



The State University
of New York

Project Manual

For construction contracts greater than \$20,000

Music Building Humidification

SU-050116

May 01, 2016



Purchase College
State University of New
York

735 Anderson Hill Road, Purchase, NY, 10577

(Attn: Sayim Malik)

Project Number: SU-050116
 Project Name: Music Building Humidification
 Agency/Div Code: 28260

Date: 05-19-16

Contract No.: _____

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4. [Form 7554-10](#) - Bid Bond and Acknowledgement (*required with bid*)
5. Affirmative Action and Minority & Women Owned Business Enterprises from *SUNY Procedure Item #7557 “Participation by Minority Group Members and Women (MWBEs) with Respect to State University of New York Contract (applies >\$25,000)*
 - a. [Form 121](#) – Prospective Bidders Notice
 - b. [Form 107](#) - M/WBE Utilization Plan
 - c. The Contractor’s EEO Policy Statement

Note: In accordance Procedure Item #7557 MWBE Utilization Plans and EEO Policy statements are due within seven days of submittal of the bid.

Attachments –Additional Contractor Documentation (required after bid opening from the low bidder)

6. State Finance Law §§139-j and 139-k from *SUNY Procedure Item #7552 “Procurement Lobbying Procedure for State University of New York” (applies >\$15,000)*
 - a. [Form A](#) - Summary: Policy and Procedure of the State University of New York Relating to State Finance Law §§139-j and 139-k
 - b. [Form B](#) - Affirmation with respect to State Finance Law §§139-j and 139-k
 - c. [Form C](#) - Disclosure and Certification with respect to State Finance Law §§139-j and 139-k
7. Procurement Forms from *SUNY Procedure Item #7553 “Purchasing and Contracting (Procurement)*
 - [Form I](#) Omnibus Procurement Act of 1992 (*applies >\$1,000,000*)
 - [Form II](#) Omnibus Procurement Act of 1992, Out of state firms (*applies >\$1,000,000*)
 - [Form XIII](#) Public Officers Law Compliance
8. Certificate of Insurance from *SUNY Procedure Item #7555 “Construction-Related Consultant Contracting Procedures*
 - a. [Form 7554-12 Certificate of Insurance](#) (*applies all contracts*)
 - b. NYS Workers Compensation and Disability Insurance (*applies all contracts*)

9. Vendor Responsibility
 - a. OSC's [Vendrep - Online System](#) or [Link to paper forms](#) (*form applies \geq \$100,000*)

10. NYS Labor Law, Section 220-a
 - a. [Form AC 2947, Prime Contractor's Certification](#)
 - b. [Form AC 2948, Subcontractor's Certification](#)
 - c. [Form AC 2958, Sub-subcontractor's Certification](#)

Notice to Bidders

The State University of New York at Purchase College will receive sealed bids for project number **SU-050116** titled until **“Music Building Humidification”** 1:00 p.m. local time **on June 21st 2016** at Purchasing & Accounts Payable Office, Administration Building, Purchase College, State University of New York, 735 Anderson Hill Road, Purchase, New York 10577-1402, where such proposals will be publicly opened and read aloud.

All work on this Contract is to be completed within **365** calendar days, starting ten (10) calendar days after the contract approval.

Bidding and Contract Documents may be examined free of charge at the campus and at the following locations.

Office of Capital Facilities and Planning, Bldg. Number: 12

Purchase College is dedicated to environmentally sustainable development. In an effort to conserve resources and reduce waste, the Bidding and Contract Documents will only be available electronically in PDF format for viewing and downloading at the following website: <http://www.purchase.edu/purchasemeansbusiness>

A Pre-Bid Conference and site walk-through for prospective Bidders will be held at Building 12 Capital Facilities and Planning Conference Room, Purchase College, State University of New York, 735 Anderson Hill Road, Purchase, New York 10577-1402 at **10:00AM on June 3rd, 2016**. Please note: This will be the only guided walk-through of the subject project facilities.

