the domestic hot water boiler set point.
8. Domestic hot water modulation limiting: Boiler may be programmed to limit the maximum domestic hot water firing rate to match the input rating of the indirect tank coil.
9. Domestic hot water night setback: Boiler may be programmed to reduce the domestic hot water tank set point during a certain time of the day.
10. PC port connection: Boiler shall have a PC port allowing the connection of PC boiler software.

## 2.2 CONSTRUCTION

- A. Description: Boiler shall be natural gas fired and vertical water tubed design. The boiler shall be factory-fabricated, factory-assembled, and factory-tested, water-tube boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls.
- B. Heat Exchanger: The heater exchanger shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. The heat exchanger shall be a "Fin Tube" design with 7/8" I.D. straight copper tubes having extruded integral fins spaced seven fins per inch. These tubes shall be "rolled" securely into glass-lined, cast iron headers. There shall be no bolts, gaskets or "O" rings in the head configuration. Removable access plugs shall be provided on the heat exchanger headers for the purposes of inspection, cleaning or repair.
- C. Burner: Natural gas, forced draft single burner premix design. The burner shall be high temperature stainless steel with a ceramic fiber outer covering to provide modulating firing rates. The burner shall be capable of a 5:1 gas train turndown without loss of combustion efficiency. The burner shall have an independent laboratory rating for Oxides of Nitrogen (NOx) to meet requirements of South Coast Air Quality Management District (SCAMD) as compliant with Rule 1146.2.
- D. Blower: Boiler shall be equipped with a pulse width modulating blower system to precisely control the fuel/air mixture to provide modulating boiler firing rates for maximum efficiency. The burner firing sequence of operation shall include pre-purge, firing, modulation, and post-purge operation.
1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- E. Gas Train: The boiler shall be supplied with a gas train designed with negative pressure regulation and shall be capable of a minimum 5:1 turndown:
- F. Ignition: Hot surface ignition with 100 percent main-valve shutoff with electronic flame supervision.
- G. Casing:
1. Jacket: 18 gauge pre-primed and painted steel jacket
  2. Control Compartment Enclosures: NEMA 250, Type 1A.
  3. Insulation: Minimum ½ inch thick, mineral fiber insulation surrounding the heat exchanger.
  4. Combustion-Air Connections: Inlet and vent duct collars.
- H. Characteristics and Capacities:
1. Heating Medium: Hot water.
  2. Design Water Pressure Rating: 160 psi working pressure.
  3. Safety Relief Valve Setting: 50 psi

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- D. AHRI Compliance: Boilers shall be AHRI listed and must meet the minimum efficiency specified under AHRI BTS-2000 as defined by Department of Energy in 10 CFR Part 431.
- E. ANSI Compliance: Boilers shall be compliant with ANSI Z21.13 test standards for US and Canada.
- F. CSA Compliant: Boilers shall be compliant with CSA certification.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.7 WARRANTY

- A. Standard Warranty: Boilers shall include manufacturer's standard form in which manufacturer agrees to repair or replace components of boilers that fail in materials or workmanship within specified warranty period. Installing contractor shall provide one year of warranty parts and labor.
  - 1. Warranty Period for Commercial Copper Fin tube Boilers:
    - a. Heat Exchanger, Pressure Vessel and Condensation Collection Basin shall carry a 10 year limited warranty against defects in materials or workmanship and failure due to thermal shock.
    - b. All other components shall carry a one year warranty from date of boiler start up.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Lochinvar Power-Fin Boiler as specified on Drawings. All others must be submitted by Voluntary alternate and approved prior to bid.



## SECTION 23 5233.19 – COPPER WATER-TUBE BOILERS – FLEET MANAGEMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes packaged, factory-fabricated and -assembled, gas-fired, copper-fin boilers, trim, and accessories for heating hot water.
- B. Related Sections include the following:
  - 1. Division 23 Section “Breechings, Chimneys, and Stacks” for connections to breechings, chimneys, and stacks.

#### 1.3 SUBMITTALS

- A. Boiler submittals are to be included with the bid to expedite review time.
- B. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- C. Shop Drawings: For boilers, boiler trim, and accessories.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Wiring Diagrams: Power, signal, and control wiring.
- D. Source quality-control test reports: Indicate and interpret test results for compliance with performance requirements before shipping. To be included in O&M Manual.
- E. Field quality-control test reports: Indicate and interpret test results for compliance with performance requirements
- F. Warranty: Standard warranty specified in this Section.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For boilers to include in emergency, operation, and maintenance manuals.

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.
- D. Include all equipment-level configuration settings and initial settings for every menu item in the O&M Manual.

### 3.5 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. Refer to Division 01 Section "Demonstration and Training."
- C. The owner will be providing a dedicated PC to connect to the boiler controls for trending purposes. During owner training, the representative shall assist in the set-up of the Lochinvar software and demonstrate its capabilities.

END OF SECTION 23 5216

### 3.2 BOILER INSTALLATION

- A. Install equipment on 4" concrete housekeeping pad.
- B. Install gas-fired boilers according to NFPA 54.
- C. Assemble and install boiler trim.
- D. Install electrical devices furnished with boiler but not specified to be factory mounted.
- E. Install control wiring to field-mounted electrical devices.
- F. Install control wiring to boiler pumps and all relays/control devices required to start the pumps on command from boiler.

### 3.3 CONNECTIONS

- A. Install boilers level on concrete bases. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- D. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of equipment connection. Provide a reducer if required.
- E. Connect hot-water piping to supply and return boiler tappings with shutoff valve and union or flange at each connection.
- F. Install piping from safety relief valves to nearest floor drain.
- G. Boiler Venting:
  - 1. Install flue venting kit and combustion-air intake.
  - 2. Connect full size to boiler connections. Comply with requirements in Division 23 Section "Breechings, Chimneys, and Stacks."
- H. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- I. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.

3. Frequency: 60 Hz

## 2.6 VENTING

- A. Exhaust flue must be Category IV approved CPVC or stainless steel sealed vent material from one of the approved manufacturers listed in the Installation and Operation manual. Boilers exhaust vent length must be able to extend to 100 equivalent feet.
- B. Intake piping must be of approved material as listed in the Installation and Operations manual. Boilers intake pipe length must be able to extend to 100 equivalent feet.
- C. Boiler venting and intake piping configuration shall be installed per one of the approved venting methods shown in the Installation and Operation manual.
- D. Boilers using common venting must only include like models and the optional common vent damper. Contact the factory for common vent sizing.
- E. Boiler shall come standard with a flue sensor to monitor and display flue gas temperature on factory provided LCD display.
- F. Refer to manufacturer's Installation and Operations manual for detailed venting instructions and approved manufacturers.

## 2.7 SOURCE QUALITY CONTROL

- A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.
- B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.

## PART 3 - EXECUTION

### 3.1 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. Boilers shall enable their respective boiler pump. Provide all wiring, relays, programming, etc.
- D. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation and include:
1. High Temperature Limit: Automatic and manual reset stops burner if operating conditions rise above maximum boiler design temperature. Limit switch to be manually reset on the control interface.
  2. Low-Water Cutoff Switch: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be manually reset on the control interface.
  3. Blocked Inlet Safety Switch: Manual-reset pressure switch field mounted on boiler combustion-air inlet.
  4. High and Low Gas Pressure Switches: Pressure switches shall prevent burner operation on low or high gas pressure. Pressure switches to be manually reset on the control interface.
  5. Blocked Drain Switch: Blocked drain switch shall prevent burner operation when tripped. Switch to be manually reset on the control interface.
  6. Low air pressure switch: Pressure switches shall prevent burner operation on low air pressure. Switch to be manually reset on the control interface.
  7. Optional Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for any lockout conditions.
- E. Building Automation System Interface:
1. Boilers shall have factory installed BACnet communication card for connection to future BAS system. BACnet card shall be MS/TP capable. Points available to monitor to include: boiler status, rotation, setpoint firing rate, inlet temp, outlet temp, flue temp flow switch, gas switch, flame detector alarm diagnostic code/text Points available to override to include: status (enable or disable) force rotation (of lead boiler) setpoint (constant value).

## 2.5 ELECTRICAL POWER

- A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.
- B. Single-Point Field Power Connection: Factory-installed and factory-wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.
- C. Electrical Characteristics:
1. See Drawings
  2. Voltage
    - a. 120V / 1PH

cycling blocking on the screen until the time has elapsed or the water temperature drops below the anti-cycling differential parameter. The anti-cycling control parameter is adjustable by the installer.

16. Space Heating Night setback: Boiler may be programmed to reduce the space heating temperature set point during a certain time of the day.
  17. Freeze protection: Boiler shall turn on the boiler and system pumps when the boiler water temperature falls below 45 degrees. When the boiler water temperature falls below 37 degrees the boiler will automatically turn on. Boiler and pumps will turn off when the boiler water temperature rises above 43 degrees.
  18. Isolation valve control: Boiler shall have the ability to control a 2-way motorized control valve. Boiler shall also be able to force a fixed number of valves to always be energized regardless of the number of boilers that are firing.
  19. BMS integration with 0-10V DC input: The Control shall allow an option to Enable and control set point temperature or control firing rate by sending the boiler a 0-10V input signal.
  20. Data logging: Boiler shall have non-volatile data logging memory including last 10 lockouts, space heat run hours, domestic hot water run hours and ignition attempts. All data should be visible on the boiler screen.
- B. The boiler shall have a built in Cascade controller to sequence and rotate lead boiler to ensure equal runtime while maintaining modulation of up to 8 boilers of different btu inputs without utilization of an external controller. The factory installed, internal cascade controller shall include:
1. Lead lag: The Control module shall allow only one boiler to fire at the beginning of a call for heat. Once the lead boiler is in full fire and the control calculates that additional heat is required it will call on an additional boiler as needed.
  2. Efficiency optimization: The Control module shall allow multiple boilers to simultaneously fire at minimum firing rate in lieu of Lead/Lag.
  3. Front end loading: The Control module shall allow the cascading and functional control of several non-condensing Lochinvar products alongside the Knight FTXL.
  4. Rotation of lead boiler: The Control module shall change the lead boiler every hour for the first 24 hours after initializing the Cascade. Following that, the leader will be changed once every 24 hours.
- C. Boiler operating controls shall include the following devices and features:
1. Set-Point Adjust: Set points shall be fully adjustable by the installer and owner.
  2. Sequence of Operation: Factory installed controller to modulate burner firing rate to maintain system water temperature in response to call for heat. Boiler shall be wired to existing loop water controller to receive its enable condition. Upon receiving enable command from the loop water controller, the boiler controller shall maintain primary heat pump loop temperature of 70°F.

## 2.4 CONTROLS

- A. Boiler controls shall feature a standard, factory installed multi-color graphic LCD screen display with navigation dial and includes the following standard features:
1. Variable Speed Boiler Pump Control: Boiler may be programmed to send a 0-10V DC output signal to an ECM or VFD boiler pump to maintain a designed temperature rise across the heat exchanger. The boiler shall be able to operate in this mode with a minimum temperature rise of 20 degrees F and a maximum temperature rise of 60 degrees F.
  2. Password Security: Boiler shall have a different password security code for the User and the Installer to access adjustable parameters.
  3. Outdoor air reset: Boiler shall calculate the set point using a new field installed, factory supplied outdoor sensor and an adjustable reset curve. Existing sensor shall not be reused.
  4. Pump exercise: Boiler shall energize any pump it controls for an adjustable time if the associated pump has been off for a time period of 24 hours.
  5. Four pump control: Boiler shall have the ability to control the boiler pump, a system pump, a domestic hot water pump, and a domestic hot water recirculation pump.
  6. Ramp delay: Boiler may be programmed to limit the firing rate based on six limits steps and six time intervals.
  7. Boost function: Boiler may be programmed to automatically increase the set point a fixed number of degrees (adjustable by installer) if the setpoint has been continuously active for a set period of time (time adjustable by installer). This process will continue until the space heating demand ends.
  8. Domestic hot water priority: Boiler shall make the domestic hot water call for heat a priority over any space heating call and adjust the boiler setpoint to the domestic hot water boiler setpoint.
  9. Domestic hot water modulation limiting: Boiler may be programmed to limit the maximum domestic hot water firing rate to match the input rating of the indirect tank coil.
  10. Domestic hot water night setback: Boiler may be programmed to reduce the domestic hot water tank set point during a certain time of the day.
  11. PC port connection: Boiler shall have a PC port allowing the connection of PC boiler software.
  12. Time clock: Boiler shall have an internal time clock with the ability to time and date stamp lock-out codes and maintain records of runtime.
  13. Maintenance reminder: Boiler shall have the ability to display a yellow colored, customizable maintenance notification screen. All notifications are adjustable by the installer based upon months of installation, hours of operation, and number of boiler cycles.
  14. English Error codes: Boiler shall have a user interface that displays a red error screen with fault codes that are displayed in English and include a date and time stamp for ease of servicing.
  15. Anti-cycling control: Boiler shall have the ability to set a time delay after a heating demand is satisfied allowing the boiler to block a new call for heat. The boiler will display an anti-

FTX500	10:1	50,000	500,000
FTX600	7:1	85,700	600,000
FTX725	7:1	103,500	725,000
FTX850	7:1	121,500	850,000

- I. Ignition: Spark ignition with 100 percent main-valve shutoff with electronic flame supervision.
- J. Casing:
  - 1. Jacket: Heavy gauge primed and painted steel jacket with snap-in closures.
  - 2. Control Compartment Enclosures: NEMA 250, Type 1A.
  - 3. Insulation: Minimum ½ inch thick, mineral fiber insulation surrounding the heat exchanger.
  - 4. Combustion-Air Connections: Inlet and vent duct collars.
- K. Characteristics and Capacities:
  - 1. Heating Medium: Hot water.
  - 2. Design Water Pressure Rating: 160 psi working pressure.
  - 3. Safety Relief Valve Setting: 50 psig
  - 4. Minimum Water Flow Rate:

Model	Minimum Flow
FTX400	10 gpm
FTX500	12 gpm
FTX600	15 gpm
FTX725	18 gpm
FTX850	21 gpm

2.3 TRIM

- A. Safety Relief Valve:
  - 1. Size and Capacity: 50 lb.
  - 2. Description: Fully enclosed steel spring with adjustable pressure range and positive shutoff; factory set and sealed.
- B. Pressure Gage: Minimum 3-1/2 inch diameter. Gage shall have normal operating pressure about 50 percent of full range.
- C. Drain Valves: Minimum NPS 3/4 or nozzle size with hose-end connection.
- D. Condensate Neutralization Kit: Factory supplied condensate trap with condensate trip sensor, high capacity condensate receiver prefilled with appropriate medium.



2.2 CONSTRUCTION

- A. Description: Boiler shall be natural gas fired, fully condensing, and fire tube design. The boiler shall be factory-fabricated, factory-assembled, and factory-tested, fire-tube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls.
- B. Heat Exchanger: The heater exchanger shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. The heat exchanger shall be constructed of a fully welded 316L stainless steel and of fire tube design. The heat exchanger shall be designed for a single-pass water flow to limit the water side pressure drop. Cast iron, aluminum, or condensing copper tube boilers will not be accepted.
- C. Efficiency: Boilers shall have an AHRI certified minimum thermal efficiency of 97 percent.
- D. Condensate Collection Basin: Fully welded 316L stainless steel and shall include a stainless steel combustion analyzer test port.
- E. Pressure Vessel: The pressure vessel shall be in accordance with ASME Section IV pressure vessel code. The pressure vessel shall be designed for a single-pass water flow to limit the water side pressure drop. The pressure vessel shall contain a volume of water no less than:

Model	Water Content
FTX400	13 gallons
FTX500	12 gallons
FTX600	12 gallons
FTX725	17 gallons
FTX850	16 gallons

- F. Burner: Natural gas, forced draft single burner premix design. The burner shall be high temperature stainless steel with a woven Fecralloy outer covering to provide modulating firing rates. The burner shall be capable of the stated gas train turndown without loss of combustion efficiency.
- G. Blower: Boiler shall be equipped with a pulse width modulating blower system to precisely control the fuel/air mixture to provide modulating boiler firing rates for maximum efficiency. The burner firing sequence of operation shall include pre-purge, firing, modulation, and post-purge operation.
  - 1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- H. Gas Train: The boiler shall be supplied with a negative pressure regulation gas train and shall be capable of the following minimum turndowns:

Model	Turndown	Minimum Input	Maximum Input
FTX400	10:1	40,000	400,000

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- D. AHRI Compliance: Boilers shall be AHRI listed and must meet the minimum efficiency specified under AHRI BTS-2000 as defined by Department of Energy in 10 CFR Part 431.
- E. ANSI Compliance: Boilers shall be compliant with ANSI Z21.13 test standards for US and Canada.
- F. CSA Compliant: Boilers shall be compliant with CSA certification.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.7 WARRANTY

- A. Standard Warranty: Boilers shall include manufacturer's standard form in which manufacturer agrees to repair or replace components of boilers that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Fire-Tube Condensing Boilers:
    - a. Heat Exchanger, Pressure Vessel and Condensation Collection Basin shall carry a 10 year limited warranty against defects in materials or workmanship and failure due to thermal shock.
    - b. All other components shall carry a one year warranty from date of boiler start up.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Lochinvar Knight FTXL Boiler as specified on Drawings. All others must be submitted by Voluntary alternate and approved prior to bid.

## SECTION 23 5216 – FIRE-TUBE CONDENSING BOILERS – CARNEGIE CENTER

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes packaged, factory-fabricated and assembled, gas-fired, fire-tube condensing boilers, trim, and accessories for space heating hot water.

#### 1.3 SUBMITTALS

- A. Boiler submittals are to be submitted with the bid to expedite review time.
- B. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- C. Shop Drawings: For boilers, boiler trim, and accessories.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Wiring Diagrams: Power, signal, and control wiring.
- D. Source quality-control test reports: Indicate and interpret test results for compliance with performance requirements before shipping. To be included in the O&M Manual.
- E. Field quality-control test reports: Indicate and interpret test results for compliance with performance requirements.
- F. Warranty: Standard warranty specified in this Section.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For boilers to include in emergency, operation, and maintenance manuals.

3.5 DEMONSTRATION

- A. Engage a factory representative or a factory-authorized service representative for boiler startup and to train Owner's maintenance personnel to adjust, operate, and maintain boilers. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23 5216

### 3.4 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.

#### D. Performance Tests:

1. Engage a factory-authorized service representative to inspect component assemblies and equipment installations, including connections, and to conduct performance testing.
2. Boilers shall comply with performance requirements indicated, as determined by field performance tests. Adjust, modify, or replace equipment to comply.
3. Perform field performance tests to determine capacity and efficiency of boilers.
4. Repeat tests until results comply with requirements indicated.
5. Provide analysis equipment required to determine performance.
6. Provide temporary equipment and system modifications necessary to dissipate the heat produced during tests if building systems are not adequate.
7. Notify Architect in advance of test dates.
8. Perform a combustion analysis after installation and adjust gas valve per the Installation and Operations manual and note in startup report.
9. Document test results in a report and submit to Architect.

#### E. Include all equipment-level configuration settings and initial settings for every menu item in the O&M Manual.

- B. Examine mechanical spaces for suitable conditions where boilers will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 BOILER INSTALLATION

- A. Install equipment on 4" concrete housekeeping pad.
- B. Install gas-fired boilers according to NFPA 54.
- C. Assemble and install boiler trim.
- D. Install electrical devices furnished with boiler but not specified to be factory mounted.
- E. Install control wiring to field-mounted electrical devices.
- F. Install control wiring to boiler pumps and all relays/control devices required to start the pumps on command from boiler.

### 3.3 CONNECTIONS

- A. Install boilers level on concrete bases. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- D. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of equipment connection. Provide a reducer if required.
- E. Connect hot-water piping to supply and return boiler tapplings with shutoff valve and union or flange at each connection.
- F. Install piping from safety relief valves to nearest floor drain.
- G. Boiler Venting:
  - 1. Install flue venting kit and combustion-air intake.
  - 2. Connect full size to boiler connections. Comply with requirements in Division 23 Section "Breechings, Chimneys, and Stacks."
- H. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- I. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

4. Factory supplied 208V, 480V or 600V transformers are available for optional voltage.

## 2.6 VENTING

- A. Exhaust flue for the FB751 – FB 3501 must be Category IV stainless steel sealed vent material from one of the approved manufacturers listed in the Installation and Operation manual. Boilers exhaust vent length must be able to extend to 100 equivalent feet.
- B. Intake piping for all models must be of approved material as listed in the Installation and Operations manual. Boilers intake pipe length must be able to extend to 100 equivalent feet.
- C. Boiler venting and intake piping configuration shall be installed per one of the approved venting methods shown in the Installation and Operation manual.
- D. Boiler shall come standard with a flue sensor to monitor and display flue gas temperature on factory provided LCD display.
- E. Boilers using common venting must contact the factory for sizing.
- F. Refer to manufacturer's Installation and Operations manual for detailed venting instructions and approved manufacturers.

## 2.7 SOURCE QUALITY CONTROL

- A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.
- B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.
- C. Allow Owner access to source quality-control testing of boilers. Notify Architect 14 days in advance of testing.
- D. Include factory test reports in O&M Manual.

## PART 3 - EXECUTION

### 3.1 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.

3. Blocked Inlet Safety Switch: Manual-reset pressure switch field mounted on boiler combustion-air inlet.
  4. High and Low Gas Pressure Switches: Pressure switches shall prevent burner operation on low or high gas pressure. Pressure switches to be manually reset on the control interface.
  5. Proof of Closure Valve (FB 6001 only): Proof of closure valve (POC) shall prevent the boiler from firing if the POC valve seat is detected open. Upon a call for heat, once the POC valve seat is proven to be closed, the pre-purge cycle will begin and the POC valve will begin to open.
  6. Blocked Drain Switch: Blocked drain switch shall prevent burner operation when tripped. Switch to be manually reset on the control interface.
  7. Low air pressure switch: Pressure switches shall prevent burner operation on low air pressure. Switch to be manually reset on the control interface.
  8. Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for any lockout conditions.
- E. Building Automation System Interface: Boilers shall have factory installed BACnet comm card for connection to existing LGR250 using BACnet MS/TP. Wiring and integration into the existing LGR250 system will be by a separate contract. This contractor is to coordinate and provide assistance in that integration. This system shall be fully operational and programmed prior to separate contractor integrating the system into the existing LGR250.
- F. Boilers to optimize hot water control at equipment-level (balance run-hours, rotate boilers periodically, OA reset, etc.) At a minimum, front-end to monitor: boiler status, rotation, setpoint, firing rate, inlet temp, outlet temp, flue temp, flow switch, gas switch, flame detector, and alarm diagnostic code/text. Front-end to allow user override of boilers: status (enable or disable), force rotation (of lead boiler), OA reset parameters (setpoint). Notify owner of additional points available for display and/or control during submittal process for front-end.

