FORT MILL SCHOOL DISTRICT

SPRINGFIELD MIDDLE SCHOOL
HVAC UPGRADES – PHASE 2

BGA PROJECT NO: 21040

January 17, 2024

PREPARED BY:

BUFORD GOFF & ASSOCIATES, INC.
1331 Elmwood Avenue, Suite 200
Columbia, South Carolina 29201
(803) 254-6302

TABLE OF CONTENTS

PROJECT NAME: FMSD – Springfield Middle School HVAC Upgrades – Phase 2

DIVISION 0 – PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 1 - GENERAL REQUIREMENTS

TECHNICAL SPECIFICATIONS

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

DIVISION 23 – HVAC

DIVISION 26 - ELECTRICAL

1. PROJECT DESCRIPTION

1.1. The Fort Mill School District (FMSD) is accepting Bids for Single Prime Contractor to provide comprehensive services as described, but not limited to, the scope outlined within the Construction Documents. The Contractor's scope of work shall include the demo, disposal, and replacement of the existing HVAC Systems at Springfield Middle School (1711 Springfield Pkwy, Fort Mill, SC 29715). Scope shall include replacement of the existing classroom interior / exterior split systems, demo and replacement of necessary acoustical ceiling system, and associated electrical requirements as indicated within the contract documents.

.

2. DEFINED TERMS

2.1. Terms used in the Information to Bidders are defined and have the meanings assigned to them in the General Conditions.

3. COPIES OF BIDDING DOCUMENTS

3.1. Only complete sets of Bidding Documents will be issued and shall be used in preparing Bids. Neither the OWNER nor the ARCHITECT/CONSTRUCTION MANAGER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.2. Complete sets of Bidding Documents may be obtained in the manner and at the location stated in the Invitation for Bids.

4. QUALIFICATIONS OF BIDDERS

4.1. Each Bid must contain evidence of the Bidder's qualifications to do business in the area where the project is located.

4.2. To demonstrate his qualifications to perform the Work, each Bidder must be prepared to submit, within five days of OWNER's request, a Statement of Qualifications providing written evidence as to his financial status; previous successful contractual and technical experience in similar work including references, description and volume of present commitments, evidence of possession of valid state, county, and local licenses; Certificates of Competency covering all operations and all areas of political jurisdiction involved in the work of this project; and such other data as may be requested by the OWNER.

4.3. Statement of Bidders Qualifications

If requested by the OWNER, Bidder must submit a Statement of Qualifications (the Qualifications) to include the following information. Bidder must provide all requested information in the Qualifications, and the data given must be clear and comprehensive. This statement shall be notarized and furnished to the OWNER, within five days of OWNER's request. If necessary, the Qualifications questions may be answered on separate, attached sheets. The Bidder may submit any additional information he desires.

4.3.1. Name of Bidder.

4.3.2. Name(s), address(es), & social security number(s) of company principal(s).

4.3.3. Permanent main office address.

4.3.4. When organized.

4.3.5. If a corporation or company, list the State where incorporated or registered, year incorporated or registered, and the location of the principal place of business.

4.3.6. How many years has your organization been engaged in the contracting business under your present firm or trade name?

4.3.7. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion).

4.3.8. Under what other and former names has your organization operated?

4.3.9. General character of work performed by your company.

4.3.10. Has your company ever failed to complete any work awarded to you?

4.3.11. Have you ever defaulted on a contract?

4.3.12. List the more important projects completed by your company in the last five (5) years, the approximate cost for each project, and the month and year completed.

4.3.13. List your major equipment available for this contract.

4.3.14. Experience in construction work similar in importance to this project.

4.3.15. Background and experience of the principal members of your organization, including officers.

4.3.16. Credit available: $ _____.

4.3.17. Give bank references: _____.

4.3.18. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the OWNER?

The following statement shall appear on the submitted Statement of Bidder Qualifications: "The undersigned hereby certifies that information furnished is true and accurate and further authorizes and requests all persons, firms, and corporations to furnish all information requested by the OWNER to allow verification of the information requested in this Statement of Bidder's Qualifications."

5. DISQUALIFICATION OF BIDDERS

5.1. One Bid: Only one Bid from an individual firm, partnership, company, or corporation under the same or under different names will be considered. If OWNER believes that a Bidder submitted more than one Bid for the work involved, all Bids submitted by that Bidder will be rejected.

5.2. Collusion Among Bidders: If OWNER believes that collusion exists among the Bidders, the Bids of all participants in such collusion will be rejected, and no participants in such collusion will be considered in future Proposals for the same work.

6. EXAMINATION OF SITE CONDITIONS

6.1. Each Bidder, by and through the submission of his Bid, agrees that he has examined the site, the location of all proposed work, and has satisfied himself from his own personal

knowledge and experience or professional advice as to the character and location of the site, surface and subsurface conditions, elevations, locations of underground utilities and structures, and any other conditions and obstructions affecting the work, the nature of any existing construction, and other physical characteristics of the job, in order that the prices which he bids include all costs required for satisfactory completion of the work, including the removal, relocation, or replacement of any objects or obstructions which may be encountered in doing the proposed work.

6.2. Reports and records of obstructions and subsurface investigations shown on the Drawings or included in the Bid Documents, were made solely for design purposes. The OWNER and ARCHITECT/CONSTRUCTION MANAGER do not warrant, guarantee or represent that said data is accurate or complete with respect to actual subsurface conditions throughout the site. Therefore, the Bidder, by and through the submission of his Bid, affirms that he has satisfied himself with respect to such site conditions, and, should the Bidder be awarded the Contract, he agrees that he will make no claims against the OWNER or ARCHITECT/CONSTRUCTION MANAGER if, in carrying out the work, he finds that the actual conditions do not conform to those indicated. The OWNER will, upon request, provide each Bidder with reasonable access to the site to conduct such tests and investigations as each Bidder deems necessary for submission of his Bid. If a Bidder obtains such access he shall restore the site to the condition existing prior to conducting said tests and investigations.

6.2.1. In reference to those reports of explorations and tests of subsurface conditions at the site which have been utilized by ARCHITECT/CONSTRUCTION MANAGER in preparation of the Contract Documents, Bidder 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 the purpose of bidding or construction.

6.2.2. In reference to those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site which has been utilized by ARCHITECT/CONSTRUCTION MANAGER in preparation of the Contract Documents, Bidder may rely upon the accuracy of the technical data contained in such drawings but not upon the completeness for the purpose of bidding or construction.

Copies of such reports and drawings will be made available by OWNER to any Bidder upon request. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which Bidder is entitled to rely as provided in Paragraphs 6.2.1 and 6.2.2 are incorporated into the Contract Documents by reference.

6.3. Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to OWNER and ARCHITECT/CONSTRUCTION MANAGER by owners of such Underground Facilities or others, and OWNER and ARCHITECT/CONSTRUCTION MANAGER do not assume responsibility for the accuracy or completeness thereof.

6.4. Should a Bidder find that any subsurface conditions, Underground Facilities or other physical conditions at or contiguous to the site is of such a nature as to require a change in the Contract Documents due to differing conditions, Bidder shall at once notify the ARCHITECT/CONSTRUCTION MANAGER in writing.

6.5. The land upon which the work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by OWNER in performing the Work are identified in the Bid Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided

by the successful Bidder. Easements for permanent structures or permanent changes in existing structures are to be obtained and/or paid for by OWNER unless otherwise provided in the Contract Documents.

7. EXAMINATION OF CONTRACT DOCUMENTS

7.1. Each Bidder shall carefully examine the Contract Documents, and become thoroughly informed regarding any and all conditions and requirements that may in any manner affect cost, progress or performance of the Work to be performed under the Contract. Ignorance on the part of the CONTRACTOR will in no way relieve him of the obligations and responsibilities assumed under the Contract.

7.2. Should a Bidder find discrepancies, ambiguities, or omissions in the Bid Documents or Contract Documents or doubt as their meaning, the Bidder shall at once notify the ARCHITECT/CONSTRUCTION MANAGER in writing.

7.3. The Submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of Articles 6 and 7; without exception the Bid is premised upon performing and furnishing the Work required by the Contract Document; and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents; and 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.

8. INTERPRETATIONS, CLARIFICATIONS AND ADDENDA

8.1. All questions about the meaning or intent of the Contract Documents or about the bid process must be written. No oral interpretations will be made to any Bidder as to the meaning of the Contract Documents or the bid process. Any inquiry or request for interpretation received prior to the indicated due date will be given consideration. Any changes or interpretations will be made in writing in the form of an addendum and, if issued, posted on the Owner's procurement website: http://www.fortmillschools.org/departments/procurement/ and will be sent by available means to all known prospective Bidders prior to the established bid opening date. Each Bidder shall acknowledge receipt of such addenda in the space provided on the Bid Form. In case any Bidder fails to acknowledge receipt of such addenda, submission of the bid constitutes acknowledgement of the receipt of all addenda. All addenda are a part of the Contract Documents and each Bidder will be bound by such addenda, whether or not received by him. It is the responsibility of each Bidder to verify that he has received all addenda issued before Bids are opened. Questions received less than five (5) days prior to the date for opening of Bids may not be answered. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will have no legal effect.

8.2. Addenda may also be issued to modify the Bidding Documents as deemed advisable by OWNER or ARCHITECT/CONSTRUCTION MANAGER.

8.3 Inquiries regarding interpretation or additional information concerning the Owner's requirements or stipulations concerning this request can be made via email as listed below.

Send questions regarding the Scope of Work on the Request for Information form included in the Project Manual via email to:

Jay Gaither, EIT (LMG)
jay@leitnergrp.com

9. INTERPRETATION OF QUANTITIES

9.1. The quantities of work to be performed and materials to be furnished under unit price items, as given in the Bid Form, shall be considered as approximate only and will be used solely for the comparison of Bids received. The OWNER and/or ARCHITECT/CONSTRUCTION MANAGER do not expressly or by implication represent that the actual quantities involved will correspond exactly with the quantities on the Bid Form. The Bidder may not plead misunderstanding or deception because of such estimate or quantities or of the character, location or other conditions pertaining to the work. Payment to the CONTRACTOR under unit price items will be made only for the actual measured quantities of work performed and materials furnished in accordance with the Contract Documents, and it is understood that the quantities may be increased or decreased at the OWNER's option, as provided in the General Conditions, without in any way invalidating any of the unit or lump sum prices Bid.

10. ALTERNATES

10.1. When certain items of equipment or materials are specified or described as the product of a particular manufacturer - together with any required additional information such as model number, size or catalog number - only such specific items may be used in preparing the Bid, except as hereinafter provided.

10.2. A Bidder proposing to seek approval for the use of alternate, substitute, or “equal” items must do so in accordance with the provisions of Section 12 of the General Conditions and must judge for himself that such proposed equipment is of comparable character and quality to that specified. The OWNER or the ARCHITECT/CONSTRUCTION MANAGER will not discuss, approve, or disapprove any alternate or substitution of equipment or materials before execution of the Contract. The cost of changes in related work and additional drawings, which may be required to illustrate or define the alternate or substitute equipment and its relation to the other parts or portions of the work, shall be paid by the Bidder. Substitution of equipment or materials will cause no change in the Contract Time or in the amount of liquidated damages in the Contract Documents.

11. GOVERNING LAWS AND REGULATIONS

11.1. Upon award of a contract under this request the successful Bidder must comply with the laws of South Carolina including obtaining authorization or licensure to do business with this State if required.

11.2. Notwithstanding the fact that applicable statutes may exempt or exclude the successful Bidder from authorization or licensure requirements, by submission of this signed proposal, the Bidder agrees to subject himself to the jurisdiction and process of the courts of the State of South Carolina as to all matters and disputes arising under the Contract Documents and the performance thereof, including any questions as to the liability for taxes, licenses, or fees levied by the State.

11.3. The Bidder is required to be familiar with and shall be responsible for complying with all federal, State and local laws, ordinances, rules, and regulations that in any manner affect the work.

11.4. The bid prices shall include all sales, consumer, use, and other taxes required to be paid in accordance with the law of the place of the project.

12. PREPARATION OF BIDS

12.1. Signature of the Bidder: Each Bidder shall sign the Bid Form in the space provided for the signature. If the Bidder is an individual, the words "doing business as", or "Sole Owner" must appear beneath such signature. In the case of a partnership, the signature of at least one of the partners must follow the firm name and the words "Member of the Firm" should be written beneath such signature. If the Bidder is company, either a member or the managing member must sign the Bid on behalf of the company and provide evidence of his authority to sign the bid. If the Bidder is a corporation, the title of the officer signing the Bid on behalf of the corporation must be stated and evidence of his authority to sign the Bid must be submitted. Bids not signed may be automatically rejected.

12.2. The Bidder shall show valid South Carolina Contractor's License Number on the Bid Form. Failure to show this required information in the proper place may cause the Bid to be automatically rejected.

12.3. Basis for Bidding: The price bid for each item shall be on a lump sum or unit price basis as specified in the Bid Form. The bid prices shall remain unchanged for the duration of the Contract and no claims for cost escalation during the progress of the work will be considered. All blanks on the Bid Form must be completed in black ink or typewritten.

12.4. Price Bid: The total price bid for the work shall be the aggregate of the lump sum prices bid and unit prices multiplied by the appropriate estimated quantities for the individual items and shall be stated in figures in the appropriate place on the Bid Form. In the event that there is a discrepancy on the Bid Form due to unit price extensions or additions, the corrected extensions and additions shall be used to determine the project bid amount. Written values (in words) shall supersede numerical values, when discrepancies exist.

13. SUBMISSION OF BIDS

13.1. Each bid shall be submitted on the Bid Form as furnished, together with a suitable bid security as herein described.

13.2. The Bid, accompanied by bid security, as described in Section 14, and other required documents, shall be submitted in a sealed envelope clearly marked with the Project title (and if applicable, the designated portion of the Project for which the Bid is submitted) and the name and address of the Bidder. If forwarded by mail or other delivery system, the above mentioned envelope shall be enclosed in another envelope with the notation "BID ENCLOSED" on the face of it and addressed to the entity and address stated in the Invitation for Bids. Bids will be received until the date and hour stated in the Invitation for Bids.

13.3. Solicitation Number – The Bidder shall also clearly indicate the Solicitation Number of this bid on the outside of the sealed envelope within which the Bid is submitted in person to the Fort Mill School District Office or by mail to 2233 Deerfield Dr. Fort Mill, SC 29715.

13.4. If requested by the OWNER, Bidder shall submit, within five days of OWNER's request, a list of the names and addresses of his major subcontractors together with the services they will supply. These subcontractors will be subject to review as to their competency by the OWNER prior to award of Contract and shall be one of the considerations in determining the successful Bidder. After award of Contract, no change in subcontractors shall be made unless approved by the OWNER after a request for such a change, including the reasons therefore, has been submitted in writing by the CONTRACTOR.

13.5. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION: The Bidder certifies, by submission of this document or

acceptance of a contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any State, Federal department, or agency. It further agrees by submitting this qualification statement that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, it shall attach an explanation to the Bid Form.

14. BID SECURITY

14.1. Each Proposal must be accompanied by a Bid Bond made payable to the OWNER in an amount not less than five percent (5%) of the total amount of the Bid if the total amount of the bid exceeds $30,000. Generally, the bid security of all non-awarded Bidders, including the three (3) lowest responsible Bidders, will be returned within ten (10) days after the OWNER and the accepted Bidder have executed the written Contract and the accepted Bidder has filed acceptable Performance and Indemnity and Payment Bonds. Upon request and no earlier than thirty (30) days after the formal opening of bids, the Owner will return the bid security of any Bidder.

14.2. Attorneys-in-Fact who sign Bid Bonds shall file with such bonds a certified copy of their Power of Attorney to sign said Bonds.

14.3. Failure of the accepted Bidder to execute a Contract and file acceptable bonds within ten (10) days after a written Notice of Award has been given shall be just cause for the annulment of the award and the forfeiture of the bid security to the OWNER as liquidated damages for damages sustained by OWNER. Award may then be made to the next lowest responsible Bidder or all Bids may be rejected.

15. WITHDRAWAL OF BID

15.1. Any Bid may be withdrawn prior to the time scheduled in Invitation for Bids for the receipt thereof. A Bid may also be withdrawn within twenty-four (24) hours after the date of the receipt of the Bids, provided that the Bidder files a duly signed, written notice with OWNER and promptly there after demonstrates, to the reasonable satisfaction of OWNER, that there was a material and substantial mistake in the preparation of its Bid. The Bid security will be returned and the Bidder will be disqualified from further bidding on the work to be provided under the Contract Documents.

16. MODIFICATION OF BIDS

16.1. The Owner does not allow modification of bids after submittal.

17. RECEIPT AND OPENING OF BIDS

17.1. Bids will be received until the designated time and will be publicly opened and (unless non-responsive) read aloud at the appointed time and place stated in the Invitation for Bids. The person whose duty it is to open the Bids will decide when the specified time has arrived and no Bids received thereafter will be considered. No responsibility will be attached to anyone for the premature opening of a Bid not properly addressed and identified. Bidders or their authorized agents are invited to be present. An abstract of the amounts of the base Bids and major alternates (if any) will be available to Bidders after the opening of Bids.

18. DETERMINATION OF SUCCESSFUL BIDDER

18.1. For the purpose of award, the correct summation of the lump sum prices and/or of the products of the estimated quantities shown in the Bid and the unit prices will be considered

the Bid. Until the final award of the Contract, the OWNER does not bind himself to accept the minimum Bid stated herein, but reserves the right to reject any and all Bids and to waive technical errors and irregularities as may be deemed best for the interests of the OWNER. Bids containing modifications that are incomplete, unbalanced, conditional, and obscure; containing additions not requested or irregularities of any kind; not complying in every respect with the Information to Bidders and the Bid Documents, may be rejected at the option of the OWNER.

18.2. In evaluating Bids, OWNER will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, alternates (if any), unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

18.3. OWNER may conduct such investigations as OWNER deems necessary to assist in the evaluation of any Bid and to establish the qualifications to perform and furnish the Work in accordance with the Contract Documents to OWNER's satisfaction within the prescribed time.

18.4. The Bids of the three (3) lowest responsible Bidders will remain subject to acceptance for a maximum of one hundred twenty (120) days after the day of the Bid opening, but OWNER may, at its sole discretion, release any Bid and return the bid security prior to that date.

19. AWARD OF CONTRACT

19.1. The OWNER reserves the right to reject any or all Bids or any part of any Bid, to waive any informality in any Bid, or to re-advertise for all or part of the work contemplated. The OWNER reserves the right, prior to award of Contract, to delete from the scope of the project any item or any combination of items. If Bids are found to be acceptable by the OWNER, written Notice of Award will be given to the lowest responsible Bidder of the acceptance of his Bid and of the award of the Contract to him.

19.2. If a Bidder to whom a Contract is awarded forfeits his bid security and the award of the Contract is annulled, the OWNER may either award the Contract to the next lowest responsible Bidder or re-advertise the work.

19.3. The Contract will be awarded to the lowest responsible Bidder complying with the applicable conditions of the Contract Documents.

19.4. The ability of a Bidder to obtain Performance and Indemnity and Payment Bonds shall not be regarded as the sole test of such Bidder's competence or responsibility.

19.5. The OWNER also reserves the right to reject the Bid of a Bidder who has previously failed to perform properly or to complete Contracts of a similar nature on time.

20. EXECUTION OF CONTRACT

20.1. The Bidder to whom a Contract is awarded will be required to return to the OWNER a minimum of three (3) executed counterparts of the prescribed Contract or Agreement together with the required Performance and Indemnity and Payment Bonds and the required Certificates of Insurance within ten (10) days from the date of Notice of Award. Within ten (10) days thereafter, OWNER shall deliver one fully signed counterpart to CONTRACTOR.

21. PERFORMANCE AND PAYMENT BONDS

21.1. Simultaneously with his delivery of the executed Contract to the OWNER, a Bidder to whom a Contract has been awarded must deliver to the OWNER executed Performance and Indemnity and Payment Bonds on the prescribed forms each in an amount equal to one hundred percent (100%) of the total amount of the Contract Amount, as security for the faithful performance of the Contract and for the payment of all persons performing labor or furnishing materials in connection therewith. The Performance and Indemnity and Payment Bonds shall have as the surety thereon only such surety company or companies as are authorized to write bonds of such character and amount under the laws of the State of South Carolina and with a resident agent in the county in which the project is located. The Attorney-in-Fact, or other officer who signs the Performance and Indemnity and Payment Bonds for a surety company must file with such bonds a certified copy of his Power-of-Attorney authorizing him to do so.

21.2. The Performance and Indemnity and Payment Bonds shall remain in force for one (1) year from the date of final payment of the Work as a protection to the OWNER against losses resulting from latent defects in materials or improper performance of work under the Contract, which may appear or be discovered during that period.

21.3. Qualification of Sureties shall be as described in the General Conditions.

22. CERTIFICATES OF INSURANCE

22.1. Simultaneously with his delivery of the executed Contract and Bonds to the OWNER, the Bidder to whom a Contract has been awarded shall deliver to the OWNER the required Certificates of Insurance and endorsements certifying insurance coverage in amounts not less than the limits of liability and coverages and naming the insureds and additional insureds as provided in the General Conditions, or as required by law, whichever is greater.

23. AFFIRMATIVE ACTION

23.1. TITLE VI OF THE CIVIL RIGHTS ACT OF 1964 Contractors shall comply with Title VI of the Civil Rights Act of 1964.

24. DRUG FREE WORKPLACE

24.1. Drug free workplace: During the performance of this project, the CONTRACTOR agrees to provide a drug-free workplace for his employees; post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the workplace and specify the actions that will be taken against employees for violations of such prohibition; and state in all solicitations or advertisements for employees placed by or on behalf of the CONTRACTOR that the CONTRACTOR maintains a drug-free workplace.

24.2. For the purposes of this section, “drug-free workplace” means a site for the performance of work done in connection with a specific contract awarded to a CONTRACTOR in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

25. CONFLICT OF INTEREST

The successful Contractor shall not knowingly employ, during the period of a contract, or any extensions to it, any professional personnel who are also in the employ of Fort Mill School District

and who are providing services involving this request or services similar in nature to the scope of this request to the Owner. Furthermore, the Vendor shall not knowingly employ, during the period of a contract or any extensions to it, any Fort Mill School District employee who has participated in the making of a contract until at least two years after his/her termination of employment with Fort Mill School District.

26. PROHIBITION OF GRATUITIES

Neither the company, nor any person, employed by the company in the performance of this request, shall offer or give any gift, money or anything of value or any promise for future reward or compensation to any Fort Mill School District employee at any time.

27. PUBLIC ACCESS TO PROCUREMENT INFORMATION

Subject to the requirements of the Freedom of Information Act, any confidential commercial or financial information provided by the Bidder in response to this Invitation for Bids will not be disclosed if the Bidder clearly marks "CONFIDENTIAL" on each specific part of its Bid containing confidential information. Confidential commercial or financial information includes proprietary information, trade secrets, or other information exempt from disclosure under S.C. Code Ann. § 30-4-40. The Bidder must only mark the section containing confidential information as “CONFIDENTIAL.” Marking the entire document confidential may result in the accidental release of confidential information.

Fort Mill School District disclaims any responsibility for accidentally disclosing information identified by any Bidder as confidential and for disclosing any information that proposer failed to visibly mark as **"**CONFIDENTIAL." Fort Mill School District may release information marked as confidential if Fort Mill School District determines that the information is not exempt from disclosure under S.C. Code Ann. § 30-4-40.

30. THE FORT MILL SCHOOL DISTRICT RESERVES THE RIGHT TO REJECT ANY AND/OR ALL BIDS AND TO WAIVE ANY AND ALL TECHNICALITIES.

_____

Signature, Title of CONTRACTOR

CERTIFICATION REGARDING IMMIGRATION REFORM & CONTROL

All Bidders are expected to comply with the Immigration and Reform Control Act of 1986 (IRCA), as may be amended from time to time. This Act, with certain limitations, requires the verification of the employment status of all individuals who were hired on or after November 6, 1986, by the Bidder as well as any sub-consultants. The usual method of verification is through the Employment Verification (I-9) Form. With the submission of this bid, the Bidder hereby certifies without exception that Bidder has complied with all federal and state laws relating to immigration and reform. Any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and, at the Fort Mill School District's option, may subject the contract to termination and any applicable damages.

The Bidder certifies that, should it be awarded a contract by the Owner, the Bidder will comply with all applicable federal and state laws, standards, orders and regulations affecting a person's participation and eligibility in any program or activity undertaken by the Bidder pursuant to this contract. The Bidder further certifies that it will remain in compliance throughout the term of the contract.

At the Owner's request, the Bidder is expected to produce to the Owner any documentation or other such evidence to verify the Bidder's compliance with any provision, duty, certification, or the like under the contract.

The Bidder agrees to include this certification in contracts between itself and any subcontractors in connection with the services performed under the Contract Documents.

_____

Signature and Title of Bidder

1. EXPLANATION TO BIDDERS

Any explanations desired by bidders regarding the meaning or interpretation of the drawings and specifications should be requested in writing on the **Bidder's Request for Information Form**. This form must be submitted with sufficient time allowed for a reply to reach all perspective bidders at least seven (7) days before the submission of the bids. **Oral explanations or instructions given before the award of the Contract will not be binding**. Any interpretations made will be in the form of an addendum to the Specifications or drawings and will be furnished to all bidders and its receipt by the bidder shall be acknowledged on the proposal form in the space provided.

2. APPROVAL OF MATERIALS, EQUIPMENT AND SUBSTITUTIONS PRIOR TO OPENING OF BIDS

A. Substitutions:

The Contract shall be based on the standards of quality established in the Contract Documents. Products specified by reference to standard specifications such as ASTM and similar standards do not require further approval except for interface within the Work. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this Work by the Architect.

B. "Or equal":

Where the phrase "or equal," or "equal as approved by the Architect", occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this Work by the Architect. The decision of the Architect shall be final.

C. Approval of Substitutions and "Or equal" Materials:

In cases where a bidder is in doubt concerning the acceptability of a material that he desires to use as a basis for this bid, the bidder may request the Architect/Engineer's approval to use such material in lieu of that particularly mentioned as a basis of this bid. Requests from material dealers and subcontractors must be made through a prime bidder. Such requests shall be submitted in writing using the **Substitution Request Form**. The Architect/Engineer's approval to use the materials as a basis of bids will, if granted, be in writing and a copy will be forwarded to all other bidders. Approval to use a material as a basis of bids shall not constitute final approval. Such approval granted prior to opening of bids shall be subject to reconsideration after the proposals are received and before the award of the Contract. Final approval of all materials proposed in lieu of those particularly mentioned will be submitted through the apparent low Contractor as provided in Division 1 of the Contract Specifications. In view of the relatively short time available for consideration of requests and advising all parties concerned prior to opening bids, bidders should limit such requests to those they consider particularly important and should submit such requests as far in advance of the opening of bids as practical **and no less than ten (10) days prior to bid opening.**

3. ADDENDA

Changes or corrections may be made to the Drawings and Specifications after they have been issued but before bids are received. In such cases, a written addendum describing the change or corrections will be issued by the Construction Manager and the Architect/Engineer to all bidders. Such Addenda will take precedence over the portion of the Drawings and Specifications concerned and will be considered a part of the Contract Documents. *Except in unusual cases*, addenda will be issued to reach bidders at least three (3) days prior to bid opening.

4. EXAMINATION OF DRAWINGS AND SPECIFICATIONS

Each bidder shall carefully examine Drawings and Specifications and all Addenda or other revisions thereto and thoroughly familiarize himself with the detailed requirements thereof prior to submitting a proposal. If any bidder is in doubt as to the true meaning of any part of the Drawings, Specifications or other documents, or if any part of the error, discrepancy, conflict or omission is noted, the bidder should immediately contact the Architect/Engineer and request clarification. The Architect/Engineer will clarify discrepancy, conflict or omission and will notify all bidders by Addendum in cases where the extent of the Work or the cost thereof will be appreciably affected. No allowance will be made after the bids are received for oversight by a bidder. Bidders shall use complete sets of Contract Documents in preparing bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

The organization of the Specifications into divisions, sections and articles and the arrangement of Drawings shall not control the Bidder in dividing the Work among sub-bidders or in establishing the extent of Work to be performed by any trade.

This Project Manual is, in part, of the "streamlined" type and includes incomplete sentences. Omissions of words or phrases such as "the Contractor shall," "as noted on the drawings" "according to the plans "a," "an", "all," are intentional and shall be supplied by inference by the reader. Words "shall" or "shall be" shall be supplied by inference where a colon (:) is used within a sentence or phrase. Where a manufacturer's name is mentioned, the words "as manufactured by" or "as made by" shall be understood.

A Pre-Bid Conference will be held for purposes of considering questions posed by Bidders as follows.

TIME: January 25, 2024 at 3:00PM
PLACE: 2233 Deerfield Dr. Fort Mill, SC 29715

All interpretations and corrections to Contract Documents deriving from this Conference will be mailed, faxed or electronically mailed to each Bidder of record.

5. EXAMINATION OF OTHER CONDITIONS AFFECTING THE WORK

Each bidder shall examine and thoroughly familiarize himself with all existing conditions including all applicable laws, ordinances, rules and regulations that will affect the work prior to submitting a proposal. He shall visit the site, examine the grounds and all existing buildings, utilities and roads and shall ascertain by any reasonable means all conditions that will in any manner affect his work. He shall ask the Architect/Engineer for any additional information that he deems necessary for him to be fully informed as to exactly what is to be expected prior to submitting a proposal. The drawings have been prepared on the basis of surveys and inspections of the site and physical conditions at the site. This, however, shall not relieve the bidder of the necessity for fully informing himself as to the existing physical conditions. Each bidder shall carefully examine the existing conditions as compared to the Contract Documents. Any discrepancies noted between same shall be noted in writing to the Architect/Engineer ten (10) days prior to the established bid date for inclusion in a written Addendum. Verbal or telephone changes will not be considered binding.

Bidder has secured on-site measurements for quantities upon which Bidder's proposal is based and has observed all existing conditions and limitations.

6. DRAWINGS AND SPECIFICATIONS

All copies of Drawings, Specifications and other documents will be accessed by each Bidder through the Owner's Procurement website. Bidding Documents may be downloaded and Bidder's will not be required to return their documents to the Construction Manager at the end of the bid process. The documents are the bidders to keep. The successful bidder will be responsible for reproducing all drawings and specifications that they and their subcontractors require for the project. NO ADDITIONAL COPIES OF THE DRAWINGS OR SPECIFICATIONS WILL BE PROVIDED TO THE SUCCESSFUL BIDDER UPON AWARD OF THE PROJECT.

7. PREPARATION AND SUBMISSION OF PROPOSAL

Proposals to be entitled for consideration must be made on the form provided in the Project Manual. All conditions set forth in the "**Bid Form**" and "**Advertisement for Bids**" must be complied with. Figures shall be entered on the Bid Form in writing. All blank spaces shall be filled in properly or indicated as not applicable as necessary. No interlineations or alteration will be made on the proposal form. If erasures are necessary and appear on the forms, each such erasure must be initialed by the person signing the proposal. Proposals shall be placed in an opaque envelope, sealed, addressed and delivered in the manner and at the time stipulated in the Invitation for Bids. Facsimile or telegraphic bids will not be considered. Additionally, modification of bids by facsimile or telegraphic will not be accepted.

8. BID GUARANTEE

The bidder shall include with his proposal a bid bond for the sum of not less than five percent (5%) of the total amount of the bids, as evidence of good faith and as a guarantee that if awarded the Contract, the bidder will execute the Contract and give bond(s) as required by the Specifications. Bid bond does not have to be on an AIA Document.

9. RETURN OF BID BONDS

Bid bonds will be returned to all except the three lowest bidders within ten (10) days after the formal opening of bids. The bid bond of the three lowest bidders will be returned within 48 hours after the Owner and Contractor have executed a Contract and the executed performance bond and payment bond has been approved by the Owner, or, if no award has been made within 120 days after the opening of bids, upon the demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of this bid.

10. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

The successful bidder, upon his failure or refusal to execute and deliver the bonds required within ten (10) days after he has received notice of the acceptance of this bid and or the notice to proceed, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid. **The successful bidder shall mobilize to the site within ten (10) days from receipt of Notice to Proceed. The contract date will be the date of issue for the notice to proceed.**

11. BIDDERS QUALIFICATIONS

Proposals for each contract will be accepted from bidders who are regularly engaged in, and licensed to perform, the work they are bidding, which represents a significant portion of their total volume and who perform this work with individuals regularly employed on their direct payrolls. Before a bid is considered for award, the bidder may be requested by the Construction Manager to submit a statement of facts in detail as to his previous experience in performing similar or comparable work and of his business and technical organization and financial resources and plant available to be used in contemplated work. The bidder may

also be required to submit a statement of facts in detail on his proposed subcontractors as to their previous experience and past performance in performing similar work or comparable work.

12. ACCEPTANCE OR REJECTION OF PROPOSAL

The Owner reserves the right to reject any and all bids when such rejection is in the interest of the Owner to reject the bid of the bidder who has previously failed to perform or to complete on time Contracts of a similar nature; and to reject the bid of a bidder who is not, in the opinion of the Architect/Engineer and/or Construction Manager, in a position to perform the Contract. The Owner reserves the right to reject any subcontractor who has previously failed to perform properly in the opinion of the Architect/Engineer, Construction Manager or the Owner. The Owner also reserves the right to waive any informalities and technicalities in bidding. The Owner may also accept or reject any of the alternates that may be set forth on the Bid Form. The Contract will be awarded (unless all bids are rejected), under normal circumstances, to the lowest responsible bidder. The Owner reserves the right, however, to award the Contract in its best interest and therefore may select a bidder other than the lowest if such is considered to be advantageous to the Owner.

The Owner reserves the right to disqualify bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of the Bidder.

13. WITHDRAWAL OF BIDS

Bids may be withdrawn on written or telegraphed requests received from bidders prior to the time fixed for the opening. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened.

14. CONTRACTOR'S LICENSES

A. The bidder shall obtain a Contractor's License under the provisions of the Contractor's Licensing Law (1976 Code) Volume 14, Chapter 11, Section 40-11-10 through 40-11-340 as amended. Specialty Contractor's Licenses can be obtained for the various building trades and information regarding these licenses can be obtained from the South Carolina Licensing Board for Contractors. It shall be the bidder's responsibility to provide appropriate licensing to perform the work described in the Contract Documents.

B. If a Contractor has any employees earning income in South Carolina who are legal residents of another state, he also becomes a withholding agent and must withhold South Carolina Income Taxes from the earnings of the non-resident employees on the basis of tables furnished by the South Carolina Tax Commission. If a Contractor subcontracts with other non-resident Contractors, he must withhold two percent (2%) of each and every payment made to the subcontractor if the total amount of the subcontract exceeds $10,000 or can be expected to exceed that amount. The subcontractor may obtain in the same relief as a Contractor by posting bond, per stipulations of this Act.

C. Any Owner hiring or contracting or having a Contract with any non-resident Contractor, where such contract exceeds $10,000 or can be expected to exceed that amount, shall be required by law to withhold two percent (2%) of each and every payment made after January 1, 1959, to such non-resident individuals and partnerships, and foreign corporations as well. A person or business entity which hires or contracts with a non-resident to perform temporary work in this state is not required to withhold two percent (2%) of the contract if the non-resident is registered to pay taxes in this state and gives an affidavit stating such person hiring or contracting with the non-resident. For additional information, contact the State of South Carolina Department of Revenue and Taxation.

15. CONTRACTS

A. The Owner will take bids for the work described in these Bid Documents and will enter into a direct construction agreement with the successful bidder. At or before delivery of signed agreement, Bidder shall deliver to Owner the policies of insurance or certificates.

B. The Bidder shall deliver the required bonds to the Owner, prior to signing of the contract. The bonds shall be dated on or before the date of the contract. The contract shall be dated on or before the date of the Notice To Proceed.

C. The contracts described by these Contract Documents are as listed below:

1) Single Prime

16. CLEANLINESS

A particularly high standard of cleanliness will be rigidly enforced. Contractors will be required to perform daily clean-up and failure to do so will result in the work being performed by other forces on the following day and back charged to the offending Contractor. The Construction Manager will issue a written notice of 48 hours before the contractor's forces are supplemented.

17. WORK BY OTHER CONTRACTORS

By submission of this bid, bidder acknowledges that he has read and is totally familiar with the scope of other Contractor's work. All work not performed or supplied under this contract will be identified under other Scopes of Work or Owner Furnished Products of these specifications.

18. EXISTING UTILITIES

The Contractor shall be responsible for the protection of underground and overhead utilities in his work area which are shown on the Drawings and/or which can be detected by a visual inspection of the job site. The Contractor is cautioned, however, that there may exist unknown underground utilities neither visible nor shown on the Drawings. The Contractor will take all reasonable precautions necessary to detect and preserve the service which these utilities provide. Should additional work be caused to the Contractor by the presence of such unknown underground utilities, the cost borne by the Contractor as a result of same shall be reimbursed by the Owner through the use of a negotiated Change Order. Should any utility interruptions occur, the Contractor shall immediately restore these same utilities to prevent further damages or Owner inconveniences.

19. EXCESS EXCAVATED MATERIALS

All excess or unsuitable excavated material generated by the grading process shall be removed from the site as directed by the Construction Manager. The Contractor shall allow for stockpiling of topsoil as indicated in the Contract Documents and shall coordinate said topsoil stockpile location with the Construction Manager.

20. PROHIBITION AGAINST GRATUITIES, ETC.

The Contractor's attention is directed to Section 8-13-420 of the South Carolina Code of Laws, 1976 as amended regarding the prohibition against gratuities and kickbacks, etc.

21. PRE-BID CONSTRUCTION SCHEDULE

Notice to Proceed:	February 23, 2024
Substantial Completion:	July 26, 2024

The Contractor will be required to perform the work within the allocated time as outlined in the Specifications. The Contractor will be required to furnish a more detailed construction schedule after award of Contract.

22. BONDS

A Performance and Payment Bond, will be required in the amount of one hundred percent (100%) of the Contract amount. Cost of bonds shall be included in the bid.

23. ACCESS TO PROJECT

The Contractor will not be permitted to occupy the site of the Work or allowed on the property of the Owner until insurance and bond requirements have been accepted and approved and the written Notice to Proceed has been issued.

END OF SECTION

PART 1 - GENERAL

1.1 Related Documents

1.1.1 Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda and General Conditions.

1.2 Products Lists

1.2.1 Within the bidding period for non-specified manufacturers of items specified by reference standards, electronically submit to Architect/Engineer one (1) copies of complete list of major products, which are proposed for installation.

1.2.2 Tabulate products by specifications' section number and title.

1.2.3 For products only by reference standards, list for each product:

A. Name and address of manufacturer

B. Trade name

C. Model or catalog designation

D. Manufacturer's data:
1) Reference standards
2) Performance test data

1.3 Contractor's Options

1.3.1 For products specified only by reference standard, select product meeting that standard by any manufacturer.

1.3.2 For products specified by naming several products or manufacturers, select any one of the products and manufacturers named which complies with the specifications.

1.3.3 For products specified by naming several products or manufacturers and stating "or equivalent", "or equal," or "or approved equal" submit a request as for substitutions, for any product or manufacturer which is not specifically named.

1.4 Substitutions

1.4.1 Contractor's Base Bid shall be in strict accordance with the drawings and project manual. Contractor has the option of requesting substitutions during the bidding period by submitting completed substitution requests a minimum of **ten (10) days prior to Bid Date**.

A. After end of that period, requests will be considered only in case of product unavailability or other conditions beyond the control of the Contractor.

1.4.2 Submit separate requests for each substitution. Support each request with the following:

A. Complete data substantiating compliance of proposed substitution with requirements stated in contract documents:

1) Product identification, including the manufacturer's name and address.
2) Manufacturer's literature; identify:
   a. Product description
   b. Reference standards
   c. Performance and test data
3) Samples, as applicable.
4) Name and address of similar projects on which product has been used, and date of each installation.

B. Itemized comparison of the proposed substitution with product specified; list significant variations.

C. Data relating to changes in construction schedule.

D. Any effect of substitution on separate contracts.

E. List of changes required in other work or products.

F. Designation of required license fees or royalties.

G. Designation of availability of maintenance services, sources of replacement materials.

1.4.3 Substitutions will not be considered for acceptance when:

A. They are indicated or implied on shop drawings or product data submittals without formal request from Contractor.

B. Acceptance will require substantial revision of contract documents.

C. In the judgment of Architect/Engineer, do not include adequate information necessary for a complete evaluation.

D. If requested after contract award directly by a trade Contractor, sub-contractor or supplier.

1.4.4 Substitute products shall not be ordered or installed without written acceptance of Architect/Engineer.

1.4.5 Architect/Engineer will determine acceptability of proposed substitutions.

1.5 Contractor's Representation

1.5.1 In making formal request for substitution, Contractor represents the following:

A. He has investigated the proposed product and has determined that it is equivalent to or superior in all respects to that specified.

B. He will provide same warranties or bonds for substitution as for product specified.

C. He will coordinate installation of accepted substitution into the work, and make such changes as may be required for the work to be complete in all respects.

D. He waives claims for additional costs caused by substitution, which may subsequently become apparent.

1.6 Architect/Engineer Duties

1.6.1 Review Contractor's request for substitutions with reasonable promptness.

1.6.2 Notification to Contractor shall be in accordance with contract documents.

1.7 Substitution Request Form

1.7.1 See Section 00 43 25 for Substitution Request Form.

END OF SECTION

II. Bid Form

SOLICITATION RFB# _____
SPRINGFIELD MIDDLE SCHOOL – HVAC Upgrades – Phase II

BIDDER NAME: _____

BIDDER PHONE: _____

BIDDER EMAIL: _____

FORT MILL SCHOOL DISTRICT
2233 DEERFIELD DR.
FORT MILL, SC 29715

SINGLE PRIME CONTRACT

All Parties:
Having carefully examined the Drawings and Specifications for the above noted project(s), as well as the premises and conditions affecting the work, the undersigned proposes to furnish all materials, labor, equipment, and services called for by them for a lump sum consideration of:

BASE BID: $_____(NUMERICAL AMOUNT HERE)

_____(WRITTEN DOLLARS HERE)

The above stated bid is based on the above-mentioned Drawings, Specifications, Pre-Bid Schedule and any Addenda issued subsequent to the basic Drawings and Specifications. (List all Addenda with dates of any issued. If no additional Addenda are issued, write the word "NONE".)

Addendum Number	Date
_____	_____
_____	_____
_____	_____

If any of the following Alternates are accepted, the above stated sum (base bid amount) will be altered by the amount(s) indicated below.

a. If no Alternates are indicated, enter the term "NOT APPLICABLE" after the dollar ($) sign.

b. If Alternates are indicated, strike through completely either "add" or "deduct" in order to leave exposed the proper change to the base bid amount and indicate the amount of the change in numbers after the dollar ($) sign.

c. If Alternates are indicated, but there is no change to the base bid amount, enter the term "NO CHARGE" after the dollar ($) sign.

Alternate No. 1: Owner Preferred Equipment

Base Bid: Provide HVAC equipment per Specification Section 23 9005 – HEAT TRANSFER (ELECTRIC COOLING).

Alternate: Provide HVAC equipment as manufactured by Trane.

ADD and/or DEDUCT $_____

Alternate No. 2: Owner Preferred Controls

Base Bid: Provide controls per Specification Section 23 0904.05.

Alternate: Provide controls as manufactured and installed by United Automation Corp.

ADD and/or DEDUCT $_____

Alternate No. 3: Refrigerant Line Replacement

Base Bid: Shall include the reuse of the existing refrigerant lines. Scope shall include the evacuation and recovery of existing refrigerant within Owner provided canisters, pressure testing of existing refrigerant lines to confirm material integrity, cleaning of existing refrigerant lines, and necessary connection to new equipment.

Alternate: Provide all necessary material and labor to evacuate / reclaim refrigerant and demo / replace existing refrigerant lines and insulation to all HVAC equipment. Existing refrigerant shall be recovered within canisters provided by the Owner and copper refrigerant line material removed and turned over to the Owner following demolition.

ADD and/or DEDUCT $_____

UNIT PRICES

Enter the requested unit prices below. The amount listed will be used for contract deductions in cases of credits and contract increases in cases of work scope additions. The amount listed should be fully inclusive of labor, material, equipment, taxes, insurance, overhead, profit, etc.

1. Replacement of HVAC Unit Refrigerant Lines (Cost per HVAC Unit)

   Unit cost shall include all necessary material and labor to evacuate / remove / replace existing refrigerant lines and insulation to HVAC equipment. Existing refrigerant shall be recovered and removed copper refrigerant line materials turned over to the Owner following demolition.

ADD and/or DEDUCT $_____

If notified of the acceptance of this bid or any Alternate within one hundred twenty (120) days after the date fixed for the opening of the bid, the undersigned agrees to execute and deliver the specified Contract and Contractor's Bond within ten (10) days. The undersigned agrees, if awarded the Contract within one hundred twenty (120) days from the fixed date for opening of the bids, to faithfully and properly complete the whole work within the specified time, consistent with the best interest of the Owner, the safety of the public and in accordance with first-class workmanship.

The undersigned agrees that the Owner may retain the sum of money specified as "Liquidated Damaged" as indicated within the Contract Documents, from the amount of compensation to be paid the undersigned for each calendar day that work remains uncompleted and unaccepted after the maximum duration of time for the work to be completed. This amount is agreed upon as the proper measure of liquidated damages, which the Owner sustains per day by failure of the undersigned to complete the work in the stipulated time and is not to be construed in any sense as a penalty.

Attached hereto is a Bid Bond, which shall not be less than five percent (5%) of the principal's bid, made payable to the Owner.

The undersigned agrees, if awarded the Contract, to comply with all provisions regarding commencement, prosecution, completion and acceptance of the work as described in the above-mentioned Specifications, "Bid Form", Construction Contract and Performance Bond. If the undersigned fails to perform according to these documents, the Bid Bond shall be paid as liquidated damages for such failure; otherwise, the Bid Bond accompanying this proposal shall be returned to the undersigned.

A Performance and Payment Bond, executed on AIA Document A312, will be required in the amount of one hundred percent (100%) of the Contract amount. Cost of bonds shall be included in the bid.

It is agreed that the undersigned has completed and/or will comply with all requirements concerning licensing and with all other local, state, and national laws and that no legal requirement has been or will be violated in making or accepting this proposal, in awarding the Contract to him and/or in the performance of the Work required there under.

By submission of this bid, the undersigned declares that the person or persons signing this proposal is/are authorized to sign the proposal on behalf of the firm listed and to fully bind the firm listed to all the conditions and provisions thereof. Furthermore, each person signing on behalf of any bidder certifies, under penalty of perjury that, to the best of its knowledge and belief, each bidder is not on the list created pursuant to Section 11-57-310 of the South Carolina Code of Laws.

Respectfully submitted this _____ day of _____, 2024.

_____

(Name of Firm)

_____

(S.C. Contractor's License)

_____

(Address)

By _____

(Title)

Minority Owned/Operated Contractor/Business? Yes ___ No ____ Certificate Number _____

***** Be sure to include this page in your proposal *****

DRAFT

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

BOND AMOUNT: $ « »

PROJECT:
(Name, location or address, and Project number, if any)

« »
« »
« »

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, 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.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

Signed and sealed this « » day of « » , « »

	« »
	(Contractor as Principal) *(Seal)*
	« »
(Witness)	*(Title)*
	« »
	(Surety) *(Seal)*
	« »
(Witness)	*(Title)*

Project: **SFMS – HVAC Upgrades – Phase II**

To: LMG
Email: jay@leitnergrp.com

Copy: Buford Goff & Associates
Email: jonathan.burkett@bgainc.com

Requested By:_____

Contract For:_____

Date:_____

Specification Section:_____

Paragraph:_____

Related Drawings:_____

Bidder's Inquiry:

Signed:

Architect's Response:

☐ Response will be issued by formal Addendum.

Signed: Date:

SUBSTITUTION REQUEST FORM

TO: LMG

PROJECT: SFMS – HVAC Upgrades – Phase II

We hereby submit for your consideration the following product instead of the specified item for the above project:

Drawing	Spec. Sect. No.	Paragraph	Specified Item
_____	_____	_____	_____

Proposed Substitution:

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

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

Fill in blanks below:

A. Does the substitution affect dimensions shown on the Drawings?

Yes____ No ____

If yes, clearly indicate the changes:

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes ___ No ___

C. What effect does substitution have on other Contracts or other Trades?

D. What effect does substitution have on construction schedule?

E. Manufacturer's warranties of the proposed and specified items are:

Same _____ Different _____(Explain on attachment.)

F. Reason for request:

G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations:

H. Accurate cost date comparing proposed substitution with product specified:

I. Designation of maintenance services and sources:
(Attach additional sheets if required)

CERTIFICATE OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

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

Submitted By:

_____
Signature Title

_____
Firm

_____
Address

_____
Telephone Date

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

For Use By Architect:

____Accepted ____Accepted as Noted

____Not Accepted ____Received Too Late

By:_____

Date:_____

Remarks:_____

_____

_____

_____

_____

_____

_____

PART 1 - GENERAL

1.1 Form of Agreement

A. The Owner will take bids for the work described in these Bid Documents and will enter into a direct construction agreement with the lowest responsive and responsible bidder. The form of agreement between the Owner and Contractor is included in these contract documents. This contract will be required to be executed prior to the commencement of work.

B. The successful bidder will be required to furnish a Performance & Indemnity Bond and a Payment Bond (enclosed herein) in the amount of one hundred percent (100%) of the Contract Amount.

C. The Contractor will not be permitted to occupy the site of the Work or allowed on the property of the Owner until insurance and bond requirements have been accepted and approved and the written Notice to Proceed has been issued.

1.2 General Conditions

A. The General Conditions that will be utilized are included as part of these contract documents.

~~1.3 Contractor Certification Form~~

~~A. SC DHEC Contractor Certification Form is hereby made part of the Contract Documents. This form is required to be signed by any Contractor(s) likely to be performing land disturbing activity prior to site access~~.

END OF SECTION

DRAFT AIA® Document A132® – 2019

Standard Form of Agreement Between Owner and Contractor,
Construction Manager as Adviser Edition

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month, and year.)

BETWEEN the Owner:
(Name, legal status, address, and other information)

« Fort Mill School District »« »
« 2233 Deerfield Drive »
« Fort Mill, SC 29715 »

and the Contractor:
(Name, legal status, address, and other information)

« »« »
« »
« »
« »

for the following Project:
(Name, location, and detailed description)

« SFMS: HVAC Upgrades – Phase II »
« 1711 Springfield Pkwy. »
« Fort Mill, SC 29715 »

The Construction Manager:
(Name, legal status, address, and other information)

« LMG »« »
« 1800 Saluda Rd. »
« Rock Hill, SC 29730 »
« »

The Architect:
(Name, legal status, address, and other information)

« Buford Goff & Associates, Inc. »« »
« 1331 Elmwood Ave. »
« Columbia, SC 29201 »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[« »] The date of this Agreement.

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

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

« Upon receipt of the Notice to Proceed. Onsite Construction shall not commence until May 31, 2024 unless otherwise approved by the Owner. »

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

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

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:

(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

« July 26, 2024 »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of all of the Contractors for the Project are to be completed prior to Substantial Completion of the entire Work of all of the Contractors for the Project, the Contractors shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
N/A	

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:
(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[« X »] Stipulated Sum, in accordance with Section 4.2 below

[« »] Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below

[« »] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
Alternate #1 – Owner Preferred Equip.	
Alternate #2 – Owner Preferred Controls	
Alternate #3 – Refrigerant Line Replace	

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.2.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price
General Contingency Allowance	$50,000
Acoustical Ceiling System Allowance	$30,000

§ 4.2.4 Unit prices, if any:
(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)
Replacement of Refrigerant Lines	Per HVAC Unit	

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)

« $500.00 per day »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the « 25th » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « 25th » day of the « following » month.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« 10% »

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

« Final payment to the Contractor shall be made upon completion of all scopes of work, punchlist phase, and following turnover of all required Closeout Documentation. »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« Mr. Joe Romenick »
« Assistant Superintendent, Operations »
« Fort Mill School District »

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[« »] Arbitration pursuant to Article 15 of AIA Document A232–2019.

[« »] Litigation in a court of competent jurisdiction.