There will be an Open Question and Answer Period from May 24th, 2016 through June 15th, 2016. During this time any questions must be submitted in writing (no telephone calls) to the following email address, sayim.malik@purchase.edu. The email should reference the project in the subject line and include the prospective bidder's contact information and email address. A response to all questions submitted within the Open Question and Answer Period and any required Addendum will be posted no later than June 17th at the following website: <http://www.purchase.edu/purchasemeansbusiness>

Bids must be submitted in duplicate in accordance with the instructions contained in the Information for Bidders. Security will be required for each bid in an amount not less than five (5) percent of the Total Bid.

It is the policy of the State of New York and the State University of New York to encourage minority and women-owned business enterprise participation in its projects by contractors, subcontractors and suppliers, and all bidders are expected to cooperate in implementing this policy. The minority (MBE) and women (WBE) owned business contractor/subcontractor

participation goals for this construction procurement are 15% for MBEs and 15% for WBEs.

The rates of wages and supplements determined by the Industrial Commissioner of the State of New York as prevailing in the locality of the site at which the work will be performed can be found

at <https://applications.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1284441>
The Prevailing Rate Case (PRC) Number assigned to this project is : 2016004920

The State University of New York reserves the right to reject any or all bids.

Designated Contacts:

For Technical Questions, contact:

Sayim Malik

Project Manager, Capital Facilities Planning

Purchase College

State University of New York

735 Anderson Hill Road

Purchase, NY 10577-1402

Tel: (914) 251-4479

Fax: (914) 251-6063

Email: sayim.malik@purchase.edu

For Administrative Questions, contact:

James A. Mwaura

Associate Director of Purchasing & Accounts Payable

Purchase College

State University of New York

735 Anderson Hill Road

Purchase, NY 10577-1402

Tel: (914) 251-6089

Fax: (914) 251-6075

Email: james.mwaura@purchase.edu

Sealed Bids are be Sent to:

Nikolaus D. Lentner

Director of Purchasing & Accounts Payable

Purchase College

State University of New York

735 Anderson Hill Road

Purchase, NY 10577-1402

Tel: (914) 251-6070

Fax: (914) 251-6075

Email: L@purchase.edu

INFORMATION FOR BIDDERS

Section 1 Definitions

All definitions set forth in the Agreement are applicable to the Notice to Bidders, Information for Bidders and the Proposal, all of which documents are hereinafter referred to as the Bidding Documents.

Section 2 Issuance of Bidding and Contract Documents

Purchase College is dedicated to environmentally sustainable development. In an effort to conserve resources and reduce waste, the Bidding and Contract Documents will only be available electronically in PDF format for viewing and downloading at the following website: <http://www.purchase.edu/purchasemeansbusiness>.

Section 3 Proposals

- (1) Proposals must be submitted in duplicate on the forms provided by the University. They shall be addressed to the University in a sealed envelope, marked with the name and address of the bidder, the title of the Project and the Project number. The University accepts no responsibility for Proposals that may be delivered by any courier or other messenger service that does not contain all of the above-noted information on the outside of a sealed envelope. Facsimile or email copies of the Proposal will not be accepted.
- (2) All blank spaces in the Proposal must be filled in and, except as otherwise expressly provided in the Bidding Documents; no change is to be made in the phraseology of the Proposal or in the items mentioned therein.
- (3) Proposals that are illegible or that contains omissions, alterations, additions or items not called for in the Bidding Documents may be rejected as informal. In the event any bidder modifies, limits or restricts all or any part of its Proposal in a manner other than that expressly provided for in the Bidding Documents, its Proposal may be rejected as informal.
- (4) Any Proposal may be considered informal which does not contain prices in words and figures in all of the spaces provided or which is not accompanied by a bid security in proper form. In case any price shown in words and its equivalent shown in figures do not agree, the written words shall be binding upon the bidder. In case of a discrepancy in the prices contained in the Proposal forms submitted in duplicate by the bidder, the Proposal form which contains the lower bid shall be deemed the bid of the bidder; provided, however, the University at its election may consider the Proposal of such bidder informal.
- (5) If the Proposal is made by a corporation, the names and places of residence of the president, secretary and treasurer shall be given. If by a partnership, the names and places of residence of the partners shall be given. If by a joint venture, the names and addresses of the members of the joint venture shall be given. If by an individual, the name and place of residence shall be given.
- (6) No Proposal will be considered which has not been deposited with the University at the location designated in and prior to the time of opening of bids designated in the Bidding and Contract Documents or prior to the time of opening as extended by Addendum.
- (7) Bids may be modified, withdrawn or canceled only in writing or by email notice received by the University prior to the time of opening of bids designated in the Bidding and Contract Documents. A written or email notice of modification, withdrawal or cancellation shall be marked by the bidder