## 2.5 ELECTRICAL POWER

- A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.
- B. Single-Point Field Power Connection: Factory-installed and factory-wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.
- C. Electrical Characteristics:
  1. See Drawings
  2. Voltage
    - a. 120V / 1PH - FB 0751 through FB 2001
    - b. 208V / 3PH - FB 2501 through FB 3501
    - c. 480V / 3PH – FB 4001 through 6001
  3. Frequency: 60 Hz



14. Isolation valve control: Boiler shall have the ability to control a 2-way motorized control valve. Boiler shall also be able to force a fixed number of valves to always be energized regardless of the number of boilers that are firing.
  15. BMS integration with 0-10V DC input: The Control shall allow an option to Enable and control set point temperature or control firing rate by sending the boiler a 0-10V input signal.
  16. Data logging: Boiler shall have non-volatile data logging memory including last 10 lockouts, hours running and ignition attempts and should be able to view on boiler screen.
- B. The boiler shall have a built in Cascade controller to sequence and rotate lead boiler to ensure equal runtime while maintaining modulation of up to 8 boilers of different btu inputs without utilization of an external controller. The factory installed, internal cascade controller shall include:
1. Lead lag:
  2. Efficiency optimization: The Control module shall allow multiple boilers to fire at minimum firing rate in lieu of Lead/Lag.
  3. Front end loading:
  4. Rotation of lead boiler: The Control module shall change the lead boiler every hour for the first 24 hours after initializing the Cascade. Following that, the leader will be changed once every 24 hours.
- C. Boiler operating controls shall include the following devices and features:
1. Set-Point Adjust: Set points shall be adjustable.
  2. Operating Pressure Control: Factory wired and mounted to cycle burner.
  3. Sequence of Operation: Factory installed controller to modulate burner firing rate to maintain system water temperature in response to enable signal which shall be received from existing ALC system.
  4. Sequence of Operation: Electric, factory-fabricated and factory-installed panel to control burner firing rate to reset supply-water temperature inversely with outside-air temperature. At 20 deg F outside-air temperature, set supply-water temperature at 180 deg F; at 60 deg F outside-air temperature, set supply-water temperature at 110 deg F.
  5. Boilers shall enable their respective boiler pump. Provide all wiring, relays, programming, etc.
- D. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.
1. High Temperature Limit: Automatic and manual reset stops burner if operating conditions rise above maximum boiler design temperature. Limit switch to be manually reset on the control interface.
  2. Low-Water Cutoff Switch: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be manually reset on the control interface.

## 2.4 CONTROLS

- A. Boiler controls shall feature a standard, factory installed 8" LCD screen display with the following standard features:
1. Variable Speed Boiler Pump Control: Boiler may be programmed to send a 0-10V DC output signal to an ECM or VFD boiler pump to maintain a designed temperature rise across the heat exchanger. The boiler shall be able to operate in this mode with a minimum temperature rise of 20 degrees F and a maximum temperature rise of 60 degrees F.
  2. Password Security: Boiler shall have a different password security code for the User and the Installer to access adjustable parameters.
  3. Outdoor air reset: Boiler shall calculate the set point using a new field installed, factory supplied outdoor sensor and an adjustable reset curve. Existing outdoor sensor shall not be reused.
  4. Pump exercise: Boiler shall energize any pump it controls for an adjustable time if the associated pump has been off for a time period of 24 hours.
  5. Ramp delay: Boiler may be programmed to limit the firing rate based on six limits steps and six time intervals.
  6. Boost function: Boiler may be programmed to automatically increase the set point a fixed number of degrees (adjustable by installer) if the setpoint has been continuously active for a set period of time (time adjustable by installer). This process will continue until the space heating demand ends.
  7. PC port connection: Boiler shall have a PC port allowing the connection of PC boiler software.
  8. Time clock: Boiler shall have an internal time clock with the ability to time and date stamp lock-out codes and maintain records of runtime.
  9. Service reminder: Boiler shall have the ability to display a yellow colored service notification screen based upon months of installation, hours of operation, and number of boiler cycles. All notifications are adjustable by the installer.
  10. Three pump control: Boiler shall have the ability to control the boiler pump, system pump and the domestic hot water pump.
  11. Anti-cycling control: Boiler shall have the ability to set a time delay after a heating demand is satisfied allowing the boiler to block a new call for heat. The boiler will display an anti-cycling blocking on the screen until the time has elapsed or the water temperature drops below the anti-cycling differential parameter. The anti-cycling control parameter is adjustable by the installer.
  12. Night setback: Boiler may be programmed to reduce the space heating temperature set point during a certain time of the day.
  13. Freeze protection: Boiler shall turn on the boiler and system pumps when the boiler water temperature falls below 45 degrees. When the boiler water temperature falls below 37 degrees the boiler will automatically turn on. Boiler and pumps will turn off when the boiler water temperature rises above 43 degrees.

L. Characteristics and Capacities:

1. Heating Medium: Hot water.
2. Design Water Pressure Rating: 160 psi working pressure.
3. Safety Relief Valve Setting: 50 psig
4. Minimum Water Flow Rate:

Model	Minimum Flow
FB 751	18 gpm
FB 1001	18 gpm
FB 1251	18 gpm
FB 1501	25 gpm
FB 1751	25 gpm
FB 2001	25 gpm
FB 2501	25 gpm
FB 3001	25 gpm
FB 3501	45 gpm
FB 4001	45 gpm
FB 5001	50 gpm
FB 6001	60 gpm

2.3 TRIM

A. Safety Relief Valve:

1. Size and Capacity: 50 lb.
2. Description: Fully enclosed steel spring with adjustable pressure range and positive shutoff; factory set and sealed.

B. Pressure Gage: Minimum 3-1/2 inch diameter. Gage shall have normal operating pressure about 50 percent of full range.

C. Drain Valves: Minimum NPS 3/4 or nozzle size with hose-end connection.

D. Condensate Neutralization Kit: Factory supplied condensate trap with condensate trip sensor, high capacity condensate receiver prefilled with appropriate medium.

with Regulation 9 Rule 7 (FB 2501 – FB 6001) and Texas Commission on Environmental Quality (FB 0751 – FB 2001) as being compliant with Section 117.465.

- G. Blower: Boiler shall be equipped with a pulse width modulating blower system to precisely control the fuel/air mixture to provide modulating boiler firing rates for maximum efficiency. The burner firing sequence of operation shall include pre-purge, firing, modulation, and post-purge operation.
  - 1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- H. Gas Train: The boiler shall be supplied with two gas valves designed with negative pressure regulation and shall be capable of the following minimum turndowns:

Model	Turndown	Minimum Input	Maximum Input
FB 751	15:1	50,000	750,000
FB 1001	20:1	50,000	999,999
FB 1251	20:1	62,500	1,250,000
FB 1501	25:1	60,000	1,500,000
FB 1751	25:1	70,000	1,750,000
FB 2001	25:1	80,000	1,999,999
FB 2501	20:1	125,000	2,500,000
FB 3001	20:1	150,000	3,000,000
FB 3501	20:1	175,000	3,500,000
FB 4001	12:1	333,333	3,999,999
FB 5001	10:1	500,000	4,999,999
FB 6001	10:1	600,000	6,000,000

- I. Ignition: Spark ignition with 100 percent main-valve shutoff with electronic flame supervision.
- J. High Altitude: Boiler shall operate at altitudes up to 4,500 feet above sea level without additional parts or adjustments. High altitude operation shall be certified at a minimum of 4,500 feet above sea level by a third party organization. High altitude boilers shall be certified to 3,000 to 12,000 feet above sea level. The boilers shall carry a CSA certification for high altitude operation up to 12,000 feet.
- K. Casing:
  - 1. Jacket: Heavy gauge primed and painted steel jacket with snap-in closures.
  - 2. Control Compartment Enclosures: NEMA 250, Type 1A.
  - 3. Insulation: Minimum ½ inch thick, mineral fiber insulation surrounding the heat exchanger.
  - 4. Combustion-Air Connections: Inlet and vent duct collars.

2.2 CONSTRUCTION

- A. Description: Boiler shall be natural gas fired, fully condensing, and fire tube design. The boiler shall be factory-fabricated, factory-assembled, and factory-tested, fire-tube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls.
- B. Heat Exchanger: The heater exchanger shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. The heat exchanger shall be constructed of a fully welded 316L stainless steel and of fire tube design. Fire tube shall be of the Wave Fire Tube design and capable of transferring 16,000 to 20,000 Btu's per tube. The heat exchanger shall be designed for a single-pass water flow to limit the water side pressure drop. There shall be no banding material, bolts, gaskets or "O" rings in the heat exchanger design. Cast iron, aluminum, or condensing copper tube boilers will not be accepted.
- C. Condensate Collection Basin: Fully welded 316L stainless steel.
- D. Intake Filter and Dirty Filter Switch: Boiler shall include an intake air filter with a factory installed air pressure switch. The pressure switch will alert the end user on the screen of the boiler that the intake filter is dirty and needs to be changed.
- E. Pressure Vessel: The pressure vessel shall be in accordance with ASME Section IV pressure vessel code. The pressure vessel shall be designed for a single-pass water flow to limit the water side pressure drop. Pressure drop shall be no greater than 3.2 psi at 180 gpm. The pressure vessel shall contain a volume of water no less than:

Model	Water Content
FB 751	73 gallons
FB 1001	77 gallons
FB 1251	87 gallons
FB 1501	94 gallons
FB 1751	106 gallons
FB 2001	111 gallons
FB 2501	157 gallons
FB 3001	156 gallons
FB 3501	202 gallons
FB 4001	201 gallons
FB 5001	254 gallons
FB 6001	304 gallons

- F. Burner: Natural gas, forced draft single burner premix design. The burner shall be high temperature stainless steel with a woven Fecralloy outer covering to provide modulating firing rates. The burner shall be capable of the stated gas train turndown without loss of combustion efficiency. The burner shall have an independent laboratory rating for Oxides of Nitrogen (NOx) to meet requirements of South Coast Air Quality Management District (SCAQMD) as compliant with Rule 1146.2 (FB 0751 – FB 2001), Bay Area Quality Management District as compliant

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.
- C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- D. AHRI Compliance: Boilers shall be AHRI listed and must meet the minimum efficiency specified under AHRI BTS-2000 as defined by Department of Energy in 10 CFR Part 431.
- E. ANSI Compliance: Boilers shall be compliant with ANSI Z21.13 test standards for US and Canada.
- F. CSA Compliant: Boilers shall be compliant with CSA certification.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.7 WARRANTY

- A. Standard Warranty: Boilers shall include manufacturer's standard form in which manufacturer agrees to repair or replace components of boilers that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Fire-Tube Condensing Boilers:
    - a. Heat Exchanger, Pressure Vessel and Condensation Collection Basin shall carry a 10 year limited warranty against defects in materials or workmanship and failure due to thermal shock.
    - b. All other components shall carry a one year warranty from date of boiler start up.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Lochinvar Crest Boiler as specified on Drawings. All others must be submitted by Voluntary alternate and approved prior to bid.

## SECTION 23 5216 – FIRE-TUBE CONDENSING BOILERS – ANNEX BUILDING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes packaged, factory-fabricated and -assembled, gas-fired, fire-tube condensing boilers, trim, and accessories for heating hot water.

#### 1.3 SUBMITTALS

- A. Submittals to be included with the bid to expedite review time.
- B. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.
- C. Shop Drawings: For boilers, boiler trim, and accessories.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Wiring Diagrams: Power, signal, and control wiring.
- D. Source quality-control test reports: Indicate and interpret test results for compliance with performance requirements before shipping. To be included in O&M Manual.
- E. Field quality-control test reports: Indicate and interpret test results for compliance with performance requirements.
- F. Warranty: Standard warranty specified in this Section.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For boilers to include in emergency, operation, and maintenance manuals.

- B. Connect piping to pumps. Install valves that are same size as piping connected to pumps.
- C. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.
- D. Install pressure gages on pump suction and discharge or at integral pressure-gage tapping, or install single gage with multiple-input selector valve.
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### 3.5 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Check piping connections for tightness.
  - 3. Clean strainers on suction piping.
  - 4. Perform the following startup checks for each pump before starting:
    - a. Verify bearing lubrication.
    - b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
    - c. Verify that pump is rotating in the correct direction.
  - 5. Prime pump by opening suction valves and closing drains ,and prepare pump for operation.
  - 6. Start motor.
  - 7. Open discharge valve slowly.

### 3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain hydronic pumps.

END OF SECTION 23 2123



### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine equipment foundations and anchor-bolt locations for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before pump installation.
- C. Examine foundations and inertia bases for suitable conditions where pumps are to be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PUMP INSTALLATION

- A. Comply with HI 1.4.
- B. Install pumps to provide access for periodic maintenance including removing motors, impellers, couplings, and accessories.
- C. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.
- D. Equipment Mounting: Install in-line pumps with continuous-thread hanger rods and spring hangers with vertical-limit stop of size required to support weight of in-line pumps.
  - 1. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
  - 2. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

#### 3.3 ALIGNMENT

- A. Engage a factory-authorized service representative to perform alignment service.
- B. Comply with requirements in Hydronics Institute standards for alignment of pump and motor shaft. Add shims to the motor feet and bolt motor to base frame. Do not use grout between motor feet and base frame.
- C. Comply with pump and coupling manufacturers' written instructions.
- D. After alignment is correct, tighten foundation bolts evenly but not too firmly.

#### 3.4 CONNECTIONS

- A. Where installing piping adjacent to pump, allow space for service and maintenance.

## PART 2 - PRODUCTS

### 2.1 CLOSE-COUPLED, IN-LINE CENTRIFUGAL PUMPS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Armstrong Pumps, Inc.
2. ITT Corporation.
3. TACO Comfort Solutions, Inc.

- B. Description: Factory-assembled and -tested, centrifugal, overhung-impeller, close-coupled, in-line pump as defined in HI 1.1-1.2 and HI 1.3; designed for installation with pump and motor shafts mounted horizontally or vertically.

- A. Pump Construction:

1. Casing: Radially split, cast iron, with threaded gage tapings at inlet and outlet, replaceable bronze wear rings, and threaded companion-flange connections.
2. Impeller: ASTM B 584, cast bronze; statically and dynamically balanced, keyed to shaft, and secured with a locking cap screw. For constant-speed pumps, trim impeller to match specified performance.
3. Pump Shaft: Stainless steel.
4. Seal: Mechanical seal consisting of carbon rotating ring against a ceramic seat held by a stainless-steel spring, and EPT bellows and gasket. Include water slinger on shaft between motor and seal.
5. Seal: Packing seal consisting of stuffing box with a minimum of four rings of graphite-impregnated braided yarn with bronze lantern ring between center two graphite rings, and bronze packing gland.
6. Pump Bearings: Permanently lubricated ball bearings.

- B. Motor: Single speed and rigidly mounted to pump casing.

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

- a. Enclosure: Open, dripproof.
- b. Efficiency: Premium efficient.

## SECTION 23 2123 - HYDRONIC PUMPS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Close-coupled, in-line centrifugal pumps.

#### 1.3 DEFINITIONS

- A. Buna-N: Nitrile rubber.
- B. EPT: Ethylene propylene terpolymer.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of pump. Include certified performance curves and rated capacities, operating characteristics, furnished specialties, final impeller dimensions, and accessories for each type of product indicated. Indicate pump's operating point on curves.
- B. Shop Drawings: For each pump.
  - 1. Show pump layout and connections.
  - 2. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.
  - 3. Include diagrams for power, signal, and control wiring.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pumps to include in emergency, operation, and maintenance manuals.

3.2 HYDRONIC SPECIALTIES INSTALLATION

- A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.
- B. Install automatic air vents at high points of system piping in mechanical equipment rooms only. Install manual vents at heat-transfer coils and elsewhere as required for air venting.
- C. Install piping from boiler air outlet, air separator, or air purger to expansion tank with a 2 percent upward slope toward tank.

END OF SECTION 23 2116

8. Maximum Operating Temperature: 225 deg F (107 deg C).

B. Automatic Air Vents:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. AMTROL, Inc.
  - b. Armstrong Pumps, Inc.
  - c. Bell & Gossett; a Xylem brand.
  - d. Flamco; a division of AALBERTS Ind.
  - e. Nexus Valve, Inc.
  - f. NuTech Hydronic Specialty Products.
  - g. Spirotherm, Inc.
  - h. TACO Comfort Solutions, Inc.
2. Body: Bronze or cast iron.
3. Internal Parts: Nonferrous.
4. Operator: Noncorrosive metal float.
5. Inlet Connection: NPS 1/2 (DN 15).
6. Discharge Connection: NPS 1/4 (DN 8).
7. CWP Rating: 150 psig (1035 kPa).
8. Maximum Operating Temperature: 240 deg F (116 deg C).

### PART 3 - EXECUTION

#### 3.1 VALVE APPLICATIONS

- A. Do not install iron or steel valves in copper piping systems. Use bronze valves.
- B. Install combination balancing and shutoff valves in the return water line of each heating or cooling element and elsewhere as required to facilitate system balancing.
- C. Install shutoff-duty valves at each branch connection to supply mains and at supply connection to each piece of equipment.
- D. Install safety valves at hot-water generators and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install drip-pan elbow on safety-valve outlet and pipe without valves to the outdoors; pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, for installation requirements.
- E. Install pressure-reducing valves at makeup-water connection to regulate system fill pressure.

D. Diaphragm-Operated Safety Valves: ASME labeled.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. AMTROL, Inc.
  - b. Apollo Flow Controls; Conbraco Industries, Inc.
  - c. Armstrong Pumps, Inc.
  - d. Bell & Gossett; a Xylem brand.
  - e. Spence Engineering Company, Inc.
  - f. WATTS.
2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Wetted, Internal Work Parts: Brass and rubber.
8. Inlet Strainer: removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

2.2 AIR-CONTROL DEVICES

A. Manual Air Vents:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. AMTROL, Inc.
  - b. Apollo Flow Controls; Conbraco Industries, Inc.
  - c. Armstrong Pumps, Inc.
  - d. Bell & Gossett; a Xylem brand.
  - e. Hays Fluid Controls.
  - f. HCI; Hydronics Components Inc.
  - g. Nexus Valve, Inc.
  - h. NuTech Hydronic Specialty Products.
  - i. TACO Comfort Solutions, Inc.
2. Body: Bronze.
3. Internal Parts: Nonferrous.
4. Operator: Screwdriver or thumbscrew.
5. Inlet Connection: NPS 1/2 (DN 15).
6. Discharge Connection: NPS 1/8 (DN 6).
7. CWP Rating: 150 psig (1035 kPa).

B. Cast-Iron or Steel, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Armstrong Pumps, Inc.
- b. Bell & Gossett; a Xylem brand.
- c. Grinnell G-Fire by Johnson Controls Company.
- d. Griswold Controls.
- e. Nexus Valve, Inc.
- f. TACO Comfort Solutions, Inc.
- g. Victaulic Company.

2. Body: Cast-iron or steel body, ball, plug, or globe pattern with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Stem Seals: EPDM O-rings.
5. Disc: Glass and carbon-filled PTFE.
6. Seat: PTFE.
7. End Connections: Flanged or grooved.
8. Pressure Gage Connections: Integral seals for portable differential pressure meter.
9. Handle Style: Lever, with memory stop to retain set position.
10. CWP Rating: Minimum 125 psig (860 kPa).
11. Maximum Operating Temperature: 250 deg F (121 deg C).

C. Diaphragm-Operated, Pressure-Reducing Valves: ASME labeled.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. AMTROL, Inc.
- b. Apollo Flow Controls; Conbraco Industries, Inc.
- c. Armstrong Pumps, Inc.
- d. Bell & Gossett; a Xylem brand.
- e. Spence Engineering Company, Inc.
- f. Victaulic Company.
- g. WATTS.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Low inlet-pressure check valve.
8. Inlet Strainer: removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For hydronic piping specialties to include in emergency, operation, and maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Differential Pressure Meter: For each type of balancing valve and automatic flow control valve, include flowmeter, probes, hoses, flow charts, and carrying case.

1.6 QUALITY ASSURANCE

- A. Pipe Welding: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
- B. Safety Valves and Pressure Vessels: Shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

PART 2 - PRODUCTS

2.1 HYDRONIC SPECIALTY VALVES

- A. Bronze, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Armstrong Pumps, Inc.
  - b. Bell & Gossett; a Xylem brand.
  - c. Griswold Controls.
  - d. Nexus Valve, Inc.
  - e. NIBCO INC.
  - f. TACO Comfort Solutions, Inc.
  - g. Victaulic Company.
2. Body: Bronze, ball or plug type with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Plug: Resin.
5. Seat: PTFE.
6. End Connections: Threaded or socket.
7. Pressure Gage Connections: Integral seals for portable differential pressure meter.
8. Handle Style: Lever, with memory stop to retain set position.
9. CWP Rating: Minimum 125 psig (860 kPa).
10. Maximum Operating Temperature: 250 deg F (121 deg C).



## SECTION 23 2116 - HYDRONIC PIPING SPECIALTIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

A. Section Includes:

1. Hydronic specialty valves.
2. Air-control devices.

B. Related Requirements:

1. Section 230516 "Expansion Fittings and Loops for HVAC Piping" for expansion fittings and loops.
2. Section 230523.11 "Globe Valves for HVAC Piping" for specification and installation requirements for globe valves common to most piping systems.
3. Section 230523.12 "Ball Valves for HVAC Piping" for specification and installation requirements for ball valves common to most piping systems.
4. Section 230523.13 "Butterfly Valves for HVAC Piping" for specification and installation requirements for butterfly valves common to most piping systems.
5. Section 230523.14 "Check Valves for HVAC Piping" for specification and installation requirements for check valves common to most piping systems.
6. Section 230523.15 "Gate Valves for HVAC Piping" for specification and installation requirements for gate valves common to most piping systems.
7. Section 230923.11 "Control Valves" for automatic control valve and sensor specifications, installation requirements, and locations.

#### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product:

1. Include construction details and material descriptions for hydronic piping specialties.
2. Include rated capacities, operating characteristics, and furnished specialties and accessories.
3. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.

LFUCG Boiler Replacements at Fleet Management,  
Carnegie Center, & Government Center Annex  
Lexington, KY

LFUCG Project #123-2019  
S&F No. 19519

1. Hot water heating system
- G. Perform cleaning in accordance with water treatment supplier's procedures.

END OF SECTION 23 2113

2. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
  3. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
  4. Isolate expansion tanks and determine that hydronic system is full of water.
  5. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
  6. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
  7. Prepare written report of testing.
- C. Perform the following before operating the system:
1. Open manual valves fully.
  2. Inspect pumps for proper rotation.
  3. Set makeup pressure-reducing valves for required system pressure.
  4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
  5. Set temperature controls so all coils are calling for full flow.
  6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
  7. Verify lubrication of motors and bearings.
- ### 3.8 CHEMICAL PIPE CLEANING
- A. Perform draining, flushing, refilling and chemical cleaning. Furnish and install piping, fittings, pumps, connections, etc., required by treatment specialist to conduct cleaning operations. The treatment specialist shall supervise cleaning, provide chemicals and shall provide a certificate of completion of cleaning procedures for each piping system. Send certificates to Architect/Engineer before final inspection is made.
- B. Chemically clean the following piping systems:
1. Hot water heating system
- C. Perform cleaning in accordance with treatment specialist's procedures. Drain system completely and refill with clean water with no chemicals after chemical cleaning is complete.
- D. Thoroughly flush and chemically clean indicated water lines and related equipment. Add recommended dosages of chemicals and circulate for a period of 24-48 hours. Then drain and flush system until the total alkalinity of rinse water is equal to the make-up water.
- E. Refill systems as directed by water treatment supplier.
- F. Chemically clean the following piping systems:

- H. Grooved Joints: Assemble joints with coupling and gasket, lubricant, and bolts. Cut or roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions for pipe wall thickness. Use grooved-end fittings and rigid, grooved-end-pipe couplings.
- I. Plain-End Mechanical-Coupled Joints: Prepare, assemble, and test joints in accordance with manufacturer's written installation instructions.
- J. Mechanically Formed, Copper-Tube-Outlet Joints: Use manufacturer-recommended tool and procedure, and brazed joints.