[« X »] Other: *(Specify)*

« Mutual Agreement »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

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

§ 7.1.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

« Payment of all materials purchased or used in scope of work and all labor performed within scope of work. All materials purchased but not installed shall be turned over to the Owner prior to payment. »

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

« Mr. Joe Romenick »
«Assistant Superintendent, Operations »
« Fort Mill School District »
« romenickj@fortmillschools.org »
« (803) 984-8980 »

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

« N/A »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit

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

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

« N/A »

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work

[« »] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:
(Insert the date of the E235-2019 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

« »

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
« »« »	« »« »
(Printed name and title)	*(Printed name and title)*

DRAFT

AIA® Document A232® – 2019

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

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

« SFMS: HVAC Upgrades – Phase II »
« 1711 Springfield Pkwy.»
« Fort Mill, SC 29715 »

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

« LMG »« »
« 1800 Saluda Rd. »
«Rock Hill, SC 29730 »

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

« Fort Mill School District »« »
« 2233 Deerfield Drive »
« Fort Mill, SC 29715 »

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

« Buford Goff & Associates, Inc. »« »
« 1331 Elmwood Ave. »
« Columbia, SC 29201 »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties. In the event of a conflict or inconsistencies between parts of the Contract Documents other than a conflict or inconsistency relating to the quantity or quality of the Work, the following order of precedence shall control: (1) the Agreement, with any Modifications; (2) these General Conditions; (3) the exhibits and attachments to the Agreement; (4) the Specifications; (5) the Drawings; and (6) any other Contract Documents in the order that is most reasonable under the circumstances. Where there is a conflict or inconsistency between figures given on drawings and scaled measurements, the figures shall govern; no measurements should be taken by scale as working dimensions except on large-scale drawing not dimensioned in detail. Where there is a conflict between large-scale drawings and small-scale drawings, the larger scale shall govern.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

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

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's

consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. If there is an inconsistency in the Contract Documents, the Contractor shall provide the better quality or greater quantity of work or comply with the more stringent requirements.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

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

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

§ 1.2.4 Contractor shall evaluate the conditions under which the Work is to be performed, including without limitation, (1) the location, condition, layout, and nature of the Project site and surrounding areas, (2) generally prevailing weather conditions, and (3) availability and cost of labor, materials, and equipment. The Owner assumes no responsibility or liability for the physical condition or safety of the project site, or any improvements located thereon. The Owner and Contractor agree that there shall not be any adjustment in either the Contract Sum or the Contract Time due in whole or in part to the Contractor's failure to comply with requirements of this paragraph.
By executing the Contract, the Contractor represents that he has reviewed all Contract Documents, including architectural, structural, mechanical, plumbing, and electrical divisions of the Plans and Specifications, the cost of all materials and equipment shown in the Contract Documents have been included in the Contract Sum, and that all costs for materials and labor associated with the installation of such equipment have been included in the Contract Sum.

§ 1.2.5 Contractor shall make a thorough examination of the site and study all Drawings and Specifications and all conditions relating to the erection of the Work. If any materials or labor evidently necessary for the proper and complete execution of the Work, which are not specifically mentioned although reasonably inferred therefrom, shall be included in the Work. Anything called for in the Specifications and not shown on the Drawings or shown on the Drawings and called for in the Specifications shall be included in the Contractor's Work, the same as if included in both. In the event of doubt arising as to the true intent and meaning of the Drawings or Specifications, the Contractor shall report it at once to the Architect in writing. The Architect shall furnish with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the Work. All such drawings and instructions shall be consistent with the Contract Documents, true developments thereof and reasonably inferable therefrom. The Work shall be executed in conformity therewith and the Contractor shall do no Work without proper drawings and instructions. If the Contractor proceeds contrary to the above instructions, all such labor and material costs shall be provided at the Contractor's sole expense.

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in writing, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner has designated Leitner Management Group to represent the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

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

evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

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

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

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.6 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.3.9 The Contractor is responsible for obtaining and providing all Drawings and Specifications for the Project for its own use and all Subcontractors' use. Drawings and Specifications are provided in digital format only by the Owner. No hard copies of the Drawings and Specifications will be provided. Any paper copies required by the Contractor shall be furnished at the Contractor's expense.

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

§ 2.6 EXTENT OF OWNER'S RIGHTS

§ 2.6.1 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (1) granted in the Contract Documents, (2) at law, or (3) in equity.

§ 2.6.2 In no event shall the Owner or Architect/Engineer have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal

observations with requirements of the Contract Documents. Contractor shall evaluate the conditions under which the Work is to be performed, including without limitation, (1) the location, condition, layout, and nature of the project site and surrounding areas, (2) generally prevailing weather conditions, and (3) availability and cost of labor, materials, and equipment. The Owner assumes no responsibility or liability for the physical condition or safety of the project site of any improvements located thereon. By executing the Contract, the Contractor represents that he has reviewed all Contract Documents, including architectural, structural, mechanical, plumbing, and electrical divisions of the Plans and Specifications, the cost of all materials and equipment shown in the Contract Documents have been included in the Contract Sum, and that all costs for the materials and labor associated with the installation of such equipment have been included in the Contract Sum.

The Contractor and each Subcontractor shall be responsible for verification of all measurements in accordance with the Contract Documents at the Project site before ordering any materials or performing any Work. No extra charge or compensation shall be allowed due to difference between actual dimensions and dimensions indicated in the Contract Documents. Any such discrepancy in dimension which may be found shall be submitted to the Architect for his consideration before the Contractor proceeds with the Work in the affected areas.

Contractor agrees that notwithstanding any other provision of the Contract, it shall not be entitled to any increase in the Contract Sum or the Contract Time with respect to any condition which was or could have been discovered by the Contractor as result of the investigation, evaluation, and information described in this Section 3.2.1.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. Should any error or inconsistency appear in the Contract Documents, the Contractor, before proceeding with the Work, must identify the same in writing to the Architect for proper adjustment and in no case proceed with the Work until sufficient direction is given by the Architect; should Contractor proceed without sufficient direction from the Architect, Contractor shall be fully responsible for any and all damages and consequences resulting from such error or inconsistency.

§ 3.2.3 All of the Work shall be executed in strict compliance with all applicable laws, statutes, ordinances, cods, rules, regulations, and lawful orders of public authorities, including without limitation, the latest edition of the Southern Carolina School Facilities Planning and Construction Guide, and shall be in compliance with all national codes, rules, regulations, and standards applicable to the Project.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents.

§ 3.2.5 Drawings and Specifications show specified structural, architectural, mechanical, and electrical entities, diagrams and devices for each item. The mention of an acceptable or approved product does not necessarily imply that their particular "standard" product is totally adaptable to the details shown. Therefore, the cost of deviations, extensions, or adjustments required for the low Bidder's product must be included in the Contractor's bid. No additional cost will be considered.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Work shall be of the highest quality, in every respect, as usually recognized in the building industry. Poor or inferior workmanship (as determined by the Architect, Owner, or inspecting authorities) is to be removed and replaced to conform to the highest quality standards of the trades concerned, or otherwise corrected.

§ 3.3.5 Contractor shall layout the Work and be responsible for all lines, levels, and measurements of all Work executed under this Contract.

§ 3.3.6 Contractor, Subcontractors, and other on-site trades shall cooperate and coordinate their Work to expedite the progress of the Project. All Subcontractors shall review and refer to the Drawings and Specifications of other trades involved with their particular Work before proceeding. Any Work involved which conflicts with another trade and had not been brought to the attention of the Architect prior to installation shall be removed at no additional cost to the Owner.

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Architect and Owner reserve the right to require the Contractor to remove from the Project any personnel whose actions are detrimental and disruptive to the Project.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The

Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. All warranties from subcontractors, suppliers, and manufacturers shall be assigned to the Owner or have the Owner named as an additional oblige on the warranty.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

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

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

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

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

§ 3.8.4 The amount due to the Contractor for any allowance item shall be based upon certified copies of invoices from suppliers and subcontractors. Marked-up for overhead and profit and premiums for insurance and bonds are not allowed to be added to items that will be deducted from allowance.

§ 3.9 Superintendent

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

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent or other project team supervisory members without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.9.4 The Contractor's superintendent shall maintain a written daily log of the progresses of the work. This log shall be kept at the job site, made available for inspection upon request by the Architect or Owner, and emailed daily or copies mailed to the Architect and Owner upon accumulating three (3) days of reports. The reports shall contain as a minimum: date, day, low & high temperatures, record of precipitation, quantity of Contractor and Subcontractor personnel on site, general description of Work activities performed, list of items needed from Contractor and from the Architect (that are currently schedule sensitive), any other comments that pertain to job progress and quality, and a record of verbal instruction/interpretations given to the Contractor.

§ 3.9.5 The Contractor's superintendent shall be capable of an shall have full authority to act on behalf of the Contractor for the following: (1) supervision of tradesmen and Subcontractors, (2) reading and interpreting the Contract Documents, (3) orderly coordination of the Work with the Architect in the daily execution of the Work, (4) laying out the Work, (5) representing the Contractor with the Owner and Architect in the daily execution of the Work, and (6) controlling and establishing good quality in the completed Work. The Contractor's superintendent shall be the supervisor of the Contractor's labor force. Contractor's superintendent shall attend the regularly scheduled progress meetings onsite and keep informed of all schedule requirements, safety hazards, and general job conditions. Contractor's superintendent shall plan and pursue the Work under its supervision in a professional and expeditious manner. The Contractor shall not replace or remove the superintendent without the prior written approval of the Owner.

§ 3.9.6 In the event that the Contractor's superintendent or the superintendents of the Contractor's major Subcontractors fail to perform their functions in keeping with the standards commonly observed in the construction industry or fail to cooperate and coordinate the Contractor's Work in conformance with the Contract Documents, then the Owner shall have the right to require the superintendent's removal from the Project. The Contractor agrees that, upon receipt of written notice, the Contractor shall remove the superintendent or require such major Subcontractor to remove the superintendent from the Project within one (1) week and provide a suitable replacement in accordance with the procedure defined in Paragraph 3.9.2.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 3.10.1.1 This schedule shall indicate the dates for the starting and completion of various stages of construction and shall be revised monthly as required by the conditions of the work. This schedule shall be broken down into work items as required for proper review.

§ 3.10.1.2 The Contractor shall prepare a time scaled Critical Path Method ("CPM") schedule and shall update this schedule monthly. Copies of the original schedule and all updates shall be provided to the Architect and Owner. A copy shall be maintained at the job site office. Additionally, a two-week look ahead or similar schedule shall be used, maintained, and distributed at each weekly OAC meeting.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 3.10.5 The Contractor agrees to maintain the schedule by having in its employment someone thoroughly trained and experienced in compiling and construction schedule, and in issuing periodic updates and reports as required. If the Contractor does not have a qualified person employed, the Contractor is required to provide an outside vendor capable of performing this function. The approved schedule shall be updated monthly and submitted along with the monthly payment application. It shall indicate actual start dates for activities and actual completion dates. It should also provide a progress by percent complete for stated activities not completed at the time of update. If the schedule indicates progress is not planned, then the Contractor shall provide a written narrative summary of revisions causing delay in the plan, and an explanation of corrective actions required to bring the Work back to the original planned schedule. Failure to provide such management effort could cause a delay in payment until such information is available.

§ 3.10.6 If the Contractor fails, in the opinion of the Architect or the Owner, to maintain progress of the Work as provided in the schedule, the Contractor agrees that, at the request of the Architect or the Owner, the Contractor will increase crew size, work overtime, add shift work, and/or work weekends at no extra cost to the Owner in order to achieve and maintain progress of the Work in keeping with the Construction Schedule.

§ 3.10.7 Each Contractor shall award all subcontracts, purchase materials, arrange for deliveries, furnish sufficient forces and equipment, and work such hours as necessary to ensure execution of the Work in conformity with the schedule.

§ 3.10.8 If the Contractor falls behind the Schedule and is not entitled to a time extension, upon request of the Architect or the Owner, the Contractor shall submit within forty-eight (48) hours a plan for bringing the progress of the Work into conformity with the schedule. This plan shall include a commitment for immediate implementation, unless otherwise approved by the Architect or the Owner, and must include a time commitment acceptable to the Architect and the Owner for bringing the progress of the Work into conformity with the schedule. If the Contractor fails to provide an acceptable plan within the time required, then the Architect or the Owner may prepare and furnish such a plan, and the Contractor agrees to implement the measures set forth in such plan prepared and furnished by the Architect and/or the Owner.

§ 3.10.9 If other measures will not be sufficient to bring the progress of the Work into conformity with the schedule, then the Contractor's plans and implementation thereof shall include increasing the number of shifts, increasing the number of days of work and/or instituting or increasing overtime, all at the Contractor's expense.

§ 3.10.10 If a Contractor fails or refuses to implement such measures to bring the progress of the Work into conformity with the schedule, the Agreement may be terminated by the Owner for cause.

§ 3.10.11 The Contractor agrees that if the Owner determines, in its sole discretion, that the contractor failed or refused to implement such measures as will bring the progress of the Work into conformity with the schedule, then the Owner may contract with others or use the Owner's own forces to perform the Work to bring the progress into conformity with the Construction Schedule. The Contractor agrees that the Owner will be entitled to a set off for the cost thereof including, but not limited to, actual costs, legal fees, and additional overhead costs, which will be charged against the Contract Sum due the Contractor.

§ 3.10.12 If the Work is delayed due to any cause entitling the Contractor to an extension of time under the provisions of the Contract, the Owner shall have the right in lieu of extending the Contract Time, to direct the Contractor to increase the number of shifts and/or days of work, to institute or increase overtime operations, or to take other measures to make up the lost time because of such delay. The Owner shall pay the Contractor only premium time differential over standard wage rates resulting from compliance with the directive to accelerate.

§ 3.10.13 The Contractor agrees that except for delays caused by acts of intentional interference as provided in paragraph 8.3.3 herein, the Owner or Architect shall not, in any event, be liable to the Contractor for the costs or expenses of delays of any kind whatsoever, and the Contractor shall be fully responsible for making up lost time for all delays except to the extent that the Contractor is entitled to an extension of the Contract Time. Nothing in this clause shall be construed to release the Contractor from the obligation to perform at his own expense all overtime necessary to main progress of the work in conformity with the schedule where delays have occurred for which no extension of the Contract Time is allowed.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data, and Samples

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

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

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner, the Architect, and the Construction Manager shall be entitled to rely upon the adequacy and accuracy and completeness of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other

appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect or Owner.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The Contractor shall use its best efforts to conduct all activities so as not to cause damage, disturbance, or disruption to surrounding property or to those that own, have an interest in, visit, or utilize such surrounding property.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.14.3 The 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 materials suppliers.

§ 3.14.4 Utility services to existing facilities shall not be interrupted unless absolutely necessary. Interruptions shall be of minimum duration and shall be scheduled to cause the least possible inconvenience. In all cases, the Owner shall be notified well in advance of anticipated interruption of utilities.

§ 3.14.5 The Contractor is responsible for the protection of his Work until final acceptance.

§ 3.14.6 All penetrations made by the Contractor through walls, ceilings, and/or floors shall be sealed by each Contractor to meet the requires of all building codes, fire codes, and all other laws, rules, regulations, codes, ordinances, and orders applicable to this Project.

§ 3.14.7 All sleeves or embeds set in concrete, masonry, or other work will be furnished and installed by the Contactor in a timely manner so as not to delay the concrete, masonry, or other Work. Should the Contractor requiring the sleeves fail to provide them in a timely manner he will be required to bear the cost of cutting and patching to install the sleeves.

§ 3.14.8 Any part of finish damaged during installation or prior to final acceptance of the Work shall be repaired so as to be unnoticeable and to be equal in quality, appearance, serviceability, and other respects to an undamaged item. Where this cannot be fully accomplished, the damaged item or part will be replaced. After installation, all exposed surfaces and parts of an item shall be cleaned in a manner that will not damage the finish or any of the pars of the item and the finish job left in first-class condition, free of all visit defects.

§ 3.14.9 The Contractor shall take precautions so as not to damage existing construction and if damage occurs, Contractor will be responsible for restoring the existing construction to a condition equal to that found prior to the damage.

§ 3.15 Cleaning Up

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager, and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction Manager. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or - relating to (1) Contractor's performance or non-performance of the Work, (2) Contractor's failure to comply with any provision of the Contract Documents, or (3) Contractor's failure to comply with any applicable laws, rules, ordinances, or orders of jurisdictions having authority over the Project, but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Construction Manager, Architect, and Contractor. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications. The Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions so rendered in good faith.

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

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.1.4 If the Contractor notifies the Owner in wiring that a Separate Contractor on this Project is failing to cooperate or coordinate its work with the Work under the Contract, the Architect will promptly investigate the matter and if the Architect finds the allegation to be true, it shall advise the Owner who shall have the right to take such measures as the Owner may deem appropriate.

§ 6.1.5 The Contractor agrees that the Owner or Architect shall not, however, be liable for any costs incurred by the Contractor by season of any Separate Contractor's failure to coordinate or cooperate, of any Separate Contractor's failure to perform its obligations in connection with the Project, or any Separate Contractor's failure to comply with directives of the Owner or Architect. The Contractor acknowledges and understands that the Owner does not guarantee that other Separate Contractors will perform their obligations to coordinate their work on the Project with that of the Contractor.

§ 6.1.6 The Contractor shall take all measures necessary for the protection of Work placed or installed by any other contractor either previously or during the performance of this Contract. In the event the Contractor, its employees, any of its Subcontractors or anyone for which Contractor may be held liable causes damage to Work placed or installed by a Separate Contractor, then the Owner shall have the right to reduce the Contract Sum by an amount equal to the cost of repairing such damage, In the event the Architect or Owner determined that another contractor, its employees or any of its subcontractors caused damage to Work installed or placed by the Contractor, then the contractor causing the damage shall be responsible for the cost of any repairs.

§ 6.1.7 The Contractor shall be responsible for providing protection for the Work until final acceptance. If damage to the Contractor's Work by other contractors to their subcontractors cannot be established, then the Contractor is responsible for repairing the Work. Any dispute between the Contractor and another contractor as to which of them, their employees, or their subcontractors, caused the damage in question shall be resolved by the Architect.

§ 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

An executed Change Order shall constitute the full and final determination of any and all revisions to the Contract Sum, the Contract Time, and any and all other adjustments to the Contractor's compensation or time for performance under the Contract Documents with respect to the Work identified in such Change Order.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;

.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

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

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 The amount of overhead and profit combined for items not deducted from an allowance, included in the total cost to the Owner, shall not exceed the following schedule:

1) For a Contractor, for any Work performed by its own forces, ten percent (10%) of the costs of the changed Work.
2) For a Contractor, for Work performed by its Subcontractor, seven percent (7%) of the amount due the Subcontractor.
3) For each Subcontractor included, for any Work performed by the Subcontractor's own forces, ten percent (10%) of the costs of the changed Work.
4) Cost to which overhead and profit is to be applied shall be determined in accordance with subparagraph 7.3.4.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

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

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

§ 8.2 Progress and Completion

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

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

§ 8.3.3 The Contract Time may be extended by Change Order to compensate for additional Work that may be ordered by Owner, provided such Work is such nature as to materially affect date of completion.

§ 8.3.4 If delay damages are allowed for any reason the damages shall be limited to a pro-rata portion of the Contractor's average monthly field overhead costs. Under no circumstances shall the Contractor be entitled to delay damages for weather delays or any force majeure or other events described in Section 8.3.1.

§ 8.3.5 It is agreed that time is of the essence for each and every portion of this Contract, and where under the Contract additional time is allowed for the completion of any Work, the new time limit fixed by such extension shall be of the essence of this Contract.

§ 8.4 Liquidated Damages

§ 8.4.1 It is mutually understood and agreed by and between parties of this contract, in execution of same, that time is of essence of the contract and that the Owner will suffer significant damage, hardship, and loss if the Work is not substantially completed within the Contract Time. Both parties also recognize the delays, difficulties, and expense involved in proving, in a legal proceeding, the actual losses suffered by the Owner if the Work is not completed on time. It shall be each Contractor's responsibility to keep himself advised of the job progress and the effects upon his work. Accordingly, the Contractor agrees, in the event that Contractor fails to substantially complete work to be performed under this contract by the Substantial Completion date, including any extension of time granted under Section 15.1.6, that as liquidated damages for delay (but not as a penalty), the Contractor shall pay to the Owner $500.00 per calendar day per scheduled activity that is incomplete for the first ten (10) days and $1,500.00 per day per scheduled activity that remains incomplete thereafter, because of delay in completing the Work and for liquidated

damages, such as Owner's increased overhead and cost of additional architectural and sub-consultant supervision and not as penalty.

§ 8.4.2 The Owner shall have the right to deduct liquidated damages from money in its hands otherwise due, or to become due, to Contactor or to sue for and recover compensation for damages for nonperformance of this Contract at time stipulated herein.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, and if the schedule of values is not already expressly identified as an exhibit to the Contract, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers of all tiers, and shall reflect retainage if provided for in the Contract Documents. Each subsequent Application for Payment shall include an affidavit from the Contractor stating that all previous progress payments received on account of the Work have been applied to discharge, in full, all of the Contractor's obligations reflected in prior Applications for Payment.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 When the Work is fifty percent (50%) complete and provided that the Contractor is on or ahead of the schedule as determined by the Owner and Architect, and the Work is satisfactory and in the absence of other good and sufficient reasons, the Contractor may request in writing, that the retention by reduced or eliminated. Together with the written request of retainage reduction, the Contractor shall include written Consent of Surety to such retainage reduction. The Owner has sole discretion in deciding whether, to what extent, and for which payments to honor the Contractor's request for any reduction for retainage pursuant to this section, and in any event, the full amount of retainage may be reinstated if the manner and progress of the Work does not remain satisfactory to the Owner and Architect.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work

has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including without limitation, loss resulting from the acts and omissions described in Section 3.3.2 or because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor or other Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 If certification for payment is withheld under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.5.5 Notwithstanding any other provision of the Contract Documents, the Owner may at any time before or after final completion of the Project withhold and offset against sums otherwise due and owing to Contractor an amount equal to any sum that the Contractor owes the Owner (including, without limitation, insurance proceeds, liquidated or other damages resulting from Contractor's acts or omissions, and any reimbursements owed by the Contractor to the Owner).

§ 9.6 Progress Payments

§ 9.6.1 If no payment or certification has been withheld under Section 9.5.1, then after the Architect has issued a valid Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 Upon request from the Owner, the Contractor shall provide written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has materially fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner as well as its partners, shareholders, members, managers, and financing sources from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. Should any lien or other claim impairing title to the property or to funds be asserted, Contractor shall be obligated immediately to discharge by bond or otherwise, at its sole expense and without right of reimbursement, such lien or claim such that it is no longer of public record or in the chain of title to the Project.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its

intended use. In no event shall the Work or any portion thereof be considered substantially complete until any necessary governmental approvals of the Work have been obtained.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect

when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor of any tier refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

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

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
- **.4** construction or operations by the Owner, Separate Contractors, or other Contractors.

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

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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

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

§ 10.3.7 In addition to all other obligations under this Section 10.3, Contractor agrees to fully comply with any and all federal, regulatory agency, state or local laws, rules, ordinances, orders and regulations concerning the transport, storage, and handling of any hazardous substance or materials required under the Contract Documents and to notify the Architect and Owner three (3) days prior to delivery of any hazardous or harmful substance or materials to the Project. The Contractor also agrees to provide the Architect and Owner, MSDS Sheets for the purposes of information, written storage, handling and health instructions and precautions from the manufacturer at the time of the notification of delivery. The Contractor will use only competent, knowledgeable workmen trained in the proper handling and storage of these materials and agrees to provide at this expense all safety devices and barriers for his workmen and others as recommended by the manufacturer or that may be deemed necessary by an appropriate governing agency and/or the Architect. The Contractor will not under any circumstance dispose of any hazardous substances or containers on the Owner's property or facilities. Methods of disposal of hazardous materials or containers must be in a manner as prescribed by law. The Contractor assumes total liability and responsibility for the handling, storage, and disposal of these hazardous materials and indemnifies the Owner and Architect of and from all liability claims and demands for bodily injury and property damage arising out of the use of the hazardous materials by this Contractor and its agents.

§ 10.3.8 Asbestos containing materials or products of any and all types are not to be installed or used on this Project. Contractor shall certify in writing at the completion of the Project that is has not installed or used asbestos containing materials on this Project.

§ 10.3.9 The Contractor shall not allow the use of lead materials in public water applications. Lead free solder, flux, and pipe must be used in public drinking water and wastewater applications. Lead free solder and flux are defined as containing less than 0.2% lead, while valves, pipes, and appurtenances must contain less than 8.0% lead.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property

insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

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

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

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the

proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.

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

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

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

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

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be

sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

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

§ 13.5 Interest

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

§ 13.6 Employment Policies

§ 13.6.1 The Contractor shall maintain policies of employment to provide equal opportunity for employment by all qualified people. The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color sex, national origin, or age. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin, or age. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment advertising; layoff or termination; rates of pay or others forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting for the policies of non-discrimination. The Contractor and all Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color sex, national origin, or age.

§ 13.6.2 Contractor hereby certifies that it ensures compliance with the South Carolina Illegal Immigration Reform Act and will register and participate in a status verification system for all employees. The term "employee" as used herein means any person who is hired to perform work within the State of South Carolina. As used herein, "status verification system" means (a) the E-Verify employment status verification system, or any successor electronic verification system replacing the E-Verify Program, that is operated by the United States Department of Homeland Security, United States Citizenship and Immigration Services, and the Social Security Administration, or (b) verification that every employee of the Contractor possesses a valid Southern Carolina driver's license, or identification card, from another state whose qualification requires are as strict as those of South Carolina. Contractor also hereby certifies that any Subcontractor or Sub-subcontractor with the requisite number of employees and performing services for a covered contractor likewise complies with the above requirements.

§ 13.6.3 Non-resident Contractors' attention is directed to Title 12, Chapter 9, Code of Laws of South Carolina 1976, as amended concerning withholding tax on non-resident employees, contractors, and subcontractors.

§ 13.6.4 Contractors' attention is directed to Title 29, Chapter 7, Code of Laws of South Carolina 1976, as amended concerning laborers' liens.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;

.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees, or any other persons performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

.2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include not profit. No adjustment shall be made to the extent:

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, or any dispute, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given, provided that that Contractor shall, within seven (7) days of the occurrence of the event for which Contractor requests additional time, notify the Architect and Owner in wiring of any such Claim. Notice of the extent of the Claim with supporting data shall be delivered within thirty (30) days of such occurrence. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

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

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- **.1** damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- **.2** damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished,

or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

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

§ 15.4 Arbitration

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

filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

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

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

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

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

DRAFT

AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ « »
Description:
(Name and location)

« »
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: [« »] None [« »] See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:	_____	Signature:	_____
Name and Title:	« »« »	Name and Title:	« »« »

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

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

« »
« »
« »

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

§ 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.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »
Address:	« »	Address:	« »

DRAFT

AIA® Document A312® – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ « »
Description:
(Name and location)

« »
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: « » None « » See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

« »
« »
« »

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

§ 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.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »
Address:	« »	Address:	« »

SECTION 01 1000 – GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 MATERIALS AND WORKMANSHIP:

A. Unless otherwise specified, all materials shall be new, of the best quality consistent with the type and grade specified and of a type and quality suitable for the purpose they are to serve. All employees shall be competent, experienced and skilled in their trades. Workmanship throughout shall be of the first quality equal to the best recognized practice in the field concerned.

1.2 APPROVAL OF SUBSTITUTIONS:

A. Specific reference in the specifications to any article, device, product, materials, fixture, form or type of construction, etc., by name, make, or catalog number, with or without the words "or equal", shall be interpreted as establishing a standard of quality.

B. Requests for written approval to substitute materials or equipment considered by the Contractor as equal to those specified shall be submitted for approval in writing ten (10) calendar days prior to bid opening date to the Engineer. Requests shall be accompanied by samples, literature, and information as necessary to fully identify and allow appraisal of the material or equipment. Submittals shall be concise, clear, and brief as possible. Incomplete submittals or submittals requiring lengthy research to ascertain quality will not be considered. No substitutions will be considered within ten (10) days prior to the bid opening.

C. Approval of the Engineer to use materials or equipment, if granted, will be in the form of a written addendum.

D. The judgment and decision of the Engineer to approve or reject a request for substitution is final.

E. Submittals for bidding are not required on items specified by model number or when a manufacturer listed by name can provide equipment with no deviations from the specifications. Submit all other items for approval.

F. Items approved shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly indicated in the form of a letter that is enclosed with the submittals.

G. Contractor shall be responsible for verifying all dimensions with available space. If, in the opinion of the engineer, the physical dimensions do not permit the substituted material or equipment to be properly operated, maintained, serviced, or otherwise accessed, or the physical dimension adversely impact other components, a system's ability to be operated, maintained, serviced or otherwise accessed, the material or equipment shall be replaced at the contractor's expense.

1.3 EXAMINATION OF CONDITIONS:

A. The Contractor, subcontractors and material suppliers shall carefully examine the drawings and specifications and all job conditions and call to the attention of the Engineer any conditions that will interfere with or preclude a first-class and serviceable installation of the product they propose to furnish. The Contractor shall notify the Engineer, in writing, should any conditions exist that would in any way affect a manufacturer's guarantee, warranty or responsibility for proper performance and service of an item.

1.4 FITTING JOB CONDITIONS:

A. The Contractor, subcontractors and material suppliers shall be responsible for inspecting all job conditions affecting the installation of an item and taking all field measurements required prior to fabrication of an item to insure that the item concerned will integrate properly with all adjacent materials and fit all other conditions as they exist or will exist in the finished building.

B. Work in connection with the installation of an item shall be coordinated with all other affected work and trades.

C. Sleeves, anchors and other items that must be embedded in or that otherwise affect other portions of work shall be located and set while such portions of the work are in progress.

1.5 TESTS, CERTIFICATIONS AND APPROVAL BY OTHER AUTHORITIES:

A. Where tests, certificates or approvals by authorities other than the Engineer are required, the Contractor shall have such tests performed and procure such certification or approvals. The contractor shall forward a minimum of four copies of the results of the test, the certificates, or approvals to the Engineer prior to the proceeding with work involved. Such laboratories and/or authorities as are employed for this purpose shall be competent, with a generally recognized reputation in the field concerned, and shall be subject to approval of the Engineer.

1.6 INCLUSION OF ACCESSORIES:

A. Unless otherwise specifically mentioned, all anchors, bolts, screws, fittings, fillers, hardware, accessories, trim and other parts required for or in connection with an item of material to make a complete, serviceable, finished and first quality installation shall be furnished and installed as part of the item whether called for by the specifications or not.

1.7 PROTECTION:

A. All materials shall be shipped and stored and handled in a manner that will afford protection and insure their being in "like new" condition at the time they are incorporated in the work. After installation, they shall be properly protected against damage to insure their being in "like new" condition when the building as a whole is completed and accepted by the Owner.

1.8 INSTALLATION:

A. All items shall be installed in a workmanlike manner in accordance with the best recognized practice in the field concerned. Manufactured items shall be installed in strict accordance with the manufacturer's printed directions, specifications and recommendations for an installation of highest quality.

B. All working parts shall be properly adjusted after installation and left in proper working order.

C. All items in walls exposed to weather or otherwise subjected to flooding or wetting shall be installed so as to shed and not hold water.

D. Items shall in all cases be installed plumb and true and in proper relation to surrounding materials.

1.9 ANCHORING AND TYING:

A. All materials, including but not limited to those mentioned below, shall be securely anchored and/or tied together in accordance with the best recognized practice in the field concerned whether shown, specified or not.

B. Material shall be installed in a permanent manner that will permit expansion, contraction and other minor movements and normal use of the structure without structural features becoming impaired and without any of its parts becoming loose.

C. Ties and anchors shall be best quality for the purpose.

D. All wood, steel, concrete or other framing shall be securely anchored and tied together and to supporting or abutting masonry. All veneers, finished and applied items shall be securely anchored and tied to the backing material.

1.10 REFERENCE TO STANDARD SPECIFICATIONS:

A. When standard specifications such as The American Society for Testing and Materials, Federal Specifications, Department of Commerce (Commercial Standards), American Institute of Steel Construction, or other well known public or trade associations are cited as a standard to govern materials and/or workmanship, such specifications or portions thereof as referred to shall be equally as binding and have the full force and effect as though it was copied into these specifications. Such standards as are mentioned are generally recognized by and available to the trades concerned. The Engineer will, upon request of a bidder or contractor, furnish for inspection a copy of any standard specifications mentioned or direct the bidder or contractor to any easily available copy. Unless otherwise specifically stated, the standard specifications referred to shall be considered as the latest edition and/or revision of such specifications that is in effect on the date of the Invitation for Bids. In case of any conflicts between standard specifications and the written portion of the specifications, the specifications as actually written herein will govern.

1.11 REFERENCES TO MANUFACTURER'S PUBLICATIONS:

A. Unless otherwise specifically stated, all manufacturer's catalogs, specifications, instructions or other information or literature that are referred to in the specifications shall be considered as the latest edition and/or revision of such publication that is in effect on the date of the Invitation for Bids.

1.12 HAZARDOUS MATERIALS:

A. Existing Conditions:

1. In the event the contractor for the project encounters on the site material believed to be asbestos, polychlorinated biphenyl (PCB), lead paints, fuel contaminated soil, or any other material considered hazardous, the contractor shall immediately stop work in the area affected and report the condition to the Engineer in writing by the fastest practical method.

2. The contractor shall not resume work until the contractor is advised in writing that the material is not hazardous and/or does not pose a risk to the contractor.

B. New Materials:

1. Contractors are hereby advised that the use of the following materials or products containing these materials in any quantity or any form is strictly forbidden, even if the products can be purchased and/or legally installed.

a. Asbestos

b. PCB

c. Lead Solder

d. Lead Paint

1.13 EQUIPMENT DELIVERY:

A. Any Contractor receiving equipment or materials that are to be installed under his Scope of Work shall provide personnel and equipment to unload these materials at the time they arrive on site or make provisions for receiving and unloading the shipment.

B. Any shipments arriving on site without proper personnel present to receive and unload the shipment will be instructed to return to the shipping terminal. The Contractor shall be responsible for all additional shipping charges.

1.14 ACCIDENT PREVENTION:

A. Each Contractor shall have an approved written Accident Prevention Program and shall produce it when required by the Engineer.

B. The Contractor shall hold weekly meetings with all subcontractors to monitor compliance with all safety regulations. These regulations shall be provision of the current editions of the State and Federal laws, including but not limited to, the latest amendments of the

following: Williams-Steagler Occupational Safety and Health Act of 1970, Public Law 91-956, Part 1910 - Occupational Safety & Health Standards, Chapter 17 of Title 29, Code of Federal Regulations, Part 1926 - Safety & Health Code and Federal and State of (South Carolina) Regulations.

1.15 BARRICADES:

A. The Contractor shall provide all labor and materials necessary to conduct work and protect personnel in accordance with OSHA standards.

B. The Contractor shall furnish, install, and maintain all necessary temporary barricades at the building floor perimeters and openings and to separate the areas of construction from the building occupants at all times.

1.16 PERSONAL PROPERTY:

A. Contractor will be held liable for all damage to personal and real property as a result of their negligence to provide protective measures.

1.17 GUARANTEE OF WORK:

A. The Contractor shall procure and furnish to the Owner all guarantees that are called for by the specifications or that are promised by a manufacturer of an item in his published catalog or literature.

B. Except as otherwise specified, all work shall be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment or workmanship for one year from the date of substantial completion.

C. If, within any guarantee period, repairs or changes are required in connection with guaranteed work which, in the opinion of the Engineer, is rendered necessary as the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the Contract, the Contractor shall promptly:

1. Correct all defects and place in satisfactory condition all guaranteed work.

2. Repair all damage to the building, site, equipment, or other components which, in the opinion of the Engineer, is the result of the use of materials, equipment, or workmanship which are inferior, defective or not in accordance with the terms of the Contract.

D. Should the contractor disturb any work guaranteed under another Contract, they shall restore such disturbed work to a condition satisfactory to the Engineer and guarantee such restored work to the same extent as it was guaranteed under such other contract.

E. If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Owner may have the defects corrected and the Contractor and his surety shall be liable for all expense incurred.

F. There will be one final inspection of project by the Engineer and Contractors between the 11th and 12th month following final acceptance of the building by the Owner. Inspection will be with Owner. Any and all items found will fall in the years' warranty.

1.18 TESTS:

A. Any specified laboratory tests of material and finished articles to be incorporated in the work shall be made by bureaus, laboratories, or agencies approved by the Engineer and the reports of such tests shall be submitted to the Engineer. The cost of the testing shall be paid for by the Contractor, unless otherwise specified.

B. The Contractor shall furnish all sample materials required for these tests and shall deliver same without charge to the testing laboratory or other designated agency when and where directed by them.

1.19 TRANSMITTAL OF DOCUMENTS:

A. Unless stated otherwise, all information shall flow from subcontractors to prime contractor to Engineer and conversely. Reference to a subcontractor submitting to the Engineer in these specifications is not intended to bypass this routing.

1.20 WORK STATED IN OTHER DIVISIONS OF WORK:

A. The specifications in each Division are intended to compliment one another. In case of conflict, the most stringent requirement shall apply.

END OF SECTION 01 1000

SECTION 01 1010 - SPECIAL CONDITIONS

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. The work under this contract includes the furnishing of all labor, material, plant and all items and services of every nature whether particularly mentioned or not that is required to complete the replacement of the existing mechanical systems, installation of new equipment, and controls as indicated.

1.2 RELATED DOCUMENTS:

A. Attention is directed to Division 1, General Requirements and Instructions to Bidders which are binding in their entirety on this portion of the work and in particular to paragraphs concerning materials, workmanship and substitutions.

1.3 BIDDING

A. A complete set of the Contract Documents can be obtained on the Fort Mill School District Procurement Vendor Registry website at https://vrapp.vendorregistry.com/Bids/View/BidsList?BuyerId=11355f9a-0f05-4070-812b-4788bd2db9d9 or by contacting the FMSD Procurement Officer, Ms. Kelly Keniston by sending her an email at kenistonk@fortmillschools.org .

B. Public receipt of Bids will be recorded at 2:00 pm on February 13, 2024 in the Board Room at the Fort Mill District Office located at 2233 Deerfield Drive, Fort Mill, SC 29715. **All Bids must be physically in the possession of the FMSD Procurement Officer by the specified time to be considered timely.**

1.4 BID BOND AMOUNT

A. Bid bond amount shall equal 5% of the contractors total bid amount.

1.5 OWNER'S SCHEDULE:

A. Buildings may not be available at all times and on all days depending upon testing, special activities, or unscheduled events. Contractor to coordinate upcoming schedule events with the Construction Manager and Owner at each weekly meeting.

1.6 SUBSTANTIAL COMPLETION:

A. Project should be bid based upon a Notice to Proceed being awarded within twenty-one (21) days of bid opening.

B. If Notice to Proceed is not given by the date indicated above, the contractor shall have ten (10) working days to notify the A/E in writing of any impact to contract cost, if any, to meet the project completion date. If notification is not received within the required time, all parties agree the contract cost is not impacted.

C. Project shall be substantially complete by: **July 26, 2023**

D. The contractor shall complete all punchlist items within thirty (30) days of substantial completion.

E. Any items the contractor does not agree is the responsibility of the contractor shall be identified in writing by the contractor. These items shall be submitted to the A/E within ten (10) days of receipt of the contractor being notified of the item.

F. Should the contractor fail to complete the punchlist items, the Owner may deduct the following from the contractor's contract amount:

1. Reasonable cost to have work completed by another party.
2. Reasonable cost to have the A/E provide additional review of work.
3. Any other reasonable costs incurred by the Owner as the result of work not being completed.

1.7 OSHA STANDARDS:

A. OSHA Construction Standards shall be applicable to all construction operations.

1.8 CONSTRUCTION SCHEDULE:

A. Refer to Specification Section 01 3216 – Construction Progress Schedule

1.9 SCHEDULE OF VALUES:

A. Refer to Specification Section 01 2975 – Schedule of Values

1.10 RETAINAGE:

A. Retainage shall be withheld at 10% of the total project contract value.

1.11 FINAL PAYMENT:

A. Contractor shall furnish to the Engineer the following prior to approval of final certificate of payment.

1. All manufacturer’s warranties.
2. Information for "As-Built Drawings" from all sections of these specifications.
3. Affidavit that all materials and labor have been paid in full.
4. Instructions to the Owner.
5. Operation and Maintenance Manuals on all equipment.
6. Submittal of punch list with each item initialed and date completed.
7. Additional information as identified in all sections of these specifications and contract drawings.

1.12 CONTRACT DRAWINGS:

A. Drawings are schematic and are based upon existing documents and engineers' field inspections. Contractor shall field verify locations of all equipment, panels, controls, accessories, wall sections, grades and floor elevations prior to ordering any material or equipment.

1.13 WORK SCHEDULE:

A. Work may be performed during the summer break and other times when the building is not occupied as directed by the Owner. These may include holidays, weekends, and all other times as coordinated with the district.

B. No crane work shall be performed while the building is occupied.

C. Depending upon the nature of the work, utility tie-ins, shutdowns, emergency work, and other work may be required to be done during non-regularly scheduled construction hours.

D. Pre-demolition test and balance may be performed, at the contractor’s option, prior to the start of construction in Summer of 2024. Contractor to coordinate with the Owner to get this work done during holidays and breaks in the school calendar.

1.14 PRIME CONTRACTOR:

A. A contractor may bid as the prime contractor if their work is 40% or more of the total construction amount and they are licensed under SC LLR’s classification or subclassifications in Section 40-11-410 (1), (2), or (3). (Note: GC-BD,-HW,-UT).

B. A contractor may bid as the prime contractor if their work is 40% or more of the total construction amount and they are licensed under SC LLR”s classification or subclassification in Sections 40-11-410 (4) and (5).

1.15 SALVAGED MATERIAL:

A. The Owner will identify any materials, equipment, or building component that they want to retain. Items shall include but not be limited to:

1. All scrap copper shall be turned over to the owner and stored within the building as directed by the Owner.

2. All recovered refrigerant shall be turned over to the owner or stored on site as directed by the Owner. FMSD maintenance will provide the canisters required to capture and store the recovered refrigerant.

B. The contractor shall carefully remove items identified by the Owner and deliver them to the Owner's designated facility within 25 miles of the project site.

C. The contractor shall be responsible for transporting unloading, and setting in place all items.

D. All other demolished materials shall be removed for the site by the contractor unless specifically designated otherwise.

1.16 STORAGE LAYDOWN AREAS:

A. There is limited storage and laydown area available on site. These areas which are available will be coordinated with the Engineer and Owner.

B. Storage and laydown may have to be relocated during the duration of the project to accommodate construction progress at no cost to the Owner.

1.17 PROJECT RESTRICTIONS AND REQUIREMENTS:

A. No tobacco products permitted on site.

B. No eating or drinking within the building.

C. All contractors shall have identification badges worn at all times or shall wear a shirt bearing the contracting company's name and/or logo.

1.18 SITE REPAIR:

A. Where the site has been excavated or damaged, it shall be refilled with suitable fill dirt and 4" top soil. All excess material shall be removed and disposed of by the contractor.

B. All fill shall be compacted.

C. Top soil shall be leveled, slightly sloping away from the building. The soil shall be heavily seeded and watered every other day, for 30 consecutive days. The type of seed shall match existing grass.

1.19 ROOM PREPARATION (EXISTING FACILITIES):

A. The Owner will be responsible for moving all personal property, computers, electronic equipment, and similar equipment.

B. The contractor shall be responsible for carefully moving the following items away from the area of construction to a location designated by the Owner on the property (within the building or stored in an area outside the building) for the duration of the construction project. Prior to the completion of the project, all items moved out of the construction area by the contractor shall be returned by the contractor to their original location. These items include, but are not limited to:

1. Non-fixed furniture

2. Non-fixed equipment

3. Desks, chairs, tables

4. Books and other teaching materials stored in boxes by the Owner

5. Non-fixed kitchen equipment

6. Washers and dryers

7. Ice machine

C. Equipment that requires utility connections such as power, water, and waste will be disconnected and utilities properly and safely capped or turned off. After moving equipment back, the contractor shall reconnect utilities.

1.20 ROOF PROTECTION:

A. The contractor shall take all measures to protect the roof from damage.

B. The roof shall be protected from damage when transporting materials and equipment to and from the roof.

C. The roof shall be protected from damage when installing materials and equipment on the roof.

D. The roof shall be protected during welding, cutting, and other construction tasks.

E. All scrap materials, screws, fasteners shall be thoroughly cleaned from the roof each day and more frequently if needed to protect the roof from damage.

F. The contractor shall determine the best method to protect the roof including but not limited to fire blankets, tarps, plywood, heavy mil plastic, etc.

G. No tools or materials are to be placed directly on the roof without adequate roof protection.

H. No equipment or materials shall be set directly on the roof. Where materials or equipment must be set on the roof, the roof shall be protected by 1/2" plywood and other materials as necessary to protect the roof.

I. Any damage to the roof shall be repaired by a roofing contractor certified to work on the type of roof installed. The existing roof warranty shall be maintained.

1.21 CONTRACTOR QUALIFICATIONS:

A. Within ten (10) days after the Bid Opening, and before award of the Contract, the low Bidder or Bidders will be required to provide qualifications for key project personnel.

B. Personnel Description:

1. The Project Manager is the person who manages the Project and who has overall project responsibility but is not the person on site running the Project on a daily basis.

2. The Project Superintendent is the person on site who manages the day-to-day operations.

C. Owner Review and Acceptance:

1. If the Owner is not satisfied with the Project Superintendent's qualifications, the Contractor will be requested to submit qualifications of other persons for those positions.

2. If no Superintendent is acceptable to the Owner, the Owner reserves the right to reject the Contractor's Bid.

D. Information Required:

1. Prime Contractor:

a. Project Manager bio

b. Project Superintendent bio

c. Listing of 3 similar projects in size, complexity, and schedule duration

d. References (name and phone) for projects listed above

e. Estimate number of workers on job on daily basis

f. What trades are subcontracted out

2. HVAC Contractor:

a. Project Manager bio

b. Project Superintendent bio

c. Listing of 3 similar projects in size, complexity, and schedule duration

d. References (name and phone) for projects listed above

e. Estimate number of workers on job on daily basis

f. What trades are subcontracted out

3. Electrical Contractor:

a. Project Manager bio

b. Project Superintendent bio

c. Listing of 3 similar projects in size, complexity, and schedule duration

d. References (name and phone) for projects listed above

e. Estimate number of workers on job on daily basis

f. What trades are subcontracted out

1.22 ADDITIONAL SITE VISITS:

A. At the prebid conference, additional site visit dates and times will be determined. These additional site visits will be provided by the Owner's representative. Nothing discussed at any visits will modify the contract requirements. Only those items listed in an addendum can change the project requirements.

1.23 POWER FOR TEMPORARY HVAC EQUIPMENT (AIR CONDITIONING AND DEHUMIDIFIERS):

A. It is the contractor's responsibility to provide all temporary power required on the project.

1.24 BUILDING HUMIDITY CONTROL:

A. Contractor shall provide an appropriately sized temporary dehumidifier in all spaces for the entire time that the spaces are without cooling from beginning of demolition until the new system is in full operation. It shall be the contractor's responsibility to maintain the dehumidifiers and humidity levels in the areas of construction for the duration of the project.

1.25 GENERAL REQUIREMENTS:

A. If the contractor observes any conditions that they cannot work safely around, the Owner or Engineer should be notified prior to working in that area.

B. The contractor shall take all steps necessary to protect all furnishings from damage at all times during construction.

C. The contractor is not to sit or stand on furniture nor place any materials on furniture other than what is required to protect the furniture.

1.26 CUTTING AND WELDING:

A. All cutting, welding, or similar operations creating dust, sparks, smoke, or potential for fire shall be done in accordance with the State of South Carolina Hot Works Procedure.

1.27 CONSTRUCTION FENCE:

A. Provide six (6) ft. tall construction fence around the crane and staging area.

B. The fence shall be galvanized and freestanding.

1.28 EQUIPMENT INSTALLATION:

A. No existing units or new units shall be placed directly on the roof.

B. Existing units shall be lifted directly off the roof curbs and off the building.

C. New units shall be lifted directly on to the new adapter curbs.

1.29 EQUIPMENT POWER REQUIREMENTS:

A. Power for the rooftop units is limited by the existing building power.

B. All equipment requested by the contractor to be approved for this project must be submitted for prior approval and must clearly indicate the power requirements for each unit.

C. Requests for prior approval not clearly showing the equipment power requirements will not be considered.

END OF SECTION 01 1010

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The scope of work includes the demo, disposal, and replacement of the existing HVAC Systems at Springfield Middle School (1711 Springfield Pkwy, Fort Mill, SC 29715). Scope includes replacement of the existing classroom interior / exterior split systems as indicated within the contract documents.

1.02 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda and General Conditions.

1.03 SAFETY COMPLIANCE

A. In addition to any detailed requirements of these specifications, the contractor shall meet the requirements of federal and state standards referenced in applicable publications, whichever is more restrictive. Matters of interpretation of these standards shall be submitted by the contractor to the respective administrative agency for resolution before starting work.

1.04 PRECAUTION AND SAFETY

A. Accident Prevention and Safety: Comply with all applicable laws, ordinances, rules, regulations, and orders of governing authorities having jurisdiction for the safety of persons and property to protect them from damage, injury or loss. Erect and maintain, as required by conditions and progress of the work, all necessary safeguards for safety and protection, including fences, railings, barricades, lighting, posting of danger signs and other warnings against hazards. Where prevention of construction accidents is not regulated by code or ordinances, comply with AGC' s "Manual of Accident Prevention in Construction." Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Project. All scaffolds shall be built in accordance with all requirements of local, state and Federal laws and regulations.

1.05 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install, and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
2. Store combustible materials in containers in fire-safe locations.

3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access route for fighting fires.

Prohibit smoking in hazardous fire exposure areas.

4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

B. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

C. Barricades, Warning Signs, and Lights: Comply with standards and code requirements of erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

D. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

E. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways, and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

1.06 COORDINATION OF WORK SEQUENCE

A. Coordinate work for the various sections of the Specifications to ensure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.

B. Verify characteristics that elements of interrelated operating equipment are compatible; coordinate work of various sections having interdependent responsibilities for installing, connection to, and placing in service, such equipment.

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

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

1.07 TIME OF COMPLETION AND LIQUIDATED DAMAGES

A. The contract performance period shall be as follows:
Notice to Proceed: February 23, 2024
Substantial Completion: July 26, 2024

B. Should the contractor fail to have all work completed within the time specified, the contractor shall be required to provide a rental cooler / freezer boxes and/or accessed Liquidated Damages in the amount of five hundred dollars ($500.00) per calendar day until Substantial Completion is achieved. The Owner reserves the right to implement the additional financial cost shall be the

1.08 CONSTRUCTION PROGRESS SCHEDULE:

A. Contractor shall provide a detailed bar chart (CPM Method) of his work clearly showing how his schedule integrates with the durations provided by other subcontractors and the total construction duration. This bar chart schedule must identify project critical path including all links between activities.

B. Construction project schedule shall be updated and provided to the Construction Manager monthly.

C. **In no event shall any Contractor work less than five (5) days per week. If a normal workday (Monday through Friday) is lost due to weather, it is expected that the Contractor work Saturday and/or Sunday to make up the lost day(s).**

1.09 REQUEST FOR EXTENSION DUE TO DELAYS:

A. It is understood that the Owner, Construction Manager or Architect/Engineer shall not, in any event, be liable to the Contractor for delays of any kind whatsoever and the Contractor shall be fully responsible for making up lost time of all delays except to the extent that extensions of time are granted. If completion of the work is delayed by any act of neglect of the Owner, or by the Construction Manager or the acts of the Construction Manager or Architect/Engineer, by strikes or by other exceptional conditions over which the Contractor has no reasonable control, the time of completion shall upon receipt of the Contractor's written request, be extended by such period as the Construction Manager may consider reasonable. No extension shall be allowed unless a claim is presented in writing to the Construction Manager within seven (7) days after the commencement of such delay. In case of continued cause of delay, only one claim is necessary. Nothing in this clause shall be construed to release the Contractor from the obligation to perform at his own expense all overtime necessary to maintain the Contract completion date where delays have occurred which are not excused. If the Contractor, delayed by any acts of the Owner, Construction Manager, Architect/Engineer, is granted an extension of time by the Construction Manager, the Contractor shall comply with the extended schedule with no additional compensation from the Owner.

B. Delays due to weather/precipitation. The following table shows the number of days, on average, per month, that it rained .1" or more in York County, SC, over a ten-year period.