with the name and address of the bidder, the title of the Project and the Project number, and, upon receipt by the University, shall be sealed in an envelope by a duly authorized employee of the University, who shall sign and note thereon the date and time of receipt and shall thereupon attach said written or email notice of modification, withdrawal or cancellation to the envelope submitted by the bidder pursuant to subdivision (1) of this section.

- (8) Permission will not be given to modify, explain, withdraw or cancel any Proposal or part thereof after the time designated in the Bidding and Contract Documents for the opening of bids, unless such modification, explanation, withdrawal or cancellation is permitted by law and the University is of the opinion that it is in the public interest to permit the same.

Section 4 Examination of Bidding and Contract Documents

- (1) Prospective bidders shall examine the Bidding and Contract Documents carefully and, before bidding, shall make written request to the Consultant (with a copy thereof to the University) for an interpretation or correction of any ambiguity, inconsistency or error therein which should be discovered by a reasonably prudent bidder. Such interpretation or correction as well as any additional Contract provision the University shall decide to include will be issued in writing by the Consultant as an Addendum, which will be sent by certified or registered mail or email or delivered to each person recorded as having received a copy of the Bidding and Contract Documents from the Consultant, and which also will be available at the places where the Bidding and Contract Documents are available for inspection by prospective bidders. Upon such emailing or delivery and making available for inspection, such Addendum will become a part of the Bidding and Contract Documents and will be binding on all bidders whether or not the bidder receives or acknowledges the actual notice of it. Prospective bidders are responsible for ensuring that all addenda have been incorporated into the bid. The requirements contained in all Bidding and Contract Documents shall apply to all Addenda.
- (2) Only the written interpretation or correction so given by Addendum shall be binding. Prospective bidders are warned that no trustee, officer, agent or employee of the University or the Consultant is authorized to explain or interpret the Bidding and Contract Documents by any other method, and any such explanation or interpretation, if given, must not be relied upon.

Section 5 Computation of Bid

- (1) In computing their bids, bidders are not to include the sales and compensating use taxes of the State of New York or of any city and county in the State of New York for any supplies or materials which are incorporated into the completed Project as the University is exempt from such taxes.
- (2) Unit prices may be inserted in the Proposal by the University or the bidder at the discretion of the University. Any unit prices listed in the Proposal by the University are based upon the Consultant's appraisal of a fair cost for the work involved. Such listed prices will be binding upon both the bidder and the University unless the bidder wishes to change any of such unit prices by crossing out the listed unit price and inserting a revised unit price. Such revised unit price shall not be binding upon the University unless it accepts the same, in writing, before it issues a Notice of Award. In the event the Proposal contains blank spaces for unit prices or the bidder revises any stated unit price, the amount of such unit prices for additions shall not vary by more than 15 percent from the prices inserted by the bidder for deductions, and, if the variance of such prices exceeds 15 percent, the University may adjust the deduction price inserted by the bidder so that it is only 15 percent lower than the addition price inserted by the bidder. In addition, the University may adjust any unit price filled in by a bidder to an amount agreeable to both the bidder and the University or it may reject any unit prices.
- (3) Alternates, if any, listed in the Proposal and described in Section B of the Technical

Specifications shall be accepted in the order indicated and will be used in combination with the Base Bid to determine the low bidder. Unit prices will not be used to determine the low bidder.