### 3.6 TERMINAL EQUIPMENT CONNECTIONS

- A. Sizes for supply and return piping connections shall be the same as or larger than equipment connections.
- B. Install control valves in accessible locations close to connected equipment.
- C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.
- D. Install ports for pressure gages and thermometers at coil inlet and outlet connections. Comply with requirements in Section 230519 "Meters and Gages for HVAC Piping."

### 3.7 FIELD QUALITY CONTROL

- A. Prepare hydronic piping according to ASME B31.9 and as follows:
  - 1. Leave joints, including welds, uninsulated and exposed for examination during test.
  - 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
  - 3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
  - 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
  - 5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.
- B. Perform the following tests on hydronic piping:
  - 1. Test systems to the following hydrostatic pressures:
    - a. Chilled water [200] psig
    - b. Chilled glycol [200] psig
    - c. Hot water [200] psig
    - d. Canopy hot water [200] psig
    - e. Energy recovery water [200] psig
    - f. Heat pump water [200] psig

- E. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:
1. NPS 3/4 (DN 20): Maximum span, 5 feet (1.5 m); minimum rod size, 1/4 inch (6.4 mm).
  2. NPS 1 (DN 25): Maximum span, 6 feet (1.8 m); minimum rod size, 1/4 inch (6.4 mm).
  3. NPS 1-1/4 (DN 32): Maximum span, 7 feet (2.1 m); minimum rod size, 3/8 inch (10 mm).
  4. NPS 1-1/2 (DN 40): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8 inch (10 mm).
  5. NPS 2 (DN 50): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8 inch (10 mm).
  6. NPS 2-1/2 (DN 65): Maximum span, 9 feet (2.7 m); minimum rod size, 3/8 inch (10 mm).
  7. NPS 3 (DN 80) and Larger: Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (10 mm).
- F. Plastic Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.
- G. Fiberglass Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.
- H. Support vertical runs at roof, at each floor, and at 10-foot (3-m) intervals between floors.

### 3.5 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8/A5.8M.
- E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- F. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
- G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

- V. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for identifying piping.
- W. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- X. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- Y. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

### 3.3 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

### 3.4 HANGERS AND SUPPORTS

- A. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hanger, support, and anchor devices. Comply with the following requirements for maximum spacing of supports.
- B. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC" for seismic restraints.
- C. Install the following pipe attachments:
  - 1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.
  - 2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet (6 m) or longer.
  - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
  - 4. Spring hangers to support vertical runs.
  - 5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
  - 6. On plastic pipe, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.
- D. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:
  - 1. NPS 3/4 (DN 20): Maximum span, 7 feet (2.1 m).
  - 2. NPS 1 (DN 25): Maximum span, 7 feet (2.1 m).
  - 3. NPS 1-1/2 (DN 40): Maximum span, 9 feet (2.7 m).
  - 4. NPS 2 (DN 50): Maximum span, 10 feet (3 m).
  - 5. NPS 2-1/2 (DN 65): Maximum span, 11 feet (3.4 m).
  - 6. NPS 3 (DN 80) and Larger: Maximum span, 12 feet (3.7 m).

- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- M. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- N. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- O. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- P. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.
- Q. Install valves according to the following:
  - 1. Section 230523.11 "Globe Valves for HVAC Piping."
  - 2. Section 230523.12 "Ball Valves for HVAC Piping."
  - 3. Section 230523.13 "Butterfly Valves for HVAC Piping."
  - 4. Section 230523.14 "Check Valves for HVAC Piping."
  - 5. Section 230523.15 "Gate Valves for HVAC Piping."
- R. Install unions in piping, NPS 2 (DN 50) and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- S. Install flanges in piping, NPS 2-1/2 (DN 65) and larger, at final connections of equipment and elsewhere as indicated.
- T. Install shutoff valve immediately upstream of each dielectric fitting.
- U. Comply with requirements in Section 230516 "Expansion Fittings and Loops for HVAC Piping" for installation of expansion loops, expansion joints, anchors, and pipe alignment guides.

1. Type L (Type B), drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
- B. Hot-water heating piping, aboveground, NPS 2-1/2 (DN 65) and larger, shall be any of the following:
1. Type L (Type B), drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
  2. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints.
  3. Schedule 40 steel pipe; grooved, mechanical joint coupling and fittings; and grooved, mechanical joints.
- C. Condensate-Drain Piping: Type M (Type C), drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
- D. Blowdown-Drain Piping: Same materials and joining methods as for piping specified for the service in which blowdown drain is installed.
- E. Air-Vent Piping:
1. Inlet: Same as service where installed with metal-to-plastic transition fittings for plastic piping systems according to piping manufacturer's written instructions.
  2. Outlet: Type K (Type A), annealed-temper copper tubing with soldered or flared joints.
- F. Safety-Valve-Inlet and -Outlet Piping for Hot-Water Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed with metal-to-plastic transition fittings for plastic piping systems according to piping manufacturer's written instructions.

### 3.2 PIPING INSTALLATIONS

- A. Use fittings for all changes in direction and all branch connections in piping. At installer's option, weld-o-lets or thread-o-lets may be used for branch connections to mains as follows:
1. Only in pipe main sizes 2-1/2" and larger.
  2. Only when branch pipe size is 1/2 or less of main pipe size.
  3. Grooved mechanical coupling tap fittings may be used subject to the above mentioned conditions, only in piping systems where grooved mechanical couplings are permitted.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.



- a. Anvil International.
  - b. Victaulic Company.
2. Joint Fittings: ASTM A 536, Grade 65-45-12 ductile iron; ASTM A 47/A 47M, Grade 32510 malleable iron; ASTM A 53/A 53M, Type F, E, or S, Grade B fabricated steel; or ASTM A 106/A 106M, Grade B steel fittings with grooves or shoulders constructed to accept grooved-end couplings; with nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fittings.
  3. Base of Design: Victaulic Style 107/W07 or engineered approved equal. Gaskets shall be grade "EHP" EDPM designed for operating temperatures from -30 deg F to +250 deg F.
- I. Steel Pipe Nipples: ASTM A 733, made of same materials and wall thicknesses as pipe in which they are installed.

## 2.4 JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness unless otherwise indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BA9-1, silver alloy for joining copper with bronze or steel.
- E. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

## 2.5 BYPASS CHEMICAL FEEDER

- A. Description: Welded steel construction; 125-psig (860-kPa) working pressure; 5-gal. (19-L) capacity; with fill funnel and inlet, outlet, and drain valves.

## PART 3 - EXECUTION

### 3.1 PIPING APPLICATIONS

- A. Hot-water heating piping, aboveground, NPS 2 (DN 50) and smaller, shall be any of the following:

1. Hot-Water Heating Piping: 175 psig (kPa) at 200 deg F (93 deg C).
2. Dual-Temperature Heating and Cooling Water Piping: 175 psig (kPa) at 180 deg F (82 deg C).
3. Blowdown-Drain Piping: 200 deg F (93 deg C).
4. Air-Vent Piping: 200 deg F (93 deg C).
5. Safety-Valve-Inlet and -Outlet Piping: Equal to the pressure of the piping system to which it is attached.

## 2.2 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tubing: ASTM B 88, Type L (ASTM B 88M, Type B).
- B. Annealed-Temper Copper Tubing: ASTM B 88, Type K (ASTM B 88M, Type A).
- C. Wrought-Copper Unions: ASME B16.22.

## 2.3 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; welded and seamless, Grade B, and wall thickness as indicated in "Piping Applications" Article.
- B. Cast-Iron Threaded Fittings: ASME B16.4; Classes 125 and 250 as indicated in "Piping Applications" Article.
- C. Malleable-Iron Threaded Fittings: ASME B16.3, Classes 150 and 300 as indicated in "Piping Applications" Article.
- D. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300 as indicated in "Piping Applications" Article.
- E. Cast-Iron Pipe Flanges and Flanged Fittings: ASME B16.1, Classes 25, 125, and 250; raised ground face, and bolt holes spot faced as indicated in "Piping Applications" Article.
- F. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.
- G. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
  1. Material Group: 1.1.
  2. End Connections: Butt welding.
  3. Facings: Raised face.
- H. Grooved Mechanical-Joint Fittings and Couplings:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Piping layout, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Suspended ceiling components.
  - 2. Other building services.
  - 3. Structural members.
- B. Qualification Data: For Installer.
- C. Welding certificates.
- D. Field quality-control reports.
- E. Preconstruction Test Reports:
  - 1. Water Analysis: Submit a copy of the water analysis to illustrate water quality available at Project site.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Installers of Pressure-Sealed Joints: Installers shall be certified by pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.
  - 2. Fiberglass Pipe and Fitting Installers: Installers of RTRF and RTRP shall be certified by manufacturer of pipes and fittings as having been trained and qualified to join fiberglass piping with manufacturer-recommended adhesive.
- B. Steel Support Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Pipe Welding: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
  - 1. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.
  - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:

## SECTION 23 2113 - HYDRONIC PIPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes pipe and fitting materials and joining methods for the following:
1. Copper tube and fittings.
  2. Steel pipe and fittings.
  3. Plastic pipe and fittings.
  4. Fiberglass pipe and fittings.
  5. Joining materials.
  6. Transition fittings.
  7. Dielectric fittings.
  8. Bypass chemical feeder.
- B. Install pipe accessories (such as strainers, valves, control valves, sensing wells, hangers, gages, pumps, etc., furnished under other sections of the Specifications, in piping systems.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of the following:

1. Pipe.
2. Fittings.
3. Joining materials.
4. Bypass chemical feeder.

- B. Delegated-Design Submittal:

1. Design calculations and detailed fabrication and assembly of pipe anchors and alignment guides, hangers and supports for multiple pipes, expansion joints and loops, and attachments of the same to the building structure.
2. Locations of pipe anchors and alignment guides and expansion joints and loops.
3. Locations of and details for penetrations, including sleeves and sleeve seals for exterior walls, floors, basement, and foundation walls.
4. Locations of and details for penetration and firestopping for fire- and smoke-rated wall and floor and ceiling assemblies.

3.13 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  - 1. Drainage piping located in crawl spaces.
  - 2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.14 INDOOR PIPING INSULATION SCHEDULE

- A. Condensate and Equipment Drain Water below 60 Deg F (16 Deg C):
  - 1. All Pipe Sizes: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 3/4 inch (19 mm) thick.
- B. Heating-Hot-Water Supply and Return, 200 Deg F (93 Deg C) and below:
  - 1. NPS 1-1/2 (DN 40) and Smaller: Insulation shall be the following:
    - a. Mineral-Fiber, Preformed Pipe, Type I: 1 inch (25 mm) thick.
  - 2. NPS 2 (DN 50) and Larger: Insulation shall be the following:
    - a. Mineral-Fiber, Preformed Pipe, Type I: 2 inch (50 mm) thick.
- C. Condensate Piping, below 65 Deg F (18 Deg C):
  - 1. All Pipe Sizes: Insulation shall be any of the following:
    - a. Mineral-Fiber, Preformed Pipe, Type I: 1 inch (25 mm) thick.
    - b. Polyisocyanurate: 1 inch (25 mm) thick.
    - c. Flexible Elastomeric: 1 inch (25 mm) thick.
- D. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- E. If more than one material is listed, selection from materials listed is Contractor's option.

END OF SECTION 23 0700

1. Install preformed pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, same thickness of adjacent pipe insulation, not to exceed 1-1/2-inch (38-mm) thickness.
  3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyisocyanurate block insulation of same thickness as pipe insulation.
- C. Insulation Installation on Fittings and Elbows:
1. Install preformed sections of same material as straight segments of pipe insulation. Secure according to manufacturer's written instructions.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed sections of polyisocyanurate insulation to valve body.
  2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  3. Install insulation to flanges as specified for flange insulation application.

### 3.11 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
1. Draw jacket smooth and tight to surface with 2-inch (50-mm) overlap at seams and joints.
  2. Embed glass cloth between two 0.062-inch- (1.6-mm-) thick coats of lagging adhesive.
  3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

### 3.12 FINISHES

- A. Equipment, and Pipe Insulation with Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 9 painting Sections.
1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
    - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

### 3.10 POLYISOCYANURATE INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with tape or bands and tighten without deforming insulation materials. Orient longitudinal joints between half sections in 3 and 9 o'clock positions on the pipe.
2. For insulation with factory-applied jackets with vapor barriers, do not staple longitudinal tabs but secure tabs with additional adhesive or tape as recommended by insulation material manufacturer and seal with vapor-barrier mastic.
3. All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor barrier must be continuous. Before installing jacket material, install vapor-barrier system.

B. Insulation Installation on Pipe Flanges:

1. Install mitered segments of calcium silicate insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
2. Install insulation to flanges as specified for flange insulation application.
3. Finish valve and specialty insulation same as pipe insulation.

### 3.8 CELLULAR-GLASS INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient services, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets on below ambient services, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

#### B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

#### C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

#### D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

### 3.9 MINERAL-FIBER INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.



- insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
  5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.
  6. Use thermal reusable insulation blankets to insulate steam strainers, steam control valves, steam traps, steam expansion joints, and steam pressure reducing valves.

### 3.7 CALCIUM SILICATE INSULATION INSTALLATION

#### A. Insulation Installation on Straight Pipes and Tubes:

1. Secure single-layer insulation with stainless-steel bands at 12-inch (300-mm) intervals and tighten bands without deforming insulation materials.
2. Install 2-layer insulation with joints tightly butted and staggered at least 3 inches (75 mm). Secure inner layer with wire spaced at 12-inch (300-mm) intervals. Secure outer layer with stainless-steel bands at 12-inch (300-mm) intervals.
3. Apply a skim coat of mineral-fiber, hydraulic-setting cement to insulation surface. When cement is dry, apply flood coat of lagging adhesive and press on one layer of glass cloth or tape. Overlap edges at least 1 inch (25 mm). Apply finish coat of lagging adhesive over glass cloth or tape. Thin finish coat to achieve smooth, uniform finish.

#### B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as pipe insulation.
4. Finish flange insulation same as pipe insulation.

#### C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed insulation sections of insulation are not available, install mitered sections of calcium silicate insulation. Secure insulation materials with wire or bands.
3. Finish fittings insulation same as pipe insulation.

#### D. Insulation Installation on Valves and Pipe Specialties:

- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
  2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
  6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe

### 3.5 EQUIPMENT, TANK, AND VESSEL INSULATION INSTALLATION

- A. Mineral Fiber, Pipe and Tank Insulation Installation for Tanks and Vessels: Secure insulation with adhesive and anchor pins and speed washers.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of tank and vessel surfaces.
  2. Groove and score insulation materials to fit as closely as possible to equipment, including contours. Bevel insulation edges for cylindrical surfaces for tight joints. Stagger end joints.
  3. Protect exposed corners with secured corner angles.
  4. Install adhesively attached or self-sticking insulation hangers and speed washers on sides of tanks and vessels as follows:
    - a. Do not weld anchor pins to ASME-labeled pressure vessels.
    - b. Select insulation hangers and adhesive that are compatible with service temperature and with substrate.
    - c. On tanks and vessels, maximum anchor-pin spacing is 3 inches (75 mm) from insulation end joints, and 16 inches (400 mm) o.c. in both directions.
    - d. Do not overcompress insulation during installation.
    - e. Cut and miter insulation segments to fit curved sides and domed heads of tanks and vessels.
    - f. Impale insulation over anchor pins and attach speed washers.
    - g. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  5. Secure each layer of insulation with stainless-steel or aluminum bands. Select band material compatible with insulation materials.
  6. Where insulation hangers on equipment and vessels are not permitted or practical and where insulation support rings are not provided, install a girdle network for securing insulation. Stretch prestressed aircraft cable around the diameter of vessel and make taut with clamps, turnbuckles, or breather springs. Place one circumferential girdle around equipment approximately 6 inches (150 mm) from each end. Install wire or cable between two circumferential girdles 12 inches (300 mm) o.c. Install a wire ring around each end and around outer periphery of center openings, and stretch prestressed aircraft cable radially from the wire ring to nearest circumferential girdle. Install additional circumferential girdles along the body of equipment or tank at a minimum spacing of 48 inches (1200 mm) o.c. Use this network for securing insulation with tie wire or bands.
  7. Stagger joints between insulation layers at least 3 inches (75 mm).
  8. Install insulation in removable segments on equipment access doors, manholes, handholes, and other elements that require frequent removal for service and inspection.
  9. Bevel and seal insulation ends around manholes, handholes, ASME stamps, and nameplates.
  10. For equipment with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.

### 3.6 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

### 3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
  - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
  - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches (50 mm).
  - 1. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
  - 1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches (50 mm).
  - 2. Pipe: Install insulation continuously through floor penetrations.
  - 3. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems."

1. Install insulation continuously through hangers and around anchor attachments.
  2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth.
  2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
  3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
  2. Testing agency labels and stamps.
  3. Nameplates and data plates.
  4. Manholes.
  5. Handholes.
  6. Cleanouts.

### 3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
  - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils (0.127 mm) thick and an epoxy finish 5 mils (0.127 mm) thick if operating in a temperature range between 140 and 300 deg F (60 and 149 deg C). Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
  - 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F (0 and 149 deg C) with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### 3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- (3.5-mm-) diameter shank, length to suit depth of insulation indicated.
  - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) AGM Industries, Inc.; CWP-1.
    - 2) GEMCO; CD.
    - 3) Midwest Fasteners, Inc.; CD.
    - 4) Nelson Stud Welding; TPA, TPC, and TPS.
  2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) AGM Industries, Inc.; RC-150.
      - 2) GEMCO; R-150.
      - 3) Midwest Fasteners, Inc.; WA-150.
      - 4) Nelson Stud Welding; Speed Clips.
    - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

## 2.11 CORNER ANGLES

- A. Aluminum Corner Angles: 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm), aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005; Temper H-14.
- B. Stainless-Steel Corner Angles: 0.024 inch (0.61 mm) thick, minimum 1 by 1 inch (25 by 25 mm), stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 or 316.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  2. Verify that surfaces to be insulated are clean and dry.
  3. Proceed with installation only after unsatisfactory conditions have been corrected.

- c. Moisture Barrier for Indoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.
- d. Moisture Barrier for Outdoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.
- e. Factory-Fabricated Fitting Covers:
  - 1) Same material, finish, and thickness as jacket.
  - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
  - 3) Tee covers.
  - 4) Flange and union covers.
  - 5) End caps.
  - 6) Beveled collars.
  - 7) Valve covers.
  - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

## 2.9 TAPES

### A. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
  - b. Compac Corp.; 120.
  - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
  - d. Venture Tape; 3520 CW.
- 2. Width: 2 inches (50 mm).
- 3. Thickness: 3.7 mils (0.093 mm).
- 4. Adhesion: 100 ounces force/inch (1.1 N/mm) in width.
- 5. Elongation: 5 percent.
- 6. Tensile Strength: 34 lbf/inch (6.2 N/mm) in width.

## 2.10 SECUREMENTS

### A. Bands:

- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Childers Products; Bands.
  - b. PABCO Metals Corporation; Bands.
  - c. RPR Products, Inc.; Bands.
- 2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch (0.38 mm) thick, 3/4 inch (19 mm) wide with closed seal.
- 3. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch (0.51 mm) thick, 3/4 inch (19 mm) wide with closed seal.

### B. Insulation Pins and Hangers:



- c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Pittsburgh Corning Corporation; Pittseal 444.
  - f. Vimasco Corporation; 750.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
  3. Permanently flexible, elastomeric sealant.
  4. Service Temperature Range: Minus 100 to plus 300 deg F (Minus 73 to plus 149 deg C).
  5. Color: White or gray.

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Childers Products, Division of ITW; CP-76-8.
  - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Vimasco Corporation; 750.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.

2.7 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and prescribed a minimum of 8 oz./sq. yd. (271 g/sq. m).
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Alpha Associates, Inc.; Alpha-Maritex 84215 and 84217/9485RW, Luben 59.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. Metal Jacket:
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Products, Division of ITW; Metal Jacketing Systems.
    - b. PABCO Metals Corporation; Surefit.
    - c. RPR Products, Inc.; Insul-Mate.
  2. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005, Temper H-14.
    - a. Sheet and roll stock ready for shop or field sizing.
    - b. Finish and thickness are indicated in field-applied jacket schedules.

2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
5. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Childers Products, Division of ITW; CP-10.
  - b. Foster Products Corporation, H. B. Fuller Company; 35-00.
  - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
  - d. Marathon Industries, Inc.; 550.
  - e. Mon-Eco Industries, Inc.; 55-50.
  - f. Vimasco Corporation; WC-1/WC-5.
2. Water-Vapor Permeance: ASTM F 1249, 3 perms (2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 200 deg F (Minus 29 to plus 93 deg C).
4. Solids Content: 63 percent by volume and 73 percent by weight.
5. Color: White.

## 2.5 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Childers Products, Division of ITW; CP-52.
  - b. Foster Products Corporation, H. B. Fuller Company; 81-42.
  - c. Marathon Industries, Inc.; 130.
  - d. Mon-Eco Industries, Inc.; 11-30.
  - e. Vimasco Corporation; 136.
2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct, equipment, and pipe insulation.
3. Service Temperature Range: Minus 50 to plus 180 deg F (Minus 46 to plus 82 deg C).
4. Color: White.

## 2.6 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass, and Polyisocyanurate Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Childers Products, Division of ITW; CP-76.
  - b. Foster Products Corporation, H. B. Fuller Company; 30-45.

- e. Vimasco Corporation; 760.
- C. Cellular-Glass, Phenolic, Polyisocyanurate, and Polystyrene Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F (minus 59 to plus 149 deg C).
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Products, Division of ITW; CP-96.
    - b. Foster Products Corporation, H. B. Fuller Company; 81-33.
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Products, Division of ITW; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.
- E. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Products, Division of ITW; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.

#### 2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Products, Division of ITW; CP-35.
    - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
    - c. ITW TACC, Division of Illinois Tool Works; CB-50.
    - d. Marathon Industries, Inc.; 590.
    - e. Mon-Eco Industries, Inc.; 55-40.
    - f. Vimasco Corporation; 749.

2. Comply with ASTM C 591, Type I or Type IV, except thermal conductivity (k-value) shall not exceed 0.19 Btu x in./h x sq. ft. x deg F (0.027 W/m x K) at 75 deg F (24 deg C) after 180 days of aging.
3. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to 1-1/2 inches (38 mm) as tested by ASTM E 84.
4. Fabricate shapes according to ASTM C 450 and ASTM C 585.
5. Factory-Applied Jacket: Requirements are specified in "Factory-Applied Jackets" Article.
  - a. Pipe Applications: ASJ-SSL.
  - b. Equipment Applications: ASJ-SSL.

## 2.2 INSULATING CEMENTS

### A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Insulco, Division of MFS, Inc.; Triple I.
  - b. P. K. Insulation Mfg. Co., Inc.; Super-Stik.

### B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C 196.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. P. K. Insulation Mfg. Co., Inc.; Thermal-V-Kote.

### C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Insulco, Division of MFS, Inc.; SmoothKote.
  - b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
  - c. Rock Wool Manufacturing Company; Delta One Shot.

## 2.3 ADHESIVES

### A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

### B. Calcium Silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 to 800 deg F (10 to 427 deg C).

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Childers Products, Division of ITW; CP-97.
  - b. Foster Products Corporation, H. B. Fuller Company; 81-27/81-93.
  - c. Marathon Industries, Inc.; 290.
  - d. Mon-Eco Industries, Inc.; 22-30.