January	4 days	July	6 days
February	4 days	August	5 days
March	5 days	September	6 days
April	4 days	October	3 days
May	4 days	November	3 days
June	5 days	December	4 days

C. For the Contractor to claim an extension due to weather, there must have been at least .1" of precipitation that day or from a previous day, a critical path activity must have been affected and the Contractor and Construction Manager must agree that the day was unworkable. Critical Path activities are determined based on the updated monthly schedule provided by the Contractor for the month in question. If the Contractor fails to provide an updated schedule for the month that an extension is being requested, then the previous month's schedule shall be used. All days must be documented on a daily basis and agreed upon by the Construction Manager. The difference between the total actual unworkable days due to precipitation and the above days will be granted (if in excess). This extension must be formally requested once a month (with transmittal of Pay Application) for the extension to be granted. If a formal request is not made at the said time, the opportunity for extension request will not be granted.

D. Per 1.0.1.C above, normal workdays lost due to weather shall be made up on the following Saturday and/or Sunday, as necessary, to complete the five (5) day work week requirement. If an extension request is made for lost day(s) and the Contractor failed to work the following Saturday and/or Sunday, weather permitting, to meet the 5 day requirement, the request will be reduced by the number of Saturdays and Sundays that should have been worked to complete the 5 day work week requirement.

1.10 TEMPORARY FACILITIES:

A. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented, and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

B. **Contractor use of the existing restrooms within the building is not permitted.**

1.11 FINAL INSPECTION AND PUNCH LIST:

A. The contract has an established contract completion date. In order to avoid the assessment of liquidated damages, the contractor shall request in writing to the Architect/Engineer a final inspection on or prior to the established completion date.

The contractor shall certify that all construction/installation is complete and has been checked out and is operating as designed. The Architect/Engineer shall notify the Owner in writing that the job is ready for inspection.

B. The Architect/Engineer, Construction Manager, contractor, and all sub-contractors associated with the construction/installation of the building equipment shall be present during the final inspection to demonstrate the proper operations of the equipment. Removal/replacement of necessary covers for inspection shall be conducted by the contractor.

C. At the time of inspection, should the architect/engineer and Owner's Representatives determine that the construction/installation is less than 100% complete to the extent that a re-inspection will be required, the inspection will cease and a charge of five hundred dollars *($500.00)* will be accessed by the Owner against the Contractor, for costs associated with re-inspection requirements and for delays incurred as a result of failure to complete the punch list.

1.12 FINAL PUNCH LIST ITEMS:

A. The contractor and sub-contractors shall have thirty (30) calendar days from the date of final inspection to complete the repair of any and all items listed on the final punch list.

B. If the contractor or his sub-contractor fails to complete all items on the final inspection punch list within the allocated twenty one calendar days, liquidated damages in the amount specified by the contract will be assessed retroactive to the contract completion date and will continue until all items on the punch list are completed. (Only exception shall be by recommendation of the Architect/Engineer and/or Construction Manager, and approval by the Owner, that lack of completion was due to circumstances beyond the control of the contractor.)

END OF SECTION

SECTION 01 2105 - TEMPORARY SERVICE

PART 1 - GENERAL

1.1 DRINKING WATER:

A. Each Contractor shall provide their own drinking water.

1.2 POWER:

A. The Owner shall provide a source of power to the extent it is available at the site. The Contractor shall provide means of distribution and connections.

1.3 TOILETS:

A. Use of existing restroom facilities is strictly prohibited.

B. The Contractor shall be responsible for providing portable toilet facilities. The portable units shall be cleaned and well maintained by Contractor. The contractor shall provide their own supplies (i.e., towel, soap, toilet paper, etc.).

C. Coordinate locations with Owner.

1.4 COST OF UTILITIES:

A. The Owner shall make available electricity, water, etc. required for construction purposes at no cost to the Contractor. The Contractor shall take care not to use more electricity, water, or other utilities than is necessary in the performance of the work described under this contract. The Owner reserves the right to charge for any overuse of utilities furnished to the Contractor by the Owner in the performance of this work.

1.5 TEMPORARY COOLING:

A. The contractor is responsible for:

1. Supplying temporary cooling units (i.e., spot coolers).

2. Installing and removing temporary cooling units.

3. Maintaining temporary cooling units (emptying condensate, etc.).

4. Locating the units which provide even cooling to the extent practical.

5. Provide temporary power in a safe manner and removing temporary power when units are removed.

B. The temporary cooling units are to be provided by the contractor for the entire time the work areas do not have permanent cooling.

C. Temporary cooling shall be provided as follows:

1. Min. of 12 total units

2. 120/1 power

3. Units equal to Movin Cool Classic Plus 14 (13,200 Btuh)

END OF SECTION 01 2105

PART 1 GENERAL

1.01 WORK INCLUDED

A. To provide adequate budget and bonding to cover items not precisely determined by Owner prior to advertising for bids, allow within the proposed contract amount the sums described below.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda, and General Conditions.

1.03 ESTABLISHED METHODS

A. When a cash allowance is set for certain items or materials, it is understood that any savings under such allowance shall accrue to the Owner and if the material purchased costs more than the Allowance, such additional cost shall be borne by the Owner.

1.04 UNDESCRIBED ALLOWANCES

A. Allowances and provisions not further described in these specifications will be specified and bid at a later date.

B. Allowance shall include purchase and installation, delivery cost to the job, unloading, sales tax and overhead & profit to the General Contractor.

C. After receipt of bids, as above mentioned, the successful subcontract shall become part of the scope of work of the general contractor at no additional cost to the Owner, except for the stipulated cash allowance as adjusted.

D. This method established to allow general contractor to control scheduling of subcontractor so as to meet established completion date.

1.05 OWNER PURCHASED ITEMS

A. The responsibilities of the Contractor vary from item to item. Overall, the Contractor is responsible for coordination and scheduling of all items to be installed. On certain specific items he is responsible for installation and protection of the finished product. On others, he is responsible for coordination of all rough-in. For items purchased by the Owner and installed by the successful bidder that require electrical, mechanical, and plumbing connections, the Contractor is responsible for coordinating the necessary provisions.

B. The Owner is responsible for furnishing the agreed upon items in a timely fashion. The names of all successful bidders shall be provided to the contractor. The Contractor and successful bidders shall be responsible for scheduling and delivery of all Owner furnished items.

PART 2 PRODUCTS

2.01 SINGLE PRIME CONTRACT

1.	**General Contingency**	**$50,000**
2.	**Acoustical Ceiling System Replacement**	**$30,000**

NOTE: The unused portion of all allowances, including overhead and profit, will be credited back to the owner through a deductive change order.

PART 3 EXECUTION

3.01 PROCEDURE

A. After receipt of bids, as above mentioned, the successful subcontractor shall become part of the scope of work of general contractor at no additional cost to the Owner, except for the stipulated cash allowance as adjusted.

B. Mark up of Allowance items (equipment, rental, labor, subcontracts or other) will <u>not</u> be allowed by the Contractor at the time of Allowance use. This includes the assignment of contracts or change requests (change conditions) whether initiated by the Owner, Contractor or any other party. The Contractor should include markup of the Allowance with the lump sum bid.

C. This method is established to allow contractors to control scheduling of subcontractors in order to meet established completion date.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This Section specifies administrative and procedural requirements for unit prices.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions.

1.03 GENERAL DESCRIPTION

A. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities or Work required by the Contract Documents are increased or decreased beyond those included in the Allowances.

B. The unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the kinds called for.

C. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections and as listed on the Bid Form.

1. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves the use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

1.04 MEASUREMENT OF QUANTITIES

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification sections shall govern.

B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect, Construction Manager and third party surveyor/inspection firm.

1.05 PAYMENT

A. Payment for work governed by Unit Prices will be made on the basis of the actual measurements and quantities of work accepted by the Architect or Construction Manager multiplied by the Unit Price.

B. Payments will be deducted from Allowances described in this Section, Cash Allowances or identified on the Bid Form that are to be included in the Contractor’s bid.

1.06 SCHEDULE OF UNIT PRICES

A. **Replacement of HVAC Refrigerant Lines:**
Unit cost shall include all necessary material and labor to evacuate / remove / replace existing refrigerant lines and insulation to HVAC equipment. Existing refrigerant shall be recovered and removed copper refrigerant line materials turned over to the Owner following demolition.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. **Alternate No. 1: Owner Preferred Equipment**
Base Bid: Provide HVAC equipment per Specification Section 23 9005

Alternate: Provide HVAC equipment as manufactured by Trane.

B. **Alternate No. 2: Owner Preferred Controls**
Base Bid: Provide controls per Specification Section 23 0905.05.

Alternate: Provide HVAC controls as manufactured and installed by United Automation Corp.

C. **Alternate No. 3: Refrigerant Line Replacement**
Base Bid: Perform pressure testing of existing refrigerant lines to confirm material integrity and re-use the existing material for reconnection to new HVAC equipment.

Alternate: Provide all necessary material and labor to evacuate / reclaim refrigerant and demo / replace existing refrigerant lines and insulation to all HVAC equipment. Existing refrigerant shall be recovered within canisters provided by the Owner and copper refrigerant line material removed and turned over to the Owner following demolition.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. NO EXTRA WORK SHALL BE PERFORMED WITHOUT FIRST RECEIVING WRITTEN APPROVAL FROM THE CONSTRUCTION MANAGER.

B. Work included: Make such changes in the Work, in the Contract Sum, in the Contract Time of Completion, or any combination thereof, as are described in written Change Orders signed by the Owner and the Architect and issued after execution of the Contract, in accordance with provisions of this Section.

C. Related Work: Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda and General Conditions.

D. Mark up of Allowance items (equipment, rental, labor, subcontracts or other) will <u>not</u> be allowed by the Contractor at the time of Allowance use. This includes the assignment of contracts or change requests (change conditions) whether initiated by the Owner, Contractor or any other party. The Contractor should include markup of the Allowance with the lump sum bid.

E. Change Orders using the “Time and Material” method may be used in order to expedite the construction process. If used, the contractor will be required to issue certified payroll and all pertinent invoicing. These items shall be agreed to during the pre-construction meeting or prior to initiating work.

1.2 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such measures as are needed to assure familiarity of the Contractor's staff and employees with these procedures for processing Change Order data.

1.3 SUBMITTALS

A. Make submittals directly to the Construction Manager at the address shown on the Project Directory in the Project Manual.

B. Submit the number of copies called for under the various items listed in this Section along with appropriate back-up materials.

1.4 PROCESSING CHANGES INITIATED BY THE OWNER

A. Should the Owner contemplate making a change in the Work or a change in the Contract Time of Completion, the Construction Manager and/or Architect will issue a Proposal Request to the Contractor.

1. Proposal Requests will be dated and will be numbered in sequence.

2. The Proposal Requests will describe the contemplated change, and will carry one of the following instructions to the Contractor:

a. Make the described change in the Work at no change in the Contract Sum and no change in the Contract Time of Completion.

b. Make the described change in the Work and provide for a credit or cost to

be determined in accordance with the General Conditions.

c. Promptly advise the Construction Manager as to the credit or cost proposed for the described change. This will not be an authorization to proceed with the change.

B. If the Contractor has been directed by the Construction Manager and/or Architect through issuance of a Construction Change Directive to make the described change in the Work at no change in the Contract Sum and no change in the Contract Time of Completion, but the Contractor wishes to make a claim for one or both of such changes, the Contractor shall proceed with the change and shall notify the Construction Manager as provided for under the General Conditions.

1. If Contractor fails to comply with initiating work within seven (7) calendar days of formal directive, the Contractor's forces will be supplemented, and all incurred costs will be back charged to Contractor. Schedule impacts as a result of the supplementation of work forces will be assessed to the Contractor as set forth in Section 01 11 00 Summary of Work Part 1.07.B.

C. If the Contractor has been directed by the Construction Manager and/or Architect through issuance of a Construction Change Directive to make the described change subject to later determination of cost or credit in accordance with the General Conditions, the Contractor shall:

1. Take such measures as needed to make the change;

2. Consult with the Construction Manager and reach agreement on the most appropriate method for determining credit or cost for the change.

D. If the Contractor has been directed by the Construction Manager or Architect to promptly advise him as to credit or cost proposed for the described change, the Contractor shall:

1. Analyze the described change and its impact on costs and time;

2. Secure the required information and forward it to the Construction Manager for review;

3. Meet with the Construction Manager and/or Architect as required to explain costs, and when appropriate, to determine other acceptable ways to achieve the desired objective;

4. Alert pertinent personnel and subcontractors as to the impending change and, to the maximum extent possible, avoid such work as would increase the Owner's cost for making the change, advising the Construction Manager in writing when avoidance no longer is practicable.

1.6 PROCESSING CHANGES INITIATED BY THE CONTRACTOR

A. Make written reply to the Construction Manager in response to each Proposal Request.

1. State proposed change in the Contract Sum, if any.

2. State proposed change in the Contract Time of Completion, if any.

3. Clearly describe other changes in the Work required by the proposed change, or

desirable therewith, if any.

4. Include full backup data such as, subcontractor's letter of proposal or similar information.

5. Submit this response in a single copy.

B. When cost or credit for the change has been agreed upon by the Owner and the Contractor, or the Owner has directed that cost or credit be determined in accordance with provisions of the General Conditions, the Construction Manager will issue written notification to bill against the General Contingency Allowance or the Construction Manager will issue a "Change Order" to the Contractor.

1.8 PROCESSING CHANGE ORDERS

A. Change Orders will be dated and will be numbered in sequence.

B. The Change Order will describe the change or changes, will refer to the Proposal Request(s) involved, and will be signed by the Owner and the Architect.

C. The Architect will issue one copy of each Change Order to the Construction Manager for the remaining execution of all parties.

1. The Contractor shall promptly sign and return to the Construction Manager.

2. The Construction Manager will then forward to the Architect for his signature.

3. The Architect will sign and then forward to the Owner for his signature.

4. The Owner will sign and return to the Construction Manager who will then forward fully executed copies to the Contractor, Architect, and the Office of School Facilities.

D. Should the Contractor disagree with the stipulated change in Contract Sum or change in Contract Time of Completion, or both:

1. The Contractor promptly shall submit a copy of the Change Order, unsigned by him, to the Architect with copy to the Construction Manager with a letter signed by the Contractor, stating his disagreement.

2. The Contractor's disagreement with the Change Order shall not in any way relieve the Contractor of his responsibility to proceed with the change as ordered under pertinent provisions of the Contract Documents.

E. 1. Maximum allowable “mark-up” percentages for contractors and sub-contractors **AFTER ALL ALLOWANCES ARE EXHAUSTED** shall be 10% for self-performed work and 7% on sub-contract work.

F. Cost of Change Work Sheet

1. See Cost of Change Worksheet included in this Section. This worksheet is to be used as part of any and all Proposal Requests.

COST OF CHANGE WORKSHEET

Project: **SFMS – HVAC Upgrades – Phase II**

Package/Contractor: _____

Proposal Request #_____

Associated RFI(s): _____

Description of Work (from Proposal Request form):

1.	Material Cost (Include Itemized Breakdown):	$_____	
2.	Equipment Cost (Include Itemized Bill):	$_____	
3.	Sales Tax:	$_____	
4.	Overhead & Profit (10%): (NOT to be added to items deducted from allowance)	$_____	
5.	SUBTOTAL 1:		$_____
6.	Labor Costs (Include Itemized Breakdown):	$_____	
7.	Labor Burden:	$_____	
8.	Overhead & Profit (10%): (NOT to be added to items deducted from allowance)	$_____	
9.	SUBTOTAL 2:		$_____
10.	Subcontract Cost (Include Itemized Breakdown):	$_____	
11.	Overhead & Profit (7%): (NOT to be added to items deducted from allowance)	$_____	
12.	SUBTOTAL 3:		$_____
13.	TOTAL:		$_____
14.	Insurance/Bond Expense: (NOT to be added to items deducted from allowance)		$_____
15.	GRAND TOTAL:		$_____

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.

B. Related Work:

1. Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda, and General Conditions.

2. Schedule of Values is required to be compatible with the continuation sheet and accompanying applications for payment, as described in Section 01 29 76.

1.2 QUALITY ASSURANCE

A. Use required means to assure arithmetical accuracy of the sums described.

B. When so required by the Construction Manager and/or Architect, provide copies of the subcontractor's Schedule of Values or other data acceptable to the Construction Manager and/or Architect, substantiating the sums described.

1.3 SUBMITTALS

A. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values. Contractor to follow AIA Documents AIA G732 and G703 formatting for Schedule of Values and Progress Payments.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.
b. Name of the Architect.
c. Project number.
d. Contractor's name and address.
e. Date of submittal.

2. Provide a breakdown of the Contract Sum in sufficient detail (Labor & Material) to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.

3. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.

4. For each part of the Work where an Application for Payment may include materials or equipment, purchased, or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

5. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item shall be complete including its total cost and proportionate share of general overhead and profit margin.

6. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be shown as separate line items in the Schedule of Values.

7. Schedule Updating: Update the Schedule of Values when Change Orders result in a change in the Contract Sum.

8. The schedule of values shall include the following line items.

   a. Retainage – Shall be withheld at 10% of the total project contract value.

   b. O&M Manuals – One percent (1%) of the total contract value shall be listed for O&M manuals. This item cannot be billed until all O&M's required have been turned in and accepted by the A/E.

   c. Owner Training – One percent (1%) of the total contract value shall be listed for Owner training. This item cannot be billed until all training has been completed.

   d. Punchlist – Five percent (5%) of the total contract value shall be listed for work related to the A/E punchlist. This item can be billed in full or in part after the contractor has returned all of the A/E's final punchlist report with the status of each item indicated. The Owner reserves the right to withhold full or part payment based upon the effort of the contractor to complete punchlist items in a timely manner.

B. Prior to first application for payment, submit a proposed schedule of values to the Construction Manager for review.

1. Meet with the Construction Manager and determine additional data, if any required to be submitted.

2. Secure the Construction Manager's approval of the schedule of values prior to submitting first application for payment. NO APPLICATIONS FOR PAYMENT WILL BE PROCESSED PRIOR TO APPROVAL OF THE SCHEDULE OF VALUES.

3. AIA Form G732 shall be submitted with all columns and spaces completed as per direction of the Construction Manager.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Comply with procedures described in this Section when applying for progress payments and final payment under the Contract.

B. Related Work:

1. Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda, and General Conditions.

2. The Contract Sum and the schedule for payments are described in the Agreement Form.

3. Payments upon Substantial Completion and Completion of the Work are described in the AIA Contract and in Division I of these Specifications.

4. The Construction Manager's and Architect's approval of applications for progress payment and final payment may be contingent upon the Construction Manager's and Architect's approval of status of Closeout and Project Record Documents.

1.2 QUALITY ASSURANCE

A. Prior to approval of payment application number one, secure the Construction Manager's approval of the project schedule and Schedule of Values required to be submitted under Section 01 29 73 of these Specifications.

B. During progress of the Work, modify the schedule of values as approved by the Construction Manager to reflect changes in the Contract Sum due to Change Orders or other modifications of the Contract.

C. Base requests for payment on the approved Schedule of Values.

1.3 SUBMITTALS

A. Informal Submittal: Unless otherwise directed by the Construction Manager:

1. Make an informal submittal of request for payment by filling in pertinent portions of AIA Document G732, "Application and Certificate for Payment", plus continuation sheet or sheets.

2. Make this preliminary submittal of request for payment as agreed with the Construction Manager, initialing all copies.

B. Formal Submittal: Unless otherwise directed by the Construction Manager:

1. Make formal submittal of request for payment by filling in the agreed date on AIA Document G732, "Application and Certificate for Payment", plus continuation sheet or sheets.

2. Sign and notarize the Application and Certificate for Payment.

3. Submit the original of the Application and Certificate for Payment of the entire

Application including all continuation sheet or sheets, to the Construction Manager. Copy shall bear original signatures and original notarizations.

4. Submit Partial Release of Liens for ALL sub-contractors and material suppliers that have an interest in the current or any past Applications for Payment.

5. The Construction Manager will compare the formal submittal with the approved informal submittal and, when approved, will sign the Application and Certificate for Payment, and will distribute.

6. Requests for Payment against any change order will not be honored until the change order is signed by all appropriate parties.

END OF SECTION

SECTION 01 3100 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Provide all cutting and patching indicated on the plans and in these specifications and as required to perform all work necessary to complete the requirements of the project.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Use materials that are identical to existing materials except where such materials are prohibited by law or these specifications including, but not limited to, those materials listed in the General Requirements specification. If identical materials are not available or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to fullest extent possible. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 GENERAL:

A. The requirements of the structural plans and specifications supersede this specification where a conflict exists.

B. Do not cut or modify structural elements other than as specifically indicated on the drawings.

C. Do not cut and patch operating elements or safety related components in manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety. Obtain written prior approval of cutting and patching for operating elements or safety related systems.

D. Do not cut and patch construction exposed on exterior or in occupied spaces, in manner that would, in the Engineer's opinion, reduce building's aesthetic qualities, or result in visual evidence of cutting and patching.

3.2 INSPECTION:

A. Examine existing surfaces before cutting and patching.

B. If unsafe or unsatisfactory conditions exist, take all necessary measures to make conditions safe and satisfactory for the work to be done. Do not proceed if contractor is unsure of conditions or conditions are not safe and acceptable to the contractor.

C. Before proceeding, meet at site with all trades affected by this work. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

D. Where subsurface conditions or systems are unknown or uncertain, contractor shall take all practical steps to ascertain subsurface conditions or systems Contractor shall proceed with caution until conditions and systems are known or uncovered.

3.3 PREPARATION:

A. Provide temporary support of work to be cut.

B. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruptions of free passage to adjoining areas if these areas are to remain in operation.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork which are to remain or to be removed or relocated at a later time.

3.4 PERFORMANCE:

A. General:

1. Employ skilled workmen to perform cutting and patching.

2. Work shall be done in a timely manner in accordance with the construction schedule and in a time frame to minimize damage, hazard, or vandalism to facility.

B. Cutting:

1. Cut existing construction using methods least likely to damage elements.

2. In general, where cutting is required use hand or small power tools designed to cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces.

3. To avoid marring existing finished surfaces, cut or drill from exposed or finished side into concealed surfaces.

4. Cut through concrete and masonry using cutting machine such as carborundum saw or diamond core drill.

5. By-pass utility services such as pipe or conduit, before cutting, where lines are indicated to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal remaining portion of pipe or conduit.

C. Patching:

1. Patch with durable seams that are as invisible as possible.

2. Where feasible, inspect and test patched areas to demonstrate integrity of installation.

3. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction in manner that will eliminate evidence of patching and refinishing.

4. Patch, repair, replace, or rehang existing ceilings as necessary to provide even plane surface of uniform appearance.

3.5 CLEANING:

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature.

3.6 PENETRATIONS:

A. All penetrations made by any contractor through walls, ceilings and floors shall be sealed by the Contractor to meet the requirements of all building codes and fire codes applicable to this project.

B. All sleeves set in concrete, masonry, or other work shall be furnished and installed by the Contractor requiring them in a timely manner so as not to delay the Contractor doing the concrete, masonry or other work. Should the Contractor requiring the sleeves fail to install them in a timely manner they will be required to bear the cost of cutting and patching to install the sleeves.

C. No penetrations, attachments, or other modifications to load bearing walls, beams, columns or other structural members shall be made without written authorization from the Engineer.

END OF SECTION 01 3100

SECTION 01 3105 - DEMOLITION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Furnish all labor, materials, tools, and equipment and perform all operations to demolish and remove systems, system components, and building components indicated on the plans and in the specifications and as required to perform all work necessary to complete the requirements of the Project.

B. Demolition is required for:

1. Portions of existing building indicated on drawings and as required to accommodate new construction.

2. Removal of existing mechanical, electrical, and plumbing equipment, piping, supports, controls and all associated items as indicated on drawings.

1.2 PROJECT CONDITIONS:

A. Owner may occupy portions of building adjacent to areas of demolition. Conduct demolition work in manner that will minimize disruption of Owner's normal operations.

B. Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of demolition work.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 GENERAL:

A. The requirements of the structural plans and specifications shall supersede this specification where a conflict exists.

3.2 PREPARATION:

A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

B. Cease operations and notify Owner's Representative and Engineer immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

C. Provide temporary barricades and other forms of protection to protect personnel from injury due to demolition work.

D. Provide protective measures as required to provide free and safe passage of personnel to occupied portions of building.

E. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.

F. Provide weatherproof closures for exterior openings resulting from demolition work.

G. Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations.

3.3 UTILITIES:

A. Locate, identify, stub off, and disconnect utility services that are not indicated to remain. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building.

B. Provide minimum of 72 hours advance notice to Owner if shut down of service is necessary during changeover.

C. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

D. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction.

E. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

3.4 DEMOLITION:

A. Perform demolition work in systematic manner.

B. Demolish concrete and masonry in small sections. Cut concrete and masonry using power-driven masonry saw or hand tools; do not use power-driven impact tools.

C. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.

D. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

E. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.

F. Maintain fire protection systems during selective demolition.

G. Provide portable fire suppression systems during flame cutting operation.

H. Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions such as flooding and pollution.

3.5 UNFORESEEN CONDITIONS:

A. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of conflict.

B. Submit report to Engineer in written, accurate detail. Pending receipt of directive from Engineer, rearrange demolition schedule as necessary to continue overall job progress without delay.

3.6 DISPOSAL OF DEMOLISHED MATERIALS:

A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.

B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

C. Burning of removed materials is not permitted on project site.

D. Remove protections at completion of work.

3.7 REPAIR:

A. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by demolition work.

3.8 MASONRY RUBBLE:

A. Masonry rubble resulting from new work will not be disposed of in the general dumpster. The masonry contractor should make arrangements to have rubble removed from the site by other means. Masonry rubble shall be removed weekly or more frequently as determined by the A/E.

END OF SECTION 01 3105

SECTION 01 3115 - GENERAL CLEANING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Furnish all labor, materials, tools, and equipment and perform all operations to maintain the buildings and site in a standard of cleanliness as described in this section.

1.2 QUALITY ASSURANCE:

A. In addition to the standards described in this Section, comply with pertinent requirements of agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT:

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

B. The Prime Contractor is to allow in his bid for provision of a dumpster service for the duration of the project. The Prime Contractor shall allow for emptying as needed.

2.2 OTHER MATERIALS:

A. Provide other materials, not specifically described, but required for a completed and proper cleaning, as selected by the Contractor subject to the approval of the A/E.

PART 3 - EXECUTION

3.1 GENERAL:

A. Conduct a daily inspection to verify that the cleaning requirements of this specification are being complied with.

B. If the contractor fails to maintain the building and site in a clean condition, the Owner, after written notification, will have the cleaning work performed by other forces with the cost incurred by the contractor.

3.2 PROGRESS CLEANING:

A. General:

1. Retain stored items in an orderly arrangement allowing maximum site and building access, not impeding traffic or drainage, and providing required protection of materials. At no time shall any emergency exit or fire egress be restricted.

2. Do not allow accumulation of scrap, debris, and waste material.

3. At least twice each week, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the environment.

5. All food, food bags and containers, beverage containers and any other organic debris shall be collected and disposed of daily.

B. Site:

1. Maintain the site in a neat and orderly condition at all times.

2. Inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.

C. Building:

1. Inspect the buildings and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.

2. Prior to the installation of any materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.

3.3 FINAL CLEANING:

A. General:

1. Cleaning shall be to the level typically provided by skilled cleaners using commercial quality building maintenance equipment and materials.

2. Remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste.

3. Additional requirements may be required elsewhere in these specifications.

B. Site:

1. Clean all debris from the site accumulated as a result of the contractor's work.

2. Broom, pressure wash, or steam clean paved areas marred or blemished as a result of the contractor's work.

C. Buildings:

1. Exterior:

a. Visually inspect exterior surfaces and remove traces of soil, waste materials, smudges, and other foreign matter.

b. Remove all traces of splashed materials from exterior surfaces.

c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.

d. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting, chemical cleaning, or other methods of cleaning at no additional cost to the Owner.

2. Interior:

a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.

b. Remove all traces of splashed materials from interior surfaces.

c. Remove paint droppings, spots, stains, and dirt from finished surfaces.

3. Glass:

a. Clean inside and outside dirtied beyond what would normally be expected if construction had not occurred.

D. Schedule final cleaning as approved by the A/E to enable the Owner to accept a completely clean project.

END OF SECTION 01 3115

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems and to coordinate all phases of the Project toward completion in accordance with the Contract Documents, the Construction Manager will conduct project meetings throughout the construction period.

B. Related Work:

1. Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda, and General Conditions.

2. The Contractor's relations with his subcontractors and materials suppliers are the Contractor's responsibility and normally are not part of project meeting content.

3. This Section specifies administrative and procedural requirements for project meetings including, but not limited to:

a. Pre-construction conferences.
b. Progress meetings.
c. Coordination meetings.
d. Pre-installation conferences.

1.2 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings. Any change in personnel by a Contractor will be forwarded in writing to the Construction Manager prior to the change.

1.3 SUBMITTALS

A. Agenda Items: To the maximum extent practical, advise the Construction Manager at least 24 hours in advance of project meetings regarding items to be added to the agenda.

B. Minutes:

1. The Construction Manager will compile minutes of each project meeting, and will furnish one copy to the Prime Contractors, Architect, and required copies to the Owner.

2. Recipients of copies may make and distribute such other copies as they wish.

PART 2 - PRODUCTS

(No products are required in this Section)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

A. Except as noted for Pre-construction Meeting, formal job site meetings with onsite job

superintendents will be held weekly.

B. Except as noted for Pre-construction Meeting, formal project meetings with attendance of each Contractor's office Project Manager will be held monthly.

C. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

A. The Construction Manager will establish the meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.3 PRE-CONSTRUCTION MEETING

A. Pre-construction Meeting will be scheduled to be held within 15 working days after the Owner has issued the Notice to Proceed.

1. Provide attendance by authorized representatives of the Contractor.

2. The Construction Manager will advise other interested parties, including the Owner, and request their attendance, as necessary.

B. Minimum Agenda: Data will be distributed and discussed on at least the following items:

1. Organizational arrangement of Contractor's forces and personnel, subcontractors, material suppliers, the Construction Manager, and the Architect.

2. Channels and procedures for communication.

3. Construction schedule, including sequence of critical work.

4. Contract Documents, including distribution of required copies of original Documents and revisions.

5. Processing of Shop Drawings and other data submitted to the Construction Manager for transmittal to Architect for review.

6. Processing of Bulletins, field decisions, Change Orders, and Payment Applications.

7. Rules and regulations governing performance of the Work.

8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.

9. Preparation of record drawings.

10. Use of the premises.

11. Office, work, and storage areas.

12. Equipment deliveries and priorities.

13. Working hours.

14. Request for Information format.

15. Notification of Defective and Non-Conforming Work format.

16. Rejection of Work format.

3.4 PROJECT MEETINGS

A. Attendance:

1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout the progress of the Work.

2. Conduct progress meetings at the Project site at regularly scheduled intervals. Notify the Owner and Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

3. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at the meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

B. Minimum Agenda:

1. Review, revise as necessary, and approve minutes of previous meetings.

2. Review progress of the Work since last meeting, including status of submittals for approval. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.

3. Identify problems which impede planned progress.

4. Develop corrective measures and procedures to regain planned schedule.

5. Complete other current business.

6. Update as-built documents as required.

7. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

8. Review the present and future needs of each entity present, including such items as:

a. Interface requirements.
b. Time.
c. Sequences.
d. Deliveries
e. Off-site fabrication problems.
f. Access.
g. Site utilization.
h. Temporary facilities and services.

l. Hours of work.
j. Hazards and risks.
k. Cleaning and site conditions.
l. Quality and work standards.
m. Change Orders.
n. Documentation of information for payment requests.

C. Revisions to minutes:

1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.

2. Persons challenging published minutes shall respond to the original distribution email with the challenge and include all original recipients of the particular set of minutes.

3. Challenge to minutes shall be discussed and settled at the next regularly scheduled meeting.

D. Reporting: No later than 5 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

END OF SECTION

PART 1 - GENERAL

1.0.1 WORK INCLUDED

A. To assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract, and to assist the Architect in evaluating progress of the Work, prepare and maintain the schedules and reports described in this Section.

B. It should be noted by all Contractors and material suppliers the extremely critical nature of this project and time being allowed for its completion.

C. **In no event shall any Contractor work less than five (5) days per week. If a normal work day (Monday through Friday) is lost due to weather, it is expected that the Contractor work Saturday and/or Sunday to make up the lost day(s).**

1.0.2 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda, and General Conditions.

B. Construction period shall be as identified in the Agreement Form.

1.0.3 DEFINITIONS

A. "Day", as used throughout the Contract unless otherwise stated, means calendar day.

B. "Contractor" means General Contractor, if the project is bid as Single Prime, or Building and Finishes Contractor, if the project is bid as Multi-Prime, except in Part 1.0.1 above which applies to ALL Contractors.

1.0.4 QUALITY ASSURANCE

A. The Contractor shall employ a ~~third party~~ scheduler who is thoroughly trained and experienced in compiling construction schedules, and in preparing and issuing periodic updates and reports as required.

B. Perform data preparation, analysis, charting and updating in accordance with standards approved by the Architect.

1.0.5 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. Construction schedule: Within Ten (10) calendar days after each Prime Contractor has received the Owner's Notice to Proceed, each Prime Contractor shall provide the Construction Manager with sufficient information on his plan for completing all work under this Contract. The Building and Finishes Contractor shall provide a detailed bar chart (CPM Method) of his work clearly showing how his schedule integrates with the durations provided by other Prime Contractors and the total construction duration. This bar chart schedule must include subcontract awards, material purchase dates and delivery dates, manpower levels broken down by

trades and plant and equipment to be used. All interface activities and tasks which must be completed by other trades prior to proceeding with the work must be shown on the bar chart schedule. Submit a draft copy of the construction schedule for review by Construction Manager and all Prime Contractors. After approval by the Construction Manager, submit one (1) 30"x42" size prints and electronic copies of the approved baseline construction schedule for distribution to all Prime Contractors.

C. Periodic revisions and reports: Submit updated copies of the construction schedule updated along with the monthly payment request, at the scheduled Monthly Meeting.

PART 2 - PRODUCTS

2.0.1 CONSTRUCTION ANALYSIS

A. Graphically show by bar-chart the order and interdependence of all activities necessary to complete the work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors.

B. The Construction Schedule shall be cost loaded and contain the following columns at a minimum: original durations, remaining durations, start and finish dates, early start and finish dates, total float, percent complete, budgeted total cost, earned value, logic and target bars in the Gantt bar chart view.

PART 3 - EXECUTION

3.0.1 CONSTRUCTION SCHEDULE

A. Ten (10) days after receipt of Notice to Proceed, complete the construction analysis in preliminary form, meet with the Construction Manager, review contents of the proposed construction schedule, and make all revisions agreed upon.

B. The information on the Contractor's plan of action for performing the work under this Contract shall be based on the allotted construction duration for this work. The Construction Schedule shall indicate the key points of interface between the work under this contract and the other work of the project and the major project milestones. Sequencing and coordinating of miscellaneous activities will be discussed and agreed upon in the weekly meetings. It is agreed and understood that the schedule dates shown in the Construction Schedule for the indicated interface points and project milestones may change during the course of the Contract and such changes, in and of themselves, will not entitle the Contractor to any additional compensation or be deemed to constitute an extension of time or to constitute a change under the Agreement Form.

C. Every effort will be made to make progress on the work as expeditiously as possible and if critical path activities can be improved during the course of the work, the Construction Schedule shall be revised to reflect improved dates on all work activities.

D. All Contractors shall award all subcontracts, purchase materials, arrange for deliveries, furnish sufficient forces, plant and equipment and work such hours as necessary to insure execution of the work in conformity with the project duration.

E. In the event of material procurement delays, the Contractor shall immediately notify the Construction Manager. However, it will be assumed that the Contractor has checked material deliveries as specified prior the Bid, as submission of a Bid for work will be assumed to be an agreement to the time frame allocated for that work as noted per the

total project duration.

F. If the any Contractor falls behind the Construction Schedule, or current approved revision of the Construction Schedule, and is not entitled to any time extension as determined by the Construction Manager, he shall, upon request of the Construction Manager, submit within forty-eight (48) hours his plan for bringing his work back up to schedule. This plan shall include a commitment for immediate implementation, unless otherwise approved by the Construction Manager, and must include a time commitment, acceptable to the Construction Manager, for bringing the work up to schedule. If the Contractor fails to provide an acceptable plan within the requested time, he will be given a mandatory plan by the Construction Manager.

G. The Contractor's plan shall illustrate his proposed methods for bringing his work back up to schedule, whether by a normal 40 hour work week, or by working 24 hours a day if necessary. If other measures will not be sufficient to make up the lag, the Contractor's plans and implementation thereof shall include increasing the number of shifts, days of work and/or instituting or increasing overtime, all at his own expense.

H. If a Contractor fails or refuses to implement such measures as will bring his work back up to conformity with the approved Schedule, his right to proceed with any or all portions of the Contract requirements may be terminated pursuant to the Agreement Form.

3.0.2 PERIODIC REVISIONS AND REPORTS

A. The approved construction schedule shall be updated monthly and submitted along with each monthly payment application.

1. Indicate "actual" progress in percent completion for each activity.

2. Provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

3.0.3 TWO WEEK LOOK-AHEAD SCHEDULES

A. The Contractor shall provide a two week look-ahead schedule at each and every weekly progress meeting. This schedule should detail all ongoing activities by that Contractor as well as any activity expected to start/resume within two weeks of the progress meeting date. The purpose of this schedule is to provide a tool to coordinate the activities of all Contractors and Subcontractors and is intended to be much more detailed than the overall construction schedule.

3.0.4 REVISIONS

A. Periodic schedule review and revision meetings will be held with the Contractors who will be expected to provide input to the scheduling activities. The latest approved revision of the Construction Schedule shall be part of the Contract Documents and shall be complied with by the Contractor at no extra cost to the Owner. Activity duration periods shown on the Construction Schedule will not be reduced without the approval of the Contractor nor will they be increased without the approval of the Construction Manager.

3.0.5 REQUEST FOR EXTENSION DUE TO DELAYS

A. It is understood that the Owner, Construction Manager, or Architect/Engineer shall not, in any event, be liable to the Contractor for delays of any kind whatsoever and

the Contractor shall be fully responsible for making up lost time of all delays except to the extent that extensions of time are granted. If completion of the work is delayed by any act of neglect of the Owner, or by the Construction Manager or the acts of the Construction Manager or Architect/Engineer, by strikes or by other exceptional conditions over which the Contractor has no reasonable control, the time of completion shall upon receipt of the Contractor's written request, be extended by such period as the Construction Manager may consider reasonable. No extension shall be allowed unless a claim is presented in writing to the Construction Manager within seven (7) days after the commencement of such delay. In case of continued cause of delay, only one claim is necessary. Nothing in this clause shall be construed to release the Contractor from the obligation to perform at his own expense all overtime necessary to maintain the Contract completion date where delays have occurred which are not excused. If the Contractor, delayed by any acts of the Owner, Construction Manager, Architect/Engineer, is granted an extension of time by the Construction Manager, the Contractor shall comply with the extended schedule with no additional compensation from the Owner.

B. Delays due to weather/precipitation. The following table shows the number of days, on average, per month, that it rained .1” or more in York County, SC, over a ten year period.

January	4 days	July	6 days
February	4 days	August	5 days
March	5 days	September	6 days
April	4 days	October	3 days
May	4 days	November	3 days
June	5 days	December	4 days

C. For the Contractor to claim an extension due to weather, there must have been at least .1” of precipitation that day or from a previous day, a critical path activity must have been affected and the Contractor and Construction Manager must agree that the day was unworkable. Critical Path activities are determined based on the updated monthly schedule provided by the Contractor for the month in question. If the Contractor fails to provide an updated schedule for the month that an extension is being requested, then the previous month’s schedule shall be used. All days must be documented on a daily basis and agreed upon by the Construction Manager. The difference between the total actual unworkable days due to precipitation and the above days will be granted (if in excess). This extension must be formally requested once a month (with transmittal of Pay Application) for the extension to be granted. If a formal request is not made at the said time, the opportunity for extension request will not be granted.

D. Per 1.0.1.C above, normal work days lost due to weather shall be made up on the following Saturday and/or Sunday, as necessary, to complete the five (5) day work week requirement. If an extension request is made for lost day(s) and the Contractor failed to work the following Saturday and/or Sunday, weather permitting, to meet the 5 day requirement, the request will be reduced by the number of Saturdays and Sundays that should have been worked to complete the 5 day work week requirement.

END OF SECTION

PART 1 GENERAL

A. The Contractor shall submit for review by the Architect/Engineer, Shop Drawings and schedules required by the Specifications, or that may be requested by the Architect/Engineer, and no work shall be fabricated by the Contractor, except at his own risk, until such review has been completed.

B. The Contractor shall be provided with access to Procore by the Construction Manager. All submittals shall be electronically uploaded to the software for review by the Design Team. Should the Contractor require assistance with functionality of the management software, please notify the Construction Manager for additional assistance.

1.1 FORM OF SUBMISSION MATERIALS

A. SHOP DRAWING SCHEDULE

1. Immediately after date of Notice to Proceed, each Contractor shall submit to the Construction Manager a Shop Drawing Submittal Schedule, which shall include the following minimum information (**This should be provided at the Pre-Construction Meeting):**

a. List all items to be submitted for review referenced to the specific specifications section.

b. Name of subcontractor if applicable.

c. Supplier and date of purchase order.

d. Total fabrication and delivery time from time submittals are returned to the Contractor.

e. Scheduled delivery date.

(NOTE): No applications for payment will be processed unless the above listed information has been submitted.

B. SHOP DRAWINGS

1. Scale and Measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.

2. Types of submittals required:

a. Submit Shop Drawings electronically in Procore.

b. Submit electronic copy of all supporting documentation including manufacturer's data, installation requirements, dimensional information, and any other required information to determine if a product meets the intent of the specification.

3. Review comments from the Architect will be made and distributed to the Contractor.

C. MANUFACTURER'S LITERATURE

1. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.

D. SAMPLES

1. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below.

2. Number of Samples required:

a. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus three which will be retained by the Architect and Construction Manager.

b. By prearrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Architect.

E. COLORS AND PATTERNS

1. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.

1.2 SUBMISSION PROCEDURE

A. GROUPING OF SUBMITTALS

1. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.

a. Partial submittals will be rejected as not complying with the provisions of the Contract.

b. The Contractor may be held liable for delays so occasioned.

2. Provide a separate transmittal and drawing number for each item to be reviewed.

B. CHECKING SUBMITTALS PRIOR TO SUBMISSION

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.

2. Verify that each item and the submittal for it conform in all respects with the specified requirements.

3. The drawings submitted shall be marked with the name of the project, numbered consecutively and bear the signed and dated stamp of the approval of that Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for re-submission. If the shop drawings show variation from the requirements of the Contract because of standard shop practice or with reasons, the Contractor shall make specific mention of such variations in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, that

Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though such shop drawings have been approved.

C. DELIVERY AND TIMING OF SUBMITTALS

1. All submittals shall be uploaded to Procore for review. The Construction Manager is responsible for initial review before forwarding to the Architect/Engineer for review based upon their relative position in the Construction Schedule, or as follows:

   a. Prior to Mobilizing On-Site
      1. Bonds
      2. Insurance Certificate

   b. Following Notice to Proceed; **NOTE TIME FRAMES INVOLVED**
      1. Shop Drawing Submittal Schedule (within 10 days)
      2. Schedule of Values (within 10 days)
      3. Superintendent's Resume (within 10 days)
      4. Detailed Construction Schedule (within 10 days) updated monthly
      5. Subcontractor Listing (within 10 days) updated monthly
      6. All Shop Drawings/Submittals (within 90 days) unless otherwise approved.

2. **If the time frames above are not adhered to, the Contractor will be subject to a penalty of $100 per day per item until all submittals are complete. The penalty is in addition to the Schedule of Values line item requirement referenced in 1.3.A.8 of Section 01 29 73.**

3. Shop drawing submittals shall be made far enough in advance, based on the approved Construction Schedule, to meet all installation dates as scheduled. This will require that sufficient lead time be allowed to address an adequate review period, securing necessary approvals, possible revisions and re-submittals, placing orders and securing delivery dates.

4. In scheduling, allow at least ten (10) working days for review by the Architect following his receipt of the submittal.

D. ARCHITECT'S REVIEW

1. Review by the Architect does not relieve the Contractor from responsibility for errors which may exist in the submitted data.

2. The review of Shop Drawings will be general and shall <u>not</u> be construed as:
   a. Permitting any departure from the Contract Requirements.

   b. Relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist.

   c. Approving departures from additional details or instruction previously furnished by the Architect/Engineer.

3. Revisions:

   a. Make revisions required by the Architect.

   b. If the Contractor considers any required revisions to be a change, he shall

notify the Construction Manager and/or Architect as provided for in Specification Section 01 26 53.

c. Make only those revisions directed or approved by the Architect.

4. If a drawing, as submitted, indicates a departure from the Contract requirements which the Architect/Engineer finds to be in the interest of the Owner and to be minor as not to involve a change in the Contract Price or time for performance, the Architect/Engineer may approve the drawing.

E. FINAL DISTRIBUTION OF SUBMITTALS

1. Final distribution of submittals will be performed via Procore and available electronically throughout the duration of the project. Each Contractor shall be responsible for the distribution of the Shop Drawings and schedules within his own organization and to his subcontractors.

END OF SECTION

PART 1 - GENERAL

Bidders and Contractors are instructed that the Owner has engaged the services of an inspection firm to perform various inspections. It shall be the responsibility of the contractor requiring the inspections or testing to adequately schedule and coordinate the timing of the inspections or tests.

1.1 DESCRIPTION

1.1.1 Work included:

1. Schedule inspections and testing, complete, as described in this section and elsewhere in pertinent sections of the project manual.

2. Provide construction of small scale sample of work as may be described in pertinent section of the project manual.

3. Remove and replace defective work.

1.1.2 Related work:

1. Requirements for testing may be described in various Sections of these Specifications, the General Conditions, and the International Building Code.

2. Where no inspections or testing requirements are described, but the Owner decides that an inspection or test is required, the Owner may require such inspections or tests to be performed under current pertinent standards. Payment for such inspections and/or testing will be made under the terms of the agreement with the Inspection or Testing Agent.

1.2 QUALITY ASSURANCE

1.2.1 Provide coordination of inspections and testing with the Owner's designated Inspections agent or testing laboratory.

1.2.2 Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

1.2.3 Construct sample construction to the workmanship which can be expected for the final installation of the proposed product.

1.3 SUBMITTALS

1.3.1 Upon completion and/or inspections, the Inspecting Agent shall promptly distribute copies of inspection reports to the Construction Manager, the Architect, The Contractor, to governmental agencies requiring submission of such reports, and to such other persons as directed by the Construction Manager.

PART 2 - PRODUCTS

2.1 PAYMENT FOR TESTING

2.1.1 The Owner shall pay for all code required special inspections and testing services required within the Specifications, and shall cover all testing and inspecting required by governmental agencies having jurisdiction.

2.1.2 When initial inspections or tests required by the Code or the Architect\Engineer indicate non-compliance with the Code or the Contract Documents, subsequent re-inspections occasioned by the non-compliance shall be performed by the Owner's inspections agent or testing laboratory and the costs thereof shall be paid by the Contractor.

2.1.3 It shall be understood and agreed by all involved that the Inspections Agent and the Testing Laboratory is the Owner's agent and representative. By accepting the work of this job, the Inspections Agent and the Testing Laboratory agrees to represent the Owner alone. All reports shall be sent directly to the Owner, the Architect, the Engineer, and the Contractor. No reports will be sent to the Contractor alone.

2.1.4 Where inspections, tests, certificates, or approvals by authorities other than the Architect\Engineer are required for an item or material, the Contractor shall request that the Owner's Inspections Agent or Testing Agency perform and\or procure such certifications of approval and forward four copies of the results of the test certificates or approvals to the Construction Manager prior to proceeding with the work involved. Such laboratories and\or authorities as are employed for this purpose shall be competent, with a generally recognized reputation in the field concerned and shall be subject to approval by the Architect.

2.2 SPECIFIC TESTS AND INSPECTIONS

2.2.1 Special inspections and testing required by codes or ordinances, or by a plan approval authority, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Owner, unless otherwise provided in the Contract Documents.

2.2.2 Testing shall include, but not be necessarily limited to that described in detail in Part 3 of this Section.

2.3 CONTRACTOR'S CONVENIENCE TESTING

2.3.1 Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

2.4 GENERAL MATERIALS

2.4.1 For sample construction use materials which are exact to those proposed for installation under this Contract.

PART 3 - EXECUTION

3.1 COOPERATION WITH INSPECTION AGENCY AND TESTING LABORATORY

3.1.1 Representatives of the Inspection Agent and the testing laboratory shall have access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

3.2 TAKING SPECIMENS

3.2.1 All specimens and samples for inspection or testing, unless otherwise provided in the Contract Documents, shall be taken by the inspecting or testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

3.3 SPECIFIC TESTING AS REQUIRED IN TECHNICAL SPECIFICATIONS SECTIONS OF THE PROJECT MANUAL

3.3.1 Most required tests include, but are not necessarily limited to:

1. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for proposed purpose;

2. Make field density tests on samples from in-place material as required;

3. As pertinent, inspect and test the scarifying and re-compacting cleaned sub-grade; inspect the progress of excavating, filling and grading; make density tests at fills and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction;

4. Visually inspect earth work under building structure and make such tests as are necessary to determine suitability for the proposed purpose;

5. Make field density tests on samples from in-place material as required in area where trenches and/or footings are dug to ensure suitability for the proposed purpose;

6. Performing compressive strength testing of concrete as described in Division 03.

7. Performing required steel testing as required in Division 05.

3.3.2 Make and distribute necessary reports and certificates.

3.4 WAIVER OF INSPECTION AND/OR TESTING

3.4.1 Specified inspections and/or tests may be waived only by the specific approval of the Architect or Engineer, and such waivers will be expected to result in credit to the Owner equal to normal cost of such inspection and/or test.

END OF SECTION

SECTION 01 5100 - PRODUCT HANDLING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Furnish labor, material, tools, and equipment and perform all operations to handle, load, unload, store, and protect all materials and products used on this Project.

1.2 QUALITY ASSURANCE:

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURERS' RECOMMENDATIONS:

A. Except as otherwise approved by the Engineer, comply with manufacturers' recommendations on product handling, storage, and protection.

1.4 PACKAGING:

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.

B. Maintain packaged materials with seals unbroken and labels intact until the time of use.

C. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

D. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality, and other pertinent information.

1.5 PROTECTION:

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, though which equipment and materials are handled.

B. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.6 REPAIRS AND REPLACEMENTS:

A. In the event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the Owner.

END OF SECTION 01 5100

1.0 GENERAL

1.1 Deficiency Lists

A. During the construction of the work, the Construction Manager and/or Architect/Engineer shall inspect the work for conformance to the Contract Documents.

B. Should an inspection reveal work that is not in conformance with the Contract Documents, and if the nature of the non-conformance warrants, at the sole discretion of the Construction Manager and/or Architect/Engineer, a written list of deficiencies will be issued.

C. The "deficiency list" as hereinafter called, shall stipulate the item or items of work that are in non-conformance and shall specify a reasonable time for the deficient work to be brought into conformance with the Contract Documents.

D. Upon receipt of the deficiency list the Contractor shall by any and all means at his disposal, endeavor to correct the work within the time stipulated. The Contractor shall notify the Construction Manager in writing when the work has been corrected and request an inspection.

E. If the inspection reveals the deficiency has been corrected, then the deficiency list shall be rescinded.

F. During the period that the deficiency list is in effect, the Construction Manager may, at his option, not authorize the payment of progress billings until the deficiency list is rescinded or, in the opinion of the Construction Manager, the Contractor is making a good faith effort to correct the deficiency.

1.2 Punch Lists/Final Inspection

A. When the Contractor determines that his work or portions of his work are sufficiently near completion to warrant a preliminary inspection, **he shall request in writing to the Construction Manager a preliminary inspection.**

B. At a mutually agreed upon time, the Construction Manager, Architect/Engineer, and Contractor shall conduct a preliminary inspection of the work for completeness, conformance to the Contract Documents and compliance with applicable codes. Any items noted as incomplete shall be listed on a preliminary punch list, a copy of which shall be forwarded to the Contractor for completion and correction. If it is determined by the Architect and Construction Manager that the work is not complete or sufficiently near completion, then the Contractor shall prepare his own preliminary punch list, forward copies to the Construction Manager for review, and repeat Part A above.