- (4) If a tie bid should occur the University reserves the right to use one of the following methods to determine the successful bidder. For tie bids between two contractors the University representative shall flip a coin, both affected contractors must be present for the coin toss. For tie bids between three or more contractors the University representative shall pull names from a bowl, hat or other container. The affected contractors must be present for the drawing.

Section 6 Payment of Bid Security

- (1) Each Proposal must be accompanied by the required amount of the bid security in the form of a bank draft or certified check, payable at sight to the University and drawn on a bank authorized to do business in the United States, or by a Bid Bond, on the form provided, duly executed by the bidder as principal and having as surety thereon a surety company or companies, approved by the University, authorized to do business in the State of New York as a surety. Attorneys-in-fact who execute a Bid Bond on behalf of a surety must affix thereto a certified and effectively dated copy of their power of appointment.
- (2) The University will return, without interest, bid securities in accordance with the following procedure:
- a. To all bidders except the apparent three (3) lowest bidders within two (2) working days after the opening of bids.
 - b. To any bidder submitting a Bid Bond, meeting the requirements of paragraph (1) hereof, after the opening of bids, as a substitute for a bank draft or certified check within two (2) working days after the University's approval of such Bid Bond.
 - c. To the apparent three (3) lowest bidders, unless their bid security was previously returned, within two (2) working days after delivery to the University by the successful bidder of the executed Agreement and required Bonds, or within two (2) working days of the University's rejection of all bids or within two (2) working days after the expiration of forty-five (45) calendar days after the bid opening, whichever event shall occur first.
 - d. Bid Bonds, due to their nature, will not be returned.
- (3) The University reserves the right to deposit bid security drafts or checks pending final disposal of them.

Section 7 Qualifications of Bidders

- (1) All prospective bidders are hereby notified that, on request of the University, they must be able to prove to the satisfaction of the University that they have the skill and experience, as well as the necessary facilities, ample financial resources, organization and general reliability to do the work to be performed under the provisions of the Contract in a satisfactory manner and within the time specified.
- (2) Each bidder must be prepared to show to the satisfaction of the University that it has working capital available for the Project upon which it is bidding in an amount equal to 15 percent of the first \$100,000 of the amount of its Base Bid plus 10 percent of the next \$900,000 plus 5 percent of the remainder of its Base Bid. Working capital is defined as the excess of current assets over current liabilities. The University defines current assets as assets which can be reasonably expected to be converted into cash within a year, and current liabilities as debts which will have to be paid within a year.

- (3) A bidder must also be prepared to prove, to the satisfaction of the University, that it has successfully completed a contract of similar work in an amount of not less than 50 percent of the amount of its Base Bid.

Section 8 Submission of Post-Bid Information

- (1) Within forty-eight (48) hours after the opening of bids, each of the apparent three lowest bidders, unless otherwise directed by the University or otherwise provided in the Bidding and Contract Documents, shall submit to both the University and the Consultant:
- a. The names and addresses of the bidder's proposed subcontractor for the Asbestos Abatement work of any value, and proposed subcontractors for Electrical Work, the Heating, Ventilating and Air Conditioning Work and the Plumbing Work for each of said work categories valued at more than \$20,000.
 - i. Only one proposed subcontractor should be named for each of such trades. **Proposed subcontractors of the bidder may not be changed except with the specific written approval of the University.**
 - ii. The naming of the bidder itself for any of such work is not acceptable and may result in rejection of the bidder unless the bidder can demonstrate to the University that it has successfully completed a contract for the designated work in an amount not less than 50 percent of the value thereof.
 - iii. The bidder will be required to establish, to the satisfaction of the Consultant and the University, the reliability and responsibility of each of their said proposed subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to each of such proposed subcontractors' respective trades.
 - iv. The bidders must submit to the University, within seven (7) calendar days after the bid opening, Vendor Responsibility Questionnaire For-Profit Construction (CCA-2) with all of the applicable blank spaces filled in, for each of the aforesaid proposed subcontractors.
 - v. In the event that the University and the Consultant reject any of said proposed subcontractors, the bidder, within five (5) working days after receipt of notification of such rejection, shall again submit to the University and the Consultant the name of another proposed subcontractor in place of the one rejected and it will be required to establish to the satisfaction of the University and the Consultant the reliability and responsibility of said proposed subcontractor;
 - vi. The bidder will not be permitted to submit another proposed subcontractor if it designated itself for any of the aforesaid categories of work.
 - vii. Proposed subcontractors of the bidder, approved by the University and the Consultant, must be used on the work for which they were proposed and approved and they may not be changed except with the specific written approval of the University.
 - b. A breakdown of the amount of the bidder's Proposal. Such breakdown shall be prepared in accordance with industry standards. No bidder shall be barred from revising, in the Contract breakdown required under the provisions of Section 4.08 of the Agreement, the various amounts listed in the bid breakdown required under the provisions of this Section.