- e. Owens Corning; Fiberglas Pipe Insulation.
  - 2. Type I, 850 deg F (454 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 3. Type II, 1200 deg F (649 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- L. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. (40 kg/cu. m) or more. Thermal conductivity (k-value) at 100 deg F (55 deg C) is 0.29 Btu x in./h x sq. ft. x deg F (0.042 W/m x K) or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. CertainTeed Corp.; CrimpWrap.
    - b. Johns Manville; MicroFlex.
    - c. Knauf Insulation; Pipe and Tank Insulation.
    - d. Manson Insulation Inc.; AK Flex.
    - e. Owens Corning; Fiberglas Pipe and Tank Insulation.
- M. Mineral Wool, Preformed and Precision Cut Pipe Insulation: Felted mineral wool bonded with a high temperature binder. Nominal density is 7 lb/cu. ft. Service temperature up to 1200 deg F (649 deg C) and water repellent. Thermal conductivity (k-value) at 200 deg F (55 deg C) is 0.30 Btu x in./h x sq. ft. x deg F (0.044 W/m x K) or less. Provide ASJ/SSL jacket. Pipe insulation shall meet ASTM C 547 and ASTM C 585. Factory applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.
- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Rock Wool Manufacturing Company.
- N. Polyisocyanurate: Unfaced, preformed, rigid cellular polyisocyanurate material intended for use as thermal insulation.
- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Apache Products Company; ISO-25.
    - b. Dow Chemical Company (The); Trymer.
    - c. Duna USA Inc.; Corafoam.
    - d. Elliott Company; Elfoam.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Kingspan Tarec Industrial Insulation NV; Koolphen K.
    - b. Resolco International BV; Insul-phen.
  2. Preformed pipe insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type III, Grade 1.
  3. Block insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type II, Grade 1.
  4. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
  5. Factory-Applied Jacket: Requirements are specified in "Factory-Applied Jackets" Article.
    - a. Preformed Pipe Insulation: None.
- I. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Armacell LLC; Tubolit.
    - b. Nomaco Insulation; IMCOLOCK, IMCOSHEET, NOMALOCK, and NOMAPLY.
- J. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cell-U-Foam Corporation; Ultra-CUF.
    - b. Pittsburgh Corning Corporation; Foamglas Super K.
  2. Block Insulation: ASTM C 552, Type I.
  3. Special-Shaped Insulation: ASTM C 552, Type III.
  4. Board Insulation: ASTM C 552, Type IV.
  5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
  6. Preformed Pipe Insulation with Factory-Applied ASJ-SSL: Comply with ASTM C 552, Type II, Class 2.
  7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- K. Mineral-Fiber, Preformed Pipe Insulation:
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Fibrex Insulations Inc.; Coreplus 1200.
    - b. Johns Manville; Micro-Lok.
    - c. Knauf Insulation; 1000 Pipe Insulation.
    - d. Manson Insulation Inc.; Alley-K.

## 1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## PART 2 - PRODUCTS

### 2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Calcium Silicate:
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Industrial Insulation Group (The); Thermo-12 Gold.
  - 2. Preformed Pipe Sections: Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
  - 3. Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
  - 4. Prefabricated Fitting Covers: Comply with ASTM C 450 and ASTM C 585 for dimensions used in preforming insulation to cover valves, elbows, tees, and flanges.
- G. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Aeroflex USA, Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.
- H. Phenolic:

5. Detail removable insulation at piping specialties, equipment connections, and access panels.
  6. Detail application of field-applied jackets.
  7. Detail application at linkages of control devices.
  8. Detail field application for each equipment type.
- C. Qualification Data: For qualified Installer.
- D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- E. Field quality-control reports.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

#### 1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 15 Section "Hangers and Supports."
- B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.



## SECTION 23 0700 - HVAC PIPING INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

A. Section Includes:

1. Insulation Materials:
  - a. Calcium silicate.
  - b. Cellular glass.
  - c. Mineral fiber.
  - d. Mineral Wool.
  - e. Phenolic.
  - f. Polyisocyanurate.
  - g. Polyolefin.
  - h. Polystyrene.
  - i. Manufactured Thermal Reusable Insulation Blankets:
2. Fire-rated insulation systems.
3. Insulating cements.
4. Adhesives.
5. Mastics.
6. Lagging adhesives.
7. Sealants.
8. Factory-applied jackets.
9. Field-applied fabric-reinforcing mesh.
10. Field-applied cloths.
11. Field-applied jackets.
12. Tapes.
13. Securements.
14. Corner angles.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).
- B. Shop Drawings:
1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  2. Detail attachment and covering of heat tracing inside insulation.
  3. Detail insulation application at pipe expansion joints for each type of insulation.
  4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.

LFUCG Boiler Replacements at Fleet Management,  
Carnegie Center, & Government Center Annex  
Lexington, KY

LFUCG Project #123-2019  
S&F No. 19519

- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 0593

- d. Make and size.
- e. Model number and serial number.
- f. Water flow rate in gpm (L/s).
- g. Water pressure differential in feet of head or psig (kPa).
- h. Required net positive suction head in feet of head or psig (kPa).
- i. Pump rpm.
- j. Impeller diameter in inches (mm).
- k. Motor make and frame size.
- l. Motor horsepower and rpm.
- m. Voltage at each connection.
- n. Amperage for each phase.
- o. Full-load amperage and service factor.
- p. Seal type.

2. Test Data (Indicated and Actual Values):

- a. Static head in feet of head or psig (kPa).
- b. Pump shutoff pressure in feet of head or psig (kPa).
- c. Actual impeller size in inches (mm).
- d. Full-open flow rate in gpm (L/s).
- e. Full-open pressure in feet of head or psig (kPa).
- f. Final discharge pressure in feet of head or psig (kPa).
- g. Final suction pressure in feet of head or psig (kPa).
- h. Final total pressure in feet of head or psig (kPa).
- i. Final water flow rate in gpm (L/s).
- j. Voltage at each connection.
- k. Amperage for each phase.

G. Instrument Calibration Reports:

1. Report Data:

- a. Instrument type and make.
- b. Serial number.
- c. Application.
- d. Dates of use.
- e. Dates of calibration.

3.13 VERIFICATION OF TAB REPORT

- A. Final Balance Report shall be submitted to the Engineer for review. Final payment will be contingent on approval of the report.

3.14 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

5. Terminal units.
  6. Balancing stations.
  7. Position of balancing devices.
- E. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:
1. Unit Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Fuel type in input data.
    - g. Output capacity in Btu/h (kW).
    - h. Ignition type.
    - i. Burner-control types.
    - j. Motor horsepower and rpm.
    - k. Motor volts, phase, and hertz.
    - l. Motor full-load amperage and service factor.
    - m. Sheave make, size in inches (mm), and bore.
    - n. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).
  2. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm (L/s).
    - b. Entering-air temperature in deg F (deg C).
    - c. Leaving-air temperature in deg F (deg C).
    - d. Air temperature differential in deg F (deg C).
    - e. Entering-air static pressure in inches wg (Pa).
    - f. Leaving-air static pressure in inches wg (Pa).
    - g. Air static-pressure differential in inches wg (Pa).
    - h. Low-fire fuel input in Btu/h (kW).
    - i. High-fire fuel input in Btu/h (kW).
    - j. Manifold pressure in psig (kPa).
    - k. High-temperature-limit setting in deg F (deg C).
    - l. Operating set point in Btu/h (kW).
    - m. Motor voltage at each connection.
    - n. Motor amperage for each phase.
    - o. Heating value of fuel in Btu/h (kW).
- F. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:
1. Unit Data:
    - a. Unit identification.
    - b. Location.
    - c. Service.

- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Pump curves.
  2. Fan curves.
  3. Manufacturers' test data.
  4. Field test reports prepared by system and equipment installers.
  5. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
  2. Name and address of the TAB specialist.
  3. Project name.
  4. Project location.
  5. Architect's name and address.
  6. Engineer's name and address.
  7. Contractor's name and address.
  8. Report date.
  9. Signature of TAB supervisor who certifies the report.
  10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  12. Nomenclature sheets for each item of equipment.
  13. Data for terminal units, including manufacturer's name, type, size, and fittings.
  14. Notes to explain why certain final data in the body of reports vary from indicated values.
  15. Test conditions for fans and pump performance forms including the following:
    - a. Settings for outdoor-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.
    - d. Face and bypass damper settings at coils.
    - e. Fan drive settings including settings and percentage of maximum pitch diameter.
    - f. Inlet vane settings for variable-air-volume systems.
    - g. Settings for supply-air, static-pressure controller.
    - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
  2. Water and steam flow rates.
  3. Duct, outlet, and inlet sizes.
  4. Pipe and valve sizes and locations.

### 3.9 PROCEDURES FOR BOILERS

#### A. Hydronic Boilers:

1. Measure and record entering- and leaving-water temperatures.
2. Measure and record water flow.
3. Record relief valve pressure setting.

#### B. Steam Boilers:

1. Measure and record entering-water temperature.
2. Measure and record feed water flow.
3. Measure and record leaving-steam pressure and temperature.
4. Record relief valve pressure setting.

### 3.10 TOLERANCES

#### A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Heating-Water Flow Rate: Plus or minus 10 percent.

#### B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

### 3.11 PROGRESS REPORTING

#### A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

#### B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

### 3.12 FINAL REPORT

#### A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

1. Measure flow in main and branch pipes.
  2. Adjust main and branch balance valves for design flow.
  3. Re-measure each main and branch after all have been adjusted.
- E. Adjust flow-measuring devices installed at terminals for each space to design water flows.
1. Measure flow at terminals.
  2. Adjust each terminal to design flow.
  3. Re-measure each terminal after it is adjusted.
  4. Position control valves to bypass the coil and adjust the bypass valve to maintain design flow.
  5. Perform temperature tests after flows have been balanced.
- F. For systems with pressure-independent valves at terminals:
1. Measure differential pressure and verify that it is within manufacturer's specified range.
  2. Perform temperature tests after flows have been verified.
- G. For systems without pressure-independent valves or flow-measuring devices at terminals:
1. Measure and balance coils by either coil pressure drop or temperature method.
  2. If balanced by coil pressure drop, perform temperature tests after flows have been verified.
- H. Verify final system conditions as follows:
1. Re-measure and confirm that total water flow is within design.
  2. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
  3. Mark final settings.
- I. Verify that memory stops have been set.

### 3.8 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
  2. Motor horsepower rating.
  3. Motor rpm.
  4. Phase and hertz.
  5. Nameplate and measured voltage, each phase.
  6. Nameplate and measured amperage, each phase.
  7. Starter size and thermal-protection-element rating.
  8. Service factor and frame size.
- B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

1. Measure differential pressure and verify that it is within manufacturer's specified range.
  2. Perform temperature tests after flows have been verified.
- E. For systems without pressure-independent valves or flow-measuring devices at terminals:
1. Measure and balance coils by either coil pressure drop or temperature method.
  2. If balanced by coil pressure drop, perform temperature tests after flows have been verified.
- F. Verify final system conditions as follows:
1. Re-measure and confirm that total water flow is within design.
  2. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
  3. Mark final settings.
- G. Verify that memory stops have been set.

### 3.7 PROCEDURES FOR PRIMARY-SECONDARY HYDRONIC SYSTEMS

- A. Balance the primary circuit flow first.
- B. Balance the secondary circuits after the primary circuits are complete.
- C. Adjust pumps to deliver total design gpm.
1. Measure total water flow.
    - a. Position valves for full flow through coils.
    - b. Measure flow by main flow meter, if installed.
    - c. If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.
  2. Measure pump TDH as follows:
    - a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
    - b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
    - c. Convert pressure to head and correct for differences in gage heights.
    - d. Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
    - e. With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
  3. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
- D. Adjust flow-measuring devices installed in mains and branches to design water flows.



3. Check flow-control valves for proper position.
4. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
5. Verify that motor starters are equipped with properly sized thermal protection.
6. Check that air has been purged from the system.

### 3.6 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

#### A. Adjust pumps to deliver total design gpm.

1. Measure total water flow.
  - a. Position valves for full flow through coils.
  - b. Measure flow by main flow meter, if installed.
  - c. If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.
2. Measure pump TDH as follows:
  - a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
  - b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
  - c. Convert pressure to head and correct for differences in gage heights.
  - d. Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow, and verify that the pump has the intended impeller size.
  - e. With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
3. Monitor motor performance during procedures and do not operate motor in an overloaded condition.

#### B. Adjust flow-measuring devices installed in mains and branches to design water flows.

1. Measure flow in main and branch pipes.
2. Adjust main and branch balance valves for design flow.
3. Re-measure each main and branch after all have been adjusted.

#### C. Adjust flow-measuring devices installed at terminals for each space to design water flows.

1. Measure flow at terminals.
2. Adjust each terminal to design flow.
3. Re-measure each terminal after it is adjusted.
4. Position control valves to bypass the coil, and adjust the bypass valve to maintain design flow.
5. Perform temperature tests after flows have been balanced.

#### D. For systems with pressure-independent valves at terminals:

- b. Piping is complete with terminals installed.
- c. Water treatment is complete.
- d. Systems are flushed, filled, and air purged.
- e. Strainers are pulled and cleaned.
- f. Control valves are functioning per the sequence of operation.
- g. Shutoff and balance valves have been verified to be 100 percent open.
- h. Pumps are started and proper rotation is verified.
- i. Pump gage connections are installed directly at pump inlet and outlet flanges or in discharge and suction pipe prior to valves or strainers.
- j. Variable-frequency controllers' startup is complete and safeties are verified.
- k. Suitable access to balancing devices and equipment is provided.

### 3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
  1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
  3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### 3.5 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports for pumps, coils, and heat exchangers. Obtain approved submittals and manufacturer-recommended testing procedures. Crosscheck the summation of required coil and heat exchanger flow rates with pump design flow rate.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. In addition to requirements in "Preparation" Article, prepare hydronic systems for testing and balancing as follows:
  1. Check liquid level in expansion tank.
  2. Check highest vent for adequate pressure.

2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens have been replaced by permanent screens with indicated perforations.
- L. Examine control valves for proper installation for their intended function of throttling, diverting, or mixing fluid flows.
- M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- N. Examine system pumps to ensure absence of entrained air in the suction piping.
- O. Examine operating safety interlocks and controls on HVAC equipment.
- P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### 3.3 PREPARATION

- A. Prepare a TAB plan that includes the following:
  1. Equipment and systems to be tested.
  2. Strategies and step-by-step procedures for balancing the systems.
  3. Instrumentation to be used.
  4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
  1. Hydronics:
    - a. Verify leakage and pressure tests on water distribution systems have been satisfactorily completed.

1.6 FIELD CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

- A. Subject to compliance with requirements, available TAB specialists that may be engaged include, but are not limited to, the following:
  - 1. Thermal Balance
  - 2. EBCO.

3.2 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
  - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

- B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.
- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.
  - 2. Serial number.
  - 3. Application.
  - 4. Dates of use.
  - 5. Dates of calibration.

#### 1.5 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC.
  - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
  - 2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.
  - 3. Test and Balance Engineer's Qualifications: A Professional Engineer (either on the installer's staff or and independent consultant), registered in the State in which the services are to be performed, and having at least 3-years of successful testing, adjusting, and balancing experience on projects with testing and balancing requirements similar to those required for this project.
- B. TAB Specialists Qualifications: Certified by NEBB or TABB.
  - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB or TABB.
  - 2. TAB Technician: Employee of the TAB specialist and certified by NEBB or TABB as a TAB technician.
- C. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Balancing Hydronic Piping Systems:
  - a. Constant-flow hydronic systems.
  - b. Variable-flow hydronic systems.
  - c. Primary-secondary hydronic systems.
- 2. Testing, Adjusting, and Balancing Equipment:
  - a. Motors.
  - b. Boilers.
- 3. Testing, adjusting, and balancing existing systems and equipment.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. UTILITY SERVICE MARKERS

- C. Install utility service markers where shown on plans.

3.7 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
- C. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Architect/Engineer.
- D. Where more than one major machine room is shown for project, install mounted valve schedule in each major machine room, and repeat only main valves which are to be operated in conjunction with operations of more than single machine room.
1. Valve-Tag Size and Shape: 1 ½ inches (38 mm), round.
  2. Valve-Tag Color: Natural.

END OF SECTION 23 0553

CONDENSED PUMP DISCHARGE	P.D.	GALVANO	SW4027
SUM PUMP DISCHARGE	S.PUMP DIS.	GALVANO	SW4027
FIRE SUPPRESSION- SPRINKLER SYSTEM	FIRE	SAFETY RED	SW4081

F. NOTES: \*COLOR AND NUMBER ARE FROM SHERWIN WILLIAMS 4000 SELECTION GUIDE DATED 1999.

G. PIPING IN ARCHITECTURAL AREAS ARE TO BE PAINTED PER THE ARCHITECT'S DIRECTION.

H. LABEL ALL PIPING SYSTEMS FOR TRACING AND IDENTIFICATION.

### 3.5 DUCT LABEL INSTALLATION

A. Install self-adhesive duct labels with permanent adhesive or stencils on air ducts in the following color codes:

1. Blue: For cold-air supply ducts.
2. Yellow: For hot-air supply ducts.
3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. Red: For lab exhaust.

B. Stenciled Duct Label Option: Stenciled labels showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch (25 mm) high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet (15 m) in each space where ducts are exposed or concealed by removable ceiling system.

	Duct System	Stencil wording
1.	Primary Air	"Primary Air"
2.	Supply Air	"Supply Air"
3.	Return Air	"Return Air"
4.	Outside Air	"Outside Air"
5.	Exhaust Air	"Exhaust"
6.	Lab Exhaust	"Lab Exhaust"

### 3.6 UNDERGROUND PIPING IDENTIFICATION

A. General: During back-filling/top-soiling of each exterior underground piping systems, install continuous underground-type plastic line marker, located directly over buried line at 12" below finished grade. Where multiple small lines are buried in common trench and do not exceed overall width of 16", install single line marker. For tile fields and similar installations, mark only edge pipe lines of field.



6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 15 feet (4.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
8. Place every 10' in mechanical rooms.

D. Provide piping identification markers in accordance with the following schedule.

E. Piping Identification Schedule

TYPE OF SERVICE	MARKINGS	COLOR*	NO.*
HIGH PRESSURE STEAM (over 76 psig)	HPS	SAFETY RED	SW4081
HIGH PRESSURE RETURN (over 76 psig)	HPR	SAFETY RED	SW4081
MEDIUM PRESSURE STEAM (21 psig to 75 psig)	MPS	INTERNATIONAL ORANGE	SW4082
MEDIUM PRESSURE RETURN (21 psig to 75 psig)	MPR	INTERNATIONAL ORANGE	SW4082
LOW PRESSURE STEAM (0 psig to 20 psig)	LPS	SAFETY ORANGE	SW4083
LOW PRESSURE RETURN (0 psig to 20 psig)	LPR	SAFETY ORANGE	SW4083
DOMESTIC COLD WATER	D.C.W.	SAFETY GREEN	SW4085
DOMESTIC HOT WATER	D.H.W.	GREEN BYTE	SW4076
REHEAT - SUPPLY	HWS	JUNCTION YELLOW	SW4033
REHEAT - RETURN	HWR	JUNCTION YELLOW	SW4033
CHILL WATER - SUPPLY	CWS	SAFETY BLUE	SW4086
CHILL WATER - RETURN	CWR	SAFETY BLUE	SW4086
CONDENSER WATER - SUPPLY	CDWS	SLATE GRAY	SW4026
CONDENSER WATER - RETURN	CDWR	SLATE GRAY	SW4026
NATURAL GAS	GAS	DECK RED	SW4040
SAFETY VALVE VENTS	SVV	GALVANO	SW4027
C.I.-SOIL WASTE & VENTS	W. & V.	VACUUM BLACK	SW4032
AIR (STEEL PIPE)	AIR	GALVANO	SW4027
AIR (COPPER PIPE)	AIR	NONE	--
VACUUM (COPPER PIPE)	VAC	NONE	--
VACUUM (STEEL PIPE)	VAC	GALVANO	SW4027
NITROGEN	NITROGEN	GALVANO	SW4027
OXYGEN	OXYGEN	NONE	--
OTHER LAB GASES	"GAS NAME"	NONE	--
ROOF LEADERS	R.L.	GALVANO	SW4027
SOFT WATER	S.W.	PILLAR WHITE	SW4029
DEIONIZED WATER	D.I.	NONE	--
DIESEL FUEL	D.FUEL	GALVANO	SW4027
CHROMATE OR COOLING TOWER ADDITIVES	C.T.A.	GALVANO	SW4027
BOILER TREATMENT	B.T.	GALVANO	SW4027

- B. Locate equipment labels where accessible and visible.

### 3.3 MECHANICAL EQUIPMENT IDENTIFICATION ABOVE CEILING:

- A. Attach Seton-Ply Discs to ceiling grid under equipment or to access doors in non-accessible ceilings as follows:

	Equipment	Engraved	Color
1.	Valve	V	Yellow
2.	Fire Damper	FD	Black
3.	Smoke Damper	SMD	Black
4.	Volume Damper	VD	Black
5.	Laboratory Supply Unit	FHS	Red
6.	Laboratory Exhaust Unit	FHG	Red
7.	Fume Hood Exhaust Unit	FHE	Red
8.	Air Terminal Unit	VAV	Red
9.	Fan Terminal Unit	FT	Red
10.	Heating Coil	HC	Blue
11.	Fan Coil Unit	FC	Red
12.	Heat Pump Unit	HP	Red

- B. Isolating valves serving equipment above ceiling (such as heating coils, fan coil units, etc.) do not require identification discs.

### 3.4 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Painting of piping is specified in other divisions.

- B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles, complying with ASME A13.1, on each piping system.

1. Identification Paint: Use for contrasting background
2. Stencil Paint: Use for pipe marking.

- C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.

- A. Provide manufacturer's standard laminated plastic, color-coded equipment markers for identifying type and location of mechanical equipment above suspended ceilings. Provide markers with pressure adhesive and engraved as scheduled in this section. Provide black lettering on white background. Markers shall be narrow enough to fit on exposed ceiling grid and long enough to accommodate specified engraving. Install on ceiling grid closest to equipment above ceiling.

## 2.7 STENCILS

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping: minimum letter height of 1 ¼ inches (32 mm) for ducts; and minimum letter height of ¾ inch (19 mm) for access panel and door labels, equipment labels, and similar operational institutions.
  1. Stencil Material: Fiberboard or metal.
  2. Stencil Paint: Exterior, gloss, enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
  3. Identification Paint: Exterior enamel in colors according to ASME A13.1 unless otherwise indicated.

## 2.8 VALVE TAGS

- A. Valve Tags: Stamped or engraved with ¼ inch (6.4 mm) letters for piping system abbreviation and ½ inch (13 mm) numbers.
  1. Tag Material: Brass, 0.032 inch (0.8 mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
  2. Fasteners: Brass wire-link or beaded chain; or S-hook.
- B. Valve Schedules: For each piping system, on 1 ½ by 11 inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, modulating) and variations for identification. Mark valves for emergency shutoff and similar special uses.
  1. Valve-tag schedule shall be included in operation and maintenance data.

## PART 3 – EXECUTION

### 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

### 3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.

2. Lettering Size: At least 1 ½ inches (33 mm) high.

### 2.3 DUCT LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch (1.6 mm) thick, and having predrilled holes for attachment to hardware.
- B. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C)
- C. Minimum Label Size: Length and width vary for required label content, but not less than 2 ½ by ¾ inch (64 by 19 mm).
- D. Minimum Letter Size: ¼ inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), ½ inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principle lettering.
- E. Fasteners: Stainless steel self-tapping screws
- F. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- G. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow to indicate flow direction.
  1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
  2. Lettering Size: At least 1 ½ inches (38 mm) high.