C. The Construction Manager shall establish a reasonable time period for the completion or correction of all items on the preliminary inspection punch list. All items on the preliminary punch list shall be completed **prior to inspection by State Agencies or Authorities Having Jurisdiction (AHJ).**

D. Any incomplete or non-compliance items found during the State Agency or AHJ inspection shall be completed by the Contractor within seven (7) days of the inspection or earlier if required by the Construction Manager.

E. Upon completion of the State Agency or AHJ inspection list, and if the completeness of the work allows, the Architect/Engineer shall issue a Certificate of Substantial Completion. Should the amount of incomplete work be such that a Certificate of Substantial Completion cannot be issued, the Contractor shall complete all remaining work and request in writing to the Construction Manager a subsequent inspection for Substantial Completion.

F. Once a Certificate of Substantial Completion has been issued, a final inspection shall be held with the Owner, Architect/Engineer, Construction Manager and Contractor. Any items noted during the final inspection will be documented in a final inspection punch list and forwarded to the Contractor for completion. All final inspection punch list items shall be completed with fourteen (14) days of receipt of the final inspection punch list. Once all final punch list items are complete, the Architect/Engineer shall establish the date of final completion.

1.3 Project Close-Out

A. Final Close-Out and Payment

1. The Contractor may make Application for Final Payment after the Certificate of Substantial Completion has been issued. The following items must be submitted to the Construction Manager prior to processing of the Final Application for Payment:

a. Affidavit of Payment of Debts and Claims, (AIA-G706);
b. Consent of Surety, (AIA-G707);
c. Release of Liens, (AIA-G706A) from: Contractors, Sub-Contractors, and Material Suppliers;
d. Letter on company letterhead stating all temporary facilities, services, debris and surplus materials have been removed;
e. Final "Project Record Documents" as specified in Section 01 78 39, Project Record Documents;
f. Operations & Maintenance Manuals as specified in Section 01 78 39, Project Record Documents;
g. Final topographical survey as required by 01 73 00;
h. Guarantees, Warranties, and Bonds as specified in Section 01 78 39, Project Record Documents;
i. Spare parts and replacement items as required by the Specifications;
j. Letter on company letterhead stating no asbestos containing material has been installed in the project;
k. Executed Certificate of Substantial Completion (AIA G704);
l. Demonstration, testing and training of equipment is completed;
m. Completed final inspection punch list signed by the Contractor verifying that each item is complete.

2. No final payment application will be processed for payment until final inspection and final acceptance.

3. Close-out time encompasses a large amount of work during a short period of time. Therefore, the Contractor is encouraged to begin to submit close-out items as soon as possible so that the Contract may be completed, thus allowing the Architect/Engineer to recommend approval of the final payment to the Owner.

4. The Construction Manager may continue to withhold no less than 5% retainage from the Contractor until all outstanding close-out materials are submitted to the Construction Manager. It shall be at the discretion of the Construction Manager, upon consultation with the Architect, to reduce the amount of retainage on a project by project basis, upon a favorable review of the status of completion of the final punch list, the status of close-out submittals, and above all, the total amount listed on the Release of Liens submitted by the Contractor for all Sub-Contractors and Material Suppliers contracted with by the General Contractor. At no time shall the retainage be reduced to an amount less than the total of the Release of Liens submitted by the Contractor. Final payment may then be made once all remaining outstanding close-out requirements are met.

1.4 Responsibility

A. It shall be the Contractor's responsibility to see that all requirements of this Section of the Specifications are executed and complete in a timely manner.

B. No provisions of this section of the Specifications shall in any way relieve the Contractor of completing his work on time and in accordance with the Project Schedule.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:

1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Paragraph 2.1 below. Upon completion of the Work, deliver the recorded changes to the Construction Manager.

2. Final record survey, performed by a Professional Land Surveyor, of installed underground materials and final grades.

3. To aid in the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding the products incorporated into the Work, furnish and deliver the operation and maintenance manuals and data as described in this Section and in other pertinent sections of these Specifications.

4. Compile specified guarantees, warranties and bonds, as well as specified service and maintenance contracts. Co-execute submittals when so specified and review submittals to verify compliance with Contract Documents. Submit to Construction Manager for review and transmittal to Owner.

B. Related work:

1. Documents affecting work of this section include, but are not necessarily limited to, the contract documents, addenda and General Conditions.

2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these specifications.

3. Documents affecting the various warranties required:

a. General Warranty of Construction: General Conditions of the Contract.

b. Warranties, Guarantees, & Bonds Required for Specific Products: Each respective section of Specifications as listed in the Project Manual.

c. Provision for Duration of Warranties Guarantees, & Bonds: The respective section of specifications which specifies the product.

1.2 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Drawings to one person on the Contractor's staff as approved by the Architect/Engineer.

B. In preparing operation and maintenance manuals and data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the extent needed for communicating the essential data.

C. In preparing warranties, guarantees, and bonds, utilize personnel familiar with the

requirements of the specifications regarding each. A detailed analysis of each specification is to be performed to assure all specified warranties, guarantees, and bonds are accounted for and submitted.

D. Accuracy of records:

1. Accuracy of records shall be such that a future search for items shown on the Project Record Drawings may rely reasonably on the information provided under this Section of the Work.

1.3 SUBMITTALS

A. Project Record Drawings

1. The Architect/Engineer's approval of the current status of Project Record Drawings may be a prerequisite to the Architect/Engineer's approval of requests for progress payment and request for final payment under the Contract.

2. Prior to submitting each request for progress payment, secure the Architect/Engineer's approval of the current status of the Project Record Drawings.

3. Prior to submitting request for final payment, submit the final Project Record Drawings to the Architect/Engineer and secure his approval.

B. Operation and Maintenance Manuals

1. Comply with pertinent provisions of Section 01 33 00 Submittal Procedure.

2. Unless otherwise directed in other Sections, or in writing by the Construction Manager, submit **THREE** copies of the final Manual to the Construction Manager prior to indoctrination of operation and maintenance personnel.

3. Submittals of approved copies of operation and maintenance data will be a prerequisite for approval of final payment applications.

C. Warranties, Guarantees and Bonds

1. Provide warranties, guarantees, and bonds as specified in Divisions 01-33.

2. Unless otherwise directed in other Sections, or in writing by the Construction Manager, submit two copies of each specified warranty, guarantee, and bond to the Construction Manager.

3. Submittals of approved copies of warranties, guarantees, and bonds will be a prerequisite for approval of final payment applications

PART 2 - PRODUCTS

2.1 JOB SET RECORD DOCUMENTS

A. Promptly following receipt of the Owner's Notice to Proceed, obtain and provide, at no charge to the Owner:

1. One complete set of all Documents comprising the Contract, including Plans, Specification Manuals, and Shop Drawings.

2. Field survey books for use in staking sewer work.

B. Immediately upon receipt of the job set described in subparagraph 2.1.A.1 above, identify each of the Documents with the title, "RECORD DRAWINGS - JOB SET", and “RECORD SPECIFICATIONS - JOB SET”.

C. Preservation:

1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Architect. Maintain the job set of Record Drawings completely protected from deterioration and from loss and damage until completion of the Work and transfer to the Construction Manager.

2. In the event of loss of recorded data, use means necessary to again secure the data to the Architect/Engineer's approval.

a. Such means shall include, if necessary in the opinion of the Architect/Engineer, removal and replacement of concealing materials.

b. In such case, provide replacements to the standards originally required by the Contract Documents.

3. Do not use the job set for any purpose except entry of new data and for review by the Architect.

4. Maintain the job set at the site of Work that is designated by the Architect.

D. Making entries on Job Set Drawings:

1. Use erasable colored pencil, preferably red (not ink or indelible pencil) to delineate changes.

2. Show by station number location of all fittings, manholes, valves, wye locations, etc.

3. Reference all valves to above ground items deemed to be reasonably safe from being relocated and indicate such references on the drawings.

4. Show location of electrical conduit, pull boxes, etc.

5. Show all finish grades.

6. Note related Change Orders, Supplemental Instructions, Requests for Information on plan sheets where applicable.

7. Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the text of the Specifications and modifications.

8. Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.

E. Submittal:

1. Submit "marked-up" set of drawings to the Construction Manager.

2. Make any necessary additions as required by the Architect.

3. Submit field survey books to the Construction Manager.

4. Submit one complete set of Product Data (Shop Drawing) submittals. All submittals are to include approval stamp of Architect/Engineer.

2.2 OPERATION AND MAINTENANCE MANUALS

A. INSTRUCTION MANUALS: Where Instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provision of this Section.

1. Format:

a. Size: 8-1/2" x 11"

b. Paper: White bond, at least 20 lb. weight

c. Text: Neatly written or printed

d. Drawings: 11" in height, preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.

e. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.

f. Binding: Use heavy-duty plastic or fiber

g. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs, and cfm; where items may be expected to be measured within ten years in accordance with metric

formula, provide additional measurements in the "International System of Units" (SI).

2. Provide front and back covers for each Manual, using durable material approved by the Architect, and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS

(name and address of work)
(name of Contractor)
(general subject of this manual)
(approval signature of Construction Manager)
(approval date)

3. Contents: Include at least the following:

a. Neatly typewritten index near the front of the Manual, giving immediate information as to location within the Manual of all emergency information regarding the installation.

b. Complete instructions regarding the installation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.

c. Complete nomenclature of all parts of all equipment.

d. Complete nomenclature and part number of all other data pertinent to procurement procedures.

e. Copy of all guarantees and warranties issued.

f. Manufacturer's bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturer's data.

g. Such other data as required in pertinent Sections of these Specifications.

4. Complete the Manuals in strict accordance with the approved preliminary drafts and the Construction Manager's and Architect's review comments.

5. Any and all other items required by the specific specifications relating to the maintenance and operations of the various components of the work or any and all certificates and testing reports required by the specific specifications shall be incorporated into the maintenance manuals. Items of this nature shall include but are not limited to:

a. Test and balance reports of HVAC systems.

b. Test and certification reports of electrical systems such as fire alarm and life safety systems, communications systems, clock systems, etc.

c. Valve tag lists

d. Certification of sterilization of potable water systems.

B. MAINTENANCE TRAINING: Each Subcontractor shall instruct the Owner in the

proper care, maintenance and operation of all systems installed under his Contract. Provide a written letter stating that the Owner has been instructed and list the following:

1. Date, time and place of instruction

2. Parties present

3. Systems and items instructions were given on

2.3 WARRANTIES, GUARANTEES, AND BONDS

A. All work under this Contract shall be guaranteed by the Contractor against defects in material or workmanship for a period of one year from the Date of Substantial Completion, as established in writing by the Architect/Engineer, unless a longer period is specified for a particular item of work in the specifications. In which case, the longer period shall be the Guarantee Period.

B. Prior to the end of the Guarantee Period, the Owner may have the Architect/Engineer inspect the Work, and shall advise the Architect/Engineer of any known defects. The Architect/Engineer or the Owner shall notify the Contractor, in writing, of any defects found.

C. The Contractor agrees to repair or replace all defects in material or workmanship within sixty (60) days of the date of the written notice from the Architect/Engineer or the Owner.

D. The Contractor shall furnish the Owner with three (3) copies of a written one-year guarantee delivered with the close-out documents, on the Contractor's stationery with original signatures on each copy, signed and sealed the same as the Bid Form, stating:

"The undersigned guarantees all work furnished by __(Company Name)__, for a period of one (1) year from the date of Substantial Completion, and agrees to repair or replace defects within sixty (60) days upon notice of defects by the Owner."

E. Submit warranties, bonds, service and maintenance contracts as specified in respective sections of Specifications.

1. Assemble warranties, bond and service and maintenance contracts, executed by each of respective manufacturers, suppliers, and subcontractors.

2. Number of original signed copies required: Two each.

a. Format:

1). Size 8-1/2 in. x 11 in., punch sheets for 3-ring binder.

2). Fold larger sheets to fit into binders.

3). Cover: Identify each packet with typed or printed title "GUARANTEES, WARRANTIES AND BONDS". List:

a). Title of Project

b). Name of Contractor

3. Binders: Commercial quality three-ring, with durable and cleanable plastic covers.

4. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

a. Product or work item.

b. Firm, with name of principal, address and telephone number.

c. Scope.

d. Date of beginning of warranty, bond or service and maintenance contract.

e. Duration of warranty, bond or service and maintenance contract.

f. Provide information for Owner's personnel:

1). Proper procedure in case of failure.

2). Instances which might affect validity of warranty or bond.

g. Contractor, name or responsible principal, address and telephone number.

F. For equipment or component parts of equipment put into service during progress of construction:

1. Submit documents within 10 days after inspection and acceptance.

2. Note: Warranty periods for equipment started during construction will not start until substantial completion for the project, including all HVAC equipment such as split system heat pumps, dehumidification equipment, exhaust fans, air handlers, etc.

G. Otherwise make submittals within ten days after Date of Substantial Completion, prior to final request for payment.

H. For items of work, where acceptance is delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

END OF SECTION

SECTION 07 1000 - ROOF WORK

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Furnish all labor, materials, tools, and equipment and perform all operations to maintain the buildings and site in a standard of cleanliness as described in this Section.

B. All work shall be performed by a roofing contractor certified and licensed to install a bituminous membrane roof. The current roof was installed in 2004. All work performed shall be done in accordance with the manufacturer's requirements to maintain the current bond.

1.2 EXISTING ROOF:

A. The existing roof was installed by Baker Roofing (Charlotte, NC). The contractor is not obligated to use the original roofing installer.

1.3 QUALITY ASSURANCE:

A. Repairs to the existing roof system shall be in accordance with the NRCA, Repair Manual for Low-Slope Membrane Roof Systems, the NRCA, Roofing and Waterproofing Manual, Fifth Edition and in accordance with the manufacturer’s written instructions.

B. Installers:

1. The following roof installers (provided they meet the requirements of these specifications) are acceptable:

a. Baker Roofing (Charlotte, NC)

b. Approved Equal

1.4 CODES AND STANDARDS:

A. ASTM D312, “Standard Specification for Asphalt Used in Roofing”

B. ASTM D450, “Standard Specification for Coal Tar Pitch Used in Roofing, Dampproofing and Waterproofing”

C. ASTM D1863, “Standard Specification for Mineral Aggregate Used on Built Up Roofs”

D. ASTM D2178, “Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing”

E. ASTM D2824, "Standard Specification for Aluminum Pigmented Asphalt Roof Coatings, Nonfibered, Asbestos Fibered, and Fibered without Asbestos"

F. ASTM D3903, "Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced With Mineral Granules"

G. ASTM D4601, "Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing"

H. ASTM D4990, "Standard Specification for Coal Tar Glass Felt Used in Roofing and Waterproofing"

PART 2 - PRODUCTS

2.1 GENERAL:

A. Provide all roof work indicated on general construction plans, electrical plans, plumbing plans, and mechanical plans. This work includes, but is not limited to:

1. Work required as the result of demolition of equipment and utilities, including but not limited to:

a. Condensing units on roof

b. Refrigerant piping and electrical roof penetrations

2. Work required as the result of adding equipment to the roof, including but not limited to:

a. Condensing units on roof

b. Refrigerant piping and electrical roof penetrations

2.2 MATERIALS:

A. System materials shall be consistent with those in place.

PART 3 - EXECUTION

3.1 COORDINATION:

A. Coordinate demolition and renovation work and schedule with prime contractor after award of project.

B. After equipment is removed from roof, roofing contractor shall inspect roof to determine exact extent of roof repairs to existing system.

3.2 TEMPORARY ROOF WORK:

A. After existing equipment is removed and before new equipment is installed, a roof can be temporarily repaired. The contractor shall provide all temporary roof patches to minimize chance of water entering building or damage to roof.

3.3 ROOF BOND:

A. After all roof work is done, contractor shall issue attachment to existing bond certifying that the bond has not been adversely impacted by the work in this project.

END OF SECTION 07 1000

SECTION 07 2000 - SEALANTS AND CAULKING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Furnish all labor, materials, tools, and equipment and perform all operations to seal and caulk joints where shown on the plans as required to provide a positive barrier against passage of moisture and passage of air.

1.2 QUALITY ASSURANCE:

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of this work.

PART 2 - PRODUCTS

2.1 SEALANTS:

A. Provide the following materials manufactured by Sonneborn Building Products:

	MATERIAL	LOCATION OF USE:
1.	Sonolastic NP1	Throughout the Work, except where other sealant is specified, where anticipated joint movement will be 25% or less.
2.	Sonolastic Omniseal	Throughout the Work, except where other sealant is specified, where anticipated joint movement will be 50% or less.
3.	Polyethylene Backer Rod	Where required to prevent 3-point adhesion

B. For other services, provide products especially formulated for the proposed use and approved in advance by the Engineer.

C. Colors:

1. Colors for each exposed sealant installation will be selected by the Engineer from standard colors normally available from the specified manufacturer.

2. In concealed installations, any color may be used.

2.2 PRIMERS:

A. Use only those primers which have been tested for durability on the surfaces to be sealed and are specifically recommended for this installation by the manufacturer of the sealant used.

2.3 BACKUP MATERIALS:

A. Use only those backup materials, specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and non-staining.

2.4 MASKING TAPE:

A. For masking around joints, provide an appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, and which is removable without damage to substrate.

2.5 WARRANTY:

A. Provide all required installation and a single-source written warranty providing that the system will be free from defects of workmanship or materials in the joint system for a period of three years.

2.6 OTHER MATERIALS:

A. Provide other materials, not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

A. Examine the areas and conditions under which work will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION:

A. Concrete, masonry, ceramic tile, and stone surfaces:

1. Install only on surfaces which are dry, sound, and well brushed, wiping free from dust.

2. At open joints, remove dust by mechanically blown compressed air if so required.

3. To remove oil and grease, use sandblasting or wire brushing.

4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.

5. Remove latency and mortar from joint cavities.

B. Aluminum surfaces:

1. Aluminum surfaces in contact with sealant:

a. Remove temporary protective coatings, dirt, oil, and grease.

b. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.

3.3 INSTALLATION OF BACKUP MATERIAL:

A. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid tube or rod backup stock.

B. Installation tool:

1. For installation of backup material, provide a blunt-surfaced tool of wood or plastic, having shoulders designed to ride on the adjacent finished surface and a protrusion of the required dimensions to assure uniform depth of backup material below the sealant.

2. Do not, under any circumstance, use a screwdriver or similar tool for this purpose.

3. Using the approved tool, smoothly and uniformly place the backup material to the depth indicated on the Drawings or otherwise required , compressing the backup material 25% to 50% and securing a positive fit.

3.4 PRIMING:

A. Use only the primer approved by the Engineer for the particular installation, applying in strict accordance with the manufacturer's recommendations.

3.5 BOND BREAKER INSTALLATION:

A. Provide an approved bond breaker where recommended by the sealant manufacturer, and where directed by the Engineer, adhering strictly to the manufacturers recommendations.

3.6 INSTALLATION OF SEALANTS:

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Engineer, and verify that the required proportion of width to depth of joint has been secured.

B. Equipment:

1. Apply sealant under pressure with power-actuated or manually-operated hand gun, or by other appropriate means.

2. Use guns with nozzle of proper size, providing sufficient pressure to completely fill the joints as designed.

C. Thoroughly and completely mask joints where the appearance of primer or sealant on adjacent surfaces would be objectionable.

D. Install the sealant in strict accordance with manufacturer's recommendations, filling joints to the recommended depth.

E. Tool joints to the profile shown on the Drawings, or as otherwise recommended by the manufacturer if not shown on the Drawings.

F. Cleaning up:

1. Remove masking tape immediately after tooling joints.

2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

3. Upon completion of this work, promptly remove from the job site all debris, empty containers, and surplus material.

END OF SECTION 07 2000

SECTION 23 0501 - GENERAL HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. The Heating, Ventilation, and Air Conditioning (HVAC) work shall include, but not be limited to, the following:

1. Heating systems
2. Air Conditioning
3. Controls and Instrumentation
4. Balancing of Air Systems

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

1.3 DELINEATION OF WORK:

A. Provide all necessary coordination of information to installers who are performing work to accommodate Division 23 installations.

B. Where the Division 23 installer is required to install items which they do not purchase, they shall include for such items:

1. The coordination of their delivery.
2. Their unloading from delivery trucks driven in to any designated point on the property line at grade level.
3. Their safe handling and field storage up to the time of permanent placement in the project.
4. The correction of any damage, defacement or corrosion to which they may have been subjected.
5. Their field assembly and internal connection as may be necessary for their proper operation.
6. Their mounting in place including the purchase and installation of all dunnage, supporting members, and fastenings necessary to adapt them to architectural and structural conditions.

7. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building systems.

C. Items which are to be installed by the Division 23 installer but not purchased as part of the work of Division 23 shall be carefully examined upon delivery to the project. The Division 23 installer shall provide all work necessary to properly install these items.

D. If any items have been received in such condition that their installation will require additional work beyond the project scope of the work, the A/E shall be notified in writing within 10 working days of the date of delivery of the items. Any claims beyond 10 days will not be considered by the A/E.

1.4 QUALITY ASSURANCE:

A. All equipment and materials required for installation under these specifications shall be new and without blemish or defect. All equipment shall bear labels attesting to Underwriters Laboratories approval where subject to Underwriters Laboratories label service. Where no specific indication as to the type or quality of material or equipment is indicated, a first-class standard article shall be furnished. All manufacturers of equipment and materials pertinent to these items shall have been engaged in the manufacture of said equipment a minimum of three (3) years and, if so directed by the Engineer, be able to furnish proof of their ability to deliver this equipment by submitting affidavits supporting their claim.

B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code Ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible. Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance.

C. All equipment of one type (such as fans, pumps, valves, grilles, etc.) shall be the products of one manufacturer unless specifically stated otherwise.

D. Where the specifications do not list a specific model number for a manufacturer, the construction of a product shall be equal to those models specifically listed.

E. All materials with a manufacturers listed shelf life shall be used at least six months prior to the expiration of the materials' shelf life.

1.5 REQUIREMENTS OF REGULATORY AGENCIES:

A. Submit all items necessary to obtain all required permits to the appropriate Regulatory Agencies, obtain all required permits, and pay all required fees.

B. Where Codes and Standards are referenced, they shall be the date stated in these specifications or on the drawings. If none stated, they shall be the latest edition.

C. All work shall conform to the following Building Codes:

1. International Building Codes

2. National Fire Protection Association

D. All work shall conform to all federal, state, and local ordinances.

E. Where applicable, all fixtures, equipment, and materials shall be as approved or listed by the following:

1. Factory Mutual Laboratories (FM)

2. Underwriters Laboratories, Inc. (UL)

F. All fuel fired equipment shall meet the requirements of the insurers and agencies listed and also meet the owner's insurer requirements.

1.6 STANDARDS AND PROCEDURES

A. All work shall meet or exceed the standards and procedures of the following:

1. ADC: Air Diffusion Council

2. AGA: American Gas Association

3. AMCA: Air Moving and Conditioning Association, Inc.

4. ANSI: American National Standards Institute

5. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers

6. ASME: American Society of Mechanical Engineers

7. ASTM: American Society of Testing and Materials

8. IBR: Institute of Boiler and Radiator Manufacturers

9. MSS: Manufacturers Standardization Society

10. NBBPVI: National Board of Boiler and Pressure Vessel Inspectors

11. NEMA: National Electrical Manufacturer's Association

12. OSHA: Occupational Safety & Health Administration

13. SMACNA: Sheet Metal and Air Conditioning Contractors National Association, Inc.

14. IRM: Improved Risk Mutuals

1.7 APPROVAL OF SUBSTITUTIONS:

A. Specific reference in the specifications to any article, device, product, materials, fixture, form or type of construction, etc., by name, make, or catalog number, with or without the words "or equal", shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. The Contractor in such cases may, at his option, use any article, device, product, material, fixture, form or type of construction which, in the judgment of the A/E expressed in writing, is equal to that named. Where quality and other characteristics are very nearly the same, the question of determining equal materials and readily available service sometimes resolves itself to a matter of personal opinion and judgment and in these and all other cases involving the approval of materials, the opinion, judgment and decision of the A/E shall be final and bind all parties concerned.

B. Requests for written approval to substitute materials or equipment considered by the Contractor as equal to those specified shall be submitted for approval in writing ten (10) calendar days prior to bid opening date to the A/E. Requests shall be accompanied by samples, literature, and information as necessary to fully identify and allow appraisal of the material or equipment. Submittals shall be concise, clear, and brief as possible. Incomplete submittals or submittals requiring lengthy research to ascertain quality will not be considered.

C. Approval of the A/E to use materials or equipment, if granted, will be in the form of a written addendum. Approved substitutions may be used at the Contractor's option. No substitutions will be allowed if substitutions are requested later than ten (10) days prior to bid opening date.

D. Items approved shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly indicated in the form of a letter that is enclosed with the submittals. The Contractor shall be responsible for verifying all dimensions with available space. If, in the opinion of the A/E, the physical dimensions do not permit the substituted material or equipment to be properly operated, maintained, serviced, or otherwise accessed, or the physical dimension adversely impact other components, a system's ability to be operated, maintained, serviced or otherwise accessed, the material or equipment shall be replaced at the Contractor's expense.

1.8 VERIFICATION OF DIMENSIONS AND LOCATIONS:

A. The Contractor shall visit the facility and become thoroughly familiar with all details of the work, working conditions, dimensions and clearances.

B. Notify the A/E of any discrepancy between actual conditions and conditions indicated on the contract documents that could cause changes, other than minor ones, to the installation of any systems or equipment.

1.9 EQUIPMENT CONNECTIONS:

A. The contract documents may indicate specific electrical, duct, and piping connection locations to equipment. Each manufacturer approved for bidding may have different connection arrangements. The Contractor is responsible for the modifications to and the extension of connecting components as required for the equipment provided.

B. The Contractor shall bear all costs for required changes in connection to equipment.

1.10 ROOFTOP EQUIPMENT LOCATIONS:

A. Rooftop equipment shall not be located within ten (10) feet of the roof edge. Notify the A/E in writing of any discrepancy on the plans and the ten (10) foot requirement prior to roughing-in equipment.

B. All roof mounted equipment shall be located so as to provide for clearance all around and above each unit equal to or greater than that recommended by the unit manufacturer's suggested services and operating clearances. Notify the A/E in writing of any circumstances that would prevent proper clearances from being provided prior to roughing-in equipment.

1.11 WORKMANSHIP:

A. Workmen shall be thoroughly experienced and fully capable of installing the work. Work shall be in accordance with the best standard practice of the trade. Work that is not of good quality will require removal and reinstallation at no additional expense to Owner.

B. All material and equipment to be installed in accordance with manufacturer's printed recommendations using recommended accessories. Retain a copy on job site and submit others for approval when required.

1.12 GUARANTEES AND WARRANTIES:

A. General:

1. Furnish to the A/E a guarantee form, included in these specifications, signed by the Contractor and Owner agreeing to the start and end dates of all systems and equipment under warranty.

2. All defective materials or inferior workmanship shall be replaced or repaired as directed by the Owner's representative during the guarantee period.

B. Equipment Warranties:

1. Equipment shall be warranted by the equipment manufacturer. Where labor is included in the warranty, the manufacturer, at their option, may permit the contractor to provide the required repairs on the equipment unless specified otherwise.

2. The equipment manufacturer shall include a written guarantee with the closeout documentation.

C. Duration Period:

1. For work not otherwise specified, the duration shall be one year from substantial completion including all parts, labor, and other charges.

2. The Contractor is responsible for purchasing from the equipment manufacturers any additional warranties to ensure that the equipment is warranted by the manufacturer through the duration period specified.

D. Extended Warranties:

1. Warranty periods shall be extended where specifically stated in these specifications.

2. The extended warranties shall meet the requirements of the base warranty unless specifically noted otherwise.

3. The extended warranty time listed is time in addition to the base warranty period.

4. The following systems or equipment shall be extended warranties:

a. The environmental control system shall have a one year extended warranty.

b. The building automation system shall have a one year extended warranty.

c. All air conditioning compressors shall be provided with an extended 4-year warranty, including parts and delivery charges. Centrifugal and rotary compressors shall include motor, impeller or screw, and drive train.

E. Non-Warranted Items:

1. Non durable replaceable items such as air filter media do not require replacement after the date of acceptance.

F. Warranty Repair:

1. Repair shall take place as soon as possible but not later than the following:

a. Items not essential for facility operation - 7 days.

b. Items that have a small impact on facility operation - 2 days.

c. Items that have a significant impact on the facility operation - immediately begin repairs or work necessary to minimize operational impact to Owner.

2. The determination of the impact on the facility is solely that of the Owner and A/E.

3. Where life safety issues are impacted, the contractor shall take all steps necessary to ensure the facility can continue to function in a safe manner.

4. If repairs cannot be made in the required time period, temporary systems shall be installed until repairs can be completed.

5. All costs associated with warranty work shall be borne by the contractor.

1.13 EXISTING FACILITIES:

A. The location of duct, pipe, fixtures, equipment and appurtenances for existing facilities are shown on plans to indicate the extent of work required. Exact condition shall be field verified by the contractor.

B. Work shall be performed above existing ceilings except where removal of existing ceilings is specifically identified. Where working above existing ceilings, remove existing tile/grid and reinstall existing tile/grid as necessary. Any damaged tile/grid shall be replaced at the contractor's expense.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRIOR CONDITIONS:

A. Prior to the installation of any equipment or system component, the Contractor shall review any prior work that has been completed to accommodate the equipment or system component to be installed.

B. If the prior work does not make a proper installation of any equipment or system component possible, notify the A/E prior to installation of any equipment or system component.

3.2 INSTALLATION:

A. Install all equipment and appurtenances in strict accordance with the manufacturer's recommendations and the manufacturer's shop drawings.

B. If any equipment cannot be installed in accordance with Codes, contract documents, manufacturer's recommendations and accepted practices, notify the A/E in writing prior to installation of equipment.

C. If any system component cannot be installed in accordance with Codes, contract documents and accepted practices, notify the A/E in writing prior to installation of the system component.

3.3 PROTECTION OF SYSTEMS AND EQUIPMENT:

A. Protect all materials and equipment from damage during storage at the Site and throughout the construction period. In the event of damage prior to final inspections, repair or replace damaged items as determined by the A/E, at no cost to the Owner.

B. Store equipment on elevated supports and cover them on all sides with securely fastened waterproof coverings. All equipment openings shall be securely sealed.

C. Piping shall be protected by storing it on elevated supports and capping the ends.

D. During construction, all open ends of pipe, etc. which could collect construction debris shall be properly capped.

3.4 CLEANING OF SYSTEMS AND EQUIPMENT:

A. All equipment and systems shall be cleaned of all extraneous materials to leave equipment and system finish in a new condition.

B. Where equipment and systems cannot be properly cleaned, take all measures necessary to replace or repair equipment and systems to bring back to a "like new" condition. All costs shall be borne by the Contractor.

C. All extraneous materials shall be removed on the site on a regular basis to provide access to all work as well as a safe working environment.

3.5 SUPPORT OF SYSTEMS:

A. Hanging duct, conduit, piping, or equipment from un-reinforced metal decks (i.e., metal roof deck w/o concrete), wood decks, etc. is not permitted.

B. The following methods of support are not permitted:

1. Wire hangers unless specifically indicated

2. Perforated straps

3. Vinyl or plastic straps

END OF SECTION 23 0501

SECTION 23 0502 - COMMON HVAC MATERIALS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools, and equipment and perform all operations in connection with the installation of the mechanical systems where shown on the drawings and specified hereinafter.

B. Description:

1. Rooftop curbs shall include all supports for rooftop equipment, pipe, duct, air handling equipment and accessories.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. All work shall meet or exceed the standards and procedures (latest edition) of the following:

1. AISC Steel Handbook

B. All work shall be applicable by mechanics normally employed in the trade. All work shall be installed in accordance with the manufacturer's recommendations.

C. Manufacturers:

1. The following caulking manufacturers are acceptable:

a. TREMCO

b. Sonneborn - Contech

c. W. R. Meadows

2. The following acoustical sealant (gypboard) manufacturers are acceptable:

a. USG

b. Approved equal

PART 2 - PRODUCTS

2.1 GENERAL:

A. Unless specifically indicated otherwise, the following products or product accessories shall be provided with the indicated equipment.

1. Filters shall be provided on all air systems to protect heat transfer components from outside air, building exhaust air or other airstreams that could foul heat transfer surfaces and elsewhere as indicated. Refer to Particulate Air Filtration specification.

2.2 FLASHING:

A. General:

1. Provide flashing and counter flashing on all pipes, ducts, flues, conduits, and other mechanical system components which penetrate exterior walls or roofs.

2. Flashing sizes where shown are minimum sizes but in no case shall they be less than size required by roofing manufacturer.

B. HVAC Ducts:

1. See detail on plans.

2. Flashing of duct shall be fabricated from 20 gauge stainless steel sheets.

2.3 HVAC ROOF CURBS:

A. Required Locations:

1. Provide roof curb for all rooftop mechanical systems or components including, but not limited to, the following:

a. Condensing units on roof

b. Elsewhere as indicated

B. Height:

1. Curbs shall be height indicated, 18 inches high, or 8 inches above top of finished roof, whichever is greater.

2. Curb shall be sloped as required to maintain a level surface for the equipment.

C. Curb Construction:

1. Curb shall be manufactured specifically for the roof type on which it is to be installed.

2. Curb shall be continuously welded.

3. Curb shall have 1-1/2 inch internal rigid insulation with 1/8 inch gasket between top of curb and equipment.

4. Curbs shall be galvanized.

5. Curbs shall be minimum 18 gauge.

6. Provide an angle on bottom of air handler curbs all around for attachment of sound barrier material.

7. Height of curb shall be coordinated with sound attenuator sizes where sound attenuators are required.

8. Were indicated on the drawings, curbs shall be provided with a service platform that is supported off of the curb.

D. Adapter Roof Curbs:

1. Provide an adapter curb on top of existing roof curb where required.

2. Provide 1/8 inch gasket between top of existing curb and new curb and between the new unit and adapter curb.

3. Blanked off section of adapter curb, if any, shall be sloped 1/8" per foot away from unit.

4. Curb shall have 1-1/2" internal elastomeric or rigid insulation and be structurally designed with cross bracing when required.

2.4 CURB DESIGN:

A. Curb shall meet or exceed the greater of the seismic requirements and wind load requirements for this project. If no wind loads are indicated on mechanical or structural plans, the supplier shall assume 130 MPH wind load.

B. Design shall be reviewed by a registered professional engineer licensed in the state in which the project is located. The engineer's seal and signature shall be indicated on the submittals.

C. The design shall include but not be limited to:

1. Weight of load

2. Type of load (point load, center load, end reaction, etc.)

3. Safety factor (minimum of 2)

4. Curb support bearing (beam, joist, concrete roof, etc.)

5. Platform load and attachment

2.5 DRAINS:

A. General:

1. Drain shall be full size of connections, size indicated on drawings, or 3/4" minimum, whichever is largest.

B. Equipment and Miscellaneous Drains:

1. Provide drains with deep seal p-trap for all equipment provided with drain connections, where drain connections are indicated on the drawings, and when drains required for proper operation of a system.

2.6 DRAIN PANS:

A. Auxiliary Drain Pans:

1. All equipment with condensing coils not located in mechanical rooms with floor drains shall be provided with auxiliary drain pans.

2.7 EQUIPMENT AND MISCELLANEOUS VENTS, RELIEFS, AND OVERFLOWS:

A. Provide vents, reliefs, and overflows for all equipment provided with these connections, where indicated on plans, and when needed for proper system operation.

B. Vent, relief, and overflows shall be run full size of connection or size indicated on drawings, whichever is larger.

2.8 FASTENERS, ANCHORS, AND ACCESSORIES:

A. Unless indicated otherwise, all fasteners, anchors, and accessories shall be metallic and manufactured in the United States.

B. Materials provided shall be considered industry standard for commercial or industrial use.

C. All materials shall be installed in accordance with the manufacturer's recommendations for the intent use and application.

D. Materials installed outdoors, in attics, in crawl spaces, in tunnels and other areas exposed to ambient temperature or humidity shall be stainless steel or hot dipped galvanized.

E. Unless otherwise specified or required by the manufacturer, bolts shall meet or exceed the following strengths:

1. Proof Load: 74 ksi

2. Yield Strength: 81 ksi

3. Tensile Strength: 105 ksi

2.9 SEALANT:

A. Exterior joint sealant shall be polyurethane base, multi-component; self-leveling type for application in vertical joints; capable of withstanding movement of up to 50% of joint width and satisfactorily handled throughout temperature of 4 to 27 degrees C.; uniform, homogeneous, and free from lumps, skins and coarse particles when mixed; Shore "A" hardness of minimum 15 and maximum 50; non-staining; non-bleeding.

B. Color shall be approved by A/E.

2.10 ACOUSTICAL SEALANT (GYPBOARD):

A. General:

1. Acoustical sealant shall be provided at penetrations of all non-rated assemblies.

2. Product shall be latex based and bond with porous and non-porous materials.

3. Product shall be permanently resilient.

B. Properties:

1. Flame spread: 0

2. Smoke spread: 0

3. Viscosity: 250K - 400K CPS

C. Manufacturer shall be:

1. USG Sheetrock Brand Acoustical Sealant

2.11 EXTRA FAN SHEAVE AND BELTS:

A. Provide one extra fan sheave and one extra belt set for each belt driven fan.

B. The sheaves and belts shall be similar to the original supplied sheaves and belts and shall be selected by the sheave manufacturer.

C. The sheaves shall not be selected where the fan operates at a speed exceeding the fan's maximum RPM or the motor's amperage rating.

D. The sheave for fans controlled by a variable frequency drive shall be selected so that the fan can operate as close to maximum RPM as long as motor maximum FLA's are not exceeded.

2.12 VOC’s (ADHESIVES, SEALANTS, AND SEALANT PRIMERS):

A. All adhesives, sealants, and sealant primers shall meet the latest requirements of LEED or Green Globes or the following, whichever has the lower values:

1. Substrate Applications:

   a. Metal to Metal - 30 g/L

2. Specialty Applications:

   a. PVC welding – 510 g/L

   b. CPVC welding – 450 g/L

   c. ABJ welding – 325 g/L

   d. Plastic cement welding – 250 g/L

   e. Adhesive primer for plastic – 550 g/L

   f. Sheet applied rubber lining – 850 G/L

   g. Contact adhesive – 80 g/L

3. Insulation:

   a. Duct - 50 g/L

   b. Piping - 50 g/L

B. The VOC limits are g/L less water.

C. Adhesives, sealants, and sealant primers shall comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168.

PART 3 - EXECUTION

3.1 ROOF CURBS:

A. Submit shop drawings with structural engineering calculations for wind and platform design.

B. Curbs shall be installed to maintain a level surface plus or minus 1/4 inch for length of curb.

C. Field verify the size of an existing curb prior to fabricating adapter curb.

D. Field verify the slope of an existing curb prior to fabricating the adapter curb.

E. Provide curb seal or gasket on all equipment curbs.

3.2 EQUIPMENT STORAGE:

A. Facilities for storing materials and equipment shall be provided by the Contractor.

B. All equipment and materials shall be protected from ambient conditions including freezing and exposure to sunlight when these conditions could affect the product.

C. All stored items shall be elevated off slab or grade.

3.3 DRAINS AND DRAIN PANS:

A. General:

1. All horizontal gravity drain piping shall be installed with a uniform grade of not less than 1/8" per foot of fall in direction of flow except as noted otherwise.

B. Equipment and Miscellaneous Drains:

1. Run drain to janitor sink, equipment room drain, or grade if not indicated otherwise on plans.

C. Auxiliary Drain Pan:

1. Run drain to janitor sink, equipment room drain, or grade if not indicated otherwise on plans.

3.4 EQUIPMENT AND MISCELLANEOUS VENTS, RELIEFS, AND OVERFLOWS:

A. Run vents and reliefs to location indicated on plans or, if none indicated, to a location where they can discharge safety without presenting a hazard to personnel. Terminate with appropriate fitting.

B. Run overflow similar to drain.

3.5 EXTERIOR SEALANT:

A. Submit color charts to A/E.

3.6 EQUIPMENT PENETRATIONS:

A. Seal all openings into equipment resulting from installation of equipment such as conduit and flex.

3.7 EQUIPMENT INSTALLATION:

A. Repair all insulation damaged during installation of equipment.

3.8 EXTRA FAN SHEAVE AND BELTS:

A. Installation:

1. Install second sheave and belts when required for the fan to meet the specified performance.

3.9 EQUIPMENT ATTACHMENT:

A. Equipment shall be secured to the building or structure. Where equipment is provided with a method of attachment, that method shall be used to attach the equipment. Where equipment is not provided with a method of attachment, the contractor shall add gussets, angles, or similar material to the unit without affecting the performance or warranty of the equipment, which shall be used to attach the equipment.

END OF SECTION 23 0502

SECTION 23 0503 - DEMOLITION, PATCHING AND REPAIR

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the demolition of all mechanical equipment, piping, duct, and appurtenances where indicated or shown on the drawings and specified hereinafter.

2. Furnish all labor, materials, tools and equipment and perform all operations in connection with the patching and repair of building structure, finishes and building assemblies as specified hereinafter.

3. All existing utilities, controls, etc. shall be reconnected to new systems as required to maintain the same functions as existed prior to new work.

B. Descriptions:

1. Cut openings thru the existing building walls, roof, floors, and finishes to accommodate the installation of Division 23 equipment, controls, piping, and appurtenances.

2. Remove and dispose of existing HVAC equipment, piping, and appurtenances.

3. Patch and repair all building finishes, structural components, or other appurtenances that are removed or damaged as a result of the performance of this contract. Patch and repair work shall include finishes, components, substructure and materials required for the installation of such work in accordance with standard practices.

4. All penetrations thru exterior walls, floors, and roof systems shall be sealed watertight.

5. Patched and repaired work shall be finished to match existing or adjacent construction and conditions.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

PART 2 - EXECUTION

2.1 GENERAL:

A. Post tensioned slabs, beams, columns and other load bearing structures shall not be drilled, cut, or otherwise modified without written approval by structural engineer.

2.2 PROTECTION:

A. Provide barricades and take all other precautionary measures necessary to protect personnel and property.

B. The Contractor shall be responsible for any damages to adjacent areas to the construction area.

C. Areas not included in the scope of work, areas where work is minimal, and, in the case of a phased contract, areas which remain inactive for long periods shall be protected from the area in which the work is being performed by a slab to slab barrier acceptable to engineer and local authorities.

D. Protect the roof at all times. Provide planking, plywood, supports, and other materials and means to ensure damage is not incurred.

E. At no time shall required means of egress be blocked by equipment materials, permanent or temporary barriers.

2.3 COORDINATION:

A. All demolition work which will interrupt building utilities or cause the disruption of the normal environment in areas of the building not within the scope of this project will be performed at other than the Owner's normal working hours.

2.4 PENETRATIONS:

A. All round penetrations shall be core drilled. All other penetrations shall be saw cut. Openings shall not be larger than required for proper installation of pipe or duct.

2.5 MATERIAL REMOVAL:

A. The Owner shall retain first right of refusal on all existing equipment, piping, and appurtenances which are to be removed as a result of this contract.

B. Coordinate demolition work with Owner using extreme care not to damage existing equipment which Owner elects to retain.

C. Remove Owner retained equipment from existing location and store equipment at a location on the site where specified by Owner.

D. All material, equipment, supports, and appurtenances not required as the result of demolition to or renovation of the building systems shall be removed from the project site and disposed of properly unless retained by Owner.

END OF SECTION 23 0503

SECTION 23 0507 - FIRESTOPPING AND SMOKESTOPPING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of firestopping and smokestopping systems required to seal off all voids or gaps at interfaces of Division 23 equipment, piping, conduits, ducts, sleeves and other penetrations at rated assemblies.

B. Descriptions:

1. Firestop all existing openings in walls, roofs, slabs and similar assemblies remaining as a result of removing existing pipes, ducts, conduit, equipment and appurtenances.

2. Firestop all new openings in walls, roofs, slabs and similar assemblies at pipe, duct, conduits, equipment and appurtenances.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work shall meet or exceed the standards and procedures (latest editions) of the following:

a. ASTM E-814, Standard Method of Fire Tests of Through-Penetration Firestop Systems

b. ASTM E-2336, Standard Test Methods for Fire Resistive Grease Duct Fire Enclosure Systems

c. UL 1479, Through-Penetration Firestop Systems

d. UL 1978, Internal Grease Duct Test

e. ASTM E-119

f. ASTM E-814

B. Manufacturer:

1. The following firestopping sealant manufacturers are acceptable:

a. Nelson

b. Dow Corning

c. Thomas & Betts

d. 3M

e. Hilti

f. GE

g. Fyre Putty

h. W.R. Grace

PART 2 - PRODUCTS

2.1 GENERAL:

A. Firestopping and smokestopping materials shall be delivered to the job site ready to install and require no critical mixing procedures or precise installation time constraints.

B. Materials shall be delivered to the site in sealed containers, fully identified with manufacturer's name, brand, type, grade and U.L. and FM labels. Store materials in a dry space under cover and off the ground.

C. Materials shall not contain flammable solvents.

D. Refer to architectural drawings for fire rated assemblies.

E. Refer to architectural drawings for smoke barriers, smoke walls, and smoke tight partitions. If no other requirements are indicated, corridor walls extending to the structure above shall be smokestopped.

2.2 THROUGH FIRESTOP PENETRATION:

A. General:

1. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items penetrating the firestopping.

2. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer.

3. Provide a firestop system with an "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

B. Locations:

1. Provide firestopping at all rated assemblies, floor penetrations, and other locations identified on the plans.

2. Provide firestopping at all penetrations in non-rated corridor walls in educational facilities where the walls extend to the structure above.

C. Materials for Metallic Pipes and Conduits:

1. Basis of design sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT) shall be:

a. Hilti FS-ONE Intumescent Firestop Sealant

b. Hilti CP 604 Self-leveling Firestop Sealant

c. Hilti CP 620 Fire Foam

d. Hilti CP 606 Flexible Firestop Sealant

e. Hilti CP 601s Elastomeric Firestop Sealant

D. Materials for Non-Metallic Pipes and Insulated Pipe:

1. Basis of design Intumescent sealants, caulking materials for use with combustible items including insulated metal pipe and plastic pipe shall be:

a. Hilti FS-ONE Intumescent Firestop Sealant

PART 3 - EXECUTION

3.1 INSTALLATION:

A. All installations shall be in accordance with the manufacturer's recommendations for the specific UL assembly which is to be firestopped.

B. Protect other surfaces and equipment from being damaged by the application or overspray of firestopping compound. Remove excess and spillage promptly.

3.2 PREPARATION:

A. Clean and prepare substrates for materials in accordance with manufacturer's recommendations.

B. Openings larger than required for proper installation of conduit, pipe, or duct shall be patched or repaired.

3.3 FIELD TESTING:

A. Contractor shall remove up to 10% of firestop assemblies when requested by Building Official or Engineer. If assemblies are not installed in accordance with UL THROUGH PENETRATION FIRESTOP SYSTEMS, additional assemblies may be removed at the discretion of the Engineer.

B. Upon removal of assemblies by the Building Official or A/E, the Contractor shall refirestop all affected penetrations.

3.4 IDENTIFICATION:

A. At every penetration of a rated assembly, an identifying label shall be securely and permanently attached as close to the penetration as practical.

B. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: “Warning—Through-Penetration Firestop System—Do Not Disturb. Notify Building Management of Any Damage.”

2. Contractor’s name, address, and phone number.

3. Through-penetration firestop system designation of applicable testing and inspecting agency.

4. Date of installation.

5. Through-penetration firestop system manufacturer's name.

6. Installer's name.

C. Labels shall be located as close as practical to the penetration. In occupied spaces, the labels shall be above the ceilings where ceilings are installed.

END OF SECTION 23 0507

SECTION 23 0510 - DOCUMENTATION AND CLOSEOUT

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Furnish all labor, materials, tools and equipment and perform all operations in connection with the project documentation and closeout.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL:

A. All reports, forms, and manuals shall be submitted to the A/E in triplicate unless additional copies are noted.

B. Report, forms, and manuals are to be submitted as soon as possible, but no later than thirty (30) days after the earliest date they can be prepared.

3.2 OWNER TRAINING:

A. The contractor shall schedule the training on equipment and systems at least 21 days before training is to take place. The contractor shall provide multiple dates and times for the training to allow the Owner to coordinate the schedules of their staff to be trained.

B. The contractor shall provide all training aids, manuals, etc. for the Owner’s staff at the training classes. These are in addition to whatever is required for the Operations and Maintenance manuals. The contractor shall coordinate the number required with the Owner but shall include a maximum of 8 sets for the training class.

C. The person providing the training shall be thoroughly knowledgeable in the subject matter.

3.3 PROJECT JOB DRAWINGS AND AS-BUILT DRAWINGS:

A. Keep a record set of drawings on the job and, as construction progresses, shall show the actual installed location of all items, material, and equipment on the project job drawings.

B. At the time of final inspection, one corrected set of prints shall be delivered to the A/E. All drawing costs to be by the Contractor.

C. As built drawings shall have the information transferred from the project job drawings including all addendum, supplemental instructions, change orders, and similar information.

D. Qualified draftsmen shall perform this task.

3.4 OPERATING AND MAINTENANCE MANUAL:

A. Compile and bind three (3) sets of all manufacturer's instructions and descriptive literature on all items of equipment furnished under this work. Additionally, provide this information on a CD in PDF format.

B. Binder shall be hard cover, three-ring notebook, embossed with the name of the project, 11" x 8-1/2" with heavy duty rings. Maximum binder size shall be 2-1/2". Use multiple binders as necessary.

C. The spine of the binder shall be titled “HVAC Operating and Maintenance Manual, Volume No. X," with the name of the project and the date under the title.

D. The Operating and Maintenance Manual shall include the following:

1. Cover sheet in each binder listing the architect, engineer, and all contractors. List addresses and contact information.

2. List name, address and phone number of organization responsible for warranty work, if other than Contractor, and the specific work for which he is responsible.

3. List name, address and phone number of the nearest sales and the nearest service organization for each product.

4. Schedules of all equipment including identification tag numbers shown on plans cross referenced to field applied identification tag numbers.

5. List of Spare Parts: Recommended for normal service requirements. Each piece of equipment shall have this list clearly marked or attached to this submittal.

6. Parts List: Identifying the various parts of the equipment for repair and replacement purposes.

7. Instruction Books: May be standard booklets but shall be clearly marked to indicate applicable equipment and characteristics.

8. Wiring Diagrams: Generalized diagrams are not acceptable, submittal shall be specifically prepared for this Project.

9. Automatic Controls: Diagrams and functional descriptions.

10. All start-up reports for all equipment.

11. Test and balance report.

12. Filter size list for each piece of equipment. Identify filter type, size, efficiency, and equipment tag.

13. Ceiling marker schedule.

E. The following diagrams, schematics, and lists shall be provided:

1. Automatic control diagrams

2. Sequences of operation

F. When the test and balance report is over 50 pages, they shall be provided in a separate manual.

3.5 ENGINEERING FIELD REPORTS AND FINAL INSPECTION REPORTS:

A. The A/E will review the Contractor's work periodically throughout the project. A report will be submitted to the Contractor.

B. The reports shall be responded to within ten days of receipt by the Contractor. Each item shall be addressed with comments written on the inspection report if possible. Contractor's response shall address the status of each item and all discrepancies.

3.6 OPERATION AND MAINTENANCE INSTRUCTIONS:

A. After all final tests and adjustments have been completed, the Owner's Representatives shall be instructed in all details of operation and maintenance for the systems installed.

B. Instruction periods shall be as designated by the Owner and shall not necessarily be consecutive.

C. Fifty percent of instructions shall be in a formal classroom setting.

D. Instruction shall be provided as follows:

1. Equipment: Trained factory representative

2. System: Competent employee of the Contractor

3.7 CONTROLS OPERATION AND MAINTENANCE INSTRUCTIONS:

A. Upon completion of Operation and Maintenance instructions, the Owner's representative shall be instructed in all details of operation and maintenance for the controls installed.

B. Controls Operation and Maintenance Instruction shall include the entire control system including control sequences that are inherent to equipment provided by the Equipment Manufacturer including economizer cycles, burner operation, low ambient operation, freezestats and similar sequences. Provide sufficient personnel equipment, walkie-talkies, gauges, and other accessories for this work.