The amount set forth in said bid breakdown will not be considered as fixing the basis for additions to or deductions from the Contract consideration.

- c. A completed New York State Vendor Responsibility Questionnaire with all requested information furnished.
 - i. SUNY recommends that vendors file the required Vendor Responsibility Questionnaire online via the New York State VendRep System. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at http://www.osc.state.ny.us/vendrep/vendor_index.htm or go directly to the VendRep System online at <https://portal.osc.state.ny.us>.
 - ii. Vendors must provide their New York State Vendor Identification Number when enrolling. To request assignment of a Vendor ID or for VendRep System assistance, contact the Office of the State Comptroller's Help Desk at 866-370-4672 or 518-408-4672 or by email at ciohelpdesk@osc.state.ny.us.
 - iii. Vendors opting to complete and submit a paper questionnaire can obtain the appropriate questionnaire from the VendRep website www.osc.state.ny.us/vendrep or may contact SUNY or the Office of the State Comptroller's Help Desk for a copy of the paper form.
 - iv. Notwithstanding the foregoing, any bidder or any of the proposed subcontractors who, within the past year immediately preceding the bidding date, had submitted to the State or the University a Vendor Responsibility Questionnaire For-Profit Construction (CCA-2), need not complete a new Questionnaire; provided, however, that they execute an Affidavit of No Change, and deliver the same together with the Questionnaire previously submitted.
- (3) Within seven (7) calendar days after the bid opening date each of the apparent three lowest bidders must submit the Utilization Plan (Form 7557-107) and the Contractor's EEO Policy Statement to the University and the Consultant. This requirement applies only to Contracts in excess of \$100,000.

Contractor compliance with the Non-Discrimination Requirements indicated on Exhibit A of the Agreement and the University's Affirmative Action Policy as indicated on Exhibit A-1, of the Agreement is a precondition to entering into a valid and binding Contract with the University.

- (4) The above information and such other information as the University or the Consultant may request or obtain will be used by the University in determining the reliability and responsibility of the bidder. Each bidder must comply promptly with all requests by the University and the Consultant for information and must actively cooperate with the University and the Consultant in their efforts to determine the qualifications of the bidder. All information required to be furnished to the University under this Section shall be sent to the State University of New York campus where the work is to be performed.

Section 9 Award of Contract

- (1) The award of the Contract shall be made to the bidder submitting the lowest bid who, in the opinion of the University, is qualified to perform the work involved and is responsible and reliable. The University shall determine the lowest bid by adding to or deducting from the Base Bid of the bidders the additive or deductive alternates, if any, the University elects to accept after the opening of the Proposals. Alternates will be accepted in the order they are set forth in the Proposal. The unit prices set forth in the Proposal for additions to or deductions from the work shall not be considered in determining the lowest bid.