### 2.4 UNDERGROUND-TYPE PLASTIC LINE MARKERS:

- A. General: Manufacturer's standard permanent, bright-colored continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried pipe.
- B. Provide multi-ply tape consisting of solid aluminum foil core between 2-layers of plastic tape.

### 2.5 UTILITY SERVICE MARKERS:

- A. Markers shall consist of bronze plates, ground and polished, and marked to identify the service. Markers shall also be stamped with arrows indicating the direction the service extends. A typical marker detail is shown on the Drawings.
- B. Markers locating services at the building shall be installed in masonry or concrete walls 2' above grade. Markers locating services elsewhere on the site shall be installed in concrete walks or curbs, or in 6" x 6" steel reinforced concrete posts as detailed.

### 2.6 MARKERS FOR IDENTIFYING EQUIPMENT ABOVE CEILINGS:

## PART 2 – PRODUCTS

### 2.1 EQUIPMENT LABELS

#### A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2 1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principle lettering.
7. Fasteners: Stainless steel self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8 1/2 by 11 inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

### 2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contacts: Including identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.

## SECTION 23 0553 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

##### A. Section Includes:

1. Equipment labels
2. Warning signs and labels
3. Pipe labels
4. Duct labels
5. Underground-Type Plastic Line Marker
6. Utility Service Markers
7. Ceiling Identification Discs
8. Valve tags
9. Warning tags

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

#### 1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

### 3.6 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in painting Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 23 0529

- a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
  - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
  - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
  - c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
  - d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
  - e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.
5. Pipes NPS 8 (DN 200) and Larger: Include wood inserts.
6. Insert Material: Length at least as long as protective shield.
7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.4 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

### 3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1/2 inches (13 mm).



H. Pipe Stand Installation:

1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 07 Section "Roof Accessories" for curbs.

I. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

J. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

K. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

L. Install lateral bracing with pipe hangers and supports to prevent swaying.

M. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

N. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

P. Insulated Piping: Comply with the following:

1. Attach clamps and spacers to piping.

- a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
- b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
- c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

- a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

- a. Horizontal (MSS Type 54): Mounted horizontally.
  - b. Vertical (MSS Type 55): Mounted vertically.
  - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
  - M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
  - N. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

### 3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
  1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
  2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Fiberglass Pipe Hanger Installation: Comply with applicable portions of MSS SP-69 and MSS SP-89. Install hangers and attachments as required to properly support piping from building structure.
- D. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- E. Fiberglass Strut System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled fiberglass struts.
- F. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- G. Fastener System Installation:
  1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb (340 kg).
    - b. Medium (MSS Type 32): 1500 lb (680 kg).
    - c. Heavy (MSS Type 33): 3000 lb (1360 kg).
  13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
  2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
  3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
  4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
  5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
  6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
  7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
  8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include

17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30 (DN 25 to DN 750), from 2 rods if longitudinal movement caused by expansion and contraction might occur.
  18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20 (DN 65 to DN 500), from single rod if horizontal movement caused by expansion and contraction might occur.
  19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42 (DN 50 to DN 1050), if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
  20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24 (DN 50 to DN 600), if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
  21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30 (DN 50 to DN 750), if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500).
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN 20 to DN 500), if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.

- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F (49 to 232 deg C) pipes, NPS 4 to NPS 16 (DN 100 to DN 400), requiring up to 4 inches (100 mm) of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24 (DN 20 to DN 600), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
  - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24 (DN 15 to DN 600), if little or no insulation is required.
  - 5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
  - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8 (DN 20 to DN 200).
  - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
  - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8 (DN 15 to DN 200).
  - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2 (DN 15 to DN 50).
  - 10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8 (DN 10 to DN 200).
  - 11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3 (DN 10 to DN 80).
  - 12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30 (DN 15 to DN 750).
  - 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
  - 14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange.
  - 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36 (DN 100 to DN 900), with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
  - 16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36 (DN 65 to DN 900), if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.

- D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
1. Available Manufacturers:
    - a. ERICO/Michigan Hanger Co.
    - b. MIRO Industries.
    - c. Portable Pipe Hangers.
  2. Base: Stainless steel.
  3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
  4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
- E. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
1. Available Manufacturers:
    - a. Portable Pipe Hangers.
  2. Bases: One or more plastic.
  3. Vertical Members: Two or more protective-coated-steel channels.
  4. Horizontal Member: Protective-coated-steel channel.
  5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
- F. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural-steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

## 2.8 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

## 2.9 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
1. Properties: Nonstaining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

## PART 3 - EXECUTION

### 3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

- E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- G. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

## 2.6 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  - 1. Available Manufacturers:
    - a. Hilti, Inc.
    - b. ITW Ramset/Red Head.
    - c. Masterset Fastening Systems, Inc.
    - d. MKT Fastening, LLC.
    - e. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated or stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  - 1. Available Manufacturers:
    - a. B-Line Systems, Inc.; a division of Cooper Industries.
    - b. Empire Industries, Inc.
    - c. Hilti, Inc.
    - d. ITW Ramset/Red Head.
    - e. MKT Fastening, LLC.
    - f. Powers Fasteners.

## 2.7 PIPE STAND FABRICATION

- A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping (or piping on grade).
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
  - 1. Available Manufacturers:
    - a. ERICO/Michigan Hanger Co.
    - b. MIRO Industries.
- C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
  - 1. Available Manufacturers:
    - a. MIRO Industries.

- C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

### 2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

### 2.4 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

- B. Available Manufacturers:

1. B-Line Systems, Inc.; a division of Cooper Industries.
2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
3. GS Metals Corp.
4. Power-Strut Div.; Tyco International, Ltd.
5. Thomas & Betts Corporation.
6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.

- C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

### 2.5 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- (690-kPa-) minimum, compressive-strength insulation insert encased in sheet metal shield.

- B. Available Manufacturers:

1. Carpenter & Paterson, Inc.
2. ERICO/Michigan Hanger Co.
3. PHS Industries, Inc.
4. Pipe Shields, Inc.
5. Rilco Manufacturing Company, Inc.
6. Value Engineered Products, Inc.

- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.

- D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.



3. Pipe stands. Include Product Data for components.
4. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel." ASME Boiler and Pressure Vessel Code: Section IX.
- B. Welding: Qualify procedures and personnel according to the following:
  1. AWS D1.1, "Structural Welding Code--Steel."
  2. AWS D1.2, "Structural Welding Code--Aluminum."
  3. AWS D1.3, "Structural Welding Code--Sheet Steel."
  4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
  5. ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Available Manufacturers:
  1. AAA Technology & Specialties Co., Inc.
  2. Bergen-Power Pipe Supports.
  3. B-Line Systems, Inc.; a division of Cooper Industries.
  4. Carpenter & Paterson, Inc.
  5. Empire Industries, Inc.
  6. ERICO/Michigan Hanger Co.
  7. Globe Pipe Hanger Products, Inc.
  8. Grinnell Corp.
  9. GS Metals Corp.
  10. National Pipe Hanger Corporation.
  11. PHD Manufacturing, Inc.
  12. PHS Industries, Inc.
  13. Piping Technology & Products, Inc.
  14. Tolco Inc.

## SECTION 23 0529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following hangers and supports for HVAC system piping and equipment:
  - 1. Steel pipe hangers and supports.
  - 2. Trapeze pipe hangers.
  - 3. Metal framing systems.
  - 4. Thermal-hanger shield inserts.
  - 5. Fastener systems.
  - 6. Pipe stands.
  - 7. Equipment supports.

#### 1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

#### 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Steel pipe hangers and supports.
  - 2. Thermal-hanger shield inserts.
  - 3. Powder-actuated fastener systems.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:
  - 1. Trapeze pipe hangers. Include Product Data for components.
  - 2. Metal framing systems. Include Product Data for components.

B. Select valves with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.
4. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.
5. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
6. For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.

3.4 HEATING-WATER VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller: bronze ball valves, two piece with bronze stainless-steel trim, full port, solder-joint ends.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Iron ball valves, Class 125.
  - a. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
2. Steel ball valves, Class 150.

END OF SECTION 23 0523.12

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

#### 3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Do not install iron or steel valves in copper piping systems. Use bronze valves.
- C. Do not install copper or bronze valves, or valves with copper or bronze parts, in high temperature hot water systems. Use only steel valves.
- D. Do not install valves with threaded ends in high temperature hot water systems. Use only welded or flanged ends.
- E. Install valves with unions or flanges at each piece of equipment arranged to allow servicing, maintenance, and equipment removal without system shutdown.
- F. Locate valves for easy access and provide separate support where necessary.
- G. Install valves in horizontal piping with stem at or above center of pipe.
- H. Install valves in position to allow full stem movement.
- I. Install valve tags. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.

#### 3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified SWP classes or CWP ratings are unavailable, the same types of valves with higher SWP classes or CWP ratings may be substituted.

### BALL VALVES FOR HVAC PIPING

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Apollo Flow Controls; Conbraco Industries, Inc.
  - b. Jamesbury; Metso.
  - c. NIBCO INC.
  
2. Description:
  - a. Standard: MSS SP-72.
  - b. CWP Rating: 285 psig (1964 kPa).
  - c. Body Design: Split body.
  - d. Body Material: Carbon steel, ASTM A 216, Type WCB.
  - e. Ends: Flanged.
  - f. Seats: PTFE.
  - g. Stem: Stainless steel.
  - h. Ball: Stainless steel, vented.
  - i. Port: Full.

## 2.4 IRON BALL VALVES

### A. Iron Ball Valves, Class 125:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. American Valve, Inc.
  - b. Apollo Flow Controls; Conbraco Industries, Inc.
  - c. KITZ Corporation.
  - d. Sure Flow Equipment Inc.
  - e. WATTS.
  
2. Description:
  - a. Standard: MSS SP-72.
  - b. CWP Rating: 200 psig (1380 kPa).
  - c. Body Design: Split body.
  - d. Body Material: ASTM A 126, gray iron.
  - e. Seats: PTFE.
  - f. Stem: Stainless steel.
  - g. Ball: Stainless steel.
  - h. Port: Full.

- e. Lance Valves.
- f. Legend Valve & Fitting, Inc.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Red-White Valve Corp.
- j. WATTS.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig (1035 kPa).
- c. CWP Rating: 600 psig (4140 kPa).
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Seats: PTFE.
- g. Stem: Bronze.
- h. Ball: Chrome-plated brass.
- i. Port: Full.

B. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Apollo Flow Controls; Conbraco Industries, Inc.
- b. Crane; a Crane brand.
- c. Hammond Valve.
- d. Lance Valves.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Red-White Valve Corp.
- h. WATTS.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig (1035 kPa).
- c. CWP Rating: 600 psig (4140 kPa).
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Full.

2.3 STEEL BALL VALVES

A. Steel Ball Valves with Full Port and Stainless-Steel Trim, Class 150:

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
1. ASME B1.20.1 for threads for threaded-end valves.
  2. ASME B16.1 for flanges on iron valves.
  3. ASME B16.5 for flanges on steel valves.
  4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  5. ASME B16.18 for solder-joint connections.
  6. ASME B31.1 for power piping valves.
  7. ASME B31.9 for building services piping valves.
- C. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- D. Refer to HVAC valve schedule articles for applications of valves.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valves in Insulated Piping:
1. Include 2-inch (50-mm) stem extensions.
  2. Extended operating handle of nonthermal-conductive material, and protective sleeves that allow operation of valves without breaking the vapor seals or disturbing insulation.
  3. Memory stops that are fully adjustable after insulation is applied.
- H. Valve Bypass and Drain Connections: MSS SP-45.

### 2.2 BRONZE BALL VALVES

- A. Bronze Ball Valves, Two-Piece with Full Port and Bronze or Brass Trim:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. American Valve, Inc.
    - b. Apollo Flow Controls; Conbraco Industries, Inc.
    - c. Crane; a Crane brand.
    - d. Hammond Valve.

SECTION 23 0523.12 - BALL VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Bronze ball valves.
  2. Steel ball valves.
  3. Iron ball valves.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. SWP: Steam working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
1. Protect internal parts against rust and corrosion.
  2. Protect threads, flange faces, and weld ends.
  3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
1. Maintain valve end protection.
  2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.



- B. Adjust faces of meters and gages to proper angle for best visibility.

### 3.4 THERMOMETER SCHEDULE

- A. Thermometers at inlet and outlet of each hydronic zone shall be the following:
  - 1. Direct-mounted, metal-case, vapor-actuated type.
- B. Thermometers at inlet and outlet of each hydronic boiler shall be the following:
  - 1. Direct-mounted, metal-case, vapor-actuated type.
  - 2. Direct-mounted, metal-case, vapor-actuated type.
- C. Thermometer stems shall be of length to match thermowell insertion length.

### 3.5 THERMOMETER SCALE-RANGE SCHEDULE

- A. Scale Range for Heating, Hot-Water Piping: 30 to 240 deg F (0 to plus 115 deg C).

### 3.6 PRESSURE-GAGE SCHEDULE

- A. Pressure gages at suction and discharge of each pump shall be the following:
  - 1. Liquid-filled, direct-mounted, metal case.

### 3.7 PRESSURE-GAGE SCALE-RANGE SCHEDULE

- A. Scale Range for Heating, Hot-Water Piping: 0 to 200 psi (0 to 1400 kPa).

END OF SECTION 23 0519

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install thermowells with socket extending a minimum of 2 inches (51 mm) into fluid and in vertical position in piping tees.
- B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- C. Install thermowells with extension on insulated piping.
- D. Fill thermowells with heat-transfer medium.
- E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- F. Install duct-thermometer mounting brackets in walls of ducts. Attach to duct with screws.
- G. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
- H. Install valve and snubber in piping for each pressure gage for fluids.
- I. Install test plugs in piping tees.
- J. Install permanent indicators on walls or brackets in accessible and readable positions.
- K. Install connection fittings in accessible locations for attachment to portable indicators.
- L. Install Hydronic Indicator System with manifold valves at each pump. Connect each port on the manifold to each measuring point as detailed on the Drawings.
- M. Install thermometers in the following locations:
  - 1. Inlet and outlet of each hydronic zone.
  - 2. Inlet and outlet of each hydronic boiler.
- N. Install pressure gages in the following locations:
  - 1. Suction and discharge of each pump.

#### 3.2 CONNECTIONS

- A. Install meters and gages adjacent to machines and equipment to allow space for service and maintenance of meters, gages, machines, and equipment.

#### 3.3 ADJUSTING

- A. After installation, calibrate meters according to manufacturer's written instructions.

## 2.6 TEST PLUGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Trerice, H. O. Co.
  2. WATTS.
  3. Weiss Instruments, Inc.
- B. Description: Test-station fitting made for insertion in piping tee fitting.
- C. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.
- D. Thread Size: NPS 1/4 (DN 8) or NPS 1/2 (DN 15), ASME B1.20.1 pipe thread.
- E. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F (3450 kPa at 93 deg C).
- F. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

## 2.7 TEST-PLUG KITS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Trerice, H. O. Co.
  2. WATTS.
  3. Weiss Instruments, Inc.
- B. Furnish one test-plug kit(s) containing two thermometer(s), one pressure gage and adapter, and carrying case. Thermometer sensing elements, pressure gage, and adapter probes shall be of diameter to fit test plugs and of length to project into piping.
- C. Low-Range Thermometer: Small, bimetallic insertion type with 1- to 2-inch- (25- to 51-mm-) diameter dial and tapered-end sensing element. Dial range shall be at least 25 to 125 deg F (minus 4 to plus 52 deg C).
- D. High-Range Thermometer: Small, bimetallic insertion type with 1- to 2-inch- (25- to 51-mm-) diameter dial and tapered-end sensing element. Dial range shall be at least 0 to 220 deg F (minus 18 to plus 104 deg C).
- E. Pressure Gage: Small, Bourdon-tube insertion type with 2- to 3-inch- (51- to 76-mm-) diameter dial and probe. Dial range shall be at least 0 to 200 psig (0 to 1380 kPa).
- F. Carrying Case: Metal or plastic, with formed instrument padding.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Terrice, H. O. Co.
  - b. WATTS.
  - c. Weiss Instruments, Inc.
2. Standard: ASME B40.100.
3. Case: Liquid-filled type(s); cast aluminum or drawn steel; 4-1/2-inch (114-mm) nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/2 (DN 15), ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi (kPa).
8. Pointer: Dark-colored metal.
9. Window: Glass.
10. Ring: Stainless steel.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

#### 2.4 GAGE ATTACHMENTS

- A. Snubbers: ASME B40.100, brass; with NPS 1/2 (DN 15), ASME B1.20.1 pipe threads and [piston] [porous-metal]-type surge-dampening device. Include extension for use on insulated piping.
- B. Valves: Brass ball, with NPS 1/2 (DN 15), ASME B1.20.1 pipe threads.

#### 2.5 HYDRONIC INDICATOR SYSTEM (REQUIRED AT EACH PUMP):

- A. Hydronic indicator shall meet ASA Grade AA specifications for pressure gauges, accurate to 1/2 of 1% and shall clearly so state on the dial. Case shall be 4-1/2" diameter, stem mounted, heavy steel with screwed ring and unbreakable crystal. Movement shall be of stainless to monel with recalibrator, compound scale calibrated both in pounds and feet from full vacuum to selected pressure, twin tip pointer for accurate reading, and quick-set dial for pressure comparison. Maximum indicator pressure shall at least equal pump shut-off head plus fill system pressure and shall exceed this minimum by no more than 50 psi.
- B. Manifold valve shall be spring return pushbutton manifold of brass construction with ports for connection to system at indicated points and with test port connection for gauge calibration.
- C. Provide master test gauge with standard test hose for calibration test.

- a. Ashcroft Inc.
- b. Marsh Bellofram.
- c. Trerice, H. O. Co.
- d. Weiss Instruments, Inc.
2. Standard: ASME B40.200.
3. Case: Sealed type, cast aluminum or drawn steel; 4-1/2-inch (114-mm) nominal diameter.
4. Element: Bourdon tube or other type of pressure element.
5. Movement: Mechanical, dampening type, with link to pressure element and connection to pointer.
6. Dial: Nonreflective aluminum with permanently etched scale markings graduated in deg F (deg C).
7. Pointer: Dark-colored metal.
8. Window: Glass.
9. Ring: Stainless steel.
10. Connector Type(s): Union joint, adjustable, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device; with ASME B1.1 screw threads.
11. Thermal System: Liquid-filled bulb in copper-plated steel, aluminum, or brass stem and of length to suit installation.
  - a. Design for Air-Duct Installation: With ventilated shroud.
  - b. Design for Thermowell Installation: Bare stem.
12. Accuracy: Plus or minus 1 percent of scale range.

## 2.2 THERMOWELLS

### A. Thermowells:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion in piping tee fitting.
3. Material for Use with Copper Tubing: CNR or CUNI.
4. Material for Use with Steel Piping: CRES.
5. Type: Stepped shank unless straight or tapered shank is indicated.
6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, (DN 15, DN 20, or NPS 25,) ASME B1.20.1 pipe threads.
7. Internal Threads: 1/2, 3/4, and 1 inch (13, 19, and 25 mm), with ASME B1.1 screw threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length required to match thermometer bulb or stem.
10. Lagging Extension: Include on thermowells for insulated piping and tubing.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

### B. Heat-Transfer Medium: Mixture of graphite and glycerin.

## 2.3 DIAL-TYPE PRESSURE GAGES

### A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

## SECTION 23 0519 - METERS AND GAGES FOR HVAC PIPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  1. Filled-system thermometers.
  2. Thermowells.
  3. Dial-type pressure gages.
  4. Gage attachments.
  5. Test plugs.
  6. Test-plug kits.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of meter and gage.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

### PART 2 - PRODUCTS

#### 2.1 FILLED-SYSTEM THERMOMETERS

- A. Direct-Mounted, Metal-Case, Vapor-Actuated Thermometers:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

## SECTION 23 0517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

### 1.1 SLEEVE-SEAL SYSTEMS

- A. Field-assembled, modular sealing-element unit for filling annular space between piping and sleeve.
  - 1. Sealing Elements: EPDM rubber.
  - 2. Pressure Plates: Stainless steel.
  - 3. Connecting Bolts and Nuts: Stainless steel.

### 1.2 SLEEVE-SEAL FITTINGS

- A. Manufactured plastic, sleeve-type, plastic or rubber waterstop assembly made for imbedding in concrete slab or wall.

### 1.3 GROUT

- A. Nonshrink, factory packaged.

### 1.4 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Exterior Concrete Walls above Grade:
  - 1. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves.
  - 2. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves.
- B. Exterior Concrete Walls below Grade:
  - 1. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.
  - 2. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system.
- C. Concrete Slabs-on-Grade:
  - 1. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system.
  - 2. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system.
- D. Concrete Slabs above Grade:
  - 1. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
  - 2. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-pipe sleeves.
- E. Interior Partitions:
  - 1. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
  - 2. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION 23 0517

of full drill-in wedge anchor ratings. If cast-in anchors are to be used, the housekeeping pads shall be sized to accommodate the ACI requirements for bolt coverage and embedment.

### 3.2 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

### 3.3 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

### 3.4 GROUTING

- A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 23 0000



- E. Laminated Sheet Flashing: Bottom laminate of heavy-duty nonplasticized chlorinated polyethylene (CPE) synthetic elastomer, with top laminate of built-up roofing (BUR) sheet material; weighing 8 oz. per sq. ft.
- F. Manufacturer's Recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.
- G. Coat back side of lead flashings where in contact with concrete and other cementitious substrates, by painting surface in area of contact with heavy application of bituminous coating, or by other permanent separation as recommended by manufacturer of metal.
- H. On vertical surfaces, lap flashings minimum of 3".
- I. On vertical surfaces, for slopes of not less than 6" in 12", lap unsealed flashings minimum of 6".
- J. For embedment of metal flashing flanges in roofing or composition flashing or stripping, extend flanges minimum of 6" for embedment.

### PART 3 - EXECUTION

#### 3.1 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
  - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
  - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
  - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
  - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
  - 7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement.
- B. Concrete Bases are to be designed by the seismic restraint vendor. Vendor shall design the width and height of the pad, type of concrete to be used as well as the type and quantity of anchors to be used.
- C. Concrete Base reinforcement and monolithic pad attachment to the structure details and design shall be prepared by the restraint vendor if not already indicated on the drawings.
- D. Housekeeping pads shall be coordinated with restraint vendor and sized to provide a minimum edge distance of ten (10) bolt diameters all around the outermost anchor bolt to allow development

## 2.2 ACCESS UNITS

- A. General. The work of this article is limited to the provisions for access through other work for access to HVAC work, and does not include internal access provisions (within the HVAC work). In general and where possible, furnish or furnish-and-mount required access units in other trades' work prior to their work, so that cutting and patching for the subsequent installation of such access units will not be required. In occupied spaces, provide finished access units of the maximum concealment type, including locks where appropriate, and matching access units provided in the same expanse of finish (for non-HVAC access, if any).
- B. The scope of access units to be furnished or provided as HVAC work includes those units indicated on the mechanical drawings or specified in Division 23 sections, and those additional units required for adequate access to HVAC work and not shown or specified individually.
- C. Access Doors. Standard welded-steel construction, 16-gage frames and 14 gage door panels, 175 degree concealed spring hinges, rust-inhibitive prime coat, flush cam lock (for screw-driver operation where keyed lock is not required), recessed to receive applied finish where applicable (such as in concealed spline ceilings).
- D. Removable Access Plates. Where only hand access is sufficient, provide removable plate-type access unit, or minimum size which will facilitate the required access. Provide units of the type, style, design, material and finish appropriate for the location and exposure in each instance. In exposed surfaces of occupied spaces provide round plate units, flush floor units and frameless low-profile wall units, primed-for-paint in painted surfaces and polished chrome or stainless steel finish in other surfaces.
- E. Access Thru Fire Rated Walls or Ceilings. Where access doors or plates are required in fire rated partitions or ceilings, provide U.L. listed "B" Label doors or plates rated for 1-1/2 hours. Furnish doors with automatic closers and key operated latches that latch automatically when door closes.