C. Instruction periods shall be as designated by the Owner and shall not necessarily be consecutive.

D. Fifty percent of instructions shall be in a formal classroom setting.

E. Instruction shall be provided as follows:

1. Controls System: Competent employee of the controls installer

3.8 ACCEPTANCE:

A. Upon notification by the Contractor and after completion of Operation and Maintenance Instructions, the A/E will visit the project for a demonstration of the building system and an inspection of the completed work.

B. Items which do not comply with the Contract Documents or which function incorrectly will be listed. The list will be provided by the A/E to the Contractor for correction of the installed work.

C. After all corrections have been made, the Contractor shall notify the A/E who will recheck the systems for compliance of all items listed.

PART 4 - STANDARD FORMS

4.1 GENERAL:

A. All forms shall be completely filled out by the Contractor prior to acceptance of the project by the A/E.

4.2 HVAC CLOSEOUT LIST:

HVAC CLOSEOUT DOCUMENT

PROJECT: FMSD Springfield Middle School HVAC Upgrades – Phase 2

BGA PROJECT NO.: 21040

DOCUMENT	DATE REVIEWED	COMMENTS
Preliminary Test and Balance (Airside)		
Test & Balance (Airside)		
HVAC O&M Manuals (3 sets plus CD)		
As installed Control Drawings		
HVAC marked-up As-Builts (1 set red lined)		
Equipment Start-Up Reports		
Filter List		
Punchlist dated _____		
Punchlist dated _____		
Punchlist dated _____		
Walk-Through with Owner		

NOTE: Not all closeout documents may be listed. See other sections of specifications for additional requirements.

4.3 HVAC INSTRUCTIONS TO OWNER:

HVAC INSTRUCTIONS TO OWNER

PROJECT: FMSD Springfield Middle School HVAC Upgrades – Phase 2
BGA PROJECT NO.: 21040

INSTRUCTIONS	DATE/TIME SCHEDULED	MINIMUM SPECIFIED HOURS	ESTIMATED HOURS OF INSTRUCTION	PERSONS ATTENDING	COPY OF SIGN-IN LIST SENT TO BGA
Controls					
Packaged Units					
HVAC General					

NOTE: Not all instructions may be listed. See other sections of specifications for additional requirements. Up to 8 sets of training material required. Provide per number of persons indicated. Where no minimum specified hours indicated, training shall be provided as necessary for technician to provide the Owner a good understanding of the operation, function, and maintenance requirements of the equipment or system installed.

4.4 HVAC SPARE MATERIALS:

HVAC SPARE MATERIALS LIST

PROJECT: FMSD Springfield Middle School HVAC Upgrades – Phase 2

BGA PROJECT NO.: 21040

ITEM	DATE DELIVERED	ACCEPTED BY	COPY OF RECEIPT SENT TO BGA
Spare Filters			

NOTE: Not all spare materials may be listed. See other sections of specifications for additional requirements.

4.5 INSTRUCTIONS TO OWNER:

OWNER INSTRUCTIONS SIGN-IN SHEET

PROJECT: FMSD Springfield Middle School HVAC Upgrades – Phase 2

BGA PROJECT NO.: 21040

SYSTEM/EQUIPMENT:	DATE	TIME		LOCATION:
		START	FINISH	

INSTRUCTORS (PRINT NAME AND SIGN)

1. _____

2. _____

ATTENDEES (PRINT NAME AND SIGN)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

WRITTEN MATERIALS PROVIDED TO ALL ATTENDEES: _____ YES _____ NO

INSTRUCTIONS IN CLASSROOM: _____ YES _____ NO

INSTRUCTIONS IN FIELD: _____ YES _____ NO

END OF SECTION 23 0510

SECTION 23 0511 - SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL:

A. Refer to Division 1 specification for information and shop drawings and submittals requirements. When conflicts exist, the more stringent requirements shall apply.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

1.3 PREPARATION OF SUBMITTALS:

A. Before preparing submittals, consult all contract drawings and specifications in detail, obtain manufacturer's recommended installation instructions, and have shop drawings prepared based on specific equipment and material intended for installation. Obtain all drawings and submittals from other trades as necessary to coordinate submittals.

B. Sign all shop drawings indicating conformance with contract documents before submitting to the A/E.

1.4 SUBMITTALS:

A. General:

1. Submittals are required on all items of equipment and materials.

2. Submittals shall include but not be limited to:

a. All requirements of Division 1.

b. Complete information pertaining to appurtenances and accessories.

c. Information properly marked with service or function identification as related to the project.

d. Where the submittal consists of catalog sheets displaying other items which are not applicable, the proper features shall be clearly identified.

e. External connections properly marked, as related to the specific use intended, on standard factory assembly and field installation drawings.

f. All performance characteristics and physical characteristics.

g. Wiring and control diagram.

h. All requirements listed in the specific section of specifications.

i. Electrical data on all motors greater than one horsepower. Data shall include horsepower unit served, power factor, efficiency and product of P.F. x EFF.

B. Field Fabricated Components:

1. When field fabricated components are permitted by the specifications, scaled detailed drawings shall be submitted, clearly showing the materials used, dimensions, sizes, and means of assembly. For example, drawings shall be submitted for pump housings (insulation), support stands, etc.

C. Submittal Summary:

1. A submittal summary shall be prepared by the contractor within (10) (30) (60) days of project award.

2. The summary shall include all products and samples to be submitted along with the date the submittal will be received by the prime contractor.

1.5 SAMPLES:

A. Samples shall be provided when specified or required by the A/E to check product acceptability or for coordination purposes.

B. Samples will not be returned and shall not be included in the total required on the project.

1.6 REVIEW OF SUBMITTALS:

A. Review of shop drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless the Contractor has, in letter form, called attention to such deviations at the time of submission and secured written approval of the specific deviations.

B. Any materials and equipment listed which are not in accordance with the equipment shown on the schedule shall be of size and physical arrangement to allow unobstructed access, when installed, for routine maintenance, coil removal, shaft removal, motor removal and other similar operations. Deviation from the characteristics of that equipment or layout system components will not necessarily be cause for rejection. Review of submittal does not relieve the Contractor of his responsibility. Should an installation not meet the intent of the contract documents, the Contractor may be required by the A/E to modify or replace equipment or system components with all costs, direct and indirect, borne by the Contractor.

C. It is strongly recommended that the Contractor not purchase or install any equipment or system components prior to receipt of reviewed shop drawings.

D. Reviewed with notations on the submittal shall not prohibit the Contractor from purchasing equipment. If the Contractor does not comply with the notations, the submittal shall be deemed rejected.

1.7 EQUIPMENT DIMENSIONS AND WEIGHTS:

A. The contract documents may indicate specific equipment dimensions. The Contractor is responsible for verification of the dimensions for the equipment submitted prior to submitting shop drawings. Equipment larger than the equipment indicated on the contract documents may not be acceptable by the A/E's.

B. The contract documents may indicate specific equipment weights. The Contractor is responsible for verification of the weight of the equipment submitted prior to submitting shop drawings. Equipment weighing more than the equipment indicated on the contract documents may not be acceptable to the A/E.

C. Equipment shall not exceed maximum weight indicated on the schedules. If the equipment weight exceeds that indicated on the schedule, even where the manufacturer is an approved manufacturer, that equipment can not be bid on for this project.

D. If equipment is not acceptable to the A/E due to dimensions or weights exceeding those indicated on contract documents, the Contractor shall accept all responsibility and costs for providing equipment that meets the dimension and weight requirements of the contract documents.

1.8 ELECTRICAL CHARACTERISTICS:

A. Electrical characteristics for mechanical equipment are generally indicated on the mechanical documents. The electrical documents generally indicate power and wiring requirements to each piece of mechanical equipment.

B. It shall be the mechanical installer's responsibility to verify prior to submitting shop drawings that the equipment submitted meets the electrical requirements of both the mechanical and electrical documents. If there is a discrepancy, the contractor shall bring the discrepancy to the A/E's attention prior to submitting shop drawings.

C. If the discrepancy is brought to the A/E's attention prior to ordering the mechanical equipment or electrical materials associated with that equipment, the A/E will issue additional instructions to the Contractor.

D. If the discrepancy is not brought to the A/E's attention prior to ordering the mechanical equipment and electrical materials (i.e. Contractor does not verify electrical requirements), the Contractor shall be responsible for all costs except those that would have been incurred if the discrepancy was determined prior to ordering the mechanical equipment and electrical materials.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRODUCT SUBMITTALS:

A. The following list may be used as a checklist for the contractor and A/E. All products may not be listed.

PRODUCT SUBMITTALS

BGA NO.	PRODUCT	NO.	DATE		STATUS				ITEMS TO RESUBMIT	DATE ITEMS RESUBMITTED
			In	Out	App.	AAN	Resub.	Rej.		
	Air Filters									
	Control Drawings & Sequences									
	Curbs and Supports									
	Dampers									
	Duct Access Doors									
	Duct Accessories									
	Duct Detectors									
	Duct Flexible Connections									
	Equipment Identification									
	Firestop Systems									
	Insulation, Mastics, and Sealants									
	Metal Duct									
	Name of Test and Balance Agency									
	Pipe and Pipe Fittings									
	Seismic Products									
	Split System Heat Pumps									
	Vibration Isolators									

3.2 TEST AND REPORT SUBMITTALS:

A. The following list may be used as a checklist for the Contractor and A/E. All tests may not be listed.

1. Duct air loss test

2. System start-up

3. Test and Balance Agency Construction report

3.3 CONTROL SUBMITTAL:

A. Control submittals shall include the following:

1. All information necessary for a clear representative of the system to be provided.

2. All control components.

3. Graphical representative of all systems to be controlled.

4. I/O summary sheets.

5. Floor plan indicating panels.

6. Sequence of operation. All devices referenced in the sequence shall be indicated on graphic representation.

7. Large scale (75% reduction maximum) of all control panel faces.

8. Wiring diagrams including interface with equipment (terminal strip, contactor, etc.).

B. All drawing submittals shall be CADD generated drawings.

C. Submit a floor plan locating all thermostats, sensors, lighting override switches, and control panels. Contractor must receive approval in writing before roughing in controls.

3.4 SHOP DRAWING SUBMITTAL COVER SHEET:

A. A separate cover sheet shall be submitted with each product type (i.e., valves can be submitted together, etc.)

3.5 SHOP DRAWING SUBMITTAL COVER SHEET
(Provide one page for each group of shop drawings.)

PROJECT NAME: **Springfield Middle School HVAC Upgrades – Phase 2** BGA FILE NO. **21040**

PRODUCT: _____ BGA SHOP DWG. NO. _____

NOTE TO CONTRACTOR

1. All shop drawing comments by Buford Goff & Associates shall be complied with or the shop drawings shall be declared rejected.
2. If this form is not completed and signed by the Contractor and items 1 to 8 below are not answered YES or N/A, the shop drawings shall be declared rejected.
3. Dampers, grilles, valves, etc., are reviewed for characteristics but not for size and quantity. It is the Contractor's responsibility to verify sizes and quantity.

SHOP DRAWING SUBMITTAL (Contractor to complete this section)

1. Does the submittal comply with the contract documents? ☐ Yes ☐ No

   If no, list all deviations on an attached page.

2. Have the electrical characteristics (i.e., volt/phase/amps, MOP, MCA, and connection location) been reviewed with the electrical schedules and the electrical circuit sizing meet the requirements of that equipment? ☐ Yes ☐ No ☐ N/A
3. Is product an approved manufacturer listed in the specifications or addendum? ☐ Yes ☐ No ☐ N/A
4. Does the product submitted meet the manufacturer's recommended service clearance for the space in which it is to be installed? ☐ Yes ☐ No ☐ N/A
5. Have the control components of the product been reviewed and do they meet with the requirements of the controls contractor? ☐ Yes ☐ No ☐ N/A
6. Have the equipment connections been reviewed (size and locations) and has the Contractor included all provisions to make the required connections? ☐ Yes ☐ No ☐ N/A
7. Has the seismic engineer reviewed and approved the method of connecting seismic restraints to equipment? ☐ Yes ☐ No ☐ N/A
8. Is the equipment within the weight limitations specified, if any? ☐ Yes ☐ No ☐ N/A

BGA'S SHOP DRAWING STAMP (Engineer to complete this section)

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor is responsible for specific compliance with the information given in the Contract Documents; dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades, and the safe and satisfactory performance of his work.

☐ Reviewed ☐ Reviewed as Noted ☐ Revise and Resubmit ☐ Revise and Resubmit Items Listed
☐ See attached for additional comments ☐ Reject

Comments: _____

_____

_____

_____ Reviewer: _____ Date: _____

END OF SECTION 23 0511

SECTION 23 0517 - SLEEVES, SEALS, AND ESCUTCHEONS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of sleeves, seals, and escutcheons where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0503 - Demolition, Patching and Repair
2. Section 23 0507 - Firestopping and Smokestopping
3. Section 23 2113 – HVAC Piping (General)

1.3 QUALITY ASSURANCE:

A. Manufacturers:

1. The following mechanical seal and sleeve manufacturers are acceptable:
   a. Thunderline Corporation
   b. Metraflex
   c. Approved equal

PART 2 - PRODUCTS

2.1 SLEEVES:

A. General:

1. Provide sleeves for each pipe passing through walls, partitions, floors, and roofs unless specific details indicate otherwise.

B. Type:

1. Sleeves in non-masonry or concrete construction shall be minimum 24 gauge sheet metal.

2. Sleeves in masonry or concrete construction shall be schedule 40 black or galvanized steel.

3. Sleeves in membrane or waterproof construction shall have flashing ring or other method acceptable to the membrane or waterproofing manufacturer.

4. Split sleeves shall be permitted only when approved by the Engineer.

C. Sleeve Sizes:

1. Sleeves for uninsulated piping shall be two pipe sizes larger than pipe passing through or a minimum of 1/2" clearance between inside of sleeve and outside of pipe.

2. Sleeves for insulated piping shall be adequate size to accommodate the full thickness of pipe covering with clearance for packing and caulking.

3. Sleeves for branches off of risers shall be sized as required for insulated or uninsulated pipe and shall also be sized to accommodate expansion of riser.

D. Sleeve Length:

1. Sleeves shall be equal to thickness of construction and terminated flush with surfaces.

E. Sleeve Packing:

1. Sleeves shall be packed as follows:

a. As indicated on detail or firestopping specification.

b. If not indicated otherwise, seal entire sleeve at exterior wall with silicone caulk.

F. Fire Rated Assemblies:

1. Provide sleeve where required by UL firestop assembly utilized.

2. Do not provide sleeve where not permitted by UL firestop assembly utilized.

3. Sleeve size, length and type shall be equal to that required for the UL firestop assembly utilized.

PART 3 - EXECUTION

3.1 GENERAL:

A. Installation:

1. Install sleeve at time of construction of assembly.

2. Sleeve shall be grouted in place with appropriate grout to match construction.

3. Pipe shall be centered to the extent practical in the sleeve. Where proper firestopping or insulation cannot be installed, sleeve shall be reset.

END OF SECTION 23 0517

SECTION 23 0529 - HANGERS AND SUPPORTS FOR HVAC PIPING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of supports and anchors on all piping and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0548 – Sound, Vibration, and Seismic Control for HVAC

2. Section 23 2113 - HVAC Piping (General)

1.3 QUALITY ASSURANCE:

A. Products not otherwise specified in these documents shall be furnished by the listed manufacturers and installed in accordance with the manufacturers recommendation.

B. Products used shall be consistent with industry practice for use in commercial or industrial installation.

C. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following as referenced (latest editions):

a. ANSI B31.3 - Pressure Piping

b. Factory Mutual

c. International Building Codes

d. Manufacturer's Standardization Society Documents, MSS-SP-58, MSS-SP-69

e. Pipe Fabrication Institute, Standard ES-26

f. AISC Specification for the Design, Fabrication, and Erection of Structural Steel Buildings

D. Manufacturers:

1. The following channel support manufacturers are acceptable:

a. Erico Eristrut

b. Unistrut

c. Approved Equal

2. The following refrigerant pipe clamp manufacturers are acceptable:

a. IRP

b. Hydro-Zorb

c. Armafix

PART 2 - PRODUCTS

2.1 GENERAL:

A. It shall be the Contractor's responsibility to provide an adequate pipe support system in accordance with recognized engineering practices using, where possible, standard, commercially available hangers, support, guides, anchors and accessories.

B. Model numbers are indicated for products not exposed to ambient conditions. The products exposed to ambient conditions shall be a similar product but with the material or finish specified for products exposed to ambient conditions.

C. Materials shall be selected to prevent electrolysis and minimize corrosion for the environment in which the product is to be installed.

D. Hanger shall be sized for insulation to run through hanger, support, clamp, or guide.

2.2 SAFETY FACTOR:

A. All attachments, rods, and accessories selected based on weight load shall be selected for a two times safety factor minimum.

2.3 SEISMIC RESTRAINTS:

A. Where seismic restraints of components is required, attachments shall be per the requirements of the Vibration and Seismic Controls specifications.

2.4 PRODUCTS EXPOSED TO AMBIENT CONDITIONS:

A. Materials:

1. The material for all accessories including, but not limited to, rods, bolts, fasteners, inserts, saddles, supports, anchors, clamps, auxiliary steel, and

accessories shall be stainless steel or hot dipped galvanized unless specifically noted otherwise.

B. Hangers:

1. Clevis hanger shall be stainless steel or hot dipped galvanized finish.

2. Swivel loop hangers shall be zinc electroplate finish.

C. Shields:

1. Shields shall be stainless steel.

2.5 PIPE HANGERS, SUPPORTS, AND ACCESSORIES - GENERAL (INDOOR):

A. General:

1. Other finishes may be specified for specific applications.

B. Hangers:

1. Swivel loop hangers for insulated pipe shall be carbon steel with zinc electroplate finish.

2. Clevis hangers for insulated pipe shall be carbon steel or carbon steel with zinc electroplate finish.

C. Shields:

1. Shields shall be carbon steel with zinc electroplate finish.

2.6 PIPE HANGERS - INSULATED PIPING (OTHER THAN HEATING PIPING):

A. Basis of design manufacturer for pipe up to 2" - Swivel loop hanger with shield:

1. Anvil Model No. 69 with 167 shield

2. At contractor's option, clevis hanger may be used.

B. Basis of design manufacturer for pipe 2½" and larger - Clevis hanger with shield:

1. Anvil Model No. 260 with 167 shield

2.7 PIPE HANGERS - NON INSULATED PIPE (COPPER):

A. Basis of design manufacturer for all pipe sizes - Swivel loop hanger:

1. Anvil Model No. 69 (with PVC coating)

2.8 PIPE HANGER SPACING:

A. General:

1. The maximum spacing for pipe hangers and supports shall not exceed those stated in these specifications or the hanger manufacturer's recommendations, whichever is less.

2. Where concentrated loads of valves, fittings, etc. occur, closer spacing will be necessary and shall be based on the weight to be supported and the maximum recommended loads for the hanger components.

3. Hangers shall be provided within 12" of each change of direction, at each valve, and at equipment connections.

4. Pipe not listed shall meet the spacing requirements of the manufacturer.

B. Copper Pipe and Tubing:

Size	Max. Span Ft.
Less than 1-1/2"	5
1-1/2" and greater	8

2.9 HANGER RODS:

A. Threaded rods, if not indicated otherwise, shall be carbon steel with zinc electroplate finish.

B. Where seismic restraints of components are required, rod sizes shall be per the requirements of the Mechanical Sound, Vibration, and Controls specifications.

C. Rods shall be selected at 2x safety factor.

D. Rod capacity based upon ASTM A107 at 650 degrees F is as follows:

Rod Dia.	Max. Load	Max. Load (@ 2 x SF)
3/8	610	305
1/2	1130	565
5/8	1810	905
3/4	2710	1355
7/8	3770	1885
1	4960	2480

2.10 AUXILIARY SUPPORTS, FASTENERS, AND ACCESSORIES:

A. Provide all auxiliary supports, anchors, and fasteners necessary for the installation of piping, equipment, and accessories.

B. Supports shall include angles, channels, flat steel, rods, bolts and appurtenances.

C. Special supports shall be provided where standard hanger, supports, or attachments cannot be used. This includes, but is not limited to, use of trapeze supports, suspending supports from other supports (where acceptable to manufacturers, etc.).

2.11 CHANNEL SUPPORTS:

A. General:

1. Channel supports shall be utilized wherever practical and whenever a channel support provides a cleaner installation than individual attachments to the structure.

B. Construction:

1. Channel supports shall be 12 gauge minimum and dimensions as necessary to meet project conditions.

2. Channels in conditioned spaces or in plenums above conditioned spaces shall be pregalvanized or powder coated carbon steel.

3. Channels exposed to ambient conditions shall be hot dipped galvanized after fabrication, aluminum, stainless steel, PVC coated, or epoxy coated.

4. Channels shall have holes, slots, knockouts, etc. as required by the Contractor.

C. Clamps and Accessories:

1. Clamps, accessories, fasteners, etc. shall generally be the same materials as the channel supports unless indicated otherwise.

2.12 BEAM CLAMPS:

A. Clamps shall be designed to attach hanger rods to a beam or bar joist.

B. Clamps shall be provided with locknut.

2.13 REFRIGERANT PIPE CLAMPS:

A. General:

1. Horizontal refrigerant pipe may be supported by either of the following methods:

a. Provide a pipe insert at the point of support. See pipe insulation.

b. Provide refrigerant pipe clamp specified in this section.

B. Pipe Clamp:

1. Metal pipe clamp shall have an inner rubber cushioning.

2. Clamp shall be sized to allow refrigerant pipe with insulation to pass through the inner rubber cushioning.

C. Basis of design manufacturer shall be:

1. IRP Hydra-Zorb Klo-Shure Cushion Clamp

2.14 PIPE SHIELDS:

A. Provide at all supports and hangers on insulated piping systems.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Provide all steel and concrete required for support and anchoring of pipes other than shown on structural or architectural drawings.

B. Contractor shall bear all responsibility for materials and workmanship as described in this section, and shall make sure that all hangers and supports are properly and permanently connected to building structure.

C. All pipe supports shall be designed to avoid interferences with other piping, hangers, electrical conduits and supports, building structures and equipment.

D. Guide points for expansion joints shall be located and constructed wherever required or shown on drawings and at each side of an expansion joint or loop, to permit only free axial movement in piping systems. Guides shall be securely anchored to structure.

E. Provide hanger rod nuts on both sides of clevis and trapeze hangers.

3.2 SUBMITTAL:

A. Manufacturer shall be responsible for reviewing all plans, specifications, and existing conditions to determine the types, quantities, and accessories required to provide a complete system of pipe support.

B. Submit shop drawings for each product to be used and indicate where the product is to be installed (i.e., steam piping in tunnel, chilled water pipe in crawl space, etc.).

3.3 AUXILIARY SUPPORTS, ANCHORS, AND FASTENERS:

A. Supports attaching to steel structure shall be by bolting or clamping without penetrating structural member. Welding is not permitted without written permission.

B. All fasteners shall be provided which resist loosening from vibration.

END OF SECTION 23 0529

SECTION 23 0548 – SOUND, VIBRATION, AND SEISMIC CONTROL FOR HVAC

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of mechanical sound, vibration, and seismic control required on all mechanical equipment, systems, and appurtenances where shown on the drawings and specified hereinafter.

B. All foundations and supports of Division 23 equipment shall be furnished and installed by Division 23 installer except where specifically noted otherwise.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All seismic equipment and design shall comply with all local codes and ordinances and meet or exceed the standards and procedures (latest editions) of the following:

a. International Building Codes

b. SMACNA Seismic Restraint Manual

c. ASHRAE

d. ASTM E 488 (Anchor locations)

B. Mechanical sound, vibration and seismic control equipment shall be sized and provided by manufacturer only. Seismic bracing shall be a factory manufactured item listed in the manufacturers catalog for the intended use.

C. Manufacturer:

1. The following sound, vibration, and seismic control (except flexible pipe connectors) manufacturers are acceptable:

a. Mason Industries

b. Vibration Mountings and Controls, Inc.

c. Vibro-Acoustics Corporation

PART 2 - PRODUCTS

2.1 GENERAL:

A. All equipment and piping shall be mounted on or suspended from approved foundations and supports as specified herein and as shown on the drawings.

B. The vibration isolation systems shall be guaranteed to have the deflection recommended by the manufacturer for the specific application but no less than shown on the schedule. Mounting sizes shall be determined by the mounting manufacturer and mountings shall be installed in accordance with the manufacturer's instructions.

C. The installed vibration isolation system for slab or roof supported equipment shall have a maximum lateral motion under equipment start-up or shut down conditions of 1/4 inch. Motions in excess of this amount shall be restrained by approved spring type mountings.

D. Components not exposed to ambient:

1. Steel components shall be powder coated. All nuts, bolts, and washers shall be zinc-electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc-chromate or metal etching primer.

E. Components exposed to ambient or inside air handlers:

1. All components shall be PVC coated steel, hot-dip galvanized, stainless steel, or heresite coated.

2.2 VIBRATION ISOLATORS:

A. General:

1. Where steel spring isolation systems are required, the mounting assemblies shall:

a. Utilize bare springs with the spring diameter not less than 0.8 of the compressed height of the spring at rated load.

b. Springs shall have minimum additional travel to solid equal to 50 percent of rated deflection.

2. Each spring isolator shall be designed and installed so that the ends of the spring remain parallel during and after the specified minimum deflection to solid height.

3. All spring-flex mountings shall be completely stable beyond rated load and have an additional 30% capacity (minimum), and horizontal and vertical spring constants shall be equal (kx/ky=1).

4. Vibration isolation equipment submittal drawings shall include the following information:

a. Isolation mounting deflections.

b. Spring diameters, compressed spring heights at rated load; solid spring heights, where spring isolation mountings are used.

c. Equipment operating speed.

d. Clearly outlined procedures for installing and adjusting isolators.

5. Isolators for equipment installed outdoors shall be designed to provide adequate restraint due to normal wind conditions and to withstand design wind loads or 30#/sq. ft., whichever is greater, applied to any exposed surface of the isolated equipment.

6. Neoprene shall be bridge bearing type.

7. Mounts shall have holes in baseplate for anchoring to structure.

8. All baseplates shall be sized to meet manufacturer's maximum published seismic restraint rating.

B. Specification type "E" (Precompressed Hangers):

1. Vibration hanger shall contain a steel spring and 0.3" deflection neoprene element in series. They shall be precompressed to the rated deflection so as to keep the piping or equipment at a fixed elevation during installation. Deflection shall be clearly indicated by means of a scale. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing thru a 30 degree arc before contacting the hole and short circuiting the spring.

2. Basis of design manufacturer shall be:

a. Mason Industries, Inc. type PC30N.

2.3 VIBRATION ISOLATOR SCHEDULE:

A. General:

1. Deflection shown is a minimum value. Higher values may be required by seismic design.

B. Suspended Air Handling Equipment:

1. Type E hanger, deflection 1.25"

2. Includes air handlers, etc.

2.4 WIND LOAD DESIGN:

A. General:

1. Specifications and plans shall indicate minimum requirements and general intent. The actual requirements shall be determined by the contractor's structural engineer but those requirements shall not be less than indicated on the plans and in these specifications.

2. The structural engineer shall be a professional engineer registered in the state in which the facility is to be constructed. The structural engineer shall be responsible for:

a. Submittals (drawings and calculations)

3. All equipment located outdoors shall be designed to meet or exceed the requirements of the current IBC wind load requirements.

4. Calculations shall be based on the ASCE determined design pressure, exposure class, building height, and building type.

B. All rooftop curbs shall be anchored sufficiently to the roofing members to withstand the IBC wind load requirements.

C. All outdoor equipment located on equipment pads shall be anchored to the equipment pads to withstand the IBC wind load requirements. Equipment pads shall be designed to withstand these requirements.

D. Where additional bracing or tie downs are required, they shall be provided at no additional cost to the Owner.

E. Coordinate the restraints required for wind loading with the seismic and vibration requirements indicated on the drawings and specifications.

2.5 ANCHORAGE TO BUILDING STRUCTURE:

A. General:

1. Anchorage to the building structure shall meet the latest requirements of:

a. International Building Code (Chapter 19)

b. ASCE Standard 7-16 (Chapter 13)

c. American Concrete Institute (ACI) 318

2. Requirements of this section of specifications are minimum requirements. When other requirements are indicated, the greater requirement shall be met or exceeded.

B. Anchorage in Concrete or Masonry:

1. Calculation of anchorage forces shall be provided by the seismic engineer for all installations in Seismic Design Category C, D, E, and F.

2. The following anchorage and attachments are not permitted:

a. Power driven fasteners for tension load applications in Category D, E, and F unless specifically approved for this application.

b. Friction clips.

2.6 VIBRATION AND SEISMIC ACCESSORIES:

A. Provide all necessary brackets, bolts, fasteners, predrilled bases, oversized bases, accessory components and materials to install systems in accordance with manufacturer's requirements.

2.7 OUTDOOR EQUIPMENT:

A. Slab Mounted Equipment (outdoor):

1. Equipment shall be direct anchored if design permits unless isolation bases are required.

2. If no other isolation is indicated for outdoor equipment, 3/4" neoprene waffle pads shall be provided.

PART 3 - EXECUTION

3.1 GENERAL:

A. If the equipment to be mounted or restrained is not furnished with integral structural frames and external mounting lugs (both of suitable strength and rigidity), approved members shall be installed in the field which shall provide means of attaching required vibration and seismic devices.

B. The members include, but not limited to the following: gussets, rails, brackets, angles, channels and similar components. These members should be sized by the vibration and seismic vendor to provide an acceptable installation.

C. All field installed components shall be neatly installed and be of materials and/or finish suitable for the installation.

3.2 SUBMITTALS (VIBRATION ISOLATION):

A. The manufacturer shall submit drawings indicating location and type of all vibration isolation components provided.

B. A schedule shall show capacity and load of each component at each location.

C. Design shall be based upon actual installation and not contract drawing schematics.

3.3 SUBMITTALS (WIND LOAD):

A. Submit drawings and calculations showing wind loading, location of anchors, ties and bracing, and types and sizes of restraints.

B. Submit drawings showing auxiliary supports and method of attachment.

C. Submit drawings and calculations showing the attachment of equipment to curbs.

D. Submit drawings and calculations showing the attachment of curbs to the structure members.

E. Submit drawings and calculations showing the attachment of equipment to adapter curb and adapter curbs to existing curbs.

3.4 SUPERVISION:

A. The manufacturer, or his qualified representative, shall be responsible for providing such supervision as may be necessary to assure correct installation and adjustment of the isolators. Upon completion of the installation and after the system is put into operation, the manufacturer, or his representative, shall make a final inspection and submit his report to the A/E in writing certifying the correctness of installation and compliance with approved submittal data.

3.5 INSTALLATION:

A. Where field conditions, construction schedule, or construction progress require that isolators be installed after the equipment or systems are installed, provide temporary supports until that time when isolators can properly be installed.

3.6 EXISTING CURBS:

A. After the existing unit is removed from the existing curb, the seismic engineer shall determine the best method to secure the existing curb to the existing building structure to meet the HVAC system’s seismic requirements.

END OF SECTION 23 0548

SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of mechanical identification on all mechanical equipment, systems, and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work furnished and installed shall comply with all local codes and ordinances and shall meet or exceed the standards and procedures (latest editions) of the following:

a. ANSI A13.1 for the identification of piping systems.

b. ANSI/NEMA Standard Z535.1.

B. Manufacturer:

1. The following band, tag, nameplate, and identification marker manufacturers are acceptable:

a. Seton Name Plate Corporation

b. T&B/Westline Products

c. Brady

d. MSI

e. Brimar

PART 2 - PRODUCTS

2.1 NAMEPLATES:

A. General:

1. Nameplates shall be black plastic with white engraved lettering.

2. All information shall be provided on a single nameplate per device if practical.

3. Nameplates shall have screw holes and screws for mounting unless screws would damage the intended use of the product to which it is attached (i.e., NEMA4 panel, etc.). In that case, provide stick-on nameplates.

4. Nameplates shall be 1/16" thick.

B. Size:

1. Three-quarter inch (3/4") high nameplate when located on ceiling grid.

2. Two inch (2") high nameplate when located on outdoor HVAC equipment.

3. Three-quarter inch (3/4") high nameplate when located on control devices such as switches, sensors, etc.

4. Size as indicated on plans or detail.

2.2 SWITCHES, THERMOSTATS, AND OTHER SIMILAR DEVICES:

A. Devices to be identified include:

1. Fan controls

2. Flat plate sensors

3. Thermostats, humidity sensors, and CO2 sensors

4. Similar equipment

B. Nameplate shall include (example):

1. Equipment description: HV #1, etc.

2. Switch position as required: Summer/Winter, On/Off, etc.

2.3 MECHANICAL EQUIPMENT:

A. Devices to be identified include all mechanical equipment.

B. Nameplate shall include (example):

1. Equipment description: EF #1, etc.

2. Owner's identification number

PART 3 - EXECUTION

3.1 NAMEPLATES:

A. Submit listing of all nameplates with associated information to A/E for approval before fabrication.

B. Coordinate method of attachment and location of nameplate with contractor who is responsible for the installation of the device (i.e., control panel, air handler, etc.).

END OF SECTION 23 0553

SECTION 23 0592 - SYSTEM START-UP

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the start-up of all building mechanical systems where shown on the drawings and specified hereinafter.

B. Description:

1. These systems shall include:

a. Air systems (heating, ventilating, air conditioning, exhaust and recirculation)

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0593 - Testing, Adjusting, and Balancing for HVAC

1.3 QUALITY ASSURANCE:

A. Codes and standards:

1. All work shall meet or exceed the standards and procedures of the following (latest edition):

a. AABC National Standards

b. SMACNA

B. Start-up of equipment shall be by manufacturer's representative unless noted otherwise.

C. Tests, in addition to those specified herein, required to prove code compliance, to meet insurance requirements, and to verify proper installation by the A/E, owner, or authorities having jurisdiction shall be provided by the Contractor.

D. All tests, instruments, and procedures shall be in accordance with the AABC National Standards and system test and balance specifications.

PART 2 - PRODUCTS

2.1 GENERAL:

A. All concealed work must remain uncovered until required tests have been completed. Sections of the system may be tested prior to concealing as outlined hereinafter.

B. The Owner and the A/E shall be notified in writing a minimum of three working days prior to any tests being performed.

C. Local, state and federal authorities having jurisdiction shall be notified in writing with sufficient time to schedule inspection as required by the authority.

D. In no case shall a system be started or operated in such a manner that the system or component pressure or temperature ratings, or the pressure or temperature to which a system or component has been tested, be exceeded.

2.2 START-UP:

A. Systems shall be started up by the Contractor except as required in specific portions of the mechanical specifications.

B. The following systems shall be started up by a factory certified technician:

1. Heating and air conditioning equipment

2.3 AIR DISTRIBUTION SYSTEMS:

A. General:

1. Cleaning and leakage testing are not required for existing duct systems unless indicated otherwise.

B. Cleaning of Duct System:

1. Upon completion of duct and before installation of any outlets, the contractor shall clean entire duct system of all rubbish, plaster, dirt, etc.

C. Leakage Tests for systems 2 inch w.g. and less:

1. Verify, by use of air monitoring devices and pitot tube traverse, that the total air quantities measured at all outlets and the air quantity handled by the fan differ by no more than $\pm$5%.

2. Where leakage is determined to exceed 5% in accordance with the above testing procedure, the Contractor shall locate and repair the duct to reduce the leakage to acceptable levels.

3. Where excessive leakage is noted at any location, whether the entire system meets the 5% leakage rate or not, the Contractor shall repair the duct to minimize the leakage at the location identified.

4. Leakage includes all connected components of the system.

5. Leakage tests shall be repeated until the duct is proven to be within the limits of leakage specified herein.

2.4 SYSTEM START-UP:

A. General:

1. System shall be started and checked to ensure safe and proper operation.

2. Minimum requirements are listed for each system and are in addition to manufacturer start-up requirements and the requirements stated in the specific sections of the specifications.

3. Temperature control systems installed complete and operable.

4. Proper thermal overload protection in place for electrical equipment.

B. Air Systems:

1. Verify proper fan rotation.

2. Verify full load amps are below nameplate amps.

3. Verify control dampers operating.

4. Verify balance dampers and fire and smoke dampers are open.

5. Remove all duct restrictions.

6. Verify clean filters are installed.

7. Verify access doors are closed and duct end caps are in place.

8. All outlets shall be installed and connected.

2.5 SYSTEM PRESSURES:

A. Observe the start-up of systems to verify that no dangerous conditions exist as the result of high (supply) or low (return/exhaust) pressure. If excessive pressures are observed, report the observed condition and shut down or modify system operation to avoid damage.

PART 3- EXECUTION

3.1 SUBMITTALS:

A. Submit to the A/E all test results including a minimum of the following information:

1. System tested

2. Location of test
3. Date, time, and ambient temperature at test startup and completion
4. Persons present for test
5. Duration of test
6. Test equipment
7. Test results

B. Partial system may be done at the Contractor's option except tests shall be completed:

1. For each phase designated by contract documents
2. In accordance with building contracts schedule for completion
3. As required to turn over portions of the system for the Owner's use

C. Reports shall include but not be limited to:

1. Tests during construction
2. Manufacturer's factory test reports
3. Equipment start-up reports

D. Reports shall be submitted within ten days of test completion.

3.2 ENGINEER REVIEW:

A. The A/E shall, at his discretion, recheck any or all of the test work. Provide ample number of technicians and test equipment to perform the tests required.

B. All systems not accepted shall be retested.

C. Systems shall be retested and rechecked until accepted by all parties.

3.3 DUCT LEAKAGE:

A. Where leakage is determined to exceed the allowable rate, locate and repair the duct to reduce the leakage to acceptable levels.

END OF SECTION 23 0592

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools, and equipment and perform all operations in connection with the testing and balancing of all mechanical systems where shown on the drawings and specified hereinafter.

B. Description:

1. Systems shall include all equipment, operators, controls, accessories, and appurtenances.

2. These systems shall include:

a. Air systems (heating, ventilating, air conditioning, exhaust and recirculation distribution systems)

b. Vibration isolation systems

3. Air inlets and outlets shall include:

a. Exhaust

b. Relief

c. Outside Air

d. Supply

e. Return

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0592 - System Start-Up

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following (latest editions):

   a. AABC National Standards

   b. NEBB Standards

2. Testing and balancing shall be performed by an agency certified by the AABC or NEBB.

3. All technicians shall have a minimum of three years testing and balancing. Each test and adjustment shall be under the direct supervision of a qualified technician.

4. Testing and balancing shall be performed by one agency.

PART 2 - PRODUCTS

2.1 GENERAL BALANCING PROCEDURES:

A. All recorded data shall represent a true, actually measured, or observed condition.

B. Any abnormal conditions in the mechanical systems or conditions which prevent total system balance, as observed by the Test and Balance Agency, shall be reported as soon as possible to the A/E.

C. If, for any reason, a system cannot be properly balanced, it shall be reported to the A/E by the Test and Balance Agency as soon as observed.

D. Should additional balancing devices be required, the Test and Balance Agency shall bring it to the attention of the Contractor as quickly as possible.

E. The Test and Balance Agency shall leave all system components in proper working order including:

   1. Replace belt guards.

   2. Close access doors.

   3. Close doors to electrical switch boxes.

   4. Restore thermostats to specified settings.

F. The Test and Balance Agency shall permanently mark the settings of all valves, dampers, and other adjustment devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop, it shall be set and locked.

G. Systems shall be tested in each specified mode of operation. See equipment Sequence of Operation.

2.2 INSTRUMENTS:

A. All Test and Balance work shall be performed using the required instrumentation to obtain proper measurements.

B. Instruments shall be properly maintained and transported in such a manner as to provide protection against damage due to vibration, impact, moisture or any other condition that may render them inaccurate.

C. Instruments shall have been calibrated within a period of six months prior to starting the project.

D. Proof of calibration shall be maintained with the instruments.

E. Instruments shall be calibrated upon completion of the work when required by the client to prove reliability.

2.3 AIR SYSTEMS:

A. General Requirements:

1. Total system balance shall not begin until the Test and Balance Agency has verified that start-up procedures have been performed and filters have been changed.

2. The Test and Balance Agency shall measure the amperes of all fan motors before total system balance is started and shall take proper steps to correct and report any overloads.

3. The Test and Balance Agency shall not continue total system balance if any conditions are observed that are hazardous to the air system. This shall be reported and corrected before proceeding further.

4. The Test and Balance Agency shall verify all outlets for compliance with design requirements and shall report any variations before starting total system balance.

5. If during total system balance, the Test and Balance agency detects any inlet or outlet conditions that will not allow proper balancing to be performed, the A/E shall be notified immediately.

6. Reports shall indicate airflow measured at unit and inlet and outlet totals.

B. Air Outlets:

1. The systems shall be balanced so that the total supply air quantity to each space shall be within -5% to +5% of the design amount.

2. The pattern for all adjustable outlets shall be adjusted for proper distribution to minimize drafts.

3. Outlet dampers shall not be used to provide proper branch airflow to space.

4. The test and balance contractor shall indicate on the test and balance report that the grilles provide the proper directional throw where direction throws are indicated.

C. Air Inlets:

1. Inlets on systems shall be adjusted to the required quantities with a tolerance of ±5%.

2. At completion of total system balance, at least one inlet of every branch shall be fully open and at least one branch balancing damper in the system shall be fully open.

3. Return air inlets installed in ceilings where the space above the ceiling is used as a return air plenum are to be fully opened and are not to be measured or adjusted except where a specific airflow is indicated.

D. Zone Dampers:

1. Dampers installed in main trunks and branches and dampers required for system control shall be balanced within -5% to +5% of the design amount.

E. Filters:

1. Under final balanced conditions, the Test and Balance Agency shall measure and record static pressure entering and leaving each filter bank.

F. Fans:

1. The Test and Balance Agency shall set the fan RPM to provide design total CFM and the required static pressure to operate the system.

2. If proper airflow is not achieved, the Contractor shall change the belts and drives. The new drives shall be calculated by the Test and Balance Agency. The Test and Balance Agency shall reset the fan RPM to provide design total CFM.

3. Fan speed shall not exceed the maximum allowable RPM as established by the fan manufacturer.

4. The final setting of fan RPM shall not result in overloading the fan motor in any mode of operation. Dampers shall be modulated, and the amperes of the supply fan motor shall be measured to ensure that no motor overload can occur. The amperes shall be measured in the full cooling, heating, dehumidification, and economizer modes to determine the maximum brake horsepower.

5. After total system balancing, the following values shall be recorded:

a. Fan RPM

b. Motor voltage and amperes

c. Entering static pressure

d. Leaving static pressure

6. Final RPM of the constant volume supply fan shall be set to supply the required CFM with filters artificially restricted to simulate 100% loading. The Test and Balance Agency shall verify that the fan motor will not be overloaded when the system is operating with unrestricted, clean filters in place.

7. When applicable, final supply fan settings shall be based on rated wet cooling coil resistance.

8. Final RPM of the supply fan in systems having mixed air dampers shall be set to provide required CFM with the system in a logical non-modulating mode; for example, minimum outside air.

G. Coils:

1. Under final balanced conditions, the Test and Balance Agency shall measure and record static pressure entering and leaving each coil bank.

H. Other Devices:

1. Under final balanced conditions, the Test and Balance Agency shall measure and record static pressures entering and leaving other devices including:

a. Soundtraps

I. Mixed Air Control:

1. The Test and Balance Agency shall observe or test mixed air plenums for possible stratification. If freeze-up or other serious problems are likely, the condition shall be reported to the Architect/Engineer at once.

2. The Test and Balance Agency shall set the minimum outside air quantity to the required value. If this airflow quantity cannot be properly measured, the Temperature Method as specified in the AABC National Standards shall be utilized.

J. Static Pressure Readings:

1. Static pressure leaving the fan shall be taken as far downstream from the fan as is practical, but shall be upstream of any restrictions in the duct (such as duct turns).

2. No reading shall be taken directly at the fan outlet or through the flexible connection.

3. Static pressure entering a fan shall be measured in the inlet duct upstream of any flexible connection and downstream of any duct restrictions.

2.4 TEMPERATURE CONTROL SYSTEM:

A. In the process of Total System Balance, the Test and Balance Agency shall:

1. Work with the temperature control contractor to ensure the most effective total system operation within the design limitations, and to obtain mutual understanding to intended control performance.

2. Verify that all control devices are properly connected.

3. Verify that all dampers and other controlled devices are operated by the intended controller.

4. Verify that all dampers are in the position indicated by the controller (open, closed, or modulating).

5. Verify the integrity of valves and dampers in terms of tightness of close-off and of full-open position.

6. Check that all valves are properly installed in the piping system in relation to direction of flow and location.

7. Check the calibration of all controllers.

8. Verify the proper application of all normally open and normally closed valves.

9. Check the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts, or cold walls.

10. Check the locations of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media.

11. Check that the sequence of operation for any control mode is in accordance with approved shop drawings. Verify that no simultaneous heating and cooling occurs except where specified.

12. Verify that all controller set points meet the design intent.

13. Check all dampers for free travel.

14. Verify the operation of all interlocked systems.

15. Perform all system verification to assure the safety of the system and its components.

2.5 EXISTING SYSTEMS:

A. General:

1. All hydronic and air systems which are to remain but are modified in any manner or are listed to be tested shall be tested before demolition begins.

2. The test and balance contractor shall utilize an ultrasonic meter to measure existing water flows where existing water flows are to be measured. If there are proper flow measuring devices installed, the test and balance contractor may use the installed devices.

3. Where ultrasonic meters are used on existing insulated systems, the contractor shall remove insulation as needed and repair insulation and finish to match existing when testing is completed.

B. Balancing Requirements

1. The A/E shall provide direction on any changes to be made to the existing equipment's air balance. After renovation work is completed, the existing equipment shall be rebalanced or, if no changes are required, equipment shall be retested.

C. Locations shall include, but not be limited to, the following:

1. Equipment and airflows indicated on the plans.

2. Air flow at points where new duct ties in.

D. Reports:

1. A test and balance report shall be submitted before demolition and after renovation is completed for all systems which are required to be measured.

2.6 TEMPERATURE MEASUREMENT:

A. General:

1. Air and water temperatures at hydronic coils must be taken in the same relative timeframe. For example, when measuring coil entering and leaving air temperatures, the coil entering and leaving water temperature must be taken in close timeframe to the measurement of the air.

2. Where outside air temperature is a variable affecting other readings (such as a mixed air temperature), the outside air reading shall be given at the time of the mixed air reading.

B. Air Temperatures:

1. Provide entering and leaving air temperatures for each cooling coil, heating coil, energy recovery and heat transfer device.

2. Temperatures shall be measured in heating, cooling, dehumidification, and neutral modes of operation.

PART 3 - EXECUTION

3.1 SUBMITTALS:

A. The Contractor shall submit to the A/E the following information within thirty days after the award of the contract:

1. The name of the Test and Balance Agency.

2. Name and registration number of the certified testing technician.

B. The Contractor shall submit to the A/E the following information within ninety days after the award of the contract.

1. Detailed testing procedures including list of instruments, task performed, model and serial number and date last calibrated.

2. Agenda including schedule of work with approximate duration of each phase, approximate date of field inspections, and required start date to meet scheduled completion date.

3. Report forms.

C. An approved copy of each submittal must be received by the Test and Balance Agency before work is begun.

D. If complete submittals are not received by the A/E within the specified times, the A/E reserves the right to select the Test and Balance Agency with any additional costs incurred by the Contractor.

3.2 REPORT SUBMITTALS:

A. Provide a preliminary typed report for engineers' review.

B. After receiving engineers' review comments and address issues, submit three copies of the Test and Balance report. Report shall have systems, subsystems, and individual readings in a sequential format.

C. Reports shall be submitted after all modifications required by these specifications to balance system (i.e. replace impellers, belts, drives, dampers) have been made. Reports will not be accepted with comments such as damper missing, new drive required, etc.

3.3 DRAWING SUBMITTALS:

A. Test and Balance Agency shall submit plans indicating:

1. All traverse locations referencing values shown in reports.

2. Locations of all required sound and vibration measurements.

3.4 COORDINATION OF WORK:

A. Test and Balance Agency shall not begin work on a system until system is started as required in SYSTEM START-UP specifications.

3.5 CONTRACTOR REVIEWS AND INSPECTIONS:

A. The Test and Balance Agency shall perform one pre-construction plan check and submit comments to A/E.

B. The Test and Balance Agency shall perform construction inspections at the following stages of each construction phase and submit comments to A/E:

1. 50% completion

2. 90% completion

3.6 BELTS, DRIVES, IMPELLERS AND DAMPERS:

A. If it is determined by the Test and Balance Agency that drive changes are required, the Contractor shall change belt and drive.

B. Drives for constant volume air handlers shall be selected for a minimum of 100% filter loading.

C. Drives for variable volume air handlers shall be selected for a minimum of 100% filter loading.

D. If it is determined by the Test and Balance Agency that impeller changes are required, the Contractor shall change impellers.

E. If it is determined by the Test and Balance Agency that additional balance dampers are required, the Contractor shall install additional dampers.

F. The Test and Balance Agency shall rebalance system after changes have been made.

3.7 ENGINEER REVIEW:

A. The A/E shall, at their discretion, recheck any or all of the test and balance work within 120 days of receipt of report. The Test and Balance Agency shall provide ample number of technicians and test equipment to perform the tests required.

B. Upon completion of the A/E's recheck, the testing and balancing report, or portions thereof, shall be accepted or rejected. All parts not accepted shall be retested and rebalanced.

C. Systems shall be tested, rebalanced and rechecked until accepted by all parties.

3.8 EXISTING SYSTEMS:

A. Pre-demolition test report shall be submitted before demolition begins.

B. Balance systems as directed by A/E after renovation work is completed and provide renovation test report.

3.9 MOTOR CAPACITY:

A. At no time shall the motor exceed full load amps. Motor shall load into service factor only if written permission is received from the engineer.

END OF SECTION 23 0593

SECTION 23 0700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of insulation required for thermal and acoustical installation on all mechanical equipment, piping, ductwork, and appurtenances where shown on the drawings and specified hereinafter under applicable sections of this specification.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0713 - Duct Insulation

2. Section 23 0716 - HVAC Equipment Insulation

3. Section 23 0719 - HVAC Piping Insulation

1.3 QUALITY ASSURANCE:

A. Flame and Smoke Spread Ratings:

1. All insulation materials must have a maximum 25/50 flame/smoke rating as tested by ASTM E-84, NFPA 255 and UL 723 except where specifically noted otherwise.

2. Flame/smoke rating shall be a minimum of 25/250 in equipment rooms where the room is not used as a plenum.

3. Flame/smoke rating shall be a minimum of 25/250 in tunnels, crawl spaces, and outdoors.

B. Insulation thickness shall equal those recommended by ASHRAE 90.1 or as scheduled, whichever is greater. Surface temperatures shall be below 140 degrees F.

C. Accessories such as adhesives, mastics, cements, and tapes for fittings shall have the same component rating as listed above.

D. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed requirements. Treatment of jackets or facing to impart flame and smoke safety shall be permanent. The use of water soluble treatments is prohibited.

E. Installation and materials shall meet the requirements of the International Building Codes.

F. All insulation work shall be applied by mechanics normally employed in the trade. All insulation shall be installed in accordance with the manufacturer's recommendations.

G. All insulation furnished under this Division of the specifications shall be the product of one manufacturer except for special applications.

H. Manufacturers:

1. The following manufacturers of sealants, adhesives, and mastics shall be:

a. Foster

b. Childers

c. Mon-Eco

PART 2 – PRODUCTS

2.1 MASTICS, SEALANTS, AND ADHESIVES:

A. General:

1. Materials shall be as recommended by the insulation manufacturer.

2. Products shall be applied as recommended by the manufacturer for that specific application.

3. The number of coats and thicknesses shall meet or exceed the manufacturer’s recommendation or as indicated in these specifications or on the plans, whichever is greatest (coats and thickness).

4. Materials shall meet LEED requirements for low emitting products.

B. Finish:

1. When material is applied where it is to be painted, the material shall be coated, if necessary, to allow the material to be properly painted without use of special paints or primers.

PART 3 - EXECUTION

3.1 GENERAL:

A. All insulation materials shall be delivered and stored in manufacturer's container and kept free from dirt, water, chemical and mechanical damage.

B. Insulation shall be applied by experienced workmen in a workmanlike manner.

C. Insulation shall not be applied until all pressure testing has been completed, inspected and released for insulation application.

D. Surfaces to be insulated shall be clean and dry.

E. All insulation joints shall be butted firmly together and all jackets and tapes shall be smoothly and securely installed.

F. Insulation shall be run continuously through walls, ceiling openings, and sleeves except where fire stop or firesafing materials are required.