- (2) The right is reserved, if, in the University's judgment, the public interest will be promoted thereby, to reject any or all Proposals, to waive any informality in any Proposal received or to afford any bidder an opportunity to remedy any deficiency resulting from a minor informality or irregularity. Without limiting the generality of the foregoing:
 - a. A Proposal may be rejected if the bidder fails to furnish the required bid security or to submit the data required with or after its Proposal.
 - b. A Proposal may be rejected if the bidder cannot show to the satisfaction of the University: (i) that it has the necessary capital, skill and experience; or (ii) that it owns, controls or can procure the necessary plant and equipment to commence the work at the time prescribed in the Contract and thereafter to prosecute and complete the work at the rate, or within the time specified; or (iii) that it is not already obligated by the performance of so much other work as is likely to delay the commencement, prosecution or completion of the work contemplated by the Contract.
 - c. A Proposal will be rejected if it does not provide for the completion of the work by the date of completion specified in the Proposal.
- (3) The University also expressly reserves the right to reject any Proposal if, in its opinion, considering the work to be performed, the facts, as to the bidder's business or technical organization, plant, financial and other sources of business experience compared with the work bid upon, justify rejection.
- (4) The award of the Contract shall not be construed as a guarantee by the University that the plant, equipment and the general scheme of operations and other data submitted by the bidder with or after its Proposal is either adequate or suitable for the satisfactory performance of the work.

Section 10 Required Bonds

- (4) Within ten (10) calendar days after the receipt of Notice of Award, the Contractor shall procure, execute and deliver to the Consultant and maintain, at its own cost and expense, a Performance Bond and a Labor and Material Bond, both of which Bonds shall be on the form prescribed by the University and in an amount not less than 100 percent of the total amount of the Contract awarded to the Contractor by the University. Said Bonds must be issued by a surety company approved by the University and authorized to do business in the State of New York as a surety.
- (2) Attorneys-in-fact who execute said Bonds on behalf of a surety must affix thereto a certified and effectively dated copy of their power of appointment.

Section 11 New York State Minority and Woman Owned Business Enterprises

- (1) Pursuant to New York State Executive Law Article 15-A, the University recognizes its obligation under the law to promote opportunities for maximum feasible participation of certified minority- and women-owned business enterprises and the employment of minority group members and women in the performance of University contracts.
- (2) For purposes of this solicitation, the University hereby establishes an overall goal of 30 % for MWBE participation, 15% for Minority-Owned Business Enterprises ("MBE") participation and 15% for Women-Owned Business Enterprises ("WBE") participation (based on the current availability of qualified MBEs and WBEs). For additional information please refer to the MWBE requirements outlined in the Prospective Bidders Notice (Form 7557-121) and Exhibit A-1.
- (3) A directory of Minority and Women's Business Enterprises is available from: Empire State

Development Corp., Division of Minority and Women's Business Development, 30 So. Pearl Street, Albany, New York 12245, Phone: (518) 292-5250, Fax: (518) 292-5803 or online at <http://www.empire.state.ny.us/MWBE.html>

Section 12 Encouraging Use of New York State Businesses

- (1) New York State businesses have a substantial presence in University contracts and strongly contribute to the economies of New York and the nation. In recognition of their economic activity and leadership in doing business in New York State, bidders for this contract for commodities, services or technology are strongly encouraged and expected to consider New York State businesses in the fulfillment of the requirements of the contract. Such partnering may be as subcontractors, suppliers, protégés or other supporting roles.
- a. Bidders need to be aware that to the maximum extent practical and consistent with legal requirements, they are strongly encouraged to use responsible and responsive New York State businesses in purchasing commodities that are of equal quality and functionality and in utilizing services and technology. Furthermore, bidders/proposers/contractors are reminded that they must continue to utilize small, minority and women-owned businesses, consistent with current State law.
 - b. Utilizing New York State businesses in University contracts will help create more private sector jobs, rebuild New York's infrastructure, and maximize economic activity to the mutual benefit of the contractor and its New York State business partners. New York State businesses will promote the contractor's optimal performance under this contract, thereby fully benefiting the public sector programs that are supported by associated procurements.
 - c. Public procurements can drive and improve the State's economic engine through promotion of the use of New York businesses by its contractors. The University therefore expects bidders/proposers to provide maximum assistance to New York businesses in their use of the contract. The potential participation by all kinds of New York businesses will deliver great value to New York State and its taxpayers.
 - d. Bidders can demonstrate their commitment to the use of New York State businesses by responding to the question below:

Will New York State Businesses be used in the performance of this contract? Y / N

If yes, identify New York State Business(es) that will be used; (Attach identifying information).