## 2.3 FLASHING:

- A. General: Provide flashings from the following listing for each penetration of HVAC systems through roofs or waterproof membranes. Select appropriate flashing method for the type of roof used. Flashing shall be in accordance with roofing manufacturer's recommendations.
- B. Copper Flashing: Provide cold-rolled sheet copper, complying with ANSI/ASTM B 370, weighing 16 oz. per sq. ft. (0.0216" thick), except as otherwise indicated.
- C. Lead Flashing: Provide sheet lead complying with FS QQ-L-2201, Grade B; formed from common desilverized pig lead, complying with ANSI/ASTM B 29; weighing 4.0 lbs. per sq. ft., except as otherwise indicated.
- D. Bituminous Coating: FS TT-C-494, or MIL-C-18480, or SSPC-paint 12, cold-applied solvent-type bituminous mastic coating for application in dry film thickness of 15 mils per coat.

- C. Foamed-In-Place Fire-Stopping Sealant: Two-part, foamed-in-place, silicone sealant formulated for use in a through-penetration fire-stop system for filling openings around cables, conduit, pipes and similar penetrations through walls and floors.
- D. One-Part Fire-Stopping Sealant: One part elastomeric sealant formulated for use in a through-penetration fire-stop system for sealing openings around cables, conduit, pipes and similar penetrations through walls and floors.
- E. Intumescent Fire-Stopping Sealant: A one-part, acrylic sealant that expands when exposed to heat.
- F. Firestop Compound: Trowelable compound for large openings
- G. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
- H. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Foamed-in-Place Fire-Stopping Sealant:
    - a. "Dow Corning Fire Stop Foam"; Dow Corning Corp.
    - b. "Pensil 851"; General Electric Co.
  - 2. One-Part Fire-Stopping Sealant:
    - a. "Dow Corning Fire Stop Sealant"; Dow Corning Corp.
    - b. "3M Fire Barrier Caulk CP-25"; Electrical Products Div./3M.
    - c. "RTV 7403"; General Electric Co.
    - d. "Fyre Putty"; Standard Oil Engineered Materials Co.
    - e. "FS 601"; Hilti Inc.
    - f. "FS 611A"; Intumescent Sealant; Hilti Inc.
    - g. "FS 635"; Hilti Inc.
- I. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing, and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.
- J. Fire Barrier Penetration Seals for Plastic Pipe Penetrations Through Fire Rated Assemblies: One part, organic/inorganic, fire resistive elastomeric sheet with aluminum foil on one side. Seal must be able of passing ASTM E-814 (UL 1479) Standard Method of Fire Tests for Through Penetration Fire Stops up to required fire resistance. Seal must be UL Classified. When heat is applied sufficient to melt the plastic pipe, the seal shall swell enough to seal off the opening left by the pipe, preserving the fire rating of the fire rated assembly. Install in accordance with manufacturer's recommendations. Material shall be equal to 3M No. FS-195 wrap/strip. An intumescent sealant may be used for small diameter plastic pipe.

1. Ceiling suspension assembly members.
  2. Ductwork, including air terminal units, dampers, coils and sound traps.
  3. Other systems installed in same space as HVAC piping and ducts.
  4. Electric branch circuit panels, cable trays and main feeder conduits.
  5. Ceiling- and wall-mounted access doors and panels required to provide access to dampers and other operating devices.
- C. Ceiling-mounted items, including light fixtures, communication system components, diffusers, grilles, speakers, sprinkler heads, access panels, special moldings and other ceiling-mounted items.
- D. Piping layouts including plumbing and fire protection, including valve and specialty locations.
- E. Elevations of above ceiling piping, ductwork and conduit.
- F. Clearances for installing and maintaining insulation.
- G. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
- H. Equipment and accessory service connections and support details.
- I. Fire-rated wall and floor penetrations.
- J. Sizes and location of required concrete pads and bases.
- K. Coordinate with applicable trades, including plumbing, HVAC, sheet metal, fire protection, electrical, ceiling installer, etc. Provide sign off box on each individual coordination drawing. Have a representative of each applicable trade initial the box showing that they have reviewed the drawings and that the positioning of their work shown on these drawings is acceptable to them.
- L. Submit coordination drawings to the Architect/Engineer for their review.

## PART 2 - PRODUCTS

### 2.1 FIRESTOPPING

- A. Provide seals for any opening through any walls, floors, or ceilings used as passage for mechanical components such as piping or ductwork.
- B. General: Provide manufacturer's standard fire-stopping sealant, with accessory materials, having fire-resistance ratings as established by testing identical assemblies per ASTM E 814 by Underwriters' Laboratories, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction. Sealant shall provide protection equal or exceeding the fire resistance rating of fire rated walls, partitions, ceilings or floors. Use two-part or one part sealants as required to meet required fire resistance ratings.

- L. The Drawings show existing work to the extent possible. However, all existing work may not be shown. Remove or relocate any existing work that interferes with new work even if it is not shown on the Drawings.
- M. Remove existing work that does not have to remain in service. Relocate existing work that has to remain in service, as required to avoid interference with new work.
- N. Remove or relocate existing electrical work that interferes with new HVAC work, if such work is not indicated to be removed or relocated on the Electrical Drawings. Remove work that does not have to remain in service. Relocate work that has to remain in service, as required to avoid interference with new work.
- O. Existing work serving the floors above or below shall remain in service.

#### 1.42 PROVIDING AIRTIGHT SPACES

- A. In rooms where room walls extend above ceiling to the floor or roof above, caulk around all new and existing penetrations through walls, ceilings, floors and/or roofs to make completely airtight rooms. Seal penetrations both above and below suspended ceilings. Seal any openings left by removal of any existing or new work. Caulking used shall be the same type as specified in the Architectural Specifications.
- B. Patch around rough openings of penetrations to form a tight fit before caulking.

#### 1.43 LICENSE REQUIRED

- A. Contractors installing HVAC work must be licensed by the Kentucky Board of Heating, Cooling and Ventilation Contractors. Submit proof of licensing.

#### 1.44 PROFESSIONAL ENGINEER QUALIFICATIONS

- A. When the term "professional engineer", or "qualified professional engineer" is used anywhere in these specifications it shall mean a person who is licensed to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

#### 1.45 COORDINATION DRAWINGS

- A. Comply with requirements listed in Division 1 Section – PROJECT MANAGEMENT AND COORDINATION and the following paragraphs.
- B. Provide CAD drawings of reflected ceiling plans to scale. Detail major elements, components, and systems of mechanical and electrical equipment, piping, ductwork and materials in relationship with other systems, installations, and building components. Show the following:

1.40 OWNER OCCUPANCY

- A. Full Owner Occupancy: The Owner will occupy the site and building surrounding construction area during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work to minimize interference with the Owner's operations. Perform portions of work on premium time if required to do so by the Owner.

1.41 DEMOLITION

- A. Disconnect, demolish, and remove existing HVAC systems, equipment, and components indicated to be removed.
- B. Refrigerant:
  - 1. Remove refrigerant from HVAC equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
  - 2. Provide Statement of Refrigerant Recovery signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- C. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
- D. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
- E. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- F. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- G. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- H. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- I. All other existing HVAC work (such as piping, ductwork, valves, etc.) shall become the property of the Contractor and shall be removed from the job site.
- J. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.
- K. Remove or relocate existing HVAC work that interferes with new work of any kind.

1.35 LINTELS:

- A. General: Provide lintels for penetration of HVAC systems through masonry walls if not provided elsewhere in these specifications. Lintels shall be type and size required to span the required openings.
- B. Lintels will not be required for openings 16 inches length or less.

1.36 SYSTEM DESIGN WORKING PRESSURES

- A. Provide all piping system components (piping, fittings, valves, traps, strainers, etc.) in high pressure steam and condensate systems suitable for 150 psig minimum steam working pressure. Provide all piping system components (piping, fittings, valves, traps, strainers, etc.) in all other piping systems suitable for 125 psig minimum steam working pressure.
- B. In high pressure steam and condensate systems, provide piping, fittings, valves, traps, strainers, etc. rated for 300 psig minimum steam working pressure and 500 deg F. In chilled water systems, provide piping, fittings, valves, strainers, etc. rated for 250 psig minimum working pressure. All piping systems and components (piping, fittings, valves, traps, strainers, etc.) not meeting the previous criteria shall be suitable for 150 psig minimum steam working pressure.

1.37 PHASING OF THE WORK

- A. Work shall be done in phases. Perform work in designated areas at the times designated by the Contract Documents.

1.38 MAINTAINING EXISTING SERVICES

- A. Properly make all temporary connections that may be necessary to continue these services in a safe and substantial manner until the permanent services are activated. Upon completion, remove all temporary work, and completely restore all areas that may be affected.

1.39 INTERRUPTION OF EXISTING HVAC SERVICES

- A. In general, do not interrupt HVAC services to occupied areas of the building (both inside and outside construction area). If services must be interrupted (for making temporary connections, for changing over from existing to new, or for making new connections to existing systems, for example) then do such work at the times designated by the Owner.
- B. Schedule this work in advance with the Owner. Perform work on premium time if required to do so by the Owner.
- C. At any time the existing building services are interrupted, the Contractor shall work continuously until the permanent services are restored.

1.34 OWNER INSTRUCTION

- A. Conduct a minimum of a full-day walk-through instruction seminar for the Owner's personnel to be involved in the continued operation and maintenance of mechanical equipment and systems.
- B. Engage factory-authorized service representatives for the following equipment to train Owner's maintenance personnel:
  - 1. Oil tank monitoring system
  - 2. Clean steam generator
  - 3. Deaerator
  - 4. Boilers
  - 5. Water chillers
  - 6. Cooling towers
  - 7. Water source heat pump units
  - 8. Computer room air conditioning units
  - 9. Packaged terminal air conditioning units
  - 10. Split system air conditioning units
  - 11. Energy recovery units
  - 12. Self contained air conditioning units
  - 13. Central station air handling units
  - 14. Air terminal units
  - 15. Fan terminal units
  - 16. Dust collection systems
  - 17. Ultraclean ventilation system
  - 18. Water treatment systems
  - 19. Heat exchangers
  - 20. Humidifiers
  - 21. Fans
  - 22. Pumps
  - 23. Bag in/bag out filter system
  - 24. Variable speed pumping system
  - 25. Automatic control systems
- C. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance. Review data in the operation and maintenance manuals.
- D. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.
- E. Provide a separate, full-day walk-through seminar for the automatic control systems.
- F. Video record the instruction sessions and turn over CD to the Owner. The CD shall be provided to the Owner in "DVD" format.



space in a satisfactory manner and that piping, electrical and other connections are suitably located.

- I. The Architect's/Engineer's review of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for deviations from drawings or specifications unless he has, in writing, called the Architect's/Engineer's attention to such deviation at the time of submission and secured his written acceptance nor shall it relieve him from responsibility for error in shop drawings or schedules.
- J. The building owner has the right to reject any submittal for any reason during the submittal process. The building owner also has the right to review and observe the operation of any equipment submitted in a past installation no less than 1 year old. The maintenance operator of the past installation is to be available for questioning by the building owner.
- K. On all submittals, a list is to be compiled of a description of replacement parts, indication of availability (same day, two day, one week or later delivery), and where parts are to be ordered from.
- L. Submittal data must be complete and acceptable before project is accepted.

### 1.33 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Comply with requirements listed in Division 1 Section – OPERATION AND MAINTENANCE DATA and the following paragraphs.
- B. This Contractor shall prepare three loose-leaf, bound brochures, entitled "Mechanical Equipment Operation and Maintenance Data." Mark identification on both front and spine of each binder. Each binder shall be a heavy duty 3-ring, vinyl-covered binder with pocket folders for folded sheet information. Each binder cover and spine shall have the project name (as listed on the drawings), what is in the binder (i.e. HVAC ...). If more than one binder is provide the cover and spine shall be marked with "Volume ? of ?". Binders shall be properly indexed (thumb- tabbed). Information shall be filed under applicable specification section number.
- C. Each brochure shall contain the following information:
  - 1. Name and address of Consulting Engineer, Contractor, and index of equipment, including vendor (name and address).
  - 2. Complete brochures, descriptive data and parts list, etc., on each piece of equipment, including all approved shop drawings.
  - 3. Complete maintenance and operating instructions, prepared by the manufacturer, on each major piece of equipment.
  - 4. Complete shop drawing submittal on temperature controls including control diagrams updated to reflect "as-built" conditions.
  - 5. Final testing and balancing report.
- D. All brochures shall be submitted to the Architect/Engineer or his representative prior to final inspection of the building.

temporary service is to be reviewed and revised as required by the Engineer. This means of providing temporary service is to include but not limited to piping and its associated fittings, ductwork and its associated fittings, valves and dampers, insulation, restraints & thrust blocks and all other components required to make a temporary service operational to a level equal to the existing utility service.

### 1.31 RESTORATION OF SURFACES

- A. Each Contractor shall restore to their original conditions all paving, curbing, surfaces, drainage ditches, structures, fences, shrubs, and other items damaged or removed by his operations that are outside of the Limit of Site boundaries. Replacement and repairs shall be in accordance with good construction practice and shall match material employed in the original construction of the item to be replaced.

### 1.32 SHOP DRAWINGS AND OTHER REQUIRED SUBMITTALS

- A. Comply with requirements listed in Division 1 Section – SUBMITTAL PROCEDURES and the following paragraphs.
- B. Definitions
  - 1. Action Submittals: See Division 1 Section – "SUBMITTAL PROCEDURES".
  - 2. Informational Submittals: See Division 1 Section – "SUBMITTAL PROCEDURES".
- C. Make submittals in PDF format.
- D. Prepare and submit to the Architect/Engineer for review, shop drawings, certified equipment drawings, installation, operating and maintenance instructions, samples, wiring diagrams, etc., and any other data required.
- E. Submittal data shall have the stamp of approval of the General Contractor (**Construction Manager**) to show that the drawings have been checked by the Contractor (**Construction Manager**). Any drawings submitted without this stamp of approval will be returned for proper resubmission.
- F. No roughing-in, connections, etc., shall be done until acceptable shop drawings are in the hands of the Contractors. It shall be the responsibility of the Contractor to obtain acceptable shop drawings and to make connections, etc., in the neatest and most workmanlike manner possible.
- G. Submittal data must be complete for each piece of equipment. Partial or incomplete data will not be processed.
- H. Architect/Engineer's review of shop drawings the applies only to general design, arrangement, type, capacity and quality. Such approval does not apply to quantities, dimensions, connection locations, etc. In these cases, the Contractor alone shall be responsible for furnishing the proper quantity of the equipment and/or materials required for seeing that the equipment fits the available

- B. Each respective Contractor shall do any cutting, patching, drilling of masonry, steel, wood or iron work and any fitting necessary for the proper installation of apparatus and materials included in these specifications or governed thereby.
- C. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
- D. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- E. Coordinate with the Structural Engineer BEFORE drilling, cutting, notching, etc., any new or existing structural members. Obtain written permission from Structural Engineer before doing such work. Locations and sizes of openings and methods of cutting or drilling such openings must be approved in advance by the Structural Engineer. Positively identify exact locations of reinforcing bars or tension cables in structural members by X-raying or other methods approved by the Structural Engineer if required by the Structural Engineer.
- F. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
- G. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- H. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
- I. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
- J. Comply with requirements of applicable Sections of Division 23 where cutting and patching requires excavating and backfilling.
- K. The patching and finishing shall be done in a workmanlike manner to the satisfaction of the Architect/Engineer.
- L. Patch any openings in existing floors, walls, ceilings or roof, left by removal of existing HVAC work.
- M. Review and conform to all structural requirements as detailed or specified in the Structural drawings and specifications.

### 1.30 TEMPORARY UTILITIES

- A. In any installation that requires deletion of existing services to install new services, a means of providing temporary service for the intermediate period is to be provided. The means of providing

- B. The Contractor shall lay out his work and be responsible for any necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so. Work at the site of the project shall be observed by the Architect/Engineer or his representative.
- C. Final Inspection: At the time of final inspection of the work performed under this Contract, systems shall be complete in every respect and in perfect operating condition. Surplus materials of every character resulting from work of this section shall have been removed. Sanitary sewers shall be free from sand, silt or other obstructions. Any defect discovered in the utilities subsequent to this inspection shall have been corrected.

#### 1.27 STRUCTURAL RESPONSIBILITY

- A. The Contractor shall be responsible for properly shoring, bracing, supporting, etc., any existing and/or new construction to guard against cracking, settling, collapsing, displacing, or weakening. No structural member shall be cut or otherwise weakened in any manner without the written consent of the Architect/Engineer.
- B. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Owner or Architect/Engineer, without cost to either the Owner or the Architect/Engineer.

#### 1.28 OPENINGS

- A. This Contractor shall be responsible for the openings he may require in floors, walls, roof or ceilings of any type of new or existing construction whether or not shown on the Architectural, Structural or Mechanical Drawings.
- B. Openings that have been shown on the Architectural and/or Structural Drawings will be provided under other Divisions; however, the responsibility for the correct size and location of such openings shall be that of this Contractor.
- C. Openings that have not been shown on the Architectural and/or Structural Drawings shall be provided by this Contractor.
- D. Review and conform to all structural requirements as detailed or specified in the Structural drawings and specifications.

#### 1.29 CUTTING, FITTING AND PATCHING

- A. Before doing any cutting or drilling, Contractor shall obtain permission from the Architect/Engineer and shall follow his instructions as to how proposed cutting or drilling is to be done.

recommended by the manufacturer, even if such accessories are not shown on the drawings or mentioned in the specifications.

#### 1.22 PERMITS, CODES AND APPROVALS

- A. Permits. Obtain and pay for the permits and licenses necessary for the complete HVAC systems from the authorities governing such work.
- B. Codes. Installation shall be in accordance with applicable codes and regulations, including but not limited to the following:
  - 1. City or County Building Inspector
  - 2. National and Local Electric Codes
  - 3. Kentucky Building Code and its referenced codes
  - 4. Kentucky Boiler Code
  - 5. Kentucky Energy Code
  - 6. Kentucky State Fire Marshal
  - 7. Local Fire Codes
  - 8. Local Building Inspections
- C. Approvals. All work must be approved by the Architect/Engineer before final payment is made.

#### 1.23 SUBSTITUTION OF MATERIALS AND EQUIPMENT

- A. When making a shop drawing submittal for materials and/or equipment of a different manufacturer than that specified, it shall be understood and agreed that such substitution if approved will be made without cost to the Owner, regardless of changes in connections, spacing, electrical service, etc.

#### 1.24 WORKMANSHIP

- A. Work shall be performed by mechanics skilled in their respective trades and shall present appearance typical of best trade practice. Work not installed in this manner shall be repaired, removed or replaced, or otherwise remedied as directed by the Architect/Engineer.

#### 1.25 RECORD DRAWINGS

- A. Keep accurate record of deviations from drawings, particularly where work is concealed. Submit one (1) set of drawings marked to show changes when work is completed.

#### 1.26 SUPERVISION

- A. The Contractor shall personally supervise the work or have a competent superintendent, satisfactory to the Architect/Engineer and Owner on the work at all times during progress with full authority to act.

2. Exposed ductwork, whether or not insulated, and any grilles, diffusers, etc., not factory finished.
  3. "Exposed" shall mean exposed to view, such as, in mechanical spaces, tunnels, on roofs and in rooms with no suspended ceilings.
- B. Colors of piping and ductwork shall be as specified in the "Identification for HVAC Piping and Equipment" section of the Specifications. See "color coding" in identification schedules.
  - C. Painting shall be done in accordance with the "Painting" section of the specifications unless otherwise specified under other sections of the specifications,
  - D. Do not paint aluminum and stainless steel equipment, motor and identification plates, tags, etc.
  - E. Do not paint piping and ductwork concealed in walls or above suspended ceilings.

#### 1.17 DEBRIS

- A. Remove from the site any debris and dirt caused by the work. Maintain the premises in a clean and orderly condition.

#### 1.18 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Provide suitable protection from dampness damage, dirt, etc., for equipment and materials during construction and until final acceptance by the Owner. Keep ends of piping and ductwork capped off when work on them is not in progress. Such protection shall be by a means acceptable to the Architect/Engineer.

#### 1.19 CLEANING UP

- A. After completion of the work and before final acceptance of the work, thoroughly clean equipment and materials and remove foreign matter such as grease, dirt, labels, stickers, etc., from the exterior of piping, equipment and associated fabrications.

#### 1.20 EQUIPMENT CONNECTIONS

- A. Make connections to equipment furnished by others whenever such equipment is shown on any part of the drawings or mentioned in any section of the specifications.
- B. Verify equipment locations and the sizes, number, locations, and types of connections to be made before installation of any such equipment.

#### 1.21 EQUIPMENT INSTALLATION INSTRUCTIONS

- A. Install HVAC piping, ductwork and equipment in strict accordance with manufacturer's recommendations. Provide equipment accessories necessary for proper operation or

- R. Do not install HVAC work over the top of electrical equipment. Maintain minimum distances away from electrical equipment as required by the Electric Code.
- S. Photographs: When all inaccessible mechanical work is installed and before any wallboards or hard ceilings installation is to begin, the contractor is to photograph all mechanical/electrical work in all inaccessible ceilings and walls. Each photograph is to have a label as a part of the photograph that indicates the orientation (i.e., north wall, south wall and etc.) and the room location. One copy of the photographs with a written description of each filename including orientation and room location are to be presented to the owner in digital (jpg) format on 3-1/2" floppy disks. The resolution of the picture is to be of a level that is required to clearly show the location of all mechanical and electrical work.

#### 1.14 WORKING DRAWINGS

- A. Scale of drawings is approximate. Do not scale the drawings to determine locations of mechanical work. Exact locations, dimensions and elevations shall be governed by field conditions. Make field measurements of building before fabricating or installing equipment or materials.
- B. Drawings are based on physical dimensions of one or more manufacturer's equipment. Other approved equipment shall be of such dimensions that it can be readily installed in available space, leaving ample clearance for proper maintenance.
- C. Intent of drawings is to show systems and sizes. Drawings do not necessarily show all required offsets. Work shall be installed to conform with space limitations. Offsets, transitions, fittings, etc., shall be provided as part of the Contract where required to attain this objective.

#### 1.15 EQUIPMENT MOUNTING

- A. Mount equipment with moving parts, such as compressors, fans, air handling units, etc., on vibration supports suitable for the purpose of minimizing noise and vibration transmission unless otherwise specified. In addition, isolate equipment from external connections such as piping, ducts, etc., with flexible connectors, vibration isolators, or other approved means.
- B. Provide each piece of equipment or apparatus suspended from the ceiling or mounted above the floor level with suitable structural support, pipe stand, platform or carrier as approved by the Architect/Engineer.
- C. Gasket and seal to mounting surface flush and surface mounted equipment such as diffusers, grilles, etc.