G. Items that are factory insulated shall not receive additional insulation where not otherwise specified.

3.2 INSTALLATION:

A. General:

1. Insulation on cold surfaces where vapor barrier jackets are used shall be applied with a continuous, unbroken vapor seal.

2. Insulation on equipment that must be opened periodically for inspection, cleaning, and repair must be constructed so insulation can be removed and replaced without damage.

END OF SECTION 23 0700

SECTION 23 0713 - DUCT INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of insulation required for thermal and acoustical installation on all sheet metal duct and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0700 - HVAC Insulation

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. Federal Specification HH-I-558C Mineral Fiber Boards, Blankets and Pipe Covering

2. ASTM C553 Standard Specification for Mineral Fiber Blanket Insulation for Commercial and Industrial Applications

3. ASTM C547 Standard Specification for Mineral Fiber Performed Pipe Insulation

4. ASTM G12 Standard Specification, Mineral Fiber Block and Board Thermal Insulation

5. ASTM C1136 Barrier Material, Vapor (Jacket Only)

6. ASTM C916 Liner Adhesive

7. ASTM G21, G22 Fungi and Bacteria Resistant Tests

8. ASTM C1071, Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)

9. UL 723 Duct Tape

B. Duct wrap shall not exceed 25% compression.

C. Manufacturers:

1. The following fiberglass duct insulation manufacturers are acceptable.

a. Owens/Corning

b. Certainteed

c. Knauf

d. Johns Manville

PART 2 - PRODUCTS

2.1 GENERAL:

A. Duct insulation shall comply with the requirements of International Energy Conservation Code or these specifications, whichever is greater.

B. If no other specific direction is provided, the spaces for duct insulation are defined as follows:

1. Concealed:

a. Above ceiling.

b. In mezzanines.

c. In mechanical rooms.

d. Other spaces not generally considered regularly occupied spaces.

2. Exposed:

a. Indoor locations generally considered regularly occupied spaces and where duct can be visible to occupants.

3. Outdoor:

a. Exposed to ambient conditions including sunlight and weather.

4. Unconditioned spaces:

a. Exposed to ambient temperatures but not to sunlight and weather. Typical spaces may be attics, crawl spaces, utility tunnels, chases open to the exterior, etc.

5. Return air plenum:

a. A space is only considered a return air plenum if the unducted air returning from a space or above the ceiling of the space is from the same air handler supplying that space.

2.2 TYPES OF FIBERGLASS INSULATION:

A. Fiberglass Duct Wrap:

1. Blanket type insulation composed of glass fibers bonded with a thermosetting resin and faced with an FSK vapor retarder. The facing shall be a glass scrim reinforced laminate of aluminum foil and kraft paper bonded with a fire retardant adhesive.

2. Insulation shall be 1.00 lb./CF density, .28K @ 75 degrees F and a facing vapor transmission of .02 perms max.

3. Basis of design insulation shall be:

a. Owens Corning Type 100

2.3 MINIMUM THERMAL VALUES REQUIRED FOR INSULATION (UP TO 9000 CDD50 AND UP TO 9000 HDD 65, CLIMATE ZONE 3):

A. General:

1. This section is intended to indicate minimum as installed "R" values.

2. Where specific duct insulation thicknesses are indicated elsewhere in this specification or on the plans, the greater thickness or insulating value shall be provided.

3. If no other requirements are indicated and an R-0 is indicated, no insulation is required.

B. Supply Duct:

1. Concealed: R-6 as installed

C. Return Duct:

1. Concealed: R-6 as installed

D. Outside Air Duct:

1. See requirements for supply duct.

2.4 APPLICATION OF FIBERGLASS DUCT WRAP:

A. Fiberglass duct wrap shall be provided for all ducts and plenums required to be insulated in the following locations:

1. Concealed ducts

2. Exposed ducts in occupied spaces

2.5 TAPE FOR FIBERGLASS DUCT INSULATION:

A. Tape shall be pressure sensitive joint sealing tape specifically made for the specific application in which it is used.

B. Tape shall be 3" wide minimum and shall match the insulation finish.

PART 3 - EXECUTION

3.1 INSTALLATION OF FIBERGLASS INSULATION:

A. Fiberglass Duct Wrap Insulation:

1. Duct wrap insulation seams shall be stapled 6" on center with outward clinching staples. All seams are to be sealed with pressure sensitive tape matching the facing.

2. Where rectangular ducts are 24" in width or greater, duct wrap insulation shall be additionally secured to the bottom of the duct with mechanical fasteners such as pins and speed clip washers, spaced 18" on center (max.) to prevent sagging of insulation.

B. Tape and Mastic Installation:

1. After the pressure sensitive tape is applied, a coat of mastic shall be applied to the tape overlapping the insulation by 2" minimum.

2. Tape and mastic shall also be applied to all tears, rips, punctures, penetrations, mechanical fasteners, access doors, and all other locations as necessary to ensure a continuous vapor tight system.

3. Mastic must also be applied to any factory applied tape such as on factory insulated supply grilles, etc.

END OF SECTION 23 0713

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools, and equipment and perform all operations in connection with the installation of insulation required for thermal and acoustical installation on all piping including valves, mechanical couplings, fittings, flanges, strainers, expansion joints, and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0700 - HVAC Insulation

1.3 QUALITY ASSURANCE:

A. Manufacturers:

1. The following elastomeric pipe insulation manufacturers are acceptable:

a. Armacell

b. K-Flex

c. Aeroflex

d. Nomaco

2. The following pipe insert (for elastomeric pipe insulation) manufacturers are acceptable:

a. Aeroflex

b. Armafix

c. Armacell

PART 2 - PRODUCTS

2.1 GENERAL:

A. Pipe insulation shall comply with the International Energy Conservation Code or these specifications, whichever is greater.

2.2 TYPES OF INSULATION:

A. Elastomeric Insulation:

1. General:

a. The insulation shall have a factory applied adhesive closure system.

2. Physical properties:

a. Thermal conductivity (k) is .27 at 75 degrees F.

b. Water transmission is .08 perms – inch.

c. Will not significantly contribute to fire.

3. Basis of design insulation shall be:

a. Armacell type AP Armaflex or type AP/SS

2.3 PIPE INSULATION APPLICATION:

A. General:

1. All fittings, valves, and accessories in the piping system shall be insulated similar to the piping system.

B. Elastomeric Pipe Insulation:

1. Elastomeric pipe insulation not permitted on the following:

a. Where not UL approved for fire rated assemblies.

b. Where details or notes specifically require another insulation type.

2.4 FITTINGS:

A. General:

1. Fittings shall be factory molded except where indicated otherwise.

2. Fittings shall have a factory installed vapor barrier or have a field installed vapor barrier equal to the pipe vapor barrier.

B. Elastomeric Pipe Insulation:

1. Piping (up to 3/4"):

a. Fittings may be mitered at contractor's option.

2.5 FINISH (OUTDOOR REFRIGERANT PIPING):

A. Outdoor refrigerant piping shall be wrapped with a prefabricated, self-adhering protective membrane.

B. The outer layer shall be UV resistant.

C. The inner layers shall be high density cross linked polymer film with a layer of asphalt adhesive.

D. The basis of design wrap shall be

1. MFM FlexClad-400 or equal

2.6 PIPE INSERT (FOR ELASTOMERIC INSULATION):

A. General:

1. Insert shall be a closed cell, high compressive strength, foam insulating pipe support.

2. The insert shall be lined with a closed cell EPDM foam rubber and encased in a zero perm weatherproof membrane.

B. Properties:

Compressive Strength (at yield)	314 PSI
Thermal Conductivity	.312K
Water Absorption (by weight)	<7%
Water Vapor Permeability	0.0 Perm

C. Insert shall be sized for the pipe on which it is installed and the thickness of the adjacent insulation.

D. Basis of design manufacturer shall be:

1. Aerofix-U

PART 3 - INSULATION THICKNESS SCHEDULES

3.1 GENERAL:

A. Specific insulation requirements may be indicated elsewhere in these specifications or on the contract drawings.

B. Insulation for piping exposed to ambient conditions based upon 90 degrees F, 90% RH, and 7 MPH wind speed.

3.2 ELASTOMERIC INSULATION SCHEDULE:

A. Refrigerant Suction Lines, Hot Gas Reheat Lines, and Liquid Lines:

1. All pipe - 1" thk.

PART 4 - EXECUTION

4.1 INSTALLATION:

A. Apply adhesives, sealants, coatings, and other materials as recommended by the manufacturer.

B. Butt joints and seams of elastomeric insulation shall be sealed with contact adhesive as recommended by the insulation manufacturer. Where possible, insulation shall be used without slitting and slipped over tubing. All fittings shall be covered and sealed with fabricated pieces of the same insulation and adhesive.

4.2 FIRERATED ASSEMBLIES:

A. Insulation shall run through all building assemblies except where the listed fire rated assembly does not allow insulation to be used.

4.3 MULTI-LAYER INSTALLATION:

A. Joints shall be staggered.

4.4 ELASTOMERIC INSULATION:

A. Inserts:

1. Center insert on hanger or pipe support.

2. Insert shall be installed using the insert manufacturer's adhesive to seal the insert to the adjacent pipe insulation.

3. The insert and adjacent insulation shall be wrapped with the insert manufacturer's tape to seal and finish the installation. The tape shall wrap the insulation/insert two complete times.

B. Coatings:

1. When installed outdoors without a metallic jacket, the insulation shall be coated with a UV resistant coating.

2. The coating shall provide a minimum of 5 years protection against deterioration.

C. Tape:

1. 3/4" longitudinal tape specifically listed for use on elastomeric insulation shall be installed along every longitudinal seam/joint.

END OF SECTION 23 0719

SECTION 23 0900 - INSTRUMENTATION AND CONTROLS FOR HVAC (GENERAL)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of the building environmental controls shown on the drawings and specified hereinafter.

B. Description:

1. Control and instrumentation work shall include:

a. Temperature control

b. Equipment interlock and controls

c. Wiring for automatic controls

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0900.01 - Controls for HVAC (Dampers and Valves)

2. Section 23 0904 - Building Automation System

3. Section 23 0905 - Smoke Devices and Systems

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All environmental controls shall comply with all local codes and ordinances, and meet or exceed the following standards:

a. Underwriters Laboratories

b. NEMA Standards

c. National Electric Code

d. Scientific Apparatus Makers Associates Standard PMC 20.1 for Process Measurement and Control Terminology

e. Scientific Apparatus Makers Associates Standard PMC 20.2 for Process Control Performance

f. NFPA 90A

g. NFPA 72E Standard for Automatic Fire Detector

B. Control circuit wiring shall meet NFPA Standard 70, Article 725, for remote control, low energy power, low voltage power and signal circuits.

C. All control equipment shall be the product of one manufacturer whenever practical.

D. Manufacturers:

1. The following Building Environmental Controls Contractors are acceptable:

a. United Automation Corporation, Charlotte, NC

2. The following steel control guard manufacturers are acceptable:

a. VPI

b. Shaw Perkins

c. Approved equal

3. The following three phase voltage monitors are acceptable:

a. Motor Saver

b. Approved equal

PART 2 - PRODUCTS

2.1 GENERAL:

A. The building environmental controls shall be provided by the Building Environmental Controls Contractor.

B. The Building Environmental Controls Contractor shall have a local office within a 75 mile radius of the job site, staffed with factory trained engineers. The engineers shall be capable of providing instructions and maintenance service on all system components.

C. The Building Environmental Controls Contractor shall have a 5-year successful history in the design and installation of building systems and automatic temperature controls similar in performance to that specified herein and shall be prepared to evidence this history as condition of acceptance and approval prior to bidding.

D. The Building Environmental Controls system shall be installed by competent controls mechanics who are full time employees of the Building Environmental Controls Contractor.

E. The Environmental Control Contractor shall be responsible for the quality and satisfactory operation of the devices within the system and for the overall performance of the specified air flow control system.

2.2 SYSTEM:

A. Provide all thermostats, humidistats, sensors, transmitters, controllers, actuators, control panels, conduit, wiring, accessories and appurtenances for a complete building environmental control system.

B. Provide switches, fuses, disconnects and all other devices necessary for protection and convenient operation of system.

C. The contractor shall be responsible for providing power wiring, conduit, breakers and final connections for all control devices, panels, and components unless specifically shown on electrical plans:

1. Control devices

2. Smoke devices

3. Smoke dampers

4. Motorized dampers

D. The control system shall be on normal power.

2.3 CONDUIT:

A. General:

1. All control conduit shall be furnished and installed under this division except where specifically indicated otherwise.

2. All line voltage and control wiring in new construction shall be run in conduit.

3. All control wiring in existing construction shall be run in conduit.

4. Conduit shall be provided in accordance with the Electrical Division of this specification unless noted otherwise in these specifications.

5. Outdoor conduit shall be GRC or IMC.

6. Indoor conduit may be EMT.

7. Conduit shall be 3/4".

B. Below slab or below grade conduit:

1. Metallic conduits installed in or below slabs or below grade shall be galvanized rigid steel or IMC and shall be protected against corrosion with two field coatings of asphaltum black varnish or approved equal.

2. All metallic conduits installed below slab or below grade shall be provided with watertight couplings.

3. Conduits passing through concrete foundation walls or floor slabs below grade or below ground water level shall be provided with waterproof conduit entrance sealing sleeves.

C. Exposed Conduit:

1. All exposed (in corridors and all other spaces where visible without removing ceiling tile but not in mechanical or electrical spaces) conduit shall be prepainted conduit.

2. Conduit shall be prepainted color to be selected by Owner.

2.4 CONTROLS WIRING:

A. Wiring for low voltage circuits generally shall be No. 18B and S gauge or larger RSH-2 heat resistant.

B. Cables of two or more conductors, not smaller than 22 B and S gauge if shielded or No. 18 B and S gauge if not shielded, may be used for low voltage d-c and electronic circuits carrying less than 1.50 amperes, in lieu of individual wires.

C. Cables carrying a-c circuits sensitive to external fields shall be shielded.

D. Cables having fewer than 12 conductors shall have thermoplastic or rubber insulation for 300 volts or more and a heavy outer braid or thermoplastic sheath. Shields shall be grounded to building's grounding system, using wire not smaller than No. 14 B and S gage. Shields shall not be grounded to conduit systems or building piping.

E. Cables shall terminate in solder or screw type terminal strips. All terminal strips shall be numbered.

F. Cables shall not be tapped at intermediate points.

G. All wires, whether individual or in cables, shall be color coded and numbered for identification in accordance with the National Electric Code.

H. Where wire is not in conduit, wire shall be plenum rated.

2.5 TRANSFORMERS:

A. Transformers shall be furnished and installed for supplying current to control equipment as required.

B. Transformers shall conform to NEMA standards, shall be capable of supplying 125 percent the connected load, shall be enclosed in U.L. listed cabinets, ventilated, with conduit connections, and provided with fused disconnect switches on primary side and on secondary side.

2.6 CONTROL VOLTAGE:

A. Voltage shall not exceed 120 volts where located within occupied spaces and not integral with the equipment (such as a unit mounted thermostat).

B. Voltage in wet or damp locations shall not exceed 24V.

2.7 SPEED SWITCHES:

A. Speed switches, rheostats, and other fan speed control devices may be furnished by either the equipment manufacturer or the controls contractor.

2.8 THERMOSTATS AND HUMIDISTATS:

A. Thermostats:

1. Thermostats shall have minimum adjustable operating range of 20 degrees F above and below design setpoint.

2. Wall mounted room thermostats shall be with thermometer and without setpoint indicator.

3. Thermostat shall have external adjustments with internal stops for minimum and maximum settings.

4. Thermostats shall be 24V.

B. Humidistats:

1. Humidistats shall have minimum adjustable operating range of 15 percent above and below design setpoint.

2. Control setting shall be accessible by removal of locking cover.

C. Remote Thermostats:

1. Remote bulb type shall have liquid filled capillary and bulb.

2. Provide sensor well in all piping.

2.9 DDC THERMOSTATS:

A. General:

1. Provide electronic thermostat with sensor, night setback, night override switch, and digital setpoint adjustment. The digital setpoint adjustment only shall be visible through cover. Override switch duration and setpoint adjustment range shall be programmable from the front end.

2. Thermostats shall connect to unit controller via communication cable with a standard jack. The thermostat shall also have a connection available for field monitoring.

3. Devices installed in duct system shall be specifically designed for duct systems.

B. Construction:

1. Device shall be polymer construction.

2. Circuit boards shall be coated.

C. Technical Specifications:

1. Ambient Operating Conditions: 32 deg F to 140 deg F, 0 to 100% RH

2. Accuracy: ± .34 deg F @ 70 deg F (thru film nickel)

2.10 DDC HUMIDISTAT:

A. General:

1. Provide electronic humidistat without setpoint adjustment.

2. Humidistat shall connect to unit controller via communication cable with a standard jack. The humidistat shall also have a connection available for field monitoring.

3. Devices installed in duct system shall be specifically designed for duct system.

4. Where humidistat and thermostat are located adjacent to each other and both are providing input for the same piece of equipment, a combination humidity transmitter and temperature sensor may be provided at the contractor's option.

5. The humidistat shall be a separate device from other control sensors/devices when input is not used to control one specific piece of equipment.

B. Construction:

1. Devices shall be polymer construction.

2. Circuit boards shall be coated.

C. Technical Specification (@ 77 deg F):

1. Ambient operating conditions: 32 deg F to 140 deg F, 0 to 100% RH

2. Accuracy: ± 3% RH for 20-80% RH
± 5% RH for 5-20% and 80-95% RH

3. Temperature Coefficient: .12% RH/deg F

4. Response: less than 120 sec between 50-90% RH

5. Offset Adjustment: ± 5

2.11 SENSORS, TRANSMITTERS, AND OTHER CONTROL DEVICES:

A. General:

1. Provide the type device specified for the specific application. Where the device is not specifically indicated, provide the device best suited to provide the control specified.

B. Location of device:

1. Device shall be located as indicated on the drawings or as stated in the specifications.

2. Where no device location is indicated or specified, the device shall be located as recommended by the manufacturers to provide the best practical results.

3. Where the location indicated on the drawings or stated in the specifications does not provide the best practical results, the manufacturers shall provide recommendations for relocating the device.

4. It shall be the responsibility of the contractor to identify all conflicts between indicated device locations and manufacturers recommended locations prior to installation of any related components (i.e., sensor wells, conduit, etc.).

2.12 SAFETY DEVICES:

A. General:

1. Safety devices including, but not limited to, the following shall be hard wired to perform their required function. Status, where specified, shall be monitored by the building automation controls system and initiate other sequences where required:

a. Condensate overflow switch

b. Smoke alarm, via unit duct detector, where shutdown sequence is specified to be by mechanical.

2.13 CONTROL PANELS:

A. General:

1. All controllers, relays, switches, etc., for equipment shall be mounted in enclosed control panels with key lockable, piano hinged door.

2. Location of each panel shall be where indicated on plans, approved by A/E, and convenient for adjustment and service.

3. Label each panel properly identifying function or service of panel and all surface mounted devices.

4. Control panels shall be extruded or formed, cold-rolled steel, enamel surfaced, with full length mounting brackets, drilled wall mounting holes.

5. The control panel shall be key lockable.

6. Provide a 24V control transformer.

2.14 FLOAT SWITCH:

A. General:

1. Float switch shall include a sealed, waterproof reed/magnet float switch with no exposed electrical contacts.

2. Float shall be prewired with 6 ft. long, 18 ga. lead cables.

3. Switch shall be tested to UL 508 and UL listed for 24V AC.

4. Float shall attach to drain pan with stainless steel clips.

B. Locations:

1. All drain pans.

C. Basis of design manufacturers shall be:

1. SMD Research Safe-T-Switch Model SS3.

2.15 EQUIPMENT STATUS:

A. Equipment status shall be provided by solid state current sensors.

B. Sensor shall have non-polarity sensitive outputs, trip point adjustment, trip LED, and power LED.

2.16 THREE PHASE VOLTAGE MONITOR:

A. Monitor shall be autoranging type that detects single phasing, low voltage, phase reversal or voltage unbalance When a harmful condition exists, the output relay shall deactivate. When the harmful condition is removed, the relay shall reactivate.

B. The three phase voltage monitor shall be field or factory installed on all three phase equipment.

C. If three phase protection is already provided with the equipment via the VFD or other means, the control contractor does not have to provide additional three phase protection.

2.17 FLAT PLATE TEMPERATURE SENSOR:

A. General:

1. Wall plate shall be standard size stainless steel with button sensor and security screws.

2. Sensor shall connect to unit controller via communication cable with a standard jack. The thermostat shall also have a connection available for field monitoring.

3. Circuit boards shall be coated.

4. The lead wires shall be Teflon and the sensor encapsulated for a watertight device.

5. A closed cell foam backing shall insulate the plate from the wall temperature.

B. Technical Specifications:

1. Ambient Operating Conditions: 32 deg F to 140 deg F, 0 to 100% RH

2. Accuracy: ± .34 deg F @ 70 deg F (thru film nickel)

C. Provide flat plate temperature sensor for all heating and cooling equipment when the sensor is located in the following spaces:

1. Gymnasium

2. Other locations where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General:

1. The Building Environmental Controls Contractor shall be responsible for a complete operational system.

2. The installation shall include:

a. Drawings

b. Supervision

c. Interlocks

d. Adjustments

e. Verification

3. Location of sensing elements shall be the responsibility of the installer.

B. Wiring splices shall not be permitted in electrical panelboards, junction boxes and switchgear.

3.2 THERMOSTATS, HUMIDISTATS AND SWITCHES:

A. General:

1. Install all devices as recommended by manufacturer.

2. When device is provided by the control contractor, the control contractor shall be totally responsible for all coordination with the equipment supplier to ensure compatibility of components to meet the requirements of the equipment manufacturer and the control sequence.

B. Installation:

1. Mount thermostats, sensors, and switches 4'-0" above finished floor to the top of the device's control mechanism unless noted otherwise.

2. Mount humidity sensors 7'-0" above finished floor unless noted otherwise.

3. Thermostats mounted on exterior walls shall be mounted on a thermally insulated sub-base.

4. When location is not shown, Contractor shall assume the most remote location served by unit. Coordinate exact location with A/E.

5. Contractor shall coordinate location of thermostat, humidistats, and switches with final architectural plans and actual field conditions to avoid locating them inside cabinets, bookcases, casework, chalkboards, tackboards and behind door swings and similar obstructions that would limit access or limit the ability to properly sense space conditions.

3.3 REMOTE THERMOSTATS:

A. Thermostats not shown on plans shall be mounted in convenient locations on duct, in mechanical space or on equipment. Provide access doors for sensor and for thermostat.

3.4 WIRING:

A. All control wiring within starters (and motor control centers) shall be installed in a workmanlike manner and neatly laced.

B. All wiring installed in manholes, below grade, or below ground water level shall be made up with waterproof connections.

C. Wiring in manholes shall be continuous thru manholes.

3.5 CONDUIT:

A. Conduit sleeves thru non-waterproofed walls and floors shall be grouted and caulked on both sides of wall.

B. After installation, any painted pipe which is damaged shall be touch-up painted.

3.6 EXISTING CONSTRUCTION:

A. Control wiring and conduit shall be installed in existing walls, slabs, and ceilings.

B. Where conditions do not permit installation of conduit and wiring in existing walls, slabs, and ceiling; and, when approved by the engineer, wire mold and similar finished enclosures may be provided.

C. Conduit and wiring shall be installed above existing ceilings except where removal of existing ceilings is specifically identified in other dimensions of work (if any). The Contractor shall be responsible for removal of all other existing tile/grid and replacement of the tile/grid as necessary. Any damaged tile/grid shall be replaced by the Contractor at the Contractor's expense.

3.7 DEVICES ON EXTERNALLY INSULATED DUCTS:

A. Devices mounted on externally insulated ducts shall be mounted on standoff brackets to allow proper installation of duct. If device must be mounted directly to duct for proper operation, standoff bracket may be deleted.

3.8 SPEED SWITCHES:

A. If switch is not factory installed on the unit, the control contractor shall field install the switch.

3.9 FLOAT SWITCH:

A. Secure bracket to drain pan with screw.

B. Verify float is properly positioned.

END OF SECTION 23 0900

SECTION 23 0904.05 - BUILDING AUTOMATION CONTROL SYSTEM (NIAGARA)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of the building automation control system (BACS) shown on the drawings and specified hereinafter.

B. Description:

1. The building automation control system shall be comprised of a network of interoperable, stand-alone digital controllers, network area controllers, graphics and programming and other control devices for a complete system.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0900 - Instrumentation and Control for HVAC (General)

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All equipment and components shall comply with all local codes and ordinances, and meet or exceed the following standards:

a. Federal Communications Commission (FCC), Rules and Regulations, Volume II -July 1986 Part 15 Class A Radio Frequency Devices.

b. FCC, Part 15, Subpart B, Class B

c. FCC, Part 15, Subpart C

d. FCC, Part 15, Subpart J, Class A Computing Devices.

e. UL 504 - Industrial Control Equipment.

f. UL 506 - Specialty Transformers.

g. UL 910 - Test Method for Fire and Smoke Characteristics of Electrical and Optical-Fiber Cables Used in Air-Handling Spaces.

h. UL 916 - Energy Management Systems All.

i. UL 1449 - Transient Voltage Suppression.

j. Standard Test for Flame Propagation Height of Electrical and Optical - Fiber Cables Installed Vertically in Shafts.

k. EIA/ANSI 232-E - Interface Between Data Technical Equipment and Data Circuit Terminal Equipment Employing Serial Binary Data Interchange.

l. EIA 455 - Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices.

m. IEEE C62.41- Surge Voltages in Low-Voltage AC Power Circuits.

n. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.

1) NEMA 250 - Enclosures for Electrical Equipment.

o. NEMA ICS 1 - Industrial Controls and Systems.

p. NEMA ST 1 - Specialty Transformers.

q. CE 61326

r. C-Tick

s. cUL

B. All the equipment shall have the UL label.

C. Manufacturers:

1. The following BACNet MSTP controllers are acceptable:

a. Honeywell

b. Distech Controls

c. Johnson Controls Inc. and Vykon

2. The following network area controllers (NAC) are acceptable:

a. Honeywell

b. Distech Controls

c. Johnson Controls Inc. and Vykon

3. The following versions of Niagara 4 Framework are acceptable:

   a. Honeywell

   b. Distech Controls

   c. Johnson Controls Inc. and Vykon

PART 2 - PRODUCTS

2.1 APPROVED CONTROL CONTRACTORS:

A. Control contractors shall have an office with at least two (2) certified Niagara technicians located within 150 miles of Fort Mill, S.C.

B. A local office may provide field support, but the office providing the shop drawings, presentation to the Owner, and final system checkout shall be the office with the certified technicians.

2.2 GENERAL SYSTEM DESCRIPTION:

A. The building automation control system includes two distinct but interconnected control components. The first includes the building controls hardware up to and including the Network Area Controller (NAC). The second includes the supervisory software, programming and graphics.

B. A single control contractor shall have overall responsibility for the installation and operation of the building automation control system.

C. The product submittals, engineering, installation supervision, programming, startup, checkout and Owner's instructions and training shall be provided by Niagara 4 TCP certified personnel.

2.3 OWNERS WITH EXISTING BUILDING AUTOMATION SYSTEMS:

A. When this facility is brought on-line, the existing software and hardware shall be upgraded to Niagara 4 framework. System shall be upgraded as necessary to support the graphics, sequences and other functions of the building automation system.

B. Migrate all equipment currently on the BAS, even if it is not being replaced under this project, to the new system.

C. The data, information and graphical representations of the systems at this facility shall be equal to or greater than that installed for other facilities (in the District) or as indicated in these specifications, whichever is greater.

2.4 SYSTEM ARCHITECTURE:

A. System architecture shall include a Network Area Controller (NAC) that resides on the IP network and the NAC shall fully support a multi-vendor environment and be able to integrate third party systems via LonTalk, BACnet, SNMP and Modbus.

B. System architecture shall provide at a minimum Transport Layer Security (TLS) (latest version supported) Web access using any of the current versions of Microsoft Internet Explorer, Mozilla Firefox, or Google Chrome browsers from any computer on the owner's LAN.

C. The software shall employ object-oriented technology for representation of all data and control devices within the system. Physical connection of any BACnet controllers shall be via BACnet IP or BACnet MS/TP. BACnet Ethernet or BACnet Arcnet communications are not acceptable for NAC, Server or field device communication.

D. All components and controllers shall be true "peer-to-peer" communicating devices. With the exception of any previously installed legacy systems which cannot be updated to current open communication technologies, components or controllers requiring "polling" by a host to pass data shall not be acceptable.

E. The system shall incorporate the ability to access all data using HTML5 enabled browsers without requiring proprietary operator interface and configuration programs or browser plug-ins.

F. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer's internal Intranet network. Systems employing a "flat" single tiered architecture shall not be acceptable.

2.5 SYSTEM CONTROLLERS (GENERAL):

A. Mechanical systems controllers shall communicate over a BACNet MSTP or BACNet IP protocol bus.

B. Electrical systems controllers shall communicate over a BACNet MSTP, BACNet IP or Modbus TCP/IP protocol bus.

C. The control shall use BACnet based devices where the application has BTL Listed PICS defined.

D. The equipment controllers shall be fully programmable with full functionality on any Niagara 4 brand platform.

1. Support downloads to the controller from any brand of Niagara 4 platform.

2. Support uploads from the controller to any brand of Niagara 4 platform.

3. Support simulation/debug mode of the controller.

4. Maintain native GUI.

5. All controllers shall be programmable directly from the Niagara 4 Workbench embedded toolset upon completion of this project. The use of configurable or programmable controllers or software tools and applications that require a specific Niagara 4 license brand to operate for post-installation maintenance shall not be acceptable.

E. The equipment controllers shall have a visual indication (LED) of the status of the devise:

1. Controller operating normally.

2. Controller in process of download.

3. Controller in manual mode under control of software tool.

4. Controller lost its configuration.

5. No power to controller, low voltage, or controller damage.

6. Processor and/or controller are not operating.

2.6 NETWORK AREA CONTROLLER (NAC):

A. Manage communications between the programmable equipment controllers (PEC), unitary controllers (UC), and variable air volume controllers (VAV) which are connected to its communications trunks, manage communications between itself and other system network controllers (NAC) and with any operator workstations (OWS) that are part of the BACS, and perform control and operating strategies for the system based on information from any controller connected to the BACS.

B. The controllers shall be fully programmable to meet the unique requirements of the facility it controls.

C. The controllers shall be capable of peer-to-peer communications with other NAC's and with any OWS connected to the BACS whether the OWS is directly connected, connected via cellular modem, or connected via the Internet.

D. The NAC shall employ a device/point count capacity license model that supports expansion capabilities.

E. The NAC shall be enabled to support and shall be licensed to include the following Open protocol drivers (client and server) by default:

1. BACnet

2. Lon

3. MODBUS

F. The NAC shall be capable of executing application control programs to provide:

1. Calendar functions.

2. Scheduling.

3. Trending.

4. Alarm monitoring and routing.

5. Time synchronization.

6. HTML5 User Configurable dashboard with Niagara Analytics

7. Integration of LonWorks, BACnet, and MODBUS controller data.

8. Network management functions for all NAC, PEC, and UC based devices.

G. Certifications – All NACs shall be listed under with the following agencies at the certification levels appropriate to them:

1. UL 916

2. CE EN 61326-1

3. FCC Part 15 Subpart B, Class B

4. FCC Part 15 Subpart C

5. C-UL listed to Canadian Standards Association (CSA) C22.2 No. 205-M1983 "Signal Equipment"

6. 1999/5/EC R&TTE Directive

7. CCC

8. SRRC

9. RSS

10. ROHS

11. IEEE802.11a/b/g/n

12. IEEE802.11n HT20 @ 2.4GHz

13. IEEE802.11n HT20/HT40 @ 5GHz

14. Configurable radio (Off, WAP, or Client)

15. WPAPSK/WPA2PSK supported

H. Minimum Specifications:

1. Operating temperature: -20–60°C

2. Storage temperature: -40–85°C

3. Humidity: 5%–95% — Non condensing

4. Shipping & vibration: ASTM D4169, Assurance Level II

5. MTTF: 10 years+

6. Batteryless operation

I. The NAC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 16 simultaneous users.

J. The NAC shall provide alarm recognition, storage, routing, management and analysis to supplement distributed capabilities of equipment or application specific controllers.

K. The NAC shall be able to route any alarm condition to any defined user location whether connected to a local network, remote via cellular modem, or wide-area network.

1. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but not limited to:

a. Alarm.

b. Return to normal.

c. To default.

2. Alarms shall be annunciated in any of the following manners as defined by the user:

a. Screen message text.

b. Email of complete alarm message to multiple recipients.

c. Pagers via paging services that initiate a page on receipt of email message.

d. Graphics with flashing alarm object(s).

3. The following shall be recorded by the NAC for each alarm (at a minimum):

a. Time and date.

b. Equipment (air handler #, access way, etc.).

c. Acknowledge time, date, and user who issued acknowledgement.

L. The NAC shall support the following security functions.

1. Module code signing to verify the author of programming tool and confirm that the code has not been altered or corrupted.

2. Role-Based Access Control (RBAC) for managing user roles and permissions.

3. Require users to use strong credentials.

4. Data in Motion and Sensitive Data at Rest be encrypted.

5. LDAP and Kerberos integration of access management.

6. A CPU that incorporates secure boot technologies.

M. The NAC shall support the data modeling structures provide with Niagara4 to utilize Search; Hierarchy; Template; and Permission functionality:

1. Metadata: Descriptive tags to define the structure of properties.

2. Tagging: Process to apply metadata to components

3. Tag Dictionary

N. The NAC shall employ template functionality. Templates are a containerized set of configured data tags, graphics, histories, alarms, etc. that are set to be deployed as a unit based upon manufacturer's controller and relationships. All lower level communicating controllers (PEC, UC, VAV, etc.) shall have an associated template file for reuse on future project additions.

2.7 PROGRAMMABLE EQUIPMENT CONTROLLER (PEC):

A. All PECs shall be application programmable and shall at all times maintain their certification. All control sequences within or programmed into the PEC shall be stored in non-volatile memory, which is not dependent upon the presence of a battery to be retained.

B. The PEC shall provide LED indication of communication and controller performance to the technician, without cover removal.

C. The PEC shall not require any external configuration tool or programming tool. All configuration and programming tasks shall be accomplished and accessible from within the Niagara 4 environment.

D. The following integral and remote Inputs/Outputs shall be supported per each PEC:

1. Eight integral dry contact digital inputs.

2. Any two digital inputs may be configured as pulse counters with a maximum pulse read rate of 15 Hz.

3. Eight integral analog inputs (configurable as 0-10V, 0-10,000 ohm or, 20K NTC).

4. Six integral 4-20 ma analog outputs.

5. Eight integral 24 Vac Triac digital outputs, configurable as maintained or floating motor control outputs.

6. One integral 20 Vdc, 65-mA power supply for auxiliary devices.

7. If a 20 Vdc 65-mA power supply terminal is not integral to the PEC, provide at each PEC a separate, fully isolated, enclosed, current limited and regulated UL listed auxiliary power supply for power to auxiliary devices.

E. Each PEC shall have expansion ability to support additional I/O requirements through the use of remote input/output modules.

F. PEC Controllers shall support at minimum the following control techniques:

1. General-purpose control loops that can incorporate Demand Limit Control strategies, Set point reset, adaptive intelligent recovery, and time of day bypass.

2. General-purpose, non-linear control loops.

3. Start/stop Loops.

4. If/Then/Else logic loops.

5. Math Function loops (MIN, MAX, AVG, SUM, SUB, SQRT, MUL, DIV, ENTHALPY).

2.8 UNITARY CONTROLLER (UC):

A. General:

1. The unitary controller (UC) platform shall be designed specifically to control ventilation, heating, cooling, humidification, dehumidification, airflow, and similar functions.

2. Equipment controlled includes but is not limited to: constant volume air handlers, VAV air handlers, packaged rooftop units, heat pumps, fan coils, heaters and similar equipment.

B. Minimum Requirements:

1. The controller shall be capable of either integrating with other devices or stand-alone operation.

2. The controller shall have two microprocessors. The Host processor contains on-chip FLASH program memory, FLASH information memory, and RAM to run the main HVAC application. The second processor for network communications. Controller memory minimum requirements include:

a. FLASH Memory Capacity: 60 Kilobytes with 8 Kilobytes for application program.

b. FLASH Memory settings retained for ten years.

c. RAM: 2 Kilobytes.

3. The controller shall have an internal time clock with the ability to automatically revert from a master time clock on failure.

    a. Operating Range: 24 hour, 365 day, multi-year calendar including day of week and configuration for automatic day-light savings time adjustment to occur on configured start and stop dates.

    b. Accuracy: ±1 minute per month at 77 degrees F (25 degrees C).

    c. Power Failure Backup: 24 hours at 32 degrees to 122 degrees F (0 degrees to 50 degrees C).

4. The controller shall have Significant Event Notification, Periodic Update capability, and Failure Detect when network inputs fail to be detected within their configurable time frame.

5. The controller shall have an internal DC power supply to power external sensors.

    a. Power Output: 20 VDC ±10% at 75 mA.

6. The minimum controller Environmental ratings.

    a. Operating Temperature Ambient Rating: -40 degrees to 150 degrees F (-40 degrees to 65.5 degrees C).

    b. Storage Temperature Ambient Rating: -40 degrees to 150 degrees F (-40 degrees to 65.5 degrees C).

    c. Relative Humidity: 5% to 95% non-condensing.

7. The controller shall have the additional approval requirements, listings, and approvals:

    a. UL/cUL (E87741) listed under UL916 (Standard for Open Energy Management Equipment) with plenum rating.

    b. CSA (LR95329-3) Listed.

    c. Meets FCC Part 15, Subpart B, Class B (radiated emissions) requirements.

    d. Meets Canadian standard C108.8 (radiated emissions).

    e. Conforms to the requirements of the European Consortium standard EN 61000-6-1; 2001 (EU Immunity).

    f. Conforms to the requirements of the European Consortium standard EN 61000-6-3; 2001 (EU Emission).

8. The controller housing shall be UL plenum rated mounting to either a panel or DIN rail (standard EN50022; 7.5mm x 35mm).

9. The controller shall have a mix of digital inputs (DI), digital Triac outputs (DO), analog outputs (AO), and universal inputs (UI).

   a. Analog outputs (AO) shall be capable of being configured as digital outputs (DO).

   b. Input and Output wiring terminal strips shall be removable from the controller without disconnecting wiring.

   c. Input and Output wiring terminals shall be designated with color coded labels.

   d. Universal inputs shall be capable of being configured as binary inputs, resistive inputs, voltage inputs (0-10 VDC), or current inputs (4-20 mA).

10. The controller shall provide "continuous" automated loop tuning with an Adaptive Integral Algorithm Control Loop.

C. Basis of design

1. Honeywell Stryker

2.9 WEB BROWSER GRAPHIC USER INTERFACE (SYSTEM OVERVIEW):

A. The Controls Contractor shall provide system software based on server/thin-client architecture, designed around the open standards of web technology. The BACS Server shall communicate using Ethernet and TCP. Server shall be accessed using a web browser over Owner intranet and remotely over the Internet.

B. The intent of the thin-client architecture is to provide the operators complete access to the BACS system via a web browser. The thin-client web browser Graphical User Interface (GUI) shall be browser and operating system agnostic, meaning it will support HTML5 enabled browsers without requiring proprietary operator interface and configuration programs or browser plug-ins. The web browser user interface shall be compatible with the current released versions of Microsoft, Firefox, and Chrome IE browsers.

C. The BACS Server software shall support at a minimum, Windows and Windows Server (latest version supported) server platforms. The BACS Server software shall be developed and tested by the manufacturer of the system stand-alone controllers and network controllers/routers.

D. The web browser GUI shall provide a completely interactive user interface and shall provide a HTML5 experience that supports the following features as a minimum:

1. Trending.

2. Scheduling.

3. Electrical demand limiting.

4. Duty Cycling.

5. Downloading Memory to field devices.

6. Real time 'live' Graphic Programs.

7. Tree Navigation.

8. Parameter change of properties.

9. Set point adjustments.

10. Alarm / event information.

11. Configuration of operators.

12. Execution of global commands.

13. Add, delete, and modify graphics and displayed data.

E. Software Components: All software shall be the most current version. All software components of the BACS system software shall be provided and installed as part of this project. BACS software components shall include:

1. Server Software, Database and Web Browser Graphical User Interface.

2. Embedded System Configuration Utilities for future modifications to the system and controllers.

3. Embedded Graphical Programming Tools.

4. Embedded Direct Digital Control software.

5. Embedded Application Software.

6. Analytic Services.

7. End User Configurable Dashboard.

F. BACS Server Database: The BACS Server software shall utilize a Java Database Connectivity (JDBC) compatible database such as MS SQL, Ovacle, or IBM DM2 (latest version supported). BACS systems written to non -standard and/or proprietary databases are NOT acceptable.

2.10 WEB BROWSER GRAPHICAL USER INTERFACE:

A. Web Browser Navigation: The Thin Client web browser GUI shall provide a comprehensive user interface. Using a collection of web pages, it shall be constructed to "feel" like a single application, and provide a complete and intuitive mouse/menu driven

operator interface. It shall be possible to navigate through the system using a web browser to accomplish requirements of this specification. The Web Browser GUI shall (as a minimum) provide for navigation, and for display of animated graphics, schedules, alarms/events, live graphic programs, active graphic set point controls, configuration menus for operator access, reports and reporting actions for events.

B. Login: On launching the web browser and selecting the appropriate domain name or IP address, the operator shall be presented with a login page that will require a login name and strong password. Navigation in the system shall be dependent on the operator's role-based application control privileges.

C. Navigation: Navigation through the GUI shall be accomplished by clicking on the appropriate level of a navigation tree (consisting of an expandable and collapsible tree control like Microsoft's Explorer program) and/or by selecting dynamic links to other system graphics. Both the navigation tree and action pane shall be displayed simultaneously, enabling the operator to select a specific system or equipment and view the corresponding graphic. The navigation tree shall as a minimum provide the following views: Geographic, Network, Groups and Configuration.

1. Geographic View shall display a logical geographic hierarchy of the system including: cities, sites, buildings, building systems, floors, equipment and objects.

2. Groups View shall display Scheduled Groups and custom reports.

3. Configuration View shall display all the configuration categories (Operators, Schedule, Event, Reporting and Roles).

D. Action Pane: The Action Pane shall provide several functional views for each subsystem specified. A functional view shall be accessed by clicking on the corresponding button:

1. Graphics: Using graphical format suitable for display in a web browser, graphics shall include aerial building/campus views, color building floor-plans, equipment drawings, active graphic set point controls, web content and other valid HTML elements. The data on each graphic page shall automatically refresh.

2. Dashboards: User customizable data using drag and drop HTML5 elements. Shall include Web Charts, Gauges, and other custom developed widgets for web browser. User shall have ability to save custom dashboards.

3. Search: User shall have multiple options for searching data based upon Tags. Associated equipment, real time data, Properties, and Trends shall be available in result.

4. Properties: Shall include graphic controls and text for the following: Locking or overriding objects, demand strategies, and any other valid data required for setup. Changes made to the properties pages shall require the operator to depress an 'accept/cancel' button.

5. Schedules: Shall be used to create, modify/edit and view schedules based on the systems hierarchy (using the navigation tree).

6. Alarms: Shall be used to view alarm information geographically (using the navigation tree), acknowledge alarms, sort alarms by category, actions and verify reporting actions.

7. Charting: Shall be used to display associated trend and historical data, modify colors, date range, axis and scaling. User shall have ability to create HTML charts through web browser without utilizing chart builder. User shall be able to drag and drop single or multiple data points, including schedules, and apply status colors for analysis.

8. Logic - Live Graphic Programs: Shall be used to display' live' graphic programs of the control algorithm, (micro block programming) for the mechanical/electrical system selected in the navigation tree.

9. Other actions such as Print, Help, Command, and Logout shall be available via a drop-down window.

E. Color Graphics: The Web Browser GUI shall make extensive use of color in the graphic pane to communicate information related to set points and comfort. Animated .gifs or .jpg, vector scalable, active set point graphic controls shall be used to enhance usability. Graphics tools used to create Web Browser graphics shall be non-proprietary and conform to the following basic criteria:

1. Display Size: The GUI workstation software shall graphically display in a minimum of 1024 by 768 pixels 24 bit True Color.

2. General Graphic: General area maps shall show locations of controlled buildings in relation to local landmarks.

3. Color Floor Plans: Floor plan graphics shall show heating and cooling zones throughout the buildings in a range of colors, as selected by Owner. Provide a visual display of temperature relative to their respective set points. The colors shall be updated dynamically as a zone's actual comfort condition changes.

4. Mechanical Components: Mechanical system graphics shall show the type of mechanical system components serving any zone through the use of a pictorial representation of components. Selected I/O points being controlled or monitored for each piece of equipment shall be displayed with the appropriate engineering units. Animation shall be used for rotation or moving mechanical components to enhance usability.

5. Minimum System Color Graphics: Color graphics shall be selected and displayed via a web browser for the following:

a. Each piece of equipment monitored or controlled including each terminal unit.

b. Each building.

c. Each floor and zone controlled.

F. Hierarchical Schedules: Utilizing the Navigation Tree displayed in the web browser GUI, an operator (with proper access credentials) shall be able to define a Normal, Holiday or Override schedule for an individual piece of equipment or room, or choose to apply a hierarchical schedule to the entire system, site or floor area. For example, Independence Day ' Holiday' for every level in the system would be created by clicking at the top of the geographic hierarchy defined in the Navigation Tree. No further operator intervention would be required and every control module in the system with would be automatically downloaded with the ' Independence Day' Holiday. All schedules that affect the system/area/equipment highlighted in the Navigation Tree shall be shown in a summary schedule table and graph.

1. Schedules: Schedules shall comply with BACnet standards, (Schedule Object, Calendar Object, Weekly Schedule property and Exception Schedule property) and shall allow events to be scheduled based on:

   a. Types of schedule shall be Normal, Holiday or Override.

   b. A specific date.

   c. A range of dates.

   d. Any combination of Month of Year (1-12, any), Week of Month (1-5, last, any), Day of Week (M-Sun, Any).

   e. Wildcard (example, allow combinations like second Tuesday of every month).

2. Schedule Categories: The system shall allow operators to define and edit scheduling categories (different types of "things" to be scheduled; for example, lighting, HVAC occupancy, etc.). The categories shall include: name, description, icon (to display in the hierarchy tree when icon option is selected) and type of value to be scheduled.

3. Schedule Groups: In addition to hierarchical scheduling, operators shall be able to define functional Schedule Groups, comprised of an arbitrary group of areas/rooms/equipment scattered throughout the facility and site. For example, the operator shall be able to define an ' individual tenant' group - who may occupy different areas within a building or buildings. Schedules applied to the ' tenant group' shall automatically be downloaded to control modules affecting spaces occupied by the ' tenant group'.

4. Intelligent Scheduling: The control system shall be intelligent enough to automatically turn on any supporting equipment needed to control the environment in an occupied space. If the operator schedules an individual room in a VAV system for occupancy, for example, the control logic shall automatically turn on the VAV air handling unit, chiller, boiler and/or any other

equipment required to maintain the specified comfort and environmental conditions within the room.

5. Partial Day Exceptions: Schedule events shall be able to accommodate a time range specified by the operator (ex: board meeting from 6 pm to 9 pm overrides Normal schedule for conference room).

6. Schedule Summary Graph: The schedule summary graph shall clearly show Normal versus Holiday versus Override Schedules and the net operating schedule that results from all contributing schedules. Note: In case of priority conflict between schedules at the different geographic hierarchy, the schedule for the more detailed geographic level shall apply.

G. Alarms: Alarms associated with a specific system, area, or equipment selected in the Navigation Tree, shall be displayed in the Action Pane by selecting an ' Alarms' view. Alarms, and reporting actions shall have the following capabilities:

1. Alarms View: Each Alarm shall display an Alarms Category (using a different icon for each alarm category), date/time of occurrence, current status, alarm report and a bold URL link to the associated graphic for the selected system, area or equipment. The URL link shall indicate the system location, address and other pertinent information. An operator shall easily be able to sort events, edit event templates and categories, acknowledge or force a return to normal in the Events View as specified in this section.

2. Alarm Categories: The operator shall be able to create, edit or delete alarm categories such as HVAC, Maintenance, Fire, or Generator. An icon shall be associated with each alarm category, enabling the operator to easily sort through multiple events displayed.

3. Alarm Templates: Alarm template shall define different types of alarms and their associated properties. As a minimum, properties shall include a reference name, verbose description, severity of alarm, acknowledgement requirements, and high/low limit and out of range information.

4. Alarm Areas: Alarm Areas enable an operator to assign specific Alarm Categories to specific Alarm Reporting Actions. For example, it shall be possible for an operator to assign all HVAC Maintenance Alarm on the 1st floor of a building to email the technician responsible for maintenance. The Navigation Tree shall be used to setup Alarm Areas in the Graphic Pane.

5. Alarm Time/Date Stamp: All events shall be generated at the DDC control module level and comprise the Time/Date Stamp using the standalone control module time and date.

6. Alarm Configuration: Operators shall be able to define the type of Alarm generated per object. A ' network' view of the Navigation Tree shall expose all objects and their respective Alarm Configuration. Configuration shall include assignment of Alarm, type of Acknowledgement and notification for return to normal or fault status.

7. Alarm Summary Counter: The view of Alarm in the Graphic Pane shall provide a numeric counter, indicating how many Alarms are active (in alarm), require acknowledgement and total number of Alarms in the BACS Server database.

8. Alarm Auto-Deletion: Alarms that are acknowledged and closed shall be auto-deleted from the database and archived to a text file after an operator defined period.

9. Alarm Reporting Actions: Alarm Reporting Actions specified shall be automatically launched (under certain conditions) after an Alarm is received by the BACS Server software. Operators shall be able to easily define these Reporting Actions using the Navigation Tree and Graphic Pane through the web browser GUI. Reporting Actions shall be as follows:

    a. Print: Alarm information shall be printed to the BACS Server's PC or a networked printer.

    b. Email: Email shall be sent via any POP3-compatible e-mail server (most Internet Service Providers use POP3). Email messages may be copied to several email accounts. Note: Email reporting action shall also be used to support alphanumeric paging services, where email servers support pagers.

    c. File Write: The ASCII File write reporting action shall enable the operator to append operator defined alarm information to any alarm through a text file. The alarm information that is written to the file shall be completely definable by the operator. The operator may enter text or attach other data point information (such as AHU discharge temperature and fan condition upon a high room temperature alarm).

    d. Write Property: The write property reporting action updates a property value in a hardware module.

    e. SNMP: The Simple Network Management Protocol (SNMP) reporting action sends an SNMP trap to a network in response to receiving an alarm.

    f. Run External Program: The Run External Program reporting action launches specified program in response to an event.

H. Trends: As system is engineered, all points shall be enabled to trend. Trends shall both be displayed and user configurable through the Web Browser GUI. Trends shall comprise analog, digital or calculated points simultaneously. A trend log's properties shall be editable using the Navigation Tree and Graphic Pane.

1. Viewing Trends: The operator shall have the ability to view trends by using the Navigation Tree and selecting a Trends button in the Graphic Pane. The system shall allow y- and x-axis maximum ranges to be specified and shall be able to simultaneously graphically display multiple trends per graph.

2. Local Trends: Trend data shall be collected locally by Multi-Equipment/Single Equipment general-purpose controllers, and periodically uploaded to the BACS Server if historical trending is enabled for the object. Trend data, including run time hours and start time date shall be retained in non-volatile module memory. Systems that rely on a gateway/router to run trends are NOT acceptable.

3. Resolution. Sample intervals shall be as small as one second. Each trended point will have the ability to be trended at a different trend interval. When multiple points are selected for displays that have different trend intervals, the system will automatically scale the axis.

4. Dynamic Update. Trends shall be able to dynamically update at operator-defined intervals.

5. Zoom/Pan. It shall be possible to zoom-in on a particular section of a trend for more detailed examination and ' pan through' historical data by simply scrolling the mouse.

6. Numeric Value Display. It shall be possible to pick any sample on a trend and have the numerical value displayed.

7. Copy/Paste. The operator shall have the ability to pan through a historical trend and copy the data viewed to the clipboard using standard keystrokes (i.e. CTRL+C, CTRL+V).

I. Security Access: Systems that Security access from the web browser GUI to BACS Server shall require a Login Name and Strong Password. Access to different areas of the BACS system shall be defined in terms of Role-Based Access Control privileges as specified:

1. Roles: Roles shall reflect the actual roles of different types of operators. Each role shall comprise a set of ' easily understood English language' privileges. Roles shall be defined in terms of View, Edit and Function Privileges.

   a. View Privileges shall comprise: Navigation, Network, and Configuration Trees, Operators, Roles and Privileges, Alarm/Event Template and Reporting Action.

   b. Edit Privileges shall comprise: Set point, Tuning and Logic, Manual Override, and Point Assignment Parameters.

   c. Function Privileges shall comprise: Alarm/Event Acknowledgement, Control Module Memory Download, Upload, Schedules, Schedule Groups, Manual Commands, Print and Alarm/Event Maintenance.

2. Geographic Assignment of Roles: Roles shall be geographically assigned using a similar expandable/collapsible navigation tree. For example, it shall be possible to assign two HVAC Technicians with similar competencies (and the same operator defined HVAC Role) to different areas of the system.

2.11 GRAPHICAL PROGRAMMING:

A. The system software shall include a Graphic Programming Language (GPL) for all DDC control algorithms resident in all control modules. Any system that does not use a drag and drop method of graphical icon programming shall not be accepted. All systems shall use a GPL method used to create a sequence of operations by assembling graphic microblocks that represent each of the commands or functions necessary to complete a control sequence. Microblocks represent common logical control devices used in conventional control systems, such as relays, switches, high signal selectors etc., in addition to the more complex DDC and energy management strategies such as PID loops and optimum start. Each microblock shall be interactive and contain the programming necessary to execute the function of the device it represents.

B. Graphic programming shall be performed while on screen and using a mouse; each microblock shall be selected from a microblock library and assembled with other microblocks necessary to complete the specified sequence. Microblocks are then interconnected on screen using graphic "wires," each forming a logical connection. Once assembled, each logical grouping of microblocks and their interconnecting wires then forms a graphic function block which may be used to control any piece of equipment with a similar point configuration and sequence of operation.

C. Graphic Sequence: The clarity of the graphic sequence shall be such that the operator has the ability to verify that system programming meets the specifications, without having to learn or interpret a manufacturer's unique programming language. The graphic programming shall be self-documenting and provide the operator with an understandable and exact representation of each sequence of operation.

D. GPL Capabilities: The following is a minimum definition of the capabilities of the Graphic Programming software:

1. Function Block (FB): Shall be a collection of points, microblocks and wires which have been connected together for the specific purpose of controlling a piece of HVAC equipment or a single mechanical system.

2. Logical I/O: Input/Output points shall interface with the control modules in order to read various signals and/or values or to transmit signal or values to controlled devices.

3. Microblocks: Shall be software devices that are represented graphically and may be connected together to perform a specified sequence. A library of microblocks shall be submitted with the integrator system integrator’s bid.

4. Wires: Shall be Graphical elements used to form logical connections between microblocks and between logical I/O.

5. Reference Labels: Labels shall be similar to wires in that they are used to form logical connections between two points. Labels shall form a connection by reference instead of a visual connection, i.e. two points labeled 'A' on a drawing are logically connected even though there is no wire between them.

6. Parameter: A parameter shall be a value that may be tied to the input of a microblock.

7. Properties: Dialog boxes shall appear after a microblock has been inserted which has editable parameters associated with it. Default parameter dialog boxes shall contain various editable and non-editable fields, and shall contain 'push buttons' for the purpose of selecting default parameter settings.

8. Icon: An icon shall be graphic representation of a software program. Each graphic microblock has an icon associated with it that graphically describes its function.

9. Menu-bar Icon: Shall be an icon that is displayed on the menu bar on the GPL screen, which represents its associated graphic microblock.

10. Live Graphical Programs: The Graphic Programming software shall support a ' live' mode, where all input/output data, calculated data and set points shall be displayed in a ' live' real-time mode.

2.12 BACS DATA MODEL AND SEMANTIC TAGGING:

A. The BACS will represent all of the data, regardless of communication protocol or integration method, as common human and machine interpretable meta data. Examples of the meta data include but are not limited to buildings, floors, air handlers, meters and zones, among other commonly understood terminology of the building operators and building managers. Data will be represented in a hierarchical format such as Buildings > Floors > Equipment.

B. The BACS will also have the ability to create tags that represent location and descriptive data that have nothing to do with the application of the particular data or group of data. Examples of this tagging may include operators' names, room names, etc. These tags shall be free form text in nature and shall be searchable by the user interface.

C. The BACS will have the ability to use a Niagara Framework, Haystack or Custom tagging dictionaries or a combination of these dictionaries as well as any future tag dictionaries.

2.13 ANALYTICS:

A. The BACS will support sequences, actions and routines to be programmed to execute against the data model. The execution of each analytics sequence shall be by; a scheduled trigger; interval based trigger, or an event based trigger. The analytics sequences shall be definable and customizable by the owner or the integrator without the requirement to use line code programming. The programming and creation of the rules shall be in a wire sheet framework where objects are added to the wire sheet and connected together. Each of the sequences shall have the ability to execute independently or with dependency on other sequences.

B. As separate programming language for analytic algorithm development or service will not be allowed. The analytic software shall use the historical data and/or real time BACS

data without having to first store the data in a database that is separate from the BACS data.

C. The analytic algorithms shall be supported on both the BACS Server and NACs to provide data analysis in real time within the limits of NACs and the BACS Server data communication and resources as well as historical based on the BACS Server historian.

D. The specification calls for analytics of both historical and real time data for reporting, diagnostics and event notification.

E. For energy and equipment optimization analytics, the analytic software shall change set point values and commands as analytic results dictate.

2.14 SOFTWARE ANALYSIS AND REPORTING TOOLS:

A. Accessing the system shall be via a web browser or mobile devices including IOS, Windows Mobile and Android. In general the system shall enable the user to:

B. Access and view data from all smart meters from a central dashboard

C. Analyze utility usage patterns

D. Measure its CO2 footprint

E. Assess energy performance of buildings

F. Identify variances using KPIs, targets, comparisons to historical patterns, etc.

G. Investigate the time, duration and cause of variances

H. Generate time-of-use consumption and peak loads (e.g. peak, shoulder and off peak kWh and KvA)

I. Use algorithms for the analysis of gas and water leakages (based on volume or flow)

J. Tools to set-up new meters

K. Configure dashboards

L. Use a variety of common reporting formats e.g. text files (txt, csv), Microsoft Excel (xls, xlsx)

M. Print reports via a local printer (with appropriate page management) and to email reports.

2.15 SYSTEM NAVIGATION:

A. System navigation shall be via a standardized navigation tree with hyperlinked for each user, given access to specific areas of the data model. Each user's navigation will dynamically update based on the permissions given in the data model.

B. In addition, the user shall be able to access a map of buildings and navigate via a geographic Map, Site Plan, or building floor plan.

C. Each user shall have the ability to modify his own dashboard as the need arises by simply saving the current Dashboard session.

2.16 BASIC ANALYTIC DASHBOARDS:

A. Dashboards as a minimum shall contain (for each building group, building, area, switchboard, or grouping in the metering tree) graphics showing live and historical utilities usage, loads and CO2 emissions. Specifically dashboards shall show:

B. Utility Usage for default period

C. Profile of usage for default period

D. Contribution of sub meters for default period

E. CO2 emissions

2.17 ANALYTIC GRAPHICAL DATA OUTPUTS:

A. Time-series daily load profiles displayed with time, in intervals of an hour or less, along the horizontal axis and load along the vertical axis

B. Overlay plots displaying multiple daily profiles on a single 24-hour time-series graph

C. Viewing of multiple time series data points on the same graph

D. Calendar profile: View up to an entire month of consumption profiles on a single screen as one long time series

E. X-Y scatter plots: X-Y scatter plots for visualizing correlations between two variables

F. Intuitive graphical axes that are scaled and labeled

2.18 ANALYTICAL DATA OUTPUTS:

A. Basic statistical analysis such as mean, median, standard deviation, correlation, and regression.

B. Benchmarking against set building energy standards

C. Intra/inter-facility comparisons against the building's historical data or across multiple buildings

D. Aggregate data among multiple data points. Integrate different energy units using energy conversions

E. Data mining (data slice/drill-down) time series data by monthly, weekly, daily, hourly, or trended interval

F. Normalization of energy usage or demand by factors such as building area, number of occupants, outside air temperature, and cooling or heating degree-days (CDD, HDD) to make a fair comparison between buildings

G. Hierarchical summary of usage and cost information by different levels

H. A comprehensive and simple graphical programming tool allowing the users to create their own views, graphs, charts, gauges, and other widgets for viewing live or historical data. Dashboards shall be capable of export to printers or PDF, CSV, Excel or image formats for use in reports, spreadsheets or as live media to display systems

2.19 BACS INTEGRATION AND MANUAL DATA ENTRY:

A. The software shall feature a rich set of enterprise data integration tools. This will allow the system to export data to SQL databases (such as Oracle or SQL Server) or spreadsheets. The system must offer open SQL data connectivity (such as ODBC) in addition to export of CSV files.

B. The software must be capable of user-friendly import of meter data either by meter or in bulk by defining a data structure and method for users to input ad-hoc data or historical utility data.

2.20 ALARMS:

A. The BACS shall provide functionality to set alarm for thresholds on each individually metered value and send alert notifications for corrective action via SMS, SNMP and Email.

2.21 SYSTEM SOFTWARE:

A. All Niagara 4 software licenses shall have the following NiCS: "accept.station.in=*"; "accept.station.out=*"and "accept.wb.in=*"and "accept.wb.out=*".

B. All open NIC statements shall follow Niagara Open NIC specifications.

C. The Open NIC ensures that software or controller can be serviced or programmed by any qualified Niagara N4 TCP certified contractor the Owner chooses.

2.22 OWNER ACCESS AND LICENSING:

A. Owner shall receive all Administrator level login and passwords for engineering toolset.

B. The Owner shall have full licensing and full access rights for all network management, operating system server, engineering and programming software required for the ongoing maintenance and operation of the building automation control system.

C. All NAC hardware licenses and certificates shall be stored on local MicroSD memory card employing encrypted “safe boot” technology.

D. All software maintenance licenses for the NAC and BACS servers shall be included for five (5) years.

2.23 GRAPHICS (SITE PAGE):

A. (This initial project shall establish a graphics showing the City of Columbia, S.C. to the extent required to show all State buildings which will eventually be added to this building

control system. This includes approximately 30 (thirty) buildings throughout the Columbia area.)

B. (Upon award of this contract, the locations of all state buildings in the Columbia area will be provided to the successful contractor.)

C. (The graphics developed by the contractor shall include a tag for each one of the buildings.)

PART 3 - EXECUTION

3.1 SUBMITTAL (GENERAL):

A. Manufacturer's product data sheets including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

4. Open NiC Statement for all Niagara4 licenses indicating that the licenses comply with Niagara Open NIC specifications.

B. Contractor qualifications.

C. Samples of written Controller Checkout Sheets and Performance Verification Procedures for applications similar in scope shall be included for approval.

D. Wiring and schematic diagrams, sequences of operation, control system bus layout and other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings.

3.2 CONTROL PANEL CONSTRUCTION:

A. Control panels shall be assembled by the Control Contractor in a UL-Certified 508A panel shop.

3.3 ACCEPTANCE TESTING:

A. Upon completion of the installation, the Control Contractor shall load all system software and start-up the system. The Control Contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to insure that the system is functioning in full accordance with these specifications.

B. The Control Contractor shall perform tests to verify proper performance of components, routines and points. Repeat tests until proper performance results. This testing shall include a point-by-point log to validate 100% of the input and output points of the DDC system operation.

C. The Control Contractor shall provide all testing to show performance to the satisfaction of the Owner.

3.4 OPERATOR TRAINING:

A. During system commissioning and at such time acceptable performance of the Control System hardware and software has been established, the Control Contractor shall provide on-site operator instruction to the owner's operating personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories.

B. The Control Contractor shall provide 32 total hours of comprehensive training in multiple sessions for system orientation, product maintenance and troubleshooting, programming and engineering. These classes are to be spread out during the 1st year warranty period in no less than four (4) 8 hour classes. The first class starting after final commissioning and the last class is to be in the last month of 1-year warranty period.

C. Training materials, including manuals in 3 ring binders, shall be provided for up to eight (8) attendees.

3.5 WARRANTY PERIOD SERVICES:

A. Equipment, materials and workmanship incorporated into the work shall be warranted for a period of one year from the time of system substantial completion.

B. Within this period, upon notice by the Owner, any defects in the BACS due to faulty materials, methods of installation or workmanship shall be promptly repaired or replaced by the Control Contractor at no expense to the Owner.

C. The Control Contractor shall maintain all software during the standard first year warranty period. In addition, all factory or sub-vendor upgrades to software that occur during the first year warranty period shall be added to the systems, at no additional cost to the Owner.

D. Labor to implement software maintenance upgrades in years two through five are not included in the warranty.

E. The Control Contractor shall inspect, repair, replace, adjust, and calibrate, as required, the controllers, control devices and associated peripheral units during the warranty period.

F. During the warranty period, the Control Contractor shall review system at approximately the midpoint of the warranty service and just prior to the end of the warranty period.

G. During the warranty period, the Control Contractor shall respond to warranty issues within 48 hours.

H. After each service call or system review, the Control Contractor shall furnish a report describing the status of the equipment, problem areas (if any) noticed during service work, and description of the corrective actions taken. The report shall clearly certify that all hardware is functioning correctly.

I. The Owner shall grant to the Control Contractor reasonable access to the BACS during the warranty period. Remote access to the BACS for the purpose of diagnostics and troubleshooting, via the Internet, during the warranty period will be allowed.

3.6 SYSTEM SECURITY:

A. The control contractor shall coordinate security policies with the Owner's IT security protocol.

B. The installed system shall provide secure strong password access to all features, functions and data.

3.7 OPERATION & MAINTENANCE MANUALS:

A. O&M manuals shall include, but not be limited to, the following:

1. As-built control drawings for all equipment.

2. As-built Network Communications Diagram.

3. General description and specifications for all components.

4. Completed Performance Verification sheets.

5. Completed Controller Checkout/Calibration Sheets.

END OF SECTION 23 0904

SECTION 23 0905 - SMOKE DEVICES AND SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of the smoke devices and systems shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0900 - Instrumentation and Control for HVAC (General)

2. Section 23 0906 - Smoke Control Systems

1.3 QUALITY ASSURANCE:

A. The requirements of the Building Environmental Controls specifications are entirely applicable to these specifications including standards, Contractor requirements, and acceptable manufacturers.

B. Indoor panels shall be NEMA 1 unless specifically noted otherwise.

PART 2 - PRODUCTS

2.1 SMOKE DETECTORS:

A. General:

1. Provide all controls, wiring, contacts, relays, switches and other devices required for system to meet the requirements of the sequence of operation.

2. Division of responsibility shall be as listed for each system.

B. Duct Detectors and Smoke Detectors installed in HVAC equipment:

1. Electrical Installer:

a. Furnish detector.

b. Wire detector to fire alarm system.

c. Provide power to detector.

2. Division 23:

a. Install detector.

b. Wire detector to shut down equipment.

c. Provide duct access door.

2.2 EQUIPMENT SHUTDOWN:

A. General:

1. Provide all controls, wiring, contacts, relays, switches, and other devices required for system to meet the requirements of the sequence of operation.

2. Division of responsibility shall be as listed for each system.

B. Electrical Installer:

1. Provide addressable control module at each piece of equipment.

2. Wire addressable control module to fire alarm system.

3. Program the addressable control module for equipment shutdown.

C. Division 23:

1. Wire output of addressable control module to each piece of equipment.

2. Upon receiving a signal from the fire alarm system, the equipment will be commanded to shut down.

3. If the manufacturer of the equipment requires some minimal shutdown time, a delay of a maximum of 10 seconds may be allowed from the time that the fire alarm device is activated.

2.3 BACK-UP POWER:

A. Provide a UPS on all panels in this specification.

PART 3 - EXECUTION

3.1 SMOKE DETECTORS:

A. Detectors shall be installed in accordance with manufacturers requirements.

B. Duct access door shall be located to provide access to sampling tube.

3.2 TESTING:

A. General:

1. Furnish all personnel and equipment for the testing of the smoke devices and systems.
2. Test shall include simulation of actual fire/smoke conditions.
3. Include approximately three (3) full days for all personnel for testing.
4. Personnel shall include:
   a. Controls contractor.
   b. HVAC installer.

B. Test Verification:

1. Verify proper operation of devices and system in all modes.

C. Demonstration:

1. Upon completion of testing, the A/E shall be notified and the Contractor shall demonstrate operation of devices and system in all modes.

D. Documentation:

1. Submit in writing three copies of the test procedure, results and verification of proper system operation.

E. Clean-Up:

1. Thoroughly clean all affected spaces of smoke residue and odors.

END OF SECTION 23 0905

SECTION 23 0993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS AND POINTS LIST

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of controls system shown on the drawings and specified hereinafter.

B. Description:

1. Points shown for equipment shall be for each item of equipment except:

a. When noted otherwise.

b. When exhaust fans are grouped together.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0900 - Instrumentation and Control for HVAC (General)

2. Section 23 0993.6 - Sequence of Operation (Single Zone Packaged Equipment)

PART 2 - SEQUENCE OF OPERATION

2.1 GENERAL:

A. These sequence descriptions and definitions shall apply to all sequences unless sequence specifically indicates otherwise.

2.2 SETPOINTS:

A. In general, the specification indicates setpoints or range of setpoints for most devices.

B. Temperatures shall be field settable to any temperature.

C. Time of day operations shall be field settable to any time.

D. The contractor shall adjust setpoints in the following manner:

1. As required to start-up, test, debug and otherwise ensure equipment and system is operating as intended.

2. Dampers, actuators, and similar devices should be left in their optimum operating position.

3. Thermostats, humidistats, and similar devices should be left as indicated on drawings or in specifications. If no value is indicated, contractor should set at a reasonable value.

4. Equipment and system schedules should be reviewed with the Owner and A/E prior to initiating the schedule.

2.3 MORNING WARM-UP/COOL-DOWN:

A. This mode is the mode between night setback and normally occupied mode and is used to bring area served from unoccupied conditions to conditions required for occupancy.

B. This mode typically will operate with outside air systems closed or de-energized.

C. The start time of this mode shall be determined by the building automation system based upon space temperatures, building characteristics, outside temperature, and historical ability of each system to warm up or cool down the building.

2.4 NIGHT SETBACK:

A. This mode is the unoccupied mode.

B. This mode is a timed function of adjustable duration.

C. This mode typically will operate with outside air systems closed or de-energized and is used primarily to maintain unoccupied space temperature (adjustable) or space humidity level (adjustable).

D. All HVAC equipment required to maintain space conditions shall be energized in this mode.

2.5 OVERRIDE:

A. When override is activated, the system shall operate with that zone, equipment, or system in the occupied mode.

B. At the end of the override time period, the zone equipment or system shall return to the mode scheduled at that time.

2.6 OUTSIDE AIR CONTROL:

A. Where motorized dampers are specified, the dampers shall open to maintain the airflow quantity indicated on the equipment schedule.

2.7 FAILURE MODES:

A. General:

1. Initiating devices shall each be hard wired.

2. Manual reset of temperature alarm and pressure alarm shall be required. Other alarms shall automatically reset unless manual reset indicated.

B. Smoke and Fire Alarm:

1. The fans shall be de-energized and smoke dampers shall shut. The fan shall de-energize as fast as practical and smoke dampers shall begin closing after fan is de-energized.

C. Low Temperature (Recirculating System):

1. A low temperature condition may be caused by mixed air low limit or leaving air low limit.

2. Unless sequences specifically identify alternative modes of operation, the following shall be provided:

a. The system shall operate in occupied mode.

b. Outside air dampers shall be closed or outside air supply fans shall be de-energized.

c. Heating system shall energize including heat sources and distribution system.

3. Alarm shall be indicated at building automation system.

D. High Condensate Level:

1. Upon a rise in condensate level in the condensate pan, the float switch shall de-energize the unit.

2.8 STARTER "HAND-OFF-AUTO":

A. When in "HAND" position, equipment shall be able to run.

B. When in "OFF" position, equipment shall not be able to run.

C. When in "AUTO" position, equipment shall be able to run if commanded by sequence of operation.

2.9 SYSTEM OPTIMUM START:

A. The building automation control system shall provide an optimum start sequence for the HVAC system.

B. Optimization shall be determined by a comparison of indoor and outdoor environmental conditions and system capacities.

C. At the completion of optimum start, the building shall be at design temperatures. This is not necessarily, and in most cases will not be, the same time as the start of the occupied period. For example, the completion of optimum start could be set at 7 am and the occupied mode set at 9 am. The occupied mode is typically when ventilation air would be energized.

2.10 ALARMS:

A. In addition to the alarms indicated, all temperatures and other monitored or sensed conditions that fall above or below the normal range shall be alarmed.

B. Alarms shall be assigned a level of alarm (minimum three levels - low (maintenance), high (important), and critical).

PART 3 - POINT SCHEDULE

3.1 DEFINITION OF POINTS:

A. Binary Output:

1.	Control Relay	-	Energize/de-energize
2.	Solenoid	-	Steam Valve Gas Valve
3.	Hand/Off/Auto	-	Starter

B. Analog Output:

1.	Cooling	-	Control Valve
2.	Heating	-	Control Valve SCR Heater
3.	Humidification	-	Control Valve
4.	Economizer	-	Dampers
5.	Position Adjust	-	Fan Drives Pump Drives Dampers VAV Damper

C. Binary Input:

1.	Differential Pressure	-	Fan Status Pump Status
2.	Pressure Switch	-	Pressure
3.	Flow Switch	-	Fan Status Pump Status

4.	Fire/Smoke	-	Smoke Detector Fire Sensor
5.	Freeze	-	Low Limit
6.	Filter	-	Filter Pressure
7.	Setback Override	-	Night Setback Override

D. Analog Input:

1.	Humidity	-	Humidity
2.	Temperature	-	Temperature
3.	Static Pressure	-	Static Pressure
4.	Fan Speed/Load	-	Fan Drives
5.	Air Flow	-	Air Flow

SYSTEM POINT SCHEDULE

POINT SCHEDULE NO. 1	HARDWARE																																			SOFTWARE																			
	OUTPUT FROM BACS								INPUT TO BACS																											ALARMS											APPLICATION PROGRAMS								
	BINARY			ANALOG					BINARY					ANALOG																						BINARY							ANALOG												
SYSTEM Springfield Middle School SPACES SERVED -- -- -- POINT DESCRIPTION	CONTROL RELAY			COOLING	HEATING				CURRENT SENSOR	FILTER				OUTSIDE HUMIDITY	OUTISIDE TEMP	SPACE TEMPERATURE	SUPPLY TEMP (AIR)																			FILTER							HIGH TEMPERATURE	LOW TEMPERATURE	RUN TIME		SCHEDULED START/STOP	S/W CHANGEOVER	DAY/NIGHT SETBACK						
Outside														●	●																																								
IDHP/ODHP-#	●			●	●				●	●						●	●																			●							●	●	●		●	●	●						

Failure Modes

○ -- ON

● -- OFF

L -- Last

END OF SECTION 23 0993

SECTION 23 0993.6 - SEQUENCE OF OPERATION (SINGLE ZONE PACKAGED EQUIPMENT)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of controls system shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0993 - Sequence of Operations for HVAC Controls and Points List

PART 2 - SEQUENCE OF OPERATION

2.1 GENERAL:

A. Unit Operation:

1. The indoor fan, compressors, heating coil, reheat coil, and outside air damper shall be controlled independently of each other by the direct digital controller.

2. Cooling and heating shall not operate simultaneously except where specifically specified otherwise.

3. Electric heat shall be disabled until air flow switch proves proper air flow.

4. When system is in occupied or override modes, the system shall operate in occupied mode.

B. Heating Control (Heat Pump):

1. Upon a demand for heating, the reverse cycle unit shall load compressor.

2. If additional heat is required or the compressor fails to energize, the auxiliary heat shall be energized.

3. Electric heat shall be energized during the defrost cycle.

4. Electric heat shall stage (single or multiple) or proportionally energize as indicated on equipment schedule or specifications to maintain sensor setpoint.

C. Cooling Control:

1. Upon a demand for cooling, the unit cooling sequence shall energize.

2. The compressors shall load to maintain sensor setpoint.

D. Indoor Fan Operation:

1. The fan shall run continuously when the unit is energized except where noted otherwise.

E. Morning Warm-Up:

1. Unit shall operate in heating to bring space to design temperature.

F. Unoccupied Mode:

1. When space temperatures drop below the night low limit setpoint, the unit shall energize in heating.

2. When space temperatures rise above the night high limit setpoint, the unit shall energize in heating.

G. Failure Mode:

1. High condensate level

2. Smoke detection

3. Others indicated with equipment or required by manufacturer.

2.2 PACKAGED COOLING AND HEATING UNITS:

A. Unit Operation:

1. The units shall be controlled by a space thermostat and direct digital controller.

END OF SECTION 23 0993.6

SECTION 23 2113 - HVAC PIPING (GENERAL)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of pipe, pipe fittings, accessories and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0517 - Sleeves, Seals, and Escutcheons

2. Section 23 0529 - Hangers and Supports for HVAC Piping

3. Section 23 0548 – Sound, Vibration, and Seismic Control for HVAC

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All pipe and pipe fittings shall comply with American National Standards Institute Code, all local codes and ordinances, and meet or exceed the standards and procedures (latest editions) of the following:

a. Ferrous Pipe and Fittings:

1) Malleable Iron Screwed Fittings. ANSI B16.3

2) Steel Flanges. ANSI B16.5

3) Steel Fittings. ANSI B16.9

4) Steel Pipe, Welded or Seamless, Black or Galvanized. ASTM A53, A106, and A120

5) Steel Pipe, Welded or Seamless (for coiling) Black or Galvanized. ASTM A53

6) Wrought Iron Pipe. ASTM A72

b. Pipe Joining Materials, Gaskets, Methods, and Accessories:

1) Soldering and brazing ANSI B9.1

B. Material shall be new domestic materials (made in the USA) of standard manufacture suitable for specified use.

C. Manufacturer shall certify materials conform to reference specifications, or specification number shall be cast into or marked on each piece.

PART 2 - PRODUCTS

2.1 GENERAL:

A. No materials shall be co-mingled within the same system except those which are specifically approved in these specifications.

2.2 PIPE SCHEDULE:

A. Cooling Coil Condensate Drain Piping:

1. Indoor piping shall be seamless hard drawn, Type L, copper pipe.

B. Refrigerant Piping:

1. Piping shall be seamless hard drawn, Type L, ACR, copper pipe.

2. Piping shall be dehydrated, charged with nitrogen, and capped.

2.3 FITTINGS AND CONNECTIONS:

A. Fittings shall be the same material and weight as the pipes joined by the fitting unless noted otherwise. Fittings shall comply with all applicable standards.

B. Prohibited Fittings:

1. The following are prohibited fittings:

a. Bull head tee's

b. Street ells

c. Bushings

d. Close nipples

e. "T" drill fittings

f. No mitered fittings in welded systems

C. Copper Pipe Fittings - Refrigerant Service:

1. Fittings shall be wrought copper.

2. All joints shall be brazed.

3. Brazing material may be an alloy of silver, copper and/or phosphorus with a minimum melting point above 1100 degrees F.

PART 3 - EXECUTION

3.1 GENERAL:

A. Pipe shall be installed in strict accordance with manufacturer's recommendations.

B. Cut pipe accurately to measurements established at building or site, and work into place without springing or forcing, properly clearing all window, doors, and other openings or obstructions. Excessive cutting or other weakening of building to facilitate piping installation will not be permitted. Piping shall line up flanges and fittings freely and shall have adequate unions and flanges so that all equipment can be disassembled for repairs.

C. Each length of pipe, as erected, shall be upended and rapped. Dirt and all foreign matter shall be cleaned from pipe and fittings before installation.

D. All turns and connections shall be made with long radius fittings as specified hereinafter.

E. Provide proper provision for expansion and contraction in all portions of pipework, to prevent undue strains on piping or apparatus connected therewith. Provide double swings at coil connections, riser transfers, and other offsets wherever necessary to take up expansion. Arrange riser branches to take up motion of riser.

F. Piping shall be installed straight and level except where required to be sloped.

3.2 ISOLATION VALVES:

A. Provide shutoff valves at all major branches and at each riser.

3.3 PIPING TO EQUIPMENT:

A. Where items in piping such as coils and equipment connections are different sizes than the piping, reducers and increasers shall be installed adjacent to such items so there is a minimum of reduced size pipe.

B. All piping connections to coils, equipment, valves and other system components shall be made with offsets with flanges or unions so arranged that the equipment can be serviced or removed without dismantling the piping.

C. Provide all final pipe connections to systems and equipment.

3.4 REFRIGERANT PIPE:

A. Cut refrigerant pipe with wheel cutter only. Do not saw or ream.

3.5 CONCEALED PIPE:

A. Test all pipe prior to concealing or insulating.

3.6 SITE UTILITIES:

A. Provide all site surveys, excavation, and other investigative work to determine the exact location and invert of site utilities if utilities are in place prior to construction beginning. The Contractor shall perform this work prior to installation of any affected piping systems.

3.7 PIPE INSPECTION:

A. The Owner and A/E reserve the right to inspect, sample, and test any pipe after delivery and to reject all pipe represented by any sample which fails to comply with the specified requirements. Inspection of pipe shall be for pits, blisters, rough spots, breakage, or other imperfections. Any pipe which has been rejected because of the above shall be conspicuously identified and immediately removed from the construction site.

3.8 DRAINAGE PIPING:

A. Provide cleanouts at all changes of direction totaling 90 degrees or more.

END OF SECTION 23 2113

SECTION 23 3112 - MECHANICAL DUCT

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools, and equipment and perform all operations in connection with the installation of mechanical duct, accessories, and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. All sections of Division 23 Specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0548 – Sound, Vibration, and Seismic Control for HVAC

2. Section 23 3113.01 - Metal Duct

3. Section 23 3300 - Duct Accessories

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. Mechanical duct systems shall be fabricated and installed in accordance with the manufacturer's recommendations and meet or exceed the standards and procedures (latest editions) of the following:

a. SMACNA, Balancing and Adjustment of Air Distribution

b. SMACNA, High Velocity Duct Construction Standards

c. SMACNA, Low Pressure Duct Construction Standards

d. SMACNA, Fire Damper and Heat Stop Guide

e. SMACNA, Ducted Electric Heat Guide

f. SMACNA, Duct Cleanliness for New Construction Guidelines

g. SMACNA, HVAC Duct Construction Standards

h. NEBB Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems

i. ASHRAE Handbook of Fundamentals and ASHRAE Systems and Equipment Handbook

j. International Building Codes

2. Duct shall be Class 0 in accordance with UL Standard 181. Where permitted by Code, Class 1 duct shall be allowed.

3. All duct system components including insulations, adhesives, mastics, cements, tapes, coverings, connectors and appurtenances shall have a maximum UL flame spread of 25 and a smoke development rating of 50 as tested by ASTM E-84.

4. Duct sealants shall meet UL 181A and UL 181B.

B. Manufacturers:

1. The following duct sealant manufacturers are acceptable:

a. AirSeal McGill

b. Ductmate

c. Hardcast

PART 2 - PRODUCTS

2.1 GENERAL:

A. Dimensions shown on the plan are finished inside dimensions. The sizes of internally lined ducts shall be increased accordingly. The size of dampers, security bars and accessories shall also be increased in size.

B. Ducts shall be smooth on inside.

C. The general location of ducts shall be as shown on the contract drawings. Exact location of ductwork shall be determined by the Contractor.

2.2 SEALING DUCTS:

A. General:

1. Sealants shall be water based. Solvent based sealants are not acceptable.

2. Sealants shall be UV, water and mildew resistant.

3. Sealants shall be suitable for low, medium and high pressure applications up to 15" WG.

4. Sealants shall have a mild odor, no flashpoint, and not require a respirator for application.

B. All ducts shall be sealed in accordance with Seal Class A. Seal all joints (longitudinal and traverse) and all penetrations. The following shall not require sealant:

1. Spiral lockseams

2. Gasketed connections

C. Basis of design sealant (not exposed to weather) shall be:

1. McGill AirSeal United Duct Sealer (Water Based).

D. Basis of design sealant (exposed to weather) shall be:

1. McGill AirSeal Uni-Weather.

2.3 DUCT SHIPMENT:

A. Intermediate Level (SMACNA):

1. Ducts leaving the place of fabrication shall be kept clean and dry.

B. Advanced Level (SMACNA):

1. Ducts leaving the place of fabrication shall be wiped clean (interior) and have all ends capped.

PART 3 - EXECUTION

3.1 GENERAL:

A. Contractor shall provide additional bends and offsets as may be required to bring ductwork into proper relation with other equipment and features of the building.

B. Where changes are made in shape of ducts, full area shall be maintained and changes shall be gradual to minimize pressure drop.

C. Ducts terminating at grilles and registers shall be provided with suitable means of attachment.

D. All ductwork shall operate without chatter and vibration, and shall be free from pulsation.

E. The following work shall be performed under direction of the System Test and Balance Contractor.

1. Provide necessary sheet metal baffle plates to eliminate stratification and provide air volumes specified. Locate baffles by experimentation and affix and seal permanently in place after stratification problem has been eliminated.

2. Provide access doors to adjust, maintain, or service equipment sensors, controllers and all other devices.

3.2 DUCT STORAGE:

A. Duct shall be protected by storing on elevated supports.

B. All ducts shall have ends capped during storage.

C. The area used for storage shall be kept dry and clean.

3.3 PROTECTION AND CLEANING DURING INSTALLATION:

A. During construction, all open ends of duct installed shall be capped.

B. Prior to capping, all interior duct surfaces shall be wiped clean.

3.4 HANGING:

A. Hanging and support systems shall be in accordance with SMACNA Duct Construction Standards and drawing details.

B. Vertical ducts shall be supported by extending bracing angles to rest firmly on floors or shall be bolted to walls, columns or other construction.

C. Where duct is supported by threaded rods, see Mechanical Sound, Vibration, and Seismic Control specifications for threaded rod requirements and attachment requirements.

D. Where duct is supported by sheetmetal straps, the strap shall attach to the duct with two #10 sheetmetal screws located within 2 inches of the top of the duct.

3.5 ACCESSORIES:

A. Doors, dampers, and other accessory items shall be installed as detailed in the SMACNA Duct Construction Standard with adequate reinforcement and support to accommodate additional weight without damage to the duct.

3.6 COMPLETION AND DEMONSTRATION:

A. Upon completion of the duct system installation, and before the A/E has inspected the system operation, open all system dampers and turn on fans to blow all scraps and other loose material out of the duct system. Allow for a means of removal of such material.

B. Check the duct system to ensure there are no excessive air leaks through joints, at reinforcement locations, seams, points of connection with fire dampers, coils, or other duct accessories. Where there are unacceptable leaks, the leakage shall be repaired and shall be done so in a manner of a new installed system. Excessive air leaks shall be leaks that exceed industry standards, cause higher than acceptable noise, or where leakage exceeds reasonable expectations.

END OF SECTION 23 3112

SECTION 23 3113.1 - METAL DUCT

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of all metal duct where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 3112 - Mechanical Duct

1.3 QUALITY ASSURANCE:

A. Codes and Standards: All work shall meet or exceed the standards and procedures (latest editions) of the following:

1. ASTM A527 Galvanized Steel Spiral Lock Seam Duct
2. Underwriter Laboratories, UL 103
3. ANSI Z223.1
4. NFPA 96

B. Material shall be free from blisters or other mechanical defects. Material shall be galvanized prime sheet steel unless noted otherwise.

C. Sheet metal thickness, cross joints, seams, slip-connections, cross-breaking, bracings, duct supports and reinforcing shall be in accordance with the more stringent requirements of ASHRAE Guide and SMACNA Duct Construction Manual for system pressure classifications. Minimum gauge thickness is 26 unless thicker gauges are indicated.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Materials:

1. Duct shall be galvanized or as indicated elsewhere on the plans or in these specifications.

2. Plenums, collars, flashing, etc. located on roofs, exterior of the building, or other locations where exposed to the weather shall be stainless steel.

B. Closure:

1. Transverse joints and seams in sheet metal duct shall be of the types and sizes recommended by SMACNA and the ASHRAE Handbook for the specific duct pressure classification.

2.2 RECTANGULAR DUCT (DUAL WALL):

A. Duct:

1. Dual wall shall be:

a. Outdoor supply: 3"

b. Outdoor return: 3"

B. Materials:

1. Outer wall stainless steel (outdoor)

2. Inner wall galvanized

C. Fittings:

1. Fittings shall be constructed similar to fittings specified for single wall duct except that they shall be dual wall.

D. Liner:

1. Fittings shall have solid liner.

2. Dual wall duct shall have solid liner.

E. Insulation:

1. Insulation shall be .27K @ 75 degrees F.

2. Insulation shall be thickness of the dual wall.

F. Location:

1. Dual wall duct shall be provided in the following locations:

a. As indicated on plans.

PART 3 - EXECUTION

3.1 DUCT DRAWINGS:

A. Provide 1/4" scale CADD drawings indicating layout of all dual wall duct.

B. Where new duct ties into existing duct, existing duct must also be shown based upon field verified dimensions.

3.2 SUBMITTALS:

A. Provide a list of all duct materials and systems in which they are to be installed for the entire project.

3.3 CUTTING DUCTS:

A. Ducts shall be cut with a hand held plasma cutter whenever practical. This shall include, but not be limited to, cutting openings for access doors, duct taps, cutting into existing ducts, and similar applications.

END OF SECTION 23 3113.1

SECTION 23 3300 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor and materials, and perform all installation of duct accessories and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 3112 - Mechanical Duct

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. Duct accessories shall be fabricated and installed in accordance with the manufacturer's recommendations and meet or exceed the standards and procedures (latest editions) of the following:

a. UL Standard 214 for Fire Retardancy

b. NFPA 90A and 90B

c. SMACNA

d. ASTM E84

e. AMCA Standard 500

2. Duct accessories shall have AMCA Certified Rating Seal when specified.

B. Manufacturers:

1. The following access door (low pressure) manufacturers are acceptable:

a. Ruskin

b. Air Balance

c. KEES

d. National Controlled Air

2. The following flexible duct connector manufacturers are acceptable:

a. Ventfabrics

b. Ductmate

c. Approved Equal

3. The following test cap manufacturers are acceptable:

a. Ventlok

b. Approved equal

PART 2 - PRODUCTS

2.1 FLEXIBLE CONNECTORS:

A. General:

1. Flexible connectors shall consist of two strips of 24 gauge metal and a coated fabric.

2. Metal strips shall be 2-3/4" minimum and fabric shall be 5" minimum.

3. Connectors shall be unaffected by mildew, resistant to weather and have a fire retardant coating on a noncombustible fabric.

4. Connector shall be suitable for -40 degree F to 180 degree F.

5. Where duct has roll formed mating flange, metal strips shall be roll formed.

B. Indoor Applications:

1. Characteristics:

a. Fabric: woven nylon

b. Weight: 22 oz/sq. yd.

c. Tongue Tear: 150/150 lbs.

d. Tensile Strength: 500/400 lbs.

2. Metal strips shall be galvanized or aluminum.

3. Basis of design manufacturer shall be:

a. DuctMate Proflex Vinyl Super Duty

C. Locations:

1. Inlet and outlet of each duct at all equipment with a fan.

2. Other locations where indicated.

2.2 DUCT ACCESS DOORS (LOW PRESSURE):

A. Low pressure access doors shall be provided in duct systems with static pressures up to 2 inches W.G. and for velocities up to 2400 FPM except where low leak duct access doors are required.

B. Frame and door shall be 20 gauge galvanized steel in galvanized duct (and stainless steel in stainless duct). Door shall be dual wall with 1/2" insulation minimum.

C. Door shall be removable cam type with two cams for doors less than 16" and four cams for door 16" and larger.

D. Polyurethane foam seals shall be provided between frame and duct and between door and frame.

E. Multiple doors shall be provided in all ducts larger than 48".

F. Access doors shall be the following sizes:

Duct Maximum Dimensions	Access Door
6"	6" x 6"
14"	10" x 14"
18"	14" x 14"
Larger than 18"	16" x 16"

2.3 AIRFLOW TEST CAPS:

A. Provide 304L stainless steel test ports and cap on each main fume exhaust duct and each runout to a fume hood, equipment or grille in the fume exhaust system where airflow cannot easily or accurately be measured at the equipment or device.

PART 3 - EXECUTION

3.1 DUCT ACCESS DOOR:

A. General:

1. Duct access door shall be provided for access to all fire dampers, smoke dampers, combination fire smoke dampers, smoke detector sampling tube, sensors, and other devices and appurtenances requiring periodic maintenance or inspections.

2. Access door shall be within 24" of damper and damper linkage. There shall not be turning vanes or any other devices prohibiting access to damper and replacement of linkages.

B. Duct Access Door:

1. Access door shall be attached to housing with sheet metal screws. Frame shall be sealed to duct with high pressure duct sealant.

3.2 FLEXIBLE DUCT CONNECTORS:

A. Installed length of material shall be 50% flat length.

3.3 AIR FLOW TEST CAP:

A. Coordinate with Test and Balance Agency the required location for each test port.

B. If duct surface is not flat or test port is not available in the duct radius, weld a test port extension to the duct.

END OF SECTION 23 3300

SECTION 23 4100 - PARTICULATE AIR FILTRATION

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of air distribution equipment and appurtenances where shown on the drawing and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section.

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following as referenced (latest editions):

a. AMCA 300 - Certified Ratings for Sound and Airflow

b. AMCA 210 - Test Code for Air Moving Devices

c. Insulation - NFPA 90A and UL 181

d. ASHRAE 52 Test Standard for filter efficiencies

e. UL Standard 900 for filter flame and smoke rating

f. Institute of Environmental Services Standard IES-RP-CC-DDI-86 for HEPA filters

B. Manufacturers:

1. The following filter manufacturers are acceptable:

a. Camfil Farr

b. American Air Filter

c. Airguard

d. Flanders Precisionaire

e. Glasfloss

f. Airflow, Inc.

PART 2 - PRODUCTS

2.1 TEMPORARY FILTERS:

A. During start-up, preliminary testing of system, operation of system prior to system being ready for testing and balancing, or operation of a system prior to final building cleaning, the contractor shall protect all equipment, coils, and the entire duct system with filters.

B. Filters shall be MERV 8 minimum and contain an antimicrobial biocide to control the growth of mold, mildew, algae, and fungi on the filters (i.e., fibers shall not support microbial growth). Biocide shall not offgas, migrate, or leach into the airstream.

C. Basis of design filter shall be:

1. Fiberbond Dustlok

2.2 EQUIPMENT REQUIREMENTS:

A. Filters shall be provided on all equipment to protect heat transfer components from outside air, building exhaust air or other airstreams that would foul heat transfer surfaces.

B. Where no other filtration is indicated or scheduled, air handling equipment shall have a 2" pleated panel filter. The 2" filter shall be MERV 8.

PART 3 - EXECUTION

3.1 TEMPORARY FILTERS:

A. The contractor shall install temporary filter media on all negative pressure openings if the system is to be operated prior to the final cleaning of all spaces served by a system. These openings include open return ducts, exhaust ducts, and grilles. All filters shall be replaced as often as necessary.

B. All temporary filters shall be held securely in place and with minimum bypass. Filters shall be changed as needed.

C. Systems shall not be operated without filters equaled to specified filters in place to protect coils and other heat exchanger devices.

3.2 SPARE FILTERS:

A. The spare set of filters shall be stored at the project site at the location designated by the Owner.

END OF SECTION 23 4100

SECTION 23 9005 - HEAT TRANSFER (ELECTRIC COOLING)

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. General:

1. Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of heat transfer equipment and appurtenances where shown on the drawings and specified hereinafter.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

B. All sections of Division 23 specifications apply to this section. In addition, refer to these specification sections:

1. Section 23 0502 - Common HVAC Materials

1.3 QUALITY ASSURANCE:

A. Codes and Standards:

1. All work shall meet or exceed the standards and procedures of the following as referenced (latest editions):

a. ARI Standards 210/240, 340, and 360

b. ANSI Z21.47/UL - Unitary Air Conditioning Standard for Safety Requirements

c. Underwriter's Laboratory

d. NFPA 90A

e. AMCA 210 Test Code For Air Moving Devices

f. National Electric Code

g. ASHRAE 15 - Safety Code for Mechanical Refrigeration

B. All motors and equipment shall be U.L. labeled.

C. All insulation and materials shall have a flame spread rating of less than 25 and smoke developed of less than 50.

D. All heating and cooling equipment shall bear the ARI seal.

E. All coils shall be ARI certified.

F. All electric heaters shall have impedance protection per UL519.

G. Burner assembly, including the gas train, shall be FM and IRM approved.

H. All outdoor cabinets shall meet or exceed the 500 hour salt spray test unless more stringent tests are specified.

I. Manufacturers:

1. The following constant volume packaged heating and cooling unit manufacturers are acceptable:

a. Trane

b. Carrier

c. JCI

2. The following dedicated outside air unit manufacturers are acceptable:

a. Trane

b. Valent

c. JCI

3. The following dedicated outside air unit manufacturers with energy recovery are acceptable:

a. Annexair

b. Innovent

PART 2 - PRODUCTS

2.1 GENERAL:

A. General:

1. Equipment shall meet or exceed the scheduled efficiencies or ASHRAE 90.1, whichever is greater.

2. Furnish and install heating and cooling units in accordance with the drawings and as specified hereinafter.

3. Units shall be air conditioning or heat pump as shown on equipment schedules.

4. Unit shall be factory assembled and tested.

5. Standard operating range for cooling shall be 55°F to 120°F outdoor ambient except where low ambient controls are required. See equipment schedule.

6. Provide all controls and accessories for a complete operating system including but not limited to:

a. Crank case heater

b. Start capacitor kit (single phase condensers)

7. Refrigerant shall be R410A.

8. Motors shall be premium efficiency.

B. Outdoor Cabinets:

1. Unit shall be designed for outdoor installation.

2. Cabinet shall be insulated and constructed of heavy duty galvanized steel. Frame and panels shall be 18 gauge minimum. They shall be zinc coated or epoxy coated with a baked-on finish.

3. Prewired control panel.

4. Hinged access doors with quick release handles shall be provided as follows:

a. On all access sections on units 3 tons and larger.

b. On filter sections for all units smaller than 3 tons.

5. Single wall cabinets shall be thermally and acoustically insulated with a minimum of R4 fiber insulation. Provide a foil, sprayed neoprene, or mat faced finish.

C. Refrigerant Circuits:

1. All units shall have factory installed liquid line filter dryer, liquid line sight glass, pressure tap ports, check valves, and suction and liquid service valves.

2. Heat pump units shall also have reversing valve, suction line accumulator, and discharge muffler.

3. Where low ambient control is required, electronic head pressure control shall be provided.

D. Compressors (up to 7 tons):

1. Compressor shall have centrifugal oil pump.

2. Motor shall have internal temperature and current sensing motor.

3. Compressor shall have totally dipped hermetic motor windings.

4. Compressor shall be resiliently mounted and seismically isolated.

E. Outdoor Coil:

1. The outdoor coil shall be constructed of aluminum spine fin mechanical bonded to seamless aluminum or copper tubing with all joints brazed.

2. Surface shall be engineered to facilitate defrost water runoff.

3. Louvered panels.

F. Indoor Coil:

1. The indoor coil shall be constructed of aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed.

2. Coil shall include factory installed refrigerant metering device and refrigerant line fittings.

G. Outdoor Fans:

1. Fan motors shall be permanently lubricated, weatherproof motors suitable for outdoor use.

2. Motor shall have built-in current and thermal overload protection.

3. Fans shall be resiliently mounted and seismically isolated.

4. Fans shall be statically and dynamically balanced.

5. Provide PVC coated fan guard.

H. Indoor Fan:

1. Indoor fan shall be direct drive plenum fan with ECM motor and speed adjustment feature or inverter duty motor with a variable frequency drive.

2. Fan shall be seismically isolated.

I. Safeties:

1. Heat pumps shall have a solid state defrost control. Defrost shall occur only when coil saturated suction temperature indicates freezing temperatures. Defrosting shall be limited to a maximum of 10 minutes over a 90 minute period.

2. Provide a time-guard device to prevent compressor recycling by requiring a 5-minute delay before restarting.

3. Three phase protection.

J. Electrical (Outdoor Unit):

1. Provide control voltage transformer.

2. Provide an unswitched GFI service receptacle on all three phase outdoor units. Receptacles shall have metal covers.

3. Provide transformer for motor or heaters as required.

4. Transformers shall be factory mounted and wired.

5. Power to the packaged unit shall be through the interior of the unit curb.

K. Electric Heaters:

1. Heaters shall have a total output as scheduled on drawings.

2. Each heater assembly shall include power supply fusing if over 48 amps, automatic resetting limit switches and heat limiters for thermal protection.

3. Heaters shall be provided with polarized plug for quick connection to unit low voltage wiring.

4. Electric heaters factory furnished and installed capacity not to exceed scheduled capacity at rated voltage.

5. If larger heaters are supplied, they shall not be large enough to require larger supply wiring or disconnects.

6. Heaters shall have SCR control except where staged heaters are scheduled.

L. Drain Pan:

1. Provide dual slope insulated non corrosive drain pan.

M. Filters:

1. Provide flat filter rack for 2 inch pre filter.

2. Where additional filters are specified, additional filter racks shall be provided for the additional filters.

N. Provide BacNet communication card on all equipment.

O. Controls:

1. Space temperature and humidity sensors shall be capable of controlling the unit in cooling and heating modes.

2.2 SPLIT SYSTEM UNITS (DUCTED):

A. Controls:

1. Provide a control wiring terminal board in the outdoor unit to match the indoor unit terminal board and thermostat terminals.

2. Airflow switch interlocked with condenser operation.

B. Air Handler:

1. Unit enclosures shall be (single wall) (dual wall) insulated, constructed of heavy-gauge steel, and finished with a baked-on acrylic finish.

2. Units shall be acoustically and thermally insulated with a minimum of 1/2 inch 1-1/2 lb. density mat-faced glass fiber material.

3. (Insulation shall have a foil, sprayed neoprene or mat faced finish.)

C. Accessories:

1. Provide factory return air plenum permitting side or front return air inlet.

PART 3 - EXECUTION

3.1 CONDENSATE DRAIN LINES:

A. Provide a weather seal grommet where drain penetrates casing and wall sleeve.

3.2 WARRANTY:

A. Compressor Failure:

1. When a compressor fails within the warranty period, the compressor shall be replaced. If the system has multiple compressors on a single refrigerant circuit, and one compressor fails, all compressors shall be replaced during the warranty period.

END OF SECTION 23 9005

SECTION 26 0500 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL CONDITIONS

1.1 WORK INCLUDED:

A. The work covered under these sections of the specifications consists of furnishing all labor, equipment, supplies and materials, and of performing all operations, including cutting, channeling, chasing, excavating and backfilling necessary for the installation of complete wiring systems, raceways, wiring, and electrical equipment in accordance with this section of the specifications and the accompanying drawings.

B. The Electrical Work shall include, but not be limited to, the following:

1. Electrical distribution system

2. Raceway system

3. Conductors and cables

1.2 RELATED WORK:

A. Related work to Division 26:

1. Division 1

2. The provisions, conditions, and requirements preceding and including general and supplemental conditions apply to and are a part of Divisions 26 and 28.

1.3 DEFINITIONS:

A. Provide: Furnish and install complete ready for use, including all accessories required for operation.

B. Furnish: Purchase and deliver to the project site complete with every necessary appurtenance, support and accessories required for operation.

C. Install: Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project.

1.4 DESCRIPTION OF SYSTEMS:

A. Furnish and install all materials for systems, resulting upon completion, in functioning systems in compliance with performance requirements specified. The omission of express reference to any parts necessary for or reasonably incidental to a complete installation shall not be construed as a release from furnishing such parts.

B. The wiring specified and shown on the drawings is for complete and workable systems. Any deviations from the wiring shown due to a particular manufacturer's requirements shall be made at no cost to either the contract or to the Owner. Changes in electrical

service to equipment due to substitutions of equipment by any Divisions of this specification shall be at no additional cost to the Owner.

1.5 QUALITY ASSURANCE:

A. All equipment and materials required for installation under these specifications shall be new and without blemish or defect. All equipment shall bear labels attesting to Underwriters Laboratories approval where subject to Underwriters Laboratories label service.