#### 1.16 PAINTING

- A. Paint the following items.
  - 1. Exposed mechanical piping, valve bodies and fittings - bare and insulated, including hangers, platforms, etc.

- B. Verify all dimensions by field measurements. Field verify existing conditions and all required measurements before fabricating any piping, ductwork or equipment.
- C. Arrange for chases, slots, and openings in other building components to allow for HVAC installations.
- D. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.
- E. Sequence, coordinate, and integrate installations of HVAC materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- F. Coordinate the cutting and patching of building components to accommodate the installation of HVAC equipment and materials.
- G. Where mounting heights are not detailed or dimensioned, install HVAC services and overhead equipment to provide the maximum headroom possible.
- H. Install HVAC equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- I. Coordinate the installation of HVAC materials and equipment above ceilings with suspension system, light fixtures, and other installations.
- J. Coordinate connection of HVAC systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
- K. Do not install HVAC work where it will interfere with work of other trades.
- L. Do not install mechanical work under HVAC terminal units above suspended ceilings, such as heat pump units, air handling units, variable volume units, coils, etc.
- M. Install mechanical equipment above ceiling at an elevation that will allow access without extending ladder thru ceiling opening.
- N. Do not install HVAC work where it will interfere with access doors in ductwork.
- O. Do not install HVAC work where it will interfere with access to control panels on HVAC and/or electrical equipment.
- P. Do not install HVAC work where it will interfere with access space around HVAC and electrical equipment. Do not install piping where it will interfere with removal of HVAC coils, filters or fan shafts.
- Q. Do not install piping so close to ceiling that ceiling tiles in accessible ceilings cannot be removed without damaging them.



in accordance with the above instructions, and which interferes with work and equipment of other Contractors.

1.8 EXISTING PIPE AND SERVICES

- A. Existing piping and services are located as accurately as possible from available information, but it shall be the Contractor's responsibility to locate, determine exact elevations and make required connections to such lines and services in manner approved by the Architect/Engineer.
- B. Maintain in operating condition active utilities encountered in the utility installation. Repair to the satisfaction of the Architect/ Engineer and the Owner any surface or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.

1.9 CONTINUOUS OPERATION AND CUTOVER

- A. To facilitate the continuous operation of the existing utilities, no utility service shall be tapped into without prior notification of 48 hours to and approval received from the designated authority of the utility company.

1.10 ASBESTOS

- A. If during the course of his work the Contractor observes the existence of asbestos, or asbestos-bearing materials, the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Engineer, determine a further course of action.

1.11 ACCESSIBILITY

- A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.
- B. Extend all grease fittings to an accessible location.

1.12 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

1.13 HVAC INSTALLATIONS

- A. Coordinate HVAC equipment and materials installation with other building components.

- F. Work under this section shall conform to governing codes, ordinances and regulations of the City, County and State.
- G. The Contractor shall be responsible for any errors in fabrication, for the correct fitting, installation and erection of the various HVAC systems.

1.3 VIBRATION ISOLATION AND SEISMIC EQUIPMENT

- A. Installation of vibration isolation equipment and seismic bracing pertaining to HVAC systems shall be by this Contractor.

1.4 POWDER ACTUATED CONCRETE FASTENERS

- A. Obtain written approval from the structural engineer before using powder-actuated concrete fasteners.
- B. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.

1.5 SUSPENSION FROM METAL DECKING

- A. Do not use metal decking for suspension of piping, ductwork or equipment. Hang items from top member of joist or provide additional structure to span between top members if needed.

1.6 COORDINATION BETWEEN TRADES

- A. Demand and examine all Drawings and Specifications pertaining to the construction before installing the work described and shown under these Drawings and Specifications. Cooperate with all other Contractors in locating piping, ductwork, conduit, openings, chases and equipment in order to avoid conflict with any other Contractor's work. Give special attention to points where ducts or piping must cross other ducts or piping and where ducts, piping and conduit must fit into the walls and columns. All work installed above a lay-in ceiling must be coordinated and installed so there is a minimum of 4 inches between the top of the ceiling grid and the bottom of the installation.
- B. Make known to other trades intended positioning of materials and intended order of work. Determine intended position of work of other trades and intended order of installation.

1.7 DISCREPANCIES

- A. If any discrepancies occur between the accompanying Drawings and these Specifications and Drawings and Specifications covering other Contracts, report such discrepancies to the Architect/Engineer far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of piping, ductwork, conduit and equipment not installed

DIVISION 23 – HVAC

SECTION 23 0000 – GENERAL PROVISIONS FOR HVAC SYSTEMS

PART 1 - GENERAL

1.1 REVIT

- A. The plans, sections and risers were made with REVIT. This program has some limitations on the types of valves, fittings, taps, accessories... that can be shown. The contractor should review the specifications and details for the proper type of valves, fittings, taps, accessories... because what is shown on the plans may be the "closest" available within the limitations of REVIT and not exactly what is required by the contract specifications and details.
- B. Mounting heights may have been modified to show elements on the correct floor plan for bidding. Coordinate with the architect and engineer if it is not clear.
- C. Components may be orientated for clarity. Actual components shall be orientated as required by specifications, service requirements or manufacturers recommendations.

1.2 GENERAL

- A. The General Conditions, Special Conditions, Supplemental Conditions, Instructions to Bidders, and other Contract Documents apply to this branch of the work as well as to the other branches.
- B. Provide the materials (piping, ductwork, wiring, conduit, software, equipment, equipment accessories, etc.) and labor necessary for complete and functioning HVAC systems. The Drawings and Specifications are intended to indicate complete working systems. Provide complete and properly working systems, even if all materials and labor necessary to achieve this are not specifically shown on the Drawings or specified.
- C. The Contractor shall familiarize himself with the work of all other trades, general type construction, and the relationship of his work to other sections. He shall examine all working drawings, specifications and conditions affecting his work. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, verify all dimensions in the field and advise the Engineer of any discrepancy before fabricating or performing any work.
- D. The work shall include complete testing of all equipment, piping and ductwork at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment.
- E. Perform any necessary temporary work during construction.

1.20 OWNER OCCUPANCY

- A. Full Owner Occupancy: The Owner will occupy the site and building surrounding construction area during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work to minimize interference with the Owner's operations. Perform portions of work on premium time if required to do so by the Owner.

1.21 CLEANING AND TRASH REMOVAL

- A. There is no room in the project for a construction dumpster. The prime contractor must use dump trucks instead of a dumpster and must remove debris daily.
- B. The Prime Contractor shall provide trash containers of adequate size on the site. Each subcontractor shall collect and deposit his debris in the containers. The Prime Contractor shall remove all trash from the project daily.
- C. The Contractor shall clean the entire area of new construction daily.
- D. The contractors shall be responsible for removal from the site of all their liquid waste or other waste that requires special handling.
- E. All work areas, passageways, and stairs must be kept free from debris at all times.

1.22 EXISTING MATERIALS TO BE REMOVED

- A. Unless otherwise shown on the Drawings or indicated by the Owner, any existing materials, equipment or fabrications indicated to be removed shall become the property of the Contractor and shall be removed from the project at the appropriate time.

1.23 ENGINEER'S WORK PRODUCT

- A. The Engineer's work product is prepared and produced for the sole and exclusive benefit of the Owner. Any real or inferred benefits to third parties is hereby expressly disclaimed.

1.24 WORKMANSHIP

- A. The workmanship shall be of the highest quality, in every respect, as usually recognized in the building industry. Poor or inferior workmanship (as determined by the Engineer or inspecting authorities) is to be removed and replaced to conform to the highest quality standards of the trades concerned, or otherwise corrected.

END OF SECTION 01 0000

1.18 USE OF THE PREMISES - CONTRACT LIMIT

- A. The Contractor shall confine his operations, including delivery and unloading of materials and equipment to the areas within the designated Contract Limits.
- B. During the work of this Contract, it is absolutely necessary that the Owner have continued use of the buildings and streets. In consultation with the Owner and Engineer, the Contractor shall cooperate to accomplish this result by scheduling his operations at such times and confining his operations to such areas as will least affect the normal operation of the existing adjacent facilities.
- C. The Contractor shall consult with the Owner and agree on a general "Plan of Operations". The Plan of Operations shall show concisely the manner in which the Contractor intends to pursue the sequence of operations, the traffic pattern for delivery of materials and equipment, etc. Once this Plan of Operations in writing is agreed upon, the Contractor shall not deviate from the plan unless approval is secured from the Owner in writing.

1.19 INTERRUPTION OF UTILITIES

- A. Interruptions shall be of minimum duration and shall be scheduled with the Owner to cause the least possible inconvenience. In all cases, the Owner shall be notified well in advance of an anticipated interruption of utilities. The Contractor shall provide a minimum of 2-week's notice to the Owner for scheduling all outages.
- B. In general, do not interrupt services to occupied areas of the building (both inside and outside construction area). If services must be interrupted (for making temporary connections, for changing over from existing to new, or for making new connections to existing systems, for example) then do such work at the times designated by the Owner.
- C. Perform work on premium time if required to do so by the Owner.
- D. If at any time the existing building services (other than the boilers) are interrupted, the Contractor shall work continuously until the permanent services are restored.
- E. The shut-down and demolition of boilers at each building will be weather-dependent. The contractor and Owner will review weather conditions and forecast to determine date demolition may begin. The contractor shall target and plan for the following dates:
  - 1. Fleet Management and Carnegie Center – 4/1/2020
  - 2. Government Center Annex – 5/1/2020
- F. Boilers are not to be shut down or demolished without review and approval of the Owner.
- G. Boiler demolition shall not start until new boilers are in hand.

1.13 STORAGE OF MATERIALS

- A. Each Contractor providing materials and equipment shall be responsible for the proper and adequate storage of his materials and equipment, and for the removal of same upon completion of his work. Storage of materials at each building shall be confined to the mechanical rooms where the existing boilers reside. Any materials stored on-site shall not hamper maintenance staff from access of existing equipment for inspection and maintenance activities. All materials shall be secured by the contractor at their own risk.

1.14 DAMAGED FACILITIES

- A. The Prime Contractor shall repair and/or replace, at no expense to the Owner, any sections of existing roads, drives, streets, sidewalks, curbs, utilities, buildings and other structures damaged by reason of work performed under this Contract or incidental thereto, whether by his own forces or by his subcontractors or by his material suppliers. The contractor shall video tape all existing areas of work before starting work to document existing conditions.

1.15 CONDUCT OF EMPLOYEES

- A. Contractors will be working within an occupied building. The safety and comfort of the building occupants shall be their top priority. Their behavior and appearance shall not disturb, threaten, or offend any of the occupants. Contractors not conducting themselves appropriately may be asked to leave the site and not return.
- B. Smoking in any buildings is also prohibited. No guns or firearms allowed on site.

1.16 USE OF TOILETS, DRINKING FOUNTAINS AND VENDING MACHINES

- A. The use of toilets, drinking fountains and vending machines will be allowed. Owner will instruct the Contractor as to which toilets, drinking fountains and vending machines may be used. Contractor shall be responsible for proper use and clean-up of all facilities used. Any abuse of the facilities shall require the contractor to provide their own on-site restroom facilities.

1.17 PARKING FACILITIES & BUILDING ACCESS

- A. LFUCG will coordinate limited construction parking and access to work areas within normal working hours. Dedicated parking will reviewed during the Pre-Construction Conference.
- B. LFUCG will coordinate limited key and/or key fob badge access to work areas within normal working hours. These will be issued at the beginning of the project following LFUCG key requests protocols and returned at the completion of the project

1.8 ALLOCATION OF WORK

- A. Where certain materials are specified to be installed under various headings, it shall be the responsibility of the Prime Contractor to re-allocate such work under the proper subcontractor if the specification is in conflict with local jurisdiction.

1.9 ENGINEER'S STATUS

- A. The Engineer is the agent of the Owner during construction and until final payment. The Engineer will have authority to act on behalf of the Owner only to the extent provided in the contract documents, unless otherwise modified by written instrument which will be shown to the Contractor. The Engineer has authority to reject work which does not conform to the contract documents.
- B. The Engineer shall at all times have access to the work whenever it is in preparation and progress. The Contractor shall provide facilities for such access so the Engineer may perform his functions under the contract documents.

1.10 OWNER'S RIGHT TO STOP THE WORK

- A. If the Contractor fails to correct defective work or persistently fails to supply materials or equipment in accordance with the contract documents, the Owner may order the Contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated.

1.11 CODES AND ORDINANCES

- A. All branches of the work shown on the plans or specified, whether specifically mentioned or not, shall be executed in strict compliance with all local or state regulations and codes and shall be in compliance with all National Codes when same have jurisdiction.

1.12 ORDERING MATERIALS

- A. Immediately following award of contract for this work, Contractor shall determine source of supply for all materials and length of time required for their delivery, including materials of subcontractors, and order shall be placed for such materials promptly.
- B. If, for any reason, any item specified will not be available when needed and Contractor can show that he has made a reasonably persistent effort to obtain item in question, the Engineer is to be notified in writing within 20 days after Contract is signed, and he will either determine source of supply or arrange with Owner for appropriate substitute within terms of Contract. Otherwise, the Contractor will not be excused for delays in securing materials specified and will be held accountable if completion of building is thereby delayed.

1.2 PROJECT SCOPE

- A. This project involves replacing existing boilers at three buildings: Fleet Management, Carnegie Center, and the Government Center Annex.

1.3 PROJECT SITE AVAILABILITY

- A. The project site will be available to the Contractor between 7:00am – 6:00pm during the business week. Access beyond these hours can be coordinated directly with LFUCG personnel if required.

1.4 TIMES FOR COMPLETION

- A. Refer to the General Conditions for Contract Time. The replacement of the boilers at the GOVERNMENT CENTER ANNEX ONLY are critical due the system also being utilized during the cooling season. The anticipated start date at the GOVERNMENT CENTER ANNEX ONLY shall be 5/1/20, which has historically been out of the heating season per LFUCG's operational data. With this system being utilized during the cooling season, the demolition and installation of the new fully functional system shall be done in the most timely manner possible to minimize system downtime – a maximum of (30) calendar days shall be allowable at this facility only to have it back online.

1.5 CONFLICTS

- A. If there is any conflict in the Instruction to Bidders and the General Conditions with the Special Conditions, the Special Conditions shall govern.

1.6 DIVISION OF SPECIFICATIONS

- A. Division of specifications into sections is done for convenience of reference and is not intended to control contractors in dividing work among subcontractors or to limit scope of work performed by any trade under any given section.

1.7 DISPUTES

- A. Contractor is hereby put on notice that it is his contractual obligation to adjust differences between his several subcontractors. Attempts to have the Owner or Engineer settle disputes between Contractor and his subcontractors, or between subcontractors, will not be given consideration.



SECTION 01 0000 – SPECIAL CONDITIONS

1.1 GENERAL

- A. These specifications and drawings accompanying them describe the work to be done and the materials to be furnished for the construction of the LFUCG BOILER REPLACEMENTS AT FLEET MANAGEMENT, CARNEGIE CENTER, AND GOVERNMENT CENTER ANNEX.
- B. Bidders, before submitting proposals, shall visit and examine the site to satisfy themselves as to the nature and scope of the new construction and any difficulties (such as clear space for storage and access to space) attending the execution. The submission of a proposal will be construed as evidence that a visit and examination have been made. Later claims for labor, equipment, or materials required for difficulties encountered which could have been foreseen had such an examination been made will not be recognized. All three facilities will be reviewed with the Engineer and LFUCG Project Manager during the Pre-Bid conference.
- C. The drawings and specifications are intended to be fully explanatory and supplementary. However, should anything be shown, indicated or specified on one and not the other, it shall be done the same as if shown, indicated or specified in both.
- D. It shall be the responsibility of all Contractors and subcontractors to carefully examine all drawings, specifications and contract documents pertaining to all phases of the construction in order that Contractor and subcontractor may foresee all requirements for coordination of their work. Submission of a bid shall be construed as evidence that such an examination has been made. Claims based on unforeseen requirements will not be considered.
- E. Should any error or inconsistency appear in drawings or specifications, the Contractor, before proceeding with the work, must make mention of the same to the Engineer for proper adjustment, and in no case proceed with the work in uncertainty or with insufficient drawings.
- F. The Contractor and each subcontractor shall be responsible for verification of all measurements at the building before ordering any materials or doing any work. No extra charge or compensation shall be allowed due to differences between actual dimensions and dimensions indicated on the drawings. Any such discrepancy in dimensions which may be found shall be submitted to the Engineer for his consideration before the Contractor proceeds with the work in the affected areas.
- G. Contractors shall follow sizes in specifications or figures on drawings, in preference to scale measurements and follow detail drawings in preference to general drawings.
- H. Where it is obvious that a drawing illustrates only a part of a given work or of a number of items, the remainder shall be deemed repetitious and so constructed.

**SPECIFICATION INDEX**

<u>Special Conditions</u>	<u>PAGES</u>
Section 01 0000 - Special Conditions.....	1 - 6

<u>DIVISION 23 – HVAC</u>	<u>PAGES</u>
Section 23 0000 - General Provisions for HVAC Systems .....	1 - 20
Section 23 0517 - Sleeves and Sleeve Seals for HVAC Piping.....	1 - 1
Section 23 0519 - Meters & Gauges for HVAC Piping .....	1 - 6
Section 23 0523.12 Ball Valves for HVAC Piping.....	1 - 6
Section 23 0529 - Hangers & Supports for HVAC Piping & Equipment .....	1 - 12
Section 23 0553 - Identification for HVAC Piping & Equipment.....	1 - 8
Section 23 0593 - Testing, Adjusting, & Balancing for HVAC .....	1 - 13
Section 23 0700 - HVAC Insulation.....	1 - 21
Section 23 2113 - Hydronic Piping .....	1 - 11
Section 23 2116 - Hydronic Specialties.....	1 - 6
Section 23 2123 - Hydronic Pumps .....	1 - 4
Section 23 5216 - Fire-Tube Condensing Boilers – Annex Building.....	1 - 12
Section 23 5216 - Fire-Tube Condensing Boilers – Carnegie Center .....	1 - 10
Section 23 05233.19 Copper Water-Tube Boilers – Fleet Management.....	1 - 10

<u>DIVISION 26 – ELECTRICAL</u>	<u>PAGES</u>
Section 26 0000 - General Electrical Provisions .....	1 - 11
Section 26 0500 - Common Work Results for Electrical .....	1 - 2
Section 26 0519 - Low Voltage Electrical Power Conductors and Cables.....	1 - 3
Section 26 0529 - Hangers and Supports for Electrical Systems.....	1 - 3
Section 26 0533 - Raceway and Boxes for Electrical Systems .....	1 - 5
Section 26 0553 - Identification for Electrical Systems .....	1 - 5

## IX. TECHNICAL SPECIFICATIONS

**PART VIII**

**ADDENDA**

All addenda issued during the bidding of the Project will be reproduced in the signed Contract Documents, on the pages following this heading sheet.

Addendum  
Number

Title

Date

1.

2.

3.

4.

5.

IN WITNESS WHEREOF, this instrument is executed in \_\_\_\_\_ counterparts, each one of  
(number)

which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

ATTEST:

\_\_\_\_\_  
(Principal) Secretary

(SEAL)

\_\_\_\_\_  
(Witness to Principal)  
\_\_\_\_\_  
(Address)  
\_\_\_\_\_

ATTEST:

\_\_\_\_\_  
(Surety) Secretary  
(SEAL)  
\_\_\_\_\_  
Witness as to Surety  
\_\_\_\_\_  
(Address)  
\_\_\_\_\_

\_\_\_\_\_  
(Principal)

BY: \_\_\_\_\_(s)

\_\_\_\_\_  
(Address)  
\_\_\_\_\_

\_\_\_\_\_  
(Surety)

BY: \_\_\_\_\_  
(Attorney-in-Fact)

\_\_\_\_\_  
(Address)  
\_\_\_\_\_  
\_\_\_\_\_

NOTE: The number of executed counterparts of the bond shall coincide with the number of executed counterparts of the Contract.

END OF SECTION

2. The above named Principal and Surety hereby jointly and severally agree with the OWNER that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The OWNER shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
  - (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: The Principal, the OWNER, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the Work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the Work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, OWNER, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.
  - (b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
  - (c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.
4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against aid improvement, whether or not claim for the amount of such lien be presented under and against this bond.

**PART VII**  
**PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENT: that

\_\_\_\_\_ (Name of Contractor)

\_\_\_\_\_ (Address of Contractor)

a \_\_\_\_\_ hereinafter  
(Corporation, Partnership or Individual)

called Principal, and \_\_\_\_\_ (Name of Surety)

\_\_\_\_\_ (Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT  
200 East Main Street, Third Floor  
Lexington, Kentucky 40507

Obligee, hereinafter called OWNER, for the use and benefit of claimants as hereinafter defined, in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal by written agreement is entering into a Contract with OWNER for \_\_\_\_\_ (project name) in accordance with drawings and specifications prepared by: \_\_\_\_\_ (the Engineer) which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

IN WITNESS WHEREOF, this instrument is executed in \_\_\_\_\_ each one of which shall be  
deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

ATTEST:

\_\_\_\_\_  
(Principal) Secretary

\_\_\_\_\_  
Principal

BY: \_\_\_\_\_ (s)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
Witness as to Principal

\_\_\_\_\_  
(Address)

ATTEST:

\_\_\_\_\_  
Surety

BY: \_\_\_\_\_  
Attorney-in-Fact

\_\_\_\_\_  
(Surety) Secretary

\_\_\_\_\_  
(Address)

(SEAL)

\_\_\_\_\_  
Witness as to Surety

\_\_\_\_\_  
(Address)

TITLE: \_\_\_\_\_

Surety

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

NOTE: The number of executed counterparts of the bond shall coincide with the number of executed counterparts of the Contract.



- (1) Complete the Contract in accordance with its terms and conditions or
- (2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or if the OWNER elects, upon determination by the OWNER and Surety jointly of the lowest responsible bidder, arrange for a Contract between such bidder and OWNER, and make available as Work progresses (even though there may be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract Price", as used in this paragraph shall mean the total amount payable by OWNER to Principal under the Contract and any amendments thereto, less the amount properly paid by OWNER to Principal.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the OWNER named herein or the heirs, executors, administrators or successors of OWNER.

**PART VII**

**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS, that

\_\_\_\_\_  
(Name of CONTRACTOR)

\_\_\_\_\_  
(Address of CONTRACTOR)

a \_\_\_\_\_ hereinafter  
(Corporation, Partnership, or Individual)

called Principal, and \_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT  
200 East Main Street, Third Floor  
Lexington, Kentucky 40507

hereinafter called "OWNER" in the penal sum of: \_\_\_\_\_  
Dollars, (\$ \_\_\_\_\_), for the payment of whereof Principal and Surety bind themselves, their heirs,  
executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal by written agreement is entering into a Contract with OWNER for  
\_\_\_\_\_ (project name) \_\_\_\_\_ in accordance with drawings and  
specifications prepared by: \_\_\_\_\_ (the Engineer) \_\_\_\_\_ which Contract is by reference  
made a part hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall  
promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall  
remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the OWNER.

Whenever, Principal shall be, and declared by OWNER to be in default under the Contract, the OWNER  
having performed OWNER'S obligations thereunder, the Surety may promptly remedy the default, or shall  
promptly:

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

**§ 14 Definitions**

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:



*(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)*

**CONTRACTOR AS PRINCIPAL**

**SURETY**

Company: \_\_\_\_\_  
(Corporate Seal)

Company: \_\_\_\_\_  
(Corporate Seal)

Signature:

Signature:

Name and Title: \_\_\_\_\_

Name and Title: \_\_\_\_\_

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

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

Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

**PERFORMANCE BOND** TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA  
Hartford, Connecticut 06183

Bond No.: 107067360

**CONTRACTOR:**

(Name, legal status and address)

C3 Mechanical, LLC, 160 Buchanan Avenue, Bardonia, NY 10962

**SURETY:**

(Name, legal status and principal place of business)

Travelers Casualty & Surety Company of America, Hartford, CT

**OWNER:**

(Name, legal status and address)

Lexington Fayette Urban Co Government, 200 East Main St., 3<sup>RD</sup> Floor, Lexington, KY 40507

**CONSTRUCTION CONTRACT**

Date: February 10, 2020

Amount: \$ 221,000.

Description:

(Name and location)

Water Replacement Project, Lexington, KY

**BOND**

Date: February 10, 2020

(Not earlier than Construction Contract Date)

Amount: \$221,000.

Modifications to this Bond:

None

See Section 16

**CONTRACTOR AS PRINCIPAL**

Company: C3 Mechanical, LLC (Corporate Seal)

**SURETY**

Company: Travelers Casualty & Surety Company of America (Corporate Seal)

Signature:

*Tim Coomes*

Name and

Tim Coomes

Title:

Signature:

*Deborah Hsieh*

Name and

Deborah Hsieh, Attorney in Fact

Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

**AGENT or BROKER:**

One County Insurance Services, Inc., 1901 Cambridge Drive, Lexington, KY 40507

**OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after  
.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the



**Travelers Casualty and Surety Company of America  
Travelers Casualty and Surety Company  
St. Paul Fire and Marine Insurance Company**

**POWER OF ATTORNEY**


**KNOW ALL MEN BY THESE PRESENTS:** That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Deborah Hisle** of **LEXINGTON Kentucky**, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

**IN WITNESS WHEREOF**, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **17th day of January, 2019**.



State of Connecticut

City of Hartford ss.

By:   
Robert L. Raney, Senior Vice President

On this the **17th day of January, 2019**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

**IN WITNESS WHEREOF**, I hereunto set my hand and official seal.

My Commission expires the **30th day of June, 2021**



  
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this **10th** day of **February**, **2020**



  
Kevin E. Hughes, Assistant Secretary

**To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.  
Please refer to the above-named Attorney-in-Fact and the details of the bond to which this Power of Attorney is attached.**

§ 18 Modifications to this bond are as follows:



*(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)*

**CONTRACTOR AS PRINCIPAL**

**SURETY**

Company: (Corporate Seal)

Company: (Corporate Seal)

Signature:

Signature:

Name and Title:

Name and Title:

Address:

Address:



§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

#### § 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.



§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

**PAYMENT  
BOND**

**TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA**  
Hartford, Connecticut 06183

Bond No.: 107067360

**CONTRACTOR:**

(Name, legal status and address)

C3 Mechanical, LLC, 160 Buchanan Avenue  
Bardonia, N.Y. 10903

**SURETY:**

(Name, legal status and principal place of business)

Travelers Casualty & Surety Company of America, Hartford, CT

**OWNER:**

(Name, legal status and address)

Lexington Fayette Urban County Government, 200 East Main Street, 3rd Floor, Lexington, KY 40507

**CONSTRUCTION CONTRACT**

Date: [Redacted]

Amount: \$221,000.

Description:

(Name and location)

Water Replacement Project - Lexington, KY

**BOND**

Date:

(Not earlier than Construction Contract Date)

February 10, 2020

Amount: \$221,000.

Modifications to this Bond:



See Section 18

**CONTRACTOR AS PRINCIPAL**

Company: C3 Mechanical, LLC (Corporate Seal)

**SURETY**

Company: Travelers Casualty & Surety Company of America (Corporate Seal)

Signature:

*Aim Coomes*

Name and

Aim Coomes

Title:

Signature:

*Deborah Hulse*

Name and

Deborah Hulse, Attorney in Fact

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

**AGENT or BROKER:**

Old Colony Insurance Agency, Inc., 1906 Cambridge  
Drive, Lexington, KY 40503

**OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:)

[Redacted]

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.



**Travelers Casualty and Surety Company of America  
Travelers Casualty and Surety Company  
St. Paul Fire and Marine Insurance Company**

**POWER OF ATTORNEY**

**KNOW ALL MEN BY THESE PRESENTS:** That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Deborah Hisle** of **LEXINGTON Kentucky**, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

**IN WITNESS WHEREOF**, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this 17th day of **January, 2019**.



State of Connecticut

City of Hartford ss.

By:   
Robert L. Raney, Senior Vice President

On this the 17th day of **January, 2019**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of said Companies by himself as a duly authorized officer.

**IN WITNESS WHEREOF**, I hereunto set my hand and official seal.

My Commission expires the 30th day of **June, 2021**



  
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

**RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

**FURTHER RESOLVED**, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

**FURTHER RESOLVED**, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

**FURTHER RESOLVED**, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 10th day of February, 2020



  
Kevin E. Hughes, Assistant Secretary

**To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.  
Please refer to the above-named Attorney-in-Fact and the details of the bond to which this Power of Attorney is attached.**

IT IS NOT INTENDED THAT THE PLANS SHOW ALL OFFERS... FOR THE CONTRACTING CONVEYANCE AND SHALL NOT BE CONSIDERED COMPLETE IN EVERY DETAIL.

MECHANICAL LEGEND table containing symbols and descriptions for Plumbing Abbreviations, Fire Protection Legend, HVAC Legend, and HVAC Piping Legend.

MECHANICAL LEGEND table containing symbols and descriptions for Site Utilities, Fire Protection Legend, and HVAC Legend.

MECHANICAL LEGEND table containing symbols and descriptions for HVAC Legend, HVAC Piping Legend, and HVAC Abbreviations.

MECHANICAL LEGEND table containing symbols and descriptions for VAV Symbol Legend, HVAC Abbreviations, and Plumbing Abbreviations.

NOTE: THE SYMBOLS LISTED ON THIS SHEET MAY NOT BE USED... UNLESS OTHERWISE NOTED.

PLUMBING REMOVAL GENERAL NOTES: 1. UNLESS OTHERWISE NOTED, BE REMOVED... MECHANICAL LEGEND AND GENERAL NOTES: 1. CONTRACTOR SHALL REFERENCE ARCHITECTURAL PLANS...

MECHANICAL LEGEND AND GENERAL NOTES

LFUJCG - BOILER REPLACEMENTS AT FLEET MGMT., CARNEGIE CTR., & GOVERNMENT CTR. ANNEX

DATE: 11/16/2019, DRAWN: MJ, CHECKED: DHB, SHEET: M000



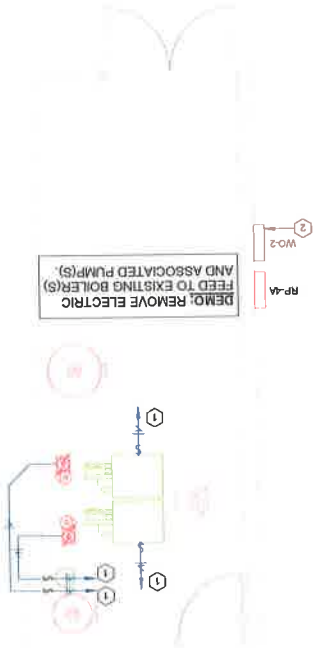






NOTE:  
IT IS NOT INTENDED THAT THE PLAN SHOW ALL OFFSETS, ALPHAS, CONCRETE, AND DIMS REQUIRED FOR INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTENDED RELATIONSHIP OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB CONTRACTORS TO OBTAIN THE NECESSARY INFORMATION TO PROVIDE THE NECESSARY OFFSETS, TRANSFORMATIONS, AND FITTERS REQUIRED. NO ADJUSTMENT OR CORRECTION SHALL BE ALLOWED FOR CONFLICTS BETWEEN THE WORK OF VARIOUS TRADES. DETAILS AND SECTIONS ARE SHOWN FOR THE CONTRACTORS CONVEINENCE AND SHALL NOT BE CONSIDERED COMPLETE HEAVY DETAIL.

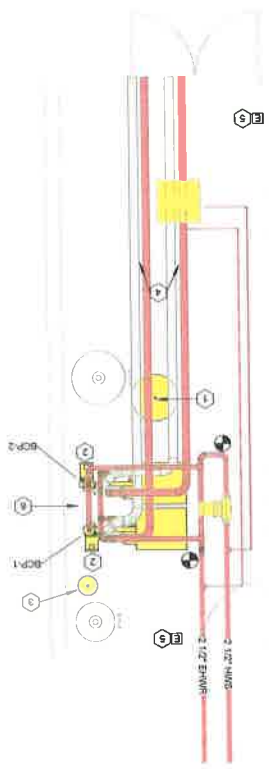
FLEET MECHANICAL ROOM - POWER PLAN  
SCALE: 1/4" = 1'-0"



- CODED NOTES:
- 1 TO NEW 20A/1P CIRCUIT BREAKER TO BE PROVIDED IN EXISTING PANEL WO-2
  - 2 EXISTING PANEL WO-2 PROVIDE (4) FOUR NEW 20A/1P CIRCUIT BREAKERS

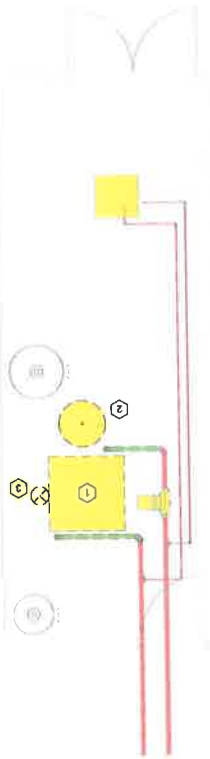
RP-4A  
WO-2  
DEMO, REMOVE ELECTRIC FEED TO EXISTING BOILER(S) AND ASSOCIATED PUMP(S).

FLEET MECHANICAL ROOM - HVAC PLAN  
SCALE: 1/4" = 1'-0"



- CODED NOTES:
- 1 RELOCATED HOT WATER EXPANSION TANK TO PROVIDE CLEARANCE
  - 2 BOILER CHECK A TOP PLUMB IN VERTICAL SUPPLY PIPING
  - 3 5 GALLON CHEMICAL POT FEEDER. SEE FLOW DIAGRAM
  - 4 VENT AND 5 COMBUSTION AIR TO OUTSIDE WALL. TERMINATE MINIMUM 7' ABOVE FINISHED GRADE
  - 5 REMOVE EXISTING BOILER EMERGENCY STOP AND INSTALL NEW WIRE TO NEW BOILERS
  - 6 PROVIDE GAS CONNECTIONS TO GAS LINE IN ROOM

FLEET MECHANICAL ROOM - HVAC DEMO PLAN  
SCALE: 1/4" = 1'-0"



- CODED NOTES:
- 1 DEMO EXISTING BOILER AND WATER LINES BACK TO MAIN
  - 2 RELOCATE EXISTING HOT WATER EXPANSION TANK TO IN FRONT OF COMPRESSED AIR TANK
  - 3 DEMO EXISTING FUE UP TO NEAR ROOF AND CAP AND SEAL.

M002

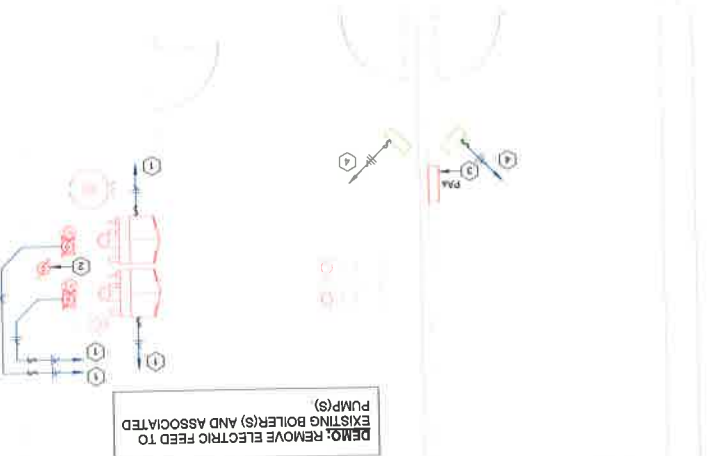
DATE: 11/18/2019  
LPUCC 123-2019  
DRAWN: MJ  
CHECKED: DHB  
SHEET

FLEET MANAGEMENT - FLOOR PLAN  
LFUCC - BOILER REPLACEMENTS AT FLEET MGMT., CARNEGIE CTR., & GOVERNMENT CTR. ANNEX

REVISION	DESCRIPTION	DATE



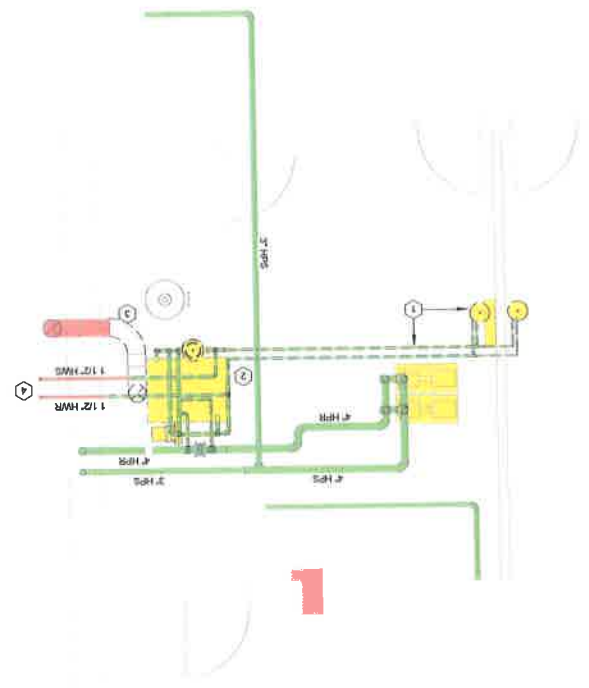
NOTE: IT IS NOT INTENDED THAT THE PANS SHOW ALL DETAILS IN PIPES, CONDUITS, AND DUCTS REQUIRED FOR INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTERFERED BELONGING OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB CONTRACTORS TO COORDINATE THE INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTERFERED BELONGING OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB CONTRACTORS TO COORDINATE THE INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTERFERED BELONGING OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB CONTRACTORS TO COORDINATE THE INSTALLATION OF THE WORK.



CARNEGIE MECHANICAL ROOM - POWER PLAN  
SCALE: 1/4" = 1'-0"

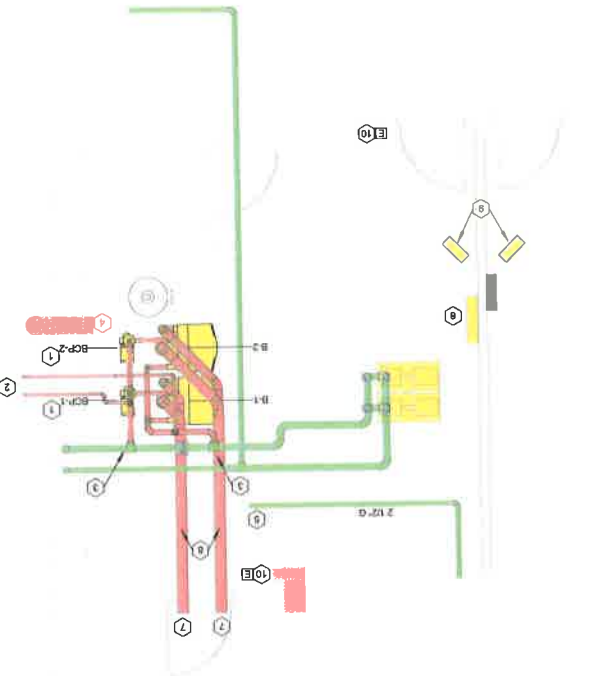
- GOOD NOTES:
- 1 TO NEW ZONE/P CIRCUIT BREAKER TO BE PROVIDED IN EXISTING PANEL PA
  - 2 RECONNECT AS REQUIRED
  - 3 EXISTING PUMP IN NEW LOCATION EXTEND EXISTING CIRCUIT AND BREAKERS AND (2) TWO NEW ZONE/P CIRCUIT BREAKERS
  - 4 EXISTING PANEL PA

CARNEGIE MECHANICAL ROOM - HVAC DEMO PLAN  
SCALE: 1/4" = 1'-0"



- GOOD NOTES:
- 1 DEMO EXISTING HOT WATER UNIT HEATERS AND ASSOCIATED PIPING AND ELECTRICAL CIRCUIT
  - 2 DEMO EXISTING BOILER, HOT WATER PIPING, HOT WATER PUMPS, ELECTRICAL CIRCUIT TO BOILER, DEMO NATURAL GAS PIPING CONNECTION IN PREPARATION FOR CONNECTIONS TO NEW BOILERS
  - 3 DEMO EXISTING BOILER FUE TO THIS POINT AND CAP
  - 4 EXISTING HWSHWR TO MAKE-UP AIR UNIT IN ATTIC TO REMAIN, DEMO PIPING IN MECHANICAL ROOM IN PREPARATION FOR CONNECTIONS ACCORDING TO NEW FLOW DIAGRAM

CARNEGIE MECHANICAL ROOM - HVAC PLAN  
SCALE: 1/4" = 1'-0"



- GOOD NOTES:
- 1 BOILER CIRCULATOR PUMP IN VERTICAL RETURN PIPE SEE FLOW DIAGRAM
  - 2 EXISTING HWSHWR UP TO MAKE-UP AIR UNIT IN ATTIC
  - 3 CONNECT NEW HOT WATER PIPING TO EXISTING HEAT PUMP LOOP SEE FLOW DIAGRAM
  - 4 CAP OLD BOILER FUE
  - 5 EXISTING GAS LINE IN MECHANICAL ROOM
  - 6 EXISTING MCOJAY HEAT PUMP LOOP CONTROLLER WIRE HEATING CABLES TO NEW BOILERS
  - 7 REINSTALL 6" VENT PIPE AND 4" COMBUSTION AIR TO BOILER (GENERATE VENT VERTICALLY TO PROVIDE REQUIRED CLEARANCES VENT TO BE MINIMUM 1' ABOVE DOOR)
  - 8 MARK NUMBER CORRECTLY VENT KIT (COORHWAN, ROSTER)
  - 9 NEW ELECTRIC UNIT HEATER MARKED 5100 SERIES OR APPROVED EQUAL 11/2 MBR, 3/4 WY, 200V/1P
  - 10 REMOVE EXISTING BOILER EMERGENCY STOP AND INSTALL NEW WIRE TO NEW BOILERS

M003

SHEET  
CHECKED: DHB  
DRAWN: MJ  
PROJECT: 123-2019  
DATE: 11/18/2019

CARNEGIE CENTER - FLOOR PLAN  
LFUGG - BOILER REPLACEMENTS AT FLEET MGMT., CARNEGIE CTR., & GOVERNMENT CTR. ANNEX

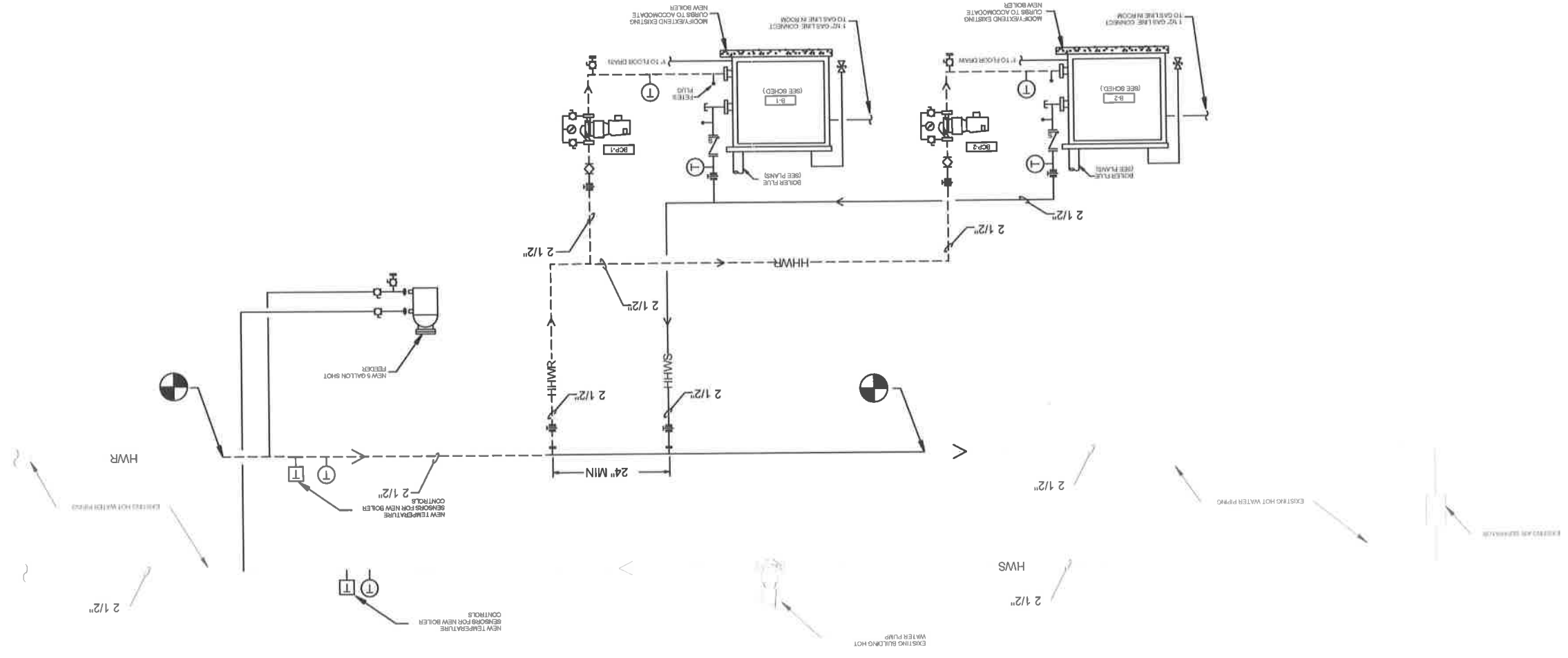
#	DESCRIPTION	DATE





NOTE: IT IS NOT INTENDED THAT THE PLANS SHOW ALL DETAILS, CONDITIONS, AND NOTES REQUIRED FOR INSTALLATION OF THE WORK. DETAILS AND NOTES ARE INCLUDED FOR SOME AREAS TO SHOW INTERRELATED RELATIONSHIP OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB CONTRACTORS TO COORDINATE INSTALLATION OF THE WORK AND TO PROVIDE THE NECESSARY OFFSETS, MANAGEMENTS, AND FITTINGS REQUIRED. NO ACCURATE CONNECTIONS WILL BE ALLOWED FOR CONNECTIONS BETWEEN THE WORK OF VARIOUS TRADES. DETAILS AND NOTES ARE SHOWN FOR THE CONTRACTORS CONVICTION AND SHALL NOT BE CONSIDERED COMPLETE IN EVERY DETAIL.

FLEET MANAGEMENT BUILDING FLOW DIAGRAM  
NO SCALE



M102  
SHEET  
DATE: 11/18/2019  
LFCUG 123-2019  
DRAWN: MJ  
CHECKED: DHB

FLEET MANAGEMENT FLOW DIAGRAM  
LFUCG - BOILER REPLACEMENTS AT FLEET MGMT., CARNEGIE CTR., & GOVERNMENT CTR. ANNEX

#	REVISIONS	DESCRIPTION	DATE