B. Equipment and material which are not covered by UL Standard will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe will be considered, if inspected or tested in accordance with national industrial standards, such as NEMA, ICEA or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.

C. All equipment of one type (such as panelboards, breakers, etc.) shall be the products of one manufacturer.

1.6 REQUIREMENTS OF REGULATORY AGENCIES/CODE COMPLIANCE:

A. Contractors shall submit all items necessary to obtain all required permits to the appropriate Regulatory Agencies, obtain all required permits, and pay all required fees.

B. All work shall conform to the following Building Codes:

1. National Electrical Code (NEC-2017)

2. National Electrical Safety Code (NESC) latest edition

3. International Building Code (IBC 2018)

C. All work shall conform to all federal, state and local ordinances.

D. References to the National Electrical Code and National Fire Protection Association (NFPA) are a minimum installation requirement standard. Design drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the NEC and NFPA.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS:

A. All products shall be new (except where noted) and unused and without blemish or defect.

2.2 SUBSTITUTIONS:

A. All requests for substitutions should be submitted so as to be received by the Architect/Engineer at least 10 working days before bid date and must be approved before award of Contract.

B. Submittals shall be concise, clear, and brief as possible. Requests shall be accompanied by samples, descriptive literature and engineering information, as necessary, to fully identify and appraise the product.

C. Items approved shall not be construed as authorizing any deviations from the plans and specifications unless such deviations are clearly indicated in the form of a table of compliance that is enclosed with the submittals. The table of compliance shall clearly identify all deviations from the specifications with clear proof of equality for each case of deviation. Each item in the table of compliance shall be marked to show specification reference including the section and paragraph numbers.

D. Contractor shall be responsible for verifying all dimensions with available space conditions (with provisions for proper access, maintenance, part replacement, and for coordination with other trades--electrical, plumbing, structural, etc.) for proper services, and construction requirements. Contractor to bear any additional cost for required changes in associated items which are directly or indirectly related to a substituted unit.

E. The Contractor shall furnish drawings showing all installation details, shop drawings, technical data and other pertinent information as required.

F. Approval of the equipment does not relieve the contractor of the responsibility of furnishing and installing the equipment at no additional cost.

G. Where Contractor substitutes equipment manufactured by an alternative vendor other than the Specification approved first named manufacturer, the Contractor shall become responsible for the operation of the product in the intended system, including all related costs required to make the design work, function, and fit in the allocated space.

PART 3 - EXECUTION

END OF SECTION 26 0500

SECTION 26 0501 - ELECTRICAL COORDINATION

PART 1 - GENERAL CONDITIONS

1.1 INTERPRETATION OF CONTRACT DOCUMENTS:

A. This section of the specifications and related drawings describe general provisions applicable to every section of Division 26.

B. Attention is directed to Instructions to Bidders and to Division 1, General Conditions, which are binding in their entirety on this portion of the work in particular to paragraphs concerning materials, workmanship and substitutions.

C. The drawings of necessity utilize symbols and schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed, in accordance with the intent diagrammatically expressed on the drawings, and in conformity with Contractor field-verified dimensions and on equipment shop drawings. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.

D. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not eliminate the requirement for field coordination for the indicated work.

1.2 EXISTING CONDITIONS:

A. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work, working conditions, verify all dimensions in the field, advise the Engineer of any discrepancy, and submit shop drawings of any changes he proposes to make, in quadruplicate for approval, before starting the work. Contractor shall install all equipment in a manner to avoid building interference.

1.3 SHOP DRAWINGS:

A. The Contractor shall not purchase any materials or equipment prior to receipt of approved shop drawings.

B. Prior to assembling or installing the work, prepare and submit shop drawings for the following items of equipment:

1. Circuit breakers

2. Electrical distribution system

3. Fire Alarm System

C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Engineer to ascertain that the proposed equipment and materials comply with specification requirements.

D. Shop drawing sets shall be suitably bound and indexed. Loose sheets are not acceptable.

E. Catalog cuts submitted for approval shall be legible and shall clearly identify equipment being submitted. Items of the submittal **that have been "faxed" are not** acceptable.

F. Before preparing drawings, Contractor shall consult all contract drawings and specifications in detail, obtain manufacturer's recommended installation instructions, and have shop drawings prepared based on specific equipment and material intended for installation. A principal of the contracting firm shall sign all shop drawings (indicating conformance with plans and specifications) before submission

G. Approval on shop drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing (and in letter form) called attention to such deviations at the time of submission and secured written approval; nor shall it relieve him from responsibility for errors in shop drawings or schedules.

H. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1.4 AS-BUILT DRAWINGS:

A. The Contractor shall keep a record set of drawings on the job and, as construction progresses, shall show the actual installed location of all items, material, and equipment on these job drawings.

B. At the time of final inspection, and electronic (PDF) corrected set of drawings shall be delivered to the Engineer. All drawings costs to be by the Contractor.

1.5 OWNER'S MANUAL:

A. The Contractor shall submit to the Engineer six identical manuals that contain manufacturer's brochures of all items installed by the Electrical Contractor.

B. The cover of the manual shall state the following information:

1. Project Name

2. Location

3. Owner

4. Electrical Engineer

5. Electrical Contractor (name, address, phone number)

6. General Contractor

7. Project Supervisors (general and electrical)

8. Date Of Project Completion

1.6 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. After all final tests and adjustments have been completed, a competent employee of the Contractor shall be provided to instruct the Owner's Representative in all details of operation and maintenance for equipment installed. Supply qualified personnel to operate equipment for sufficient length of time to assure that Owner's Representative is qualified to take over operation and maintenance procedures. Instruction periods shall be as designated by the Owner and shall not necessarily be consecutive.

1.7 MAINTENANCE MATERIALS:

A. All special tools for proper operation and maintenance of the equipment provided under this Specification shall be delivered to the Owner's Representative and a receipt requested for same.

B. Where specified, provide Owner's Representative with spare parts, equipment and materials and request a receipt for same.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION:

A. In addition to the requirements of the National Electrical Code, install an identification sign which will clearly indicate information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchgear and motor control assemblies, control devices and other significant equipment.

B. Nameplates shall be laminated black phenolic resin with a white core and engraved lettering, a minimum of 1/4-inch high. Nameplates that are furnished by manufacturer, as a standard catalog item, or where other methods of identification is herein specified, are exceptions.

2.2 UNDERGROUND WARNING TAPE:

A. Furnish and install a six (6) inch wide polyethylene tape, permanently colored yellow, for all electric underground work (outside the building) with wording indicating type of service and "caution". Install twelve (12) inches below finished grade and directly above underground equipment.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

A. Inspection:

1. Prior to any Work, the Contractor shall carefully inspect the installed Work of all other Trades and verify that all such Work is complete to the point where his installation may properly commence.

2. Verify that all equipment may be installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Engineer.

2. Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

C. Return to original (pre-construction) condition any paved areas, sidewalks, planting, etc., disturbed during electrical system installation.

3.2 INSTALLATION:

A. Install all equipment in strict accordance with the manufacturer's recommendations and the shop drawings approved by the Engineer.

B. Secure equipment using fasteners suitable for the use, materials, and loads encountered. If requested, submit evidence proving suitability. Do not attach electrical materials to roof decking, removable or knockout panels, or temporary walls and partitions, unless indicated otherwise.

C. Coordinated electrical systems, equipment and materials complete with auxiliaries and accessories shall be installed. Remove, modify, relocate and reinstall the existing electrical equipment and materials as shown.

D. Equipment location: Shall be as close as practicable to locations shown on drawings.

E. Working spaces shall be not less than specified in the National Electrical Code for all voltages specified.

F. Inaccessible Equipment:

1. Where the Engineer determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled as directed at no additional cost to the Owner.

2. "Conveniently accessible" is defined as being capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping, and duct work.

G. Equipment and Materials:

1. New equipment and materials shall be installed unless otherwise specified.

2. Equipment and materials shall be designed to assure satisfactory operation and operating life for environmental conditions where being installed. NEC and other code requirements shall apply to the installation in areas requiring special protection such as explosion-proof, vapor-proof, watertight and weatherproof construction.

3.3 COORDINATION WITH OTHER TRADES:

A. Coordinate all work of each section with work of other sections to avoid interference. Bidders are cautioned to check their equipment against space available as indicated on drawings, and shall make sure that proposed equipment can be accommodated. If interferences occur, Contractor shall bring them to the attention of Engineer, in writing, prior to signing of contract; or, Contractor shall, at his own expense, provide proper materials, equipment, and labor to correct any damage due to defects in his work caused by such interferences.

3.4 SERVICE CONTINUITY

A. At all times during the construction of the project, electric service shall be maintained to all portions of the site except with prior written approval of interruptions. Any required interruptions of electric service due to work being performed under this contract shall be scheduled in advance after consultation with the Owner and shall generally occur between the hours of five o'clock p.m. and five o'clock a.m. The Contractor shall be responsible for any material and labor costs, including overtime pay, to meet these requirements as part of the Division 26 scope of work.

B. At least 14 days prior to the requirement of any interruption of electrical service, the Contractor shall furnish to the Engineer for approval a written plan for the work associated with the outage including a description of the installation and removal of temporary wiring and facilities necessary to be installed.

3.5 WORK PERFORMANCE:

A. Arrange, phase and perform work to assure electrical service for other buildings at all times. See General Methods of Procedure under Section GENERAL REQUIREMENTS.

B. New work shall be installed and connected to existing work neatly and carefully. Disturbed or damaged work shall be replaced or repaired to its prior condition.

C. Coordinate location of equipment and conduit with other trades to minimize interferences.

D. Cutting of Holes:

1. Holes through concrete and masonry in new and existing structures shall be cut with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills shall not be allowed.

2. Holes shall be located so as not to affect structural sections such as ribs or beams.

3. Holes shall be laid out in advance. The Engineer shall be advised prior to drilling through structural sections, for determination of proper layout.

E. Where conduits, wireways, busduct, and other electrical raceways pass through fire partitions, fire walls or walls and floors, install a firestop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight, and completely fill clearances between raceways and openings. Installation of fire-stop material shall conform to Section 260503 Cutting, Patching and Repair, Firestopping.

F. Hangers and other supports shall support only electrical equipment and materials. Provide not less than a safety factor of 5, which shall conform with any specific requirements as shown on the drawings or in the specifications.

G. In security areas, exposed equipment and materials, including screws and other fasteners, shall be tamperproof. Cover plates shall have beveled edges.

H. Exposed conduit shall be painted, see Section 09900 PAINTING. Fire alarm junction boxes, pull boxes, and wireways, exposed or concealed, shall be painted red.

3.6 PROTECTION AND CLEANING OF SYSTEMS AND EQUIPMENT:

A. Protect all materials and equipment from damage during storage at the Site and throughout the construction period. Equipment and materials shall be protected during shipment and storage against physical damage, dirt, moisture, cold and rain.

B. Damage from rain, dirt, sun and ground water shall be prevented by storing the equipment on elevated supports and covering them on all sides with securely fastened protective rigid or flexible waterproof coverings.

C. Conduit shall be protected by storing it on elevated supports and capping the ends with suitable closure material to prevent dirt accumulation in the piping.

D. During construction cap the top of all conduits and raceway installed vertically.

E. During installation, equipment, controls, controllers, circuit protective devices, etc., shall be protected against entry of foreign matter on the inside; and be vacuum cleaned both inside and outside before testing, operating and painting.

F. Damaged equipment shall be placed in first class operating condition or be returned to source of supply for repair or replacement.

G. Painted surfaces shall be protected with removable heavy kraft paper, sheet vinyl or equal, installed at the factory, and removed prior to final inspection.

H. Damaged paint on equipment and materials shall be repainted with painting equipment and finished with same quality of paint and workmanship as used by manufacturer so repaired areas are not obvious.

3.7 DISPOSITION OF EXISTING MATERIAL AND EQUIPMENT:

A. All material and equipment which is noted, specified, or required by the Owner to be salvaged and which is not scheduled to be reused or relocated shall be carefully removed and shall be delivered to the Owner and stored where directed on the site.

B. Carefully remove and store on the site all material and equipment noted or specified to be reused or relocated. Thoroughly clean this equipment prior to installation.

C. Remove all other materials or debris resulting from demolition operations from the site.

3.8 EXCAVATING, TRENCHING, BACKFILLING AND RESURFACING:

A. Perform work as required, indicated, and in compliance with site work. All excavation depths indicated are below finished grade.

B. Do not excavate below required depth except as necessary for removal of unstable soil. Unless indicated otherwise, pitch all electrical conduit runs downward away from buildings.

C. Where backfill compaction is critical (e.g. under floor slabs, roadways, sidewalks, trenches deeper than four feet), test the degree of compaction each 75 linear feet of trench and each two feet of depth. Test as required by Division - "Sitework" and compact backfill until density is acceptable.

D. Repair the excavated area to original pre-excavation condition. Repair and replace sidewalks, roadways, etc.

3.9 IDENTIFICATION:

A. Upper case letters of uniform height; centered on device, coverplate, or enclosure; engraved letters filled with a contrasting color; and all characters made clearly and distinctly.

B. Use abbreviations defined in the contract documents whenever possible. Use plan designations for labeling, unless indicated otherwise. Indicate loads served using designations from electrical schedules and designations from the trade furnishing the equipment served.

C. Label the following with marking pen.

1. Junction boxes or portions of junction boxes with 277 or 480 volt wiring; communications system pull and junction boxes; and pull, junction boxes, and raceway installed above ceilings and for future use. Label inside covers in exterior locations and outside covers in unfinished areas.

D. Label feeder conductors and control conductors with self adhesive, numbered labeling tapes; Brady Co. or equal. Indicate feeder numbers on feeders and terminal numbers for control conductors. Label conductors at origin and destination points and at all junction boxes where two or more feeder or control circuits are present.

3.10 ACCESS TO EQUIPMENT:

A. All equipment shall be installed in location and manner that will allow for convenient access for maintenance and inspection.

3.11 CONNECTION OF EQUIPMENT FURNISHED AND INSTALLED UNDER OTHER DIVISIONS OF THE WORK:

A. This Contractor shall rough-in and make final electrical connection to all pieces of equipment requiring electrical connections. Such equipment being furnished and installed under other Divisions of the Work.

B. Installations shall be functional and code complying.

C. This Contractor shall provide whatever incidental devices are necessary for final connection, such as, but not necessarily limited to outlet boxes, receptacles, connectors, clamps and switches.

3.12 GENERAL COMPLETION AND DEMONSTRATION:

A. Results expected:

1. All systems shall be complete and operational, and all controls shall be set and calibrated.

2. All testing, start-up and cleaning work shall be complete.

B. Demonstration:

1. Upon notification by the Contractors, the Engineer will visit the project for a demonstration of the building system and an inspection of the completed work.

2. Items which do not comply with the Contract Documents or which function incorrectly will be listed, and the list will be submitted by the Engineer to the Contractors for repairs.

3. After all corrections have been made the Contractors shall notify the Engineer who will recheck the systems for compliance of all items listed.

3.13 COORDINATION WITH COMMISSIONING AGENT:

A. Contractor shall coordinate their work with the Owner's Commissioning Agent. Provide all necessary labor, materials, test equipment, etc. Attend all meetings with the Commissioning Agent and participate in the development and implementation of the Commissioning Plan.

B. Perform all necessary corrective work to comply with deficiencies noted by the Commissioning Agent.

3.14 CLEANING:

A. Periodically during construction and prior to Owner acceptance of the building, Contractor shall remove from the premises and dispose of all packing material and debris.

B. Clear away all debris and surplus material resulting from electrical work. Remove all dust and debris from interiors and exteriors of electrical equipment. Clean accessible current carrying elements prior to being energized.

END OF SECTION

SECTION 26 0502 - ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SCOPE:

A. This section describes the electrical demolition work to be done to existing facilities.

B. The term demolition, as used in this specification, shall mean any and all removal of electrical equipment as shown on the demolition plans or as described herein.

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:

1. Division 1.

2. All other Division 26000 sections.

1.3 WORK INCLUDED:

A. The work under this section consists of furnishing equipment, performing labor and services necessary for the demolition and removal of the electrical system shown on the drawings and hereinafter noted.

1.4 AS-BUILT DRAWINGS:

A. Where existing raceways and outlet boxes are used in the renovation work, they shall be shown on the "As-Built Drawings".

1.5 SALVAGED MATERIALS:

A. The Owner shall have priority for the selection of salvaged material and equipment. Any equipment and material selected to remain the property of the Owner shall be removed and delivered to a location on the site as designated by the Owner. Material and equipment not retained by the Owner shall become the property of the Contractor and shall be removed from the site by him.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Verify field measurements and circuiting arrangements prior to commencement of work.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.

3.2 PREPARATION:

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Coordinate electrical service outages with Owner.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Reconnect existing circuits and services interrupted by demolition.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK:

A. Remove abandoned wiring to source of supply.

B. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces and fire stop opening.

C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned backboxes which are not removed.

D. Replace/rework/extend existing Fire Alarm circuits as required to accommodate the new devices shown on the drawing. Schedule disruptions to the existing Fire Alarm system with the Owner in advance of disruptions.

E. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

F. Repair adjacent construction and finishes damaged during demolition and extension work.

END OF SECTION

SECTION 26 0503 - CUTTING, PATCHING, REPAIR, AND FIRESTOPPING

PART 1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK:

A. Cutting: Furnish all labor, materials, tools and equipment and perform all operations in connection with the cutting of new and existing building structure, finishes and building assemblies as specified hereinafter.

B. Patching: Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of watertight sealant as required to seal voids or gaps around Division 26 equipment at penetrations through exterior floors, walls, and roof systems.

C. Repair: Furnish all labor, materials, tools and equipment required to repair all existing or new building components and finishes, outside components, landscaping, utilities, or other appurtenances that are damaged as a result of the performance of this contract.

D. Firestopping: Furnish all labor, materials, tools and equipment and perform all operations in connection with the installation of firestopping systems required to seal off all voids or gaps at interfaces of Division 26 equipment, wires, cables, sleeves, raceways and other penetrations at fire rated walls, roofs, floors, floor-ceilings, roof-ceilings and similar assemblies.

E. All existing branch circuits and fire alarm wiring, etc. shall be reconnected to new or existing systems as required to maintain the same functions as existed prior to new work.

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include but not be limited to, the following:

1. Division 1

2. All other Division 26 sections

1.3 QUALITY ASSURANCE:

A. All firestopping work shall be performed by an installer specializing in firestopping work and certified by the material manufacturer.

B. All fill, void, and cavity firestopping materials shall be UL classified and FM approved as a through-penetration Firestop System for 1 hour, 2 hour, or 3 hour construction.

C. Sealants shall equal or exceed all requirements of ASTM E-814.

D. All applicable codes as stated elsewhere in these specifications for the type of work performed.

E. No penetrations through any fire rated walls, floors, roofs, floor-ceilings, or ceiling-roof assemblies will be allowed unless they are sealed with firestop systems which are included in assemblies tested in accordance with ASTM E119 and ASTM E814 and are Factory Mutual approved for the assembly.

F. All firestop systems shall have an F rating equal to or greater than the assembly in which the penetration occurs.

G. All firestop systems used to seal floor penetrations which are outside of a shaft enclosure shall have a T rating equal to or greater than one-half of the fire rating of the floor being penetrated.

1.4 SUBMITTALS:

A. Submit catalog cuts, descriptive literature and manufacturers fire stop penetration details for approval in accordance with Section 26 0500, ELECTRICAL GENERAL REQUIREMENTS.

1. Fire stop penetration details must be specific for all required applications. Details submitted that do not apply to the required applications will be rejected.

B. Submit manufacturer's details of all fire stop systems to be used to demonstrate compliance with U.L fire stop system assembly specifications.

C. The specific item proposed and its area of application shall be marked on the catalog cuts.

PART 2 - PRODUCTS

2.1 FIRESTOPPING:

A. Firestopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM E119 time-temperature rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Firestopping material shall be noncombustible as defined by ASTM E136; and in addition for insulation materials, melt point shall be a minimum of 1700 degrees F or one (1) hour protection and 1850 degrees F for two (2) hour protection.

B. The following firestopping sealant manufacturers are acceptable:

1. Nelson

2. Thomas & Betts

3. 3M

4. Hilti

C. Materials shall be new, unused, (not more than one year old) properly stored and matching existing in colors, texture, finish, appearance and function.

D. The firestopping compound shall be dry to the touch within 2 hours after installation but shall not set up immediately so as to allow easy working of the compound during installation.

E. Fire-stopping compounds shall have a minimum shelf life of 1 year and shall be delivered to the job site and used at least 3 months prior to the expiration of its shelf life.

2.2 WATERPROOFING:

A. Sealant materials shall be as follows:

1. Penetrations in Fire Rated assemblies shall meet the requirements of 2.1 FIRESTOPPING specified hereinbefore.

2. Exterior joint sealant shall be Polyurethane base, multi-component; self-leveling type for application in vertical joints; capable of withstanding

3. Movement of up to 50% of joint width and satisfactorily handled throughout temperature of 4 to 27 degrees C.; uniform, homogeneous, and free from lumps, skins and coarse particles when mixed; Shore "A" hardness of minimum 15 and maximum 50; non-staining; non-bleeding; colors selected by Architect/Engineer.

B. The following waterproofing sealant manufacturers are acceptable:

1. TREMCO

2. Sonneborn - Contech

3. W. R. Meadows

4. Hilti

PART 3 - EXECUTION

3.1 GENERAL:

A. Patch and repair all building finishes, structural components, or other appurtenances that are damaged as a result of the performance of this contract. Patch and repair work shall include finishes, components, substructure and materials required for the installation of such work in accordance with standard practices.

B. Replace all building components, outside components, shrubbery, or other appurtenances which are damaged beyond repair. Replacement item(s) shall be of equal or higher quality than the original item(s).

C. All penetrations thru exterior floors, walls, and roof systems shall be sealed watertight.

D. All roof penetrations shall be patched in accordance with roofing manufacturers' recommendations.

E. Patched and repaired work shall be finished to match existing or adjacent construction and conditions.

3.2 INSTALLATION OF SEALANT MATERIALS:

A. Install materials in accordance with manufacturer's recommendations for installation of these materials.

B. Clean and prepare joints for sealant application in accordance with manufacturer's recommendations. Ensure that joint forming materials are compatible with sealant. Use joint filler to achieve required joint depths. Apply primers as recommended by sealant manufacturer.

C. Openings larger than required for proper installation of electrical raceways or conduits shall be patched or repaired.

3.3 INSTALLATION OF FIRESTOPPING:

A. Firestop material shall be packed tight and completely fill annular clearances around all Division 26 & Division 28 equipment, wires, cables, sleeves, raceways and other penetrations at fire rated walls, roofs, floors, floor-ceilings, roof-ceilings, and similar assemblies.

B. During construction, field verify locations and ratings of all fire barriers with the Owner (obtain current life safety drawings indicating the fire resistive ratings of all walls, roofs, floors, floor-ceilings, ceiling-roofs, and similar assemblies). Concrete floors shall be considered as 2-hour fire rated. Field verification of ratings shall dictate the actual firestop systems applied.

C. Firestop all existing openings in walls, roofs, slabs and similar assemblies remaining as a result of removing existing wires, cables, sleeves, raceways, equipment and appurtenances.

D. Firestop all new penetrations through fire rated walls, roofs, floors, floor-ceilings, roof-ceilings and similar assemblies for wires, cables, sleeves, raceways, conduits, equipment and appurtenances.

E. Firestopping materials shall be delivered to the job site ready to install and require no critical mixing procedures or precise installation time constraints.

F. Materials shall be delivered to each site in sealed containers, fully identified with manufacturer's name, brand, type, grade and U.L. and FM labels. Store materials in a dry space under cover and off the ground.

G. Firestopping, patching, and sealant material, once installed, shall not shrink after curing so as to allow voids or through openings to form.

H. Firestopping, patching, sealant material shall be sufficiently flexible and pliable after curing so as to allow for normal expansion and contraction of the building assemblies and the penetrating objects without cracking, becoming displaced or allowing voids or through openings to occur.

I. The thickness of all finished firestopping material shall meet the minimum specified for the hourly fire resistance rating of the wall, floor, floor-ceiling or ceiling-roof assembly being firestopped. Verify in field.

J. Seal openings with firestop sealant as recommended by manufacturer.

K. The thickness of the finished firestopping material shall meet the minimum specified for the hourly fire resistance rating of the assembly being firestopped.

L. Protect other surfaces and equipment from being damaged by the application or overspray of firestopping compound. Remove excess and spillage promptly.

M. Clean up of the firestopping compound shall be performed without the use of flammable or corrosive solvents.

3.4 LABELING OF FIRESTOPPING:

A. Provide stick-on labels at each fire-stopped penetration from the manufacturer (required only on one side of fire barrier).

B. Labels shall provide the following minimum information:

1. Manufacturer.

2. Firestopping material used (model number).

3. U.L. detail number.

4. Installer.

5. Date of installation.

END OF SECTION 26 0503

SECTION 26 0519 - WIRE AND CABLE - BUILDING WIRE (600 VOLTS AND BELOW)

PART 1 - GENERAL

1.1 SCOPE:

A. This section includes the furnishing, installation, and connection of the building wire for power and lighting circuits.

B. Unless otherwise specified in other sections of these specifications, control wiring shall be provided, installed, and connected to perform the functions specified in other sections of these specifications.

C. Unless otherwise specified in other sections of these specifications, communication and signal wiring shall be provided, installed, and connected to perform the function specified in other sections of these specifications.

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:

1. Division 1

2. All other Division 26000 sections

1.3 WORK INCLUDED:

A. The work under this section consists of furnishing materials and equipment, performing labor and services necessary for the installation of the electrical cable and wiring system shown on the drawings and hereinafter specified.

1.4 APPLICABLE PUBLICATIONS:

A. The following specifications and standards, except as hereinafter modified, are incorporated herein by reference and form a part of this specification to the extent indicated by the references thereto. Except where a specific date is given, the issue in effect (including amendments, addenda, revisions, supplements, and errata) on the date of Invitation for Bids shall be applicable. In text such specifications and standards are referred to by basic designation only.

1. National Fire Protection Association (NFPA) Publications

   No. 70 . . . . . .National Electrical Code (NEC)

2. Underwriters' Laboratories, Inc. (UL) Publications:

   No. 44 . . . . . .Rubber-Insulated Wire and Cables

No. 83 . . . . . .Thermoplastic-Insulated Wires

No 493 . . . . . .Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables

No. 486. . . . . .Wire Connectors and Soldering Lugs

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Building Wire (Power and Lighting):

1. Cable and wire shall be in accordance with UL, NEC, as shown on the drawings, and as hereinafter specified.

2. Conductors:

a. Shall be annealed copper.

b. Shall be stranded for sizes No. 8 and larger. Sizes No. 10, and smaller shall be solid.

c. Size shall be not less than shown on the drawings. Minimum size shall be No. 12 AWG.

3. Insulation: Unless otherwise shown on the drawings, insulation shall be as follows:

a. THWN - Dry Locations.

b. THHN - Dry, Damp Locations.

c. XHHW - Dry, Damp, Wet Locations.

4. Color Code:

a. All secondary service, feeder, and branch circuit conductors shall be color coded as follows:

208/120 Volt	Phase	480/277 Volt
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray

b. All No. 12 and No. 10 branch circuit conductors shall have solid color compound or solid color coating.

c. No. 8 AWG and larger phase conductors shall have either:

1) Solid color compound or solid color coating.

2) Stripes, bands, or hash marks of colors specified above.

3) Colored pressure-sensitive plastic tape. Tape shall be applied in half overlapping turns for a minimum of three inches for all terminal points, and in all junction boxes, pull boxes, troughs, manholes, and handholes. Tape shall be 3/4-inch wide with colors as specified above. The last two laps of tape shall be applied with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable stating size and insulation type.

d. The neutral conductor shall have a colored strip matching the phase conductor color it is paired with where dedicated neutral conductors for single phase circuits are shown.

e. For modifications and additions to existing wiring systems, color coding shall conform to the existing wiring system.

B. Splices and Joints:

1. Shall be in accordance with UL and NEC.

2. Branch circuits (No. 10 AWG and smaller):

a. Connectors shall be solderless, screw-on, pressure cable type, 600 volt, 105 degree C, with integral insulation. They shall be approved for copper conductors, and shall be reusable.

b. The integral insulator shall have a skirt to completely cover the stripped wires.

c. The number, size, and combination of conductors as listed on the manufacturers packaging shall be strictly complied with.

3. Feeder Circuits:

a. Connectors shall be indent, hex screw, or bolt clamp-type. Material shall be high conductivity and corrosion-resistant.

b. Connectors for cable sizes 250 MCM and larger shall have not less than two compression indents.

c. Splices and joints shall be insulated with materials approved for the particular use, location, voltage, and temperature. Insulation shall be not less than that of the conductors being joined.

d. Plastic electrical insulating tape:

1) Tape shall be flame retardant, cold and weather resistant.

C. Fire Alarm Wiring: See Specification Section 28 3111

D. Wire Lubricating Compound shall be suitable for the wire insulation and conduit it is used with, and shall not harden or become adhesive.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Installation shall be in accordance with the NEC, as shown on the drawings, and as hereinafter specified.

B. All wiring shall be installed in raceway systems, except where direct burial is shown on the drawings.

C. Cables and wires shall be spliced only in outlet boxes, junction boxes, pull boxes, manholes, or handholes.

D. Cable supports shall be installed for all vertical feeders in accordance with the NEC. They shall be of the split wedge type which firmly clamps each individual cable and tightens due to cable weight.

E. For panelboards, cabinets, wireways, switches, and equipment assemblies, neatly form, train, and tie the cables in individual circuits.

F. Cable and wire entering a building from underground shall be sealed between the wire and conduit, where the cable exits the conduit, with a nonhardening approved compound.

G. Wire Pulling:

1. Suitable installation equipment shall be provided to prevent cutting or abrasion of conduits during pulling of feeders.

2. Ropes used for pulling feeders shall be made of suitable nonmetallic material.

3. Pulling lines for feeders shall be attached by means of either woven basket grips or pulling eyes attached directly to the conductors.

4. All cables to be pulled in a single conduit shall be pulled in together.

3.2 FIELD TESTING:

A. Feeders and branch circuits shall have their insulation tested after installation and before connection to utilization devices such as fixtures, motors, or appliances.

B. Test shall be performed by megger and conductors shall test free from short-circuits, grounds, and opens.

C. Conductors shall be tested phase-to-phase and phase-to-ground.

D. Record test results and include report within the OWNER'S MANUAL.

END OF SECTION

SECTION 26 0526 - GROUNDING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. This section includes the furnishing, installation, and connection of conduit, fittings, and boxes to form complete, coordinated, grounding systems.

B. The term ground, as used in this specification, shall mean any or all of the grounding types specified.

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:

1. Division 1

2. All other Division 26 sections

1.3 QUALITY ASSURANCE:

A. NEC Compliance: Comply with NEC requirements as applicable to materials and installation of electrical grounding systems, associated equipment and wiring. Provide grounding products which are UL listed and labeled.

B. UL Compliance: Comply with applicable requirements of UL Standards Nos. 467 and 869 pertaining to electrical grounding and bonding.

C. IEEE Compliance: Comply with applicable requirements of IEEE Standard 142 and 241 pertaining to electrical grounding.

PART 2 - PRODUCTION

2.1 GENERAL:

A. Provide electrical grounding systems with assembly of materials, including cables/wires, connectors, terminals, solderless lugs, grounding rod/electrodes, bonding jumper braid and additional accessories needed for complete installation. Where materials or components are not indicated, provide products complying with NEC, UL, IEEE and established industry standards.

2.2 GROUNDING CONDUCTORS:

A. Shall be UL and NEC approved types, copper, with insulation color identified green, except where otherwise shown on the drawings, or specified.

B. Wire size shall not be less than #12 AWG and not less than required by the NEC.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL GROUNDING:

A. General: Install electrical grounding systems in accordance with applicable portions of NEC, with NECA's "Standard of Installation," and in accordance with recognized industry practices to ensure that products comply with requirements and serve intended functions.

B. Coordinate with other electrical work as necessary to interface installation of electrical grounding system with other work.

3.2 FEEDERS AND BRANCH CIRCUITS:

A. Install green insulated equipment grounding conductors with all feeders and branch circuits. Conductors shall be sized in accordance with NEC Article 250.

3.3 EQUIPMENT GROUNDS:

A. All equipment that has electrical connections (lights, receptacles, panels, and utilization equipment) shall have a ground wire connected that is directly tied to the ground bus of the panel which serves it.

B. Fixed electrical appliances and equipment shall have a ground lug installed and provided by this contractor for termination of the green ground conductor.

END OF SECTION 26 0526

SECTION 26 0533 - METALLIC CONDUITS/RACEWAYS AND FITTINGS

PART 1 - GENERAL

1.1 SCOPE:

A. This section includes the furnishing, installation, and connection of conduit, fittings, and boxes to form complete, coordinated, grounded raceway systems.

B. Types of raceways in this section include the following:

1. Galvanized rigid metal conduit (GRC).
2. Intermediate metal conduit (IMC).
3. Electrical metallic tubing (EMT).
4. Flexible metal conduit.
5. Liquidtight flexible metal conduit.

C. The term conduit, as used in this specification, shall mean any or all of the raceway types specified.

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:

1. Division 1.
2. All other Division 26000 sections.

1.3 QUALITY ASSURANCE:

A. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.

B. UL Compliance and Labeling: Comply with provisions of UL safety standards pertaining to raceways systems; and, provide products and components which have been UL listed and labeled.

C. NEC Compliance: Comply with requirements as applicable to construction and installation of raceway systems.

PART 2 - PRODUCTS

2.1 RIGID STEEL CONDUIT (GRC):

A. Metal rigid steel conduit shall conform to ANSI C80.1 and Underwriter's Laboratories UL-6 specification, ANSI C80.1.

B. Conduit shall be hot-dipped galvanized to provide a corrosion resistant coating.

C. Fittings: Fittings shall be ANSI/NEMA FB 1 threaded type, hot dipped or electronic plated. Threaded conduit to be secured to boxes, cabinets, etc., by means of galvanized threaded bushings on the inside and bond-type locknuts on the inside and outside of such boxes and cabinets. Fittings shall be watertight and the same material as conduit installed with factory manufactured elbows.

2.2 RIGID INTERMEDIATE STEEL CONDUIT (IMC):

A. Intermediate Metallic Conduit shall conform to ANSI C80.1 and proposed Underwriter's Laboratories UL 1242 specification.

B. Conduit shall be hot-dipped galvanized to provide a corrosion resistant coating. Intermediate Metallic Conduit (IMC) shall have galvanized/metallized thread protection, and pipe interior shall be protected by corrosion inhibiting coating.

C. Fittings: Shall be similar to GRC.

D. Maximum allowable size shall be (4) inches.

2.3 ELECTRICAL METALLIC TUBING (EMT):

A. Electrical metallic tubing shall conform to ANSI C80.3 and Underwriter's Laboratories UL 797.

B. EMT shall be hot-dipped galvanized steel with internal coating of silicone epoxy lubricant to assist in wire pulling.

C. Fittings: Shall be compression type, steel or malleable iron. Set screw or indentation type of fittings are not acceptable.

2.4 FLEXIBLE METAL CONDUIT:

A. Flexible metal conduit shall conform to UL 1.

B. Flexible conduit to be of hot-dipped galvanized interlocked spirally wound steel strip.

C. Fittings shall be multiple point type, threading into the internal wall of the conduit convolutions, and shall have insulated throat. Connectors to be galvanized and be suitable for connection to associated boxes and conduits.

2.5 LIQUID TIGHT FLEXIBLE METAL CONDUIT:

A. Liquid-tight flexible metal conduit shall conform to UL 360.

B. Liquid-tight flexible metal conduit shall consist of flexible galvanized steel tubing over which is extruded a liquid-tight jacket of polyvinyl chloride (PVC). Conduit shall be provided with a continuous copper bonding conductor wound spirally between the convolutions.

C. Fittings used shall be reusable type of malleable iron/steel construction, electro zinc plated inside and outside, furnished with nylon insulated throat and taper threaded hub. Connectors to be galvanized and be suitable for connection to associated boxes and conduits.

2.6 EXPANSION AND DEFLECTION COUPLINGS:

A. UL 467 and UL 514 shall apply.

B. Shall accommodate, 1.9 cm (0.75 inch) deflection, expansion, or contraction in any direction, and shall allow 30 degree angular deflections.

C. Shall include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC code tables for ground conductors.

D. Shall be watertight, seismically qualified, corrosion-resistant, threaded for and compatible with rigid or intermediate metal conduit.

E. Jacket shall be flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber material with stainless steel jacket clamps.

2.7 CONDUIT SUPPORTS:

A. All parts and hardware shall be zinc-coated or have equivalent corrosion protection.

B. Pipe straps: Fed. Spec. FF-S-760, type 1, style A or B.

C. Individual conduit hangers: Shall be designed for the purpose, and have pre-assembled closure bolt and nut, and provisions for receiving hanger rod.

D. Multiple conduit (trapeze) hangers shall be not less than 1-1/2 x 1-1/2 inch, 12 gage steel, cold formed, lipped channels. Hanger rods shall be not less than 3/8 inch diameter steel.

E. Solid masonry and concrete anchors: Fed. Spec. FF-S-325 shall apply. Anchors shall be GROUP III self-drilling expansion shields, or machine bolt expansion anchors GROUP II type 2 or 4, or GROUP VII.

PART 3 - EXECUTION

3.1 CONDUIT INSTALLATION SCHEDULE:

A. Power distribution feeders such as feeders for switchboards, panelboard, transformers, etc.:

1. Above Grade - GRC or IMC

2. Underground - S40 (PVC) (with green insulated grounding conductor sized in accordance with NEC 250-102).

B. Motor feeders: Same requirements as power distribution feeders.

C. Branch circuits from panelboards (not described above):

1. Exposed to weather - GRC or IMC

2. Concealed dry interior location - EMT.

3. Exposed dry interior locations - GRC IMC within 8 ft. of finished floor, EMT above 8 ft.

4. Underground - S40 (PVC).

D. Fire alarm system conduits: Same requirements as branch circuits.

3.2 CONDUIT INSTALLATION - GENERAL:

A. Installation shall be in accordance with UL, NEC, as shown on the drawings, and as hereinafter specified.

B. Contractor shall lay out and install conduit runs to avoid proximity to hot pipes. In no case will a conduit be run within three inches of such pipes, except where crossings are unavoidable and then conduit shall be kept at least one inch from the covering on pipe crossed.

C. Conduits shall be supported as required to comply with applicable paragraphs of the NEC.

D. Conduit installation shall be as follows:

1. Installed as complete runs before pulling in cables or wires.

2. Flattened, dented, crushed or deformed conduit is not permitted and shall be removed and replaced at no cost to the Owner.

3. Installed so they will not obstruct head room, walkways, doorways or work by other trades.

4. Cut square with a hacksaw, reamed, burrs removed, and drawn up tight.

5. Mechanically and electrically continuous.

6. Supported within one foot of all changes of direction, and within one foot of each enclosure to which connected.

7. Ends of empty conduit to be closed with plugs or caps at rough-in stage to prevent entry of debris until wires are pulled in.

8. Conduits shall be secured to cabinets, junction boxes, pull boxes, and outlet boxes by bonding type locknuts.

9. Underground conduit runs shall be installed a minimum of 24” below finished grade (lower as required to avoid conflicts with encroaching underground utilities).

E. Conduit Bends:

1. Shall be made with standard conduit bending machines.

2. Conduit hickey may be used for slight offsets, and for straightening stubbed out conduits.

3. Conduits shall not be bent with a pipe tee or vice.

F. Conduit shall be securely fastened in place at intervals as specified by the code using suitable straps, hangers and other supporting assemblies. All strap hangers and supporting assemblies:

1. Shall be of rugged construction capable of supporting weight with a reasonable factor of safety.

2. Shall be adequately protected against corrosion.

G. In wet locations or in locations where corrosive conditions are present, vertical and horizontal runs of conduit shall be firmly supported so that there is at least 1/4" air space between the conduit and the wall or supporting surface. Spacers and supporting straps shall be of malleable iron construction, hot dipped galvanized.

H. EMT shall be securely fastened in place at intervals as specified by the code using straps, hangers and other supporting assemblies.

1. Spacers and supporting straps shall be of rugged malleable iron or steel construction hot dipped galvanized.

I. Flexible conduit when installed shall have sufficient slack to avoid sharp flexing and straining due to vibration and thermal expansion/construction. Conduit shall be installed in such a manner that liquids will tend to run off the surface instead of draining towards the fittings.

J. Concealed work installation:

1. In concrete:

a. Conduit shall be run in direct lines.

b. Conduit shall not be installed through concrete beams, except where shown on the structural drawings or as approved by the Engineer prior to construction, and after submittal of drawing showing locations size, and position of each penetration.

c. Conduit shall not be installed in concrete which is less than three inches thick.

d. Conduit outside diameter larger than 1/3 of the concrete thickness is not permitted.

e. Spacing between conduits in slab shall be approximately six conduit diameters apart except one conduit diameter at conduit crossings.

f. Conduits shall be installed approximately at the center of the slab.

g. Couplings and connections shall be water tight. Thread compounds shall be UL approved conductive type to ensure low resistance ground continuity through the conduits.

2. Conduit shall be run parallel or perpendicular to the building lines.

3. Branch circuit conduits shall not be supported by the suspended ceiling, lighting fixtures, or air conditioning ducts.

4. Conduit shall be run parallel or perpendicular to the building lines.

5. Horizontal runs shall be installed close to the ceiling or beams and secured with approved conduit straps.

6. Horizontal or vertical runs shall be supported at not over eight foot intervals.

3.3 UNDERGROUND INSTALLATION:

A. Tops of conduits shall be:

1. Not less than 24 inches and not less than shown on the drawings below finished grade.

2. Not less than 30 inches and not less than shown on the drawings below road and other paved surfaces.

3. Shall not be installed above power company direct burial primary feeder.

B. Work with extreme care near existing ducts, conduits, cables, and other utilities to avoid damaging them.

C. For excavation and back-filling, see Section 260501 ELECTRICAL COORDINATION.

D. Seal conduits, including spare conduits, at building entrances and at outdoor terminations for equipment with a suitable compound to prevent the entrance of moisture and gases.

3.4 MOTORS AND VIBRATING EQUIPMENT:

A. Flexible metal conduit shall be used for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission. Flexible metal conduit shall be liquid-tight when installed in exterior

locations, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, and locations subject to seepage or dripping of oil, grease or water. Flexible metal conduit shall be installed with green ground wire.

3.5 EXPANSION JOINTS:

A. Conduits 3 inches and larger, rigidly secured to building construction on opposite sides of a building expansion joint, shall be provided with expansion and deflection couplings. The couplings shall be installed in accordance with the manufacturer's recommendations.

B. Conduits smaller than 3 inches shall be provided with junction boxes on both sides of the expansion joint, and connected by 15 inches of slack flexible conduit. Flexible conduit shall have a copper green ground bonding jumper installed. In lieu of this flexible conduit, expansion and deflection couplings as specified above may be installed.

C. Expansion and deflection couplings shall also be installed where shown on the drawings.

3.6 CONDUIT SUPPORTS, INSTALLATION:

A. Safe working load shall not exceed 1/4 of proof test load of fastening devices.

B. Pipe straps or individual conduit hangers shall be used for supporting individual conduits.

C. Multiple conduit runs shall be supported by trapeze hangers. Trapeze hangers shall be designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 200 pounds. Each conduit shall be attached by U-bolt or other approved fastener.

D. Conduit shall be supported independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, etc.

E. Solid Masonry and Concrete: Fasteners shall be as follows:

1. New construction: Generally, steel or malleable iron concrete inserts in concrete prior to pouring.

2. Existing construction:

a. Steel expansion anchors not less than 1/4-inch bolt size and not less than 1-1/8 inch embedment.

b. Power set fasteners shall be approved, and not less than 1/4-inch diameter with depth of penetration not less than three inches.

c. Anchors or fasteners attached to concrete ceilings shall be vibration and shock resistant.

F. Hollow masonry. Toggle bolts are permitted. Bolts supported only by plaster are not acceptable.

G. Metal structures. Fasteners shall be machine screw or devices specifically designed and approved for the application.

H. Attachments by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking is not permitted.

I. Chain, wire, or perforated strap shall not be used to support or fasten conduit.

J. Vertical supports. Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown on the drawings. Supports for cable and wire shall have fittings which include internal wedges and retaining collars.

3.7 FIRE ALARM SYSTEM CONDUIT:

A. All wiring shall be installed in conduit.

B. Size all conduit as required per NEC and manufacturers' recommendations for number of wires or cables but minimum size shall be 3/4".

C. Install junction boxes and pull boxes as required for each system.

D. Conduit bends shall be long radius.

3.8 PULL WIRES:

A. Install a nylon pull string in Fire Alarm conduits.

3.9 PAINTING:

A. Exposed non-fire alarm conduit shall be primed and painted to match existing room finishes (obtain paint chips from the Owner).

B. Fire Alarm conduit and box covers shall be painted red.

END OF SECTION 26 0533

SECTION 26 0535 - ELECTRICAL BOXES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. This section includes the furnishing, installation and connection of all outlet boxes, junction boxes, and floor boxes as shown on the drawings or as required to house the intended wiring, devices or equipment.

B. Types of electrical boxes and fittings specified in this section include the following:

1. Outlet boxes
2. Junction boxes
3. Pull boxes
4. Floor boxes
5. Bushings
6. Locknuts
7. Knockout closures

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:

1. Division 1
2. All other Division 26000 sections

B. Other systems specified in Division 26000 may call for special boxes not covered in section 26 0535.

1.3 QUALITY ASSURANCE:

A. NEC Compliance: Comply with NEC as applicable to construction and installation of electrical wiring boxes and fittings.

B. UL Compliance: Comply with applicable requirements of UL 50, UL 514-Series, and UL 886 pertaining to electrical boxes and fittings. Provide electrical boxes and fittings which are UL listed and labeled.

C. NEMA Compliance: Comply with applicable requirements of NEMA Stds./Pub No.'s OS1, OS2, and Pub 250 pertaining to outlet and device boxes, covers, and box supports.

PART 2 - PRODUCTS

2.1 FABRICATED MATERIALS:

A. Outlet and Device Boxes (dry interior locations): Provide galvanized coated sheet-steel outlet wiring boxes, of shapes, cubic inch capacities, and sizes, including box depths as required by particular application, suitable for installation at respective locations. Construct outlet boxes with mounting holes, and with conduit size knockout openings in bottom and sides. Provide boxes with threaded screw holes, with corrosion-resistant cover and grounding screws for fastening surface and device type box covers, and for equipment type grounding.

B. Outlet and Device Box Accessories: Provide outlet box accessories as required for each installation, including box supports, mounting ears and brackets, wallboard hangers, box extension rings, fixture studs and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used to fulfill installation requirements for individual wiring situations.

1. Plaster rings and device mounting rings shall be of proper depth such that the device mounting surface is flush with the finished wall/ceiling surface.

C. Outlet and Device Boxes (damp and wet locations): Provide corrosion resistant cast metal raintight outlet and wiring device boxes of types, shapes and sizes required for each application, including depth of boxes, with threaded conduit holes for fastening electrical conduit, and cast metal face plates. Where weatherproof devices are indicted, provide spring hinged watertight caps suitable configured for each application, including face plate gaskets and corrosion resistant plugs and fasteners.

D. Junction and Pull Boxes: Provide galvanized code-gage sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes, to suite each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

E. Floor Boxes: Provide cast iron raintight adjustable floor boxes as indicated, with threaded conduit-entrance ends, and vertical adjusting rings, gaskets, brass floor plates with flush screw-on covers with ground flange and stainless steel cover screws.

F. Bushings, Knockout Closures, and Locknuts: Provide corrosion resistant box knockout closures, conduit locknuts and malleable iron conduit bushings, offset connectors, of types and sizes, to suit respective installation requirements and applications.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS:

A. General: Install electrical boxes and fittings as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation," and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate installation of electrical boxes and fittings with wire/cable, wiring devices, and raceway installation work.

C. Provide weathertight outlets for interior and exterior locations exposed to weather or moisture.

D. Provide knockout closures to cap unused knockout holes where blanks have been removed.

E. Avoid installing boxes back-to-back in walls.

F. Position recessed outlet boxes accurately to allow for surface finish thickness. Boxes shall be installed such that the device mounting surface is flush with the wall/ceiling finished surface.

G. Set floor boxes level and flush with finish flooring material. Provide trim flange to match finish floor material.

H. Fasten electrical boxes firmly and rigidly to substrates, or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry.

3.2 GROUNDING:

A. Upon completion of installation work, properly ground electrical boxes and demonstrate compliance with requirements.

END OF SECTION 26 0535

SECTION 26 2816 - SAFETY/DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. This section includes the furnishing, installation, connection, and wiring of safety switches.

1.2 RELATED WORK/SECTIONS:

A. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included. This shall include, but not be limited to, the following:

1. Division 1

2. All other Division 26000 sections

B. See section on Substitutions.

1.3 QUALITY ASSURANCE:

A. Safety/Disconnect switches shall conform to Underwriter's Laboratories UL 98, "Enclosed and Dead-Front Switches."

1.4 SUBMITTALS:

A. Submit catalog cuts and descriptive literature for approval in accordance with Section 260500, ELECTRICAL GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

2.1 GENERAL SAFETY/DISCONNECT SWITCH FEATURES:

A. Furnish and install safety/disconnect switches as indicated on the plans and specifications.

B. Switches shall be NEMA type HD (Heavy Duty) and UL listed.

C. All switches shall have switch blades which are fully visible in the "OFF" position when the switch door is open. All current carrying parts shall be plated to resist corrosion and promote cool operation. Switches shall have removable arc suppressors where necessary to permit easy access to line side lugs. Lugs shall be front removable and UL listed for 60 degrees C and 75 degrees C, aluminum or copper wires.

D. Switches shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started. The operating handle shall be an integral part of the box, not the cover. Provisions for

padlocking the switch in the "OFF" position with at least three locks shall be provided. Switches shall have a dual cover interlock to prevent unauthorized opening of the switch door when the handle is in the "ON" position, and to prevent closing of the switch mechanism with the door open. The handle position shall indicate whether the switch is "ON" or "OFF".

E. Switches shall be horsepower rated for AC and/or DC as indicated by the plans. All fusible switches rated 100 thru 600 amperes at 240 volts and 30 thru 600 amperes at 600 volts shall have a UL approved method of field conversion from standard Class H fuse spacing to Class J fuse spacing. The switch also must accept Class R fuses and have provisions for field installation of a UL listed rejection feature to reject all fuses except Class R. The UL listed short circuit rating of the switches shall be 200,000 rms symmetrical amperes when Class R or Class J fuses are used with the appropriate rejection scheme. The UL listed short circuit rating of the switch, when equipped with Class H fuses, shall be 10,000 rms symmetrical amperes. 800 and 1200 ampere switches shall have provisions for Class L fuses and shall have a UL listed short circuit rating of 200,000 rms symmetrical amperes.

F. Disconnect switches shall be equipped with ground lug.

2.2 NEMA 1 AND 3R HEAVY DUTY SAFETY/DISCONNECT SWITCHES:

A. Switches shall be furnished in NEMA 1 general purpose enclosures unless exposed to weather which shall be NEMA 3R. Covers on NEMA 1 enclosures shall be attached with pin type hinges. NEMA 3R covers shall be securable in the open position. NEMA 3R enclosures for switches thru 200 amperes shall have provisions for interchangeable bolt-on hubs. Hubs shall be as indicated on the plans. NEMA 3R enclosures shall be manufactured from galvanized steel. Enclosures shall have a gray baked enamel finish, electrodeposited on cleaned, phosphatized steel.

B. Switches shall comply with paragraph 2.01 of this section.

2.3 NEMA 4X HEAVY DUTY SAFETY/DISCONNECT SWITCHES:

A. Provide NEMA 4X disconnect switches where indicated on the drawings.

2.4 SPECIFIED MANUFACTURERS:

A. Specified manufacturers shall be as follows, or approved equal:

1. General Electric

2. Square D

3. Eaton

PART 3 - EXECUTION

3.1 INSTALLATION LOCATION:

A. As a general rule, install switches on the equipment it serves, if shown that way on the drawings.

B. Do not install switch on equipment removable panel.

C. All switches shall be accessible.

3.2 GROUNDING:

A. Connect ground wires to ground lug.

B. See section “GROUNDING”.

3.3 CONDUIT BUSHINGS:

A. Use plastic bushings where conduit enters switch.

END OF SECTION 26 2816