Section 12 Single Contract Responsibility

This is a single bid general construction project. The Contractor submitting the bid is responsible for all work associated with this Project.

Section 13 Examination of Site

A pre-bid conference and project walk-through will be held on June 3rd 2016 at 10:00 AM with all contractors assembled at Capital Facilities Conference Room building number 12. No individual or additional walk-throughs will be performed under the pre-bid time period. Failure to attend a walk-through shall not be the cause for extra payment.

Section 14 General Terms and Conditions

- (1) The following items will be incorporated into, and made part of, the formal agreement: (1) the University's Invitation for Bid; (2) the Successful Bidder's proposal; (3) Exhibit A, Standard Contract Clauses; (4) Exhibit A-1, Affirmative Action Clauses; and, (5) Exhibit B, Procurement Lobbying Form.
- (2) In the event of any inconsistency in or conflict among the document elements of the agreement described above, such inconsistency or conflict shall be resolved by giving precedence to the document elements in the following order: (1) Exhibits A and A-1; (2) Exhibit B, (3) the Agreement; (4) this RFQ; and (5) the Successful Bidder's proposal.

Section 14.1 Vendor Debriefing

- (1) Upon notification of the selection and award of a contract unsuccessful offerers may request in writing a debriefing of the results of their response to this solicitation. Requests for debriefing must be received within a reasonable timeframe, not more than 30 days after notice of award.
- (2) This procurement is subject to SUNY Procedure Item 7561, Contract Award Protest Procedure.

Section 14.2 Proposal Confidentiality

- (1) All proposals and qualifications submitted for the University's consideration will be held in confidence. However, the resulting contract is subject to the New York State Freedom of Information Law (FOIL). Therefore, if an Bidder believes that any information in its proposal constitutes a trade secret or should otherwise be treated as confidential and wishes such information not to be disclosed the Bidder shall submit with its proposal a separate letter to the designated contact. The letter shall specifically identify the page number(s), line(s) or other appropriate designation(s) containing such information, explaining in detail why such information is a trade secret and formally requesting that such information be kept confidential. Failure by an Bidder to submit such a letter will constitute a waiver by the Bidder of any rights it may have under Section 89(5) of the Public Officers' Law relating to protection of trade secrets.
- (2) The proprietary nature of the information designated confidential by the Bidder may be subject to disclosure if ordered by a court of competent jurisdiction. A request that an entire proposal be kept confidential is not advisable since a proposal cannot reasonably consist of all data subject to FOIL proprietary status.

Section 14.3 Information Security Breach and Notification Act

- (1) The Bidder shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa and State Technology Law, Section 208). The Bidder shall be liable for the costs associated with such breach if caused by its negligent or willful acts or omissions, or the negligent or willful acts or omissions of its agents, officers, employees or subcontractors.

Section 14.4 State Finance Law §§ 139-j and 139-k

- (1) State Finance Law §§139-j and 139-k imposes certain restrictions on communications between a Governmental Entity and a Bidder during the procurement process. During the restricted period the Bidder is restricted from making contacts to other than designated contact unless it is a

contact that is included among certain statutory exceptions set forth in State Finance Law §139-j(3)(a). The restricted period is from the earliest notice of intent to solicit offers through final award and approval of the Contract.

- (2) University employees and their designated representatives are also required to obtain certain information when contacted during the restricted period and make a determination of the responsibility of the Bidder pursuant to these two statutes. Certain findings of non-responsibility can result in rejection for contract award and in the event of two findings within a 4 year period the Bidder is debarred from obtaining government procurement contracts.

Section 14.5 Insurance Requirements

Prior to the commencement of work the Successful Bidder will provide, at its sole cost and expense, Certificates of Insurance in accordance with Section 5.06 and 5.07 of the Construction Agreement, which shall remain in force throughout the term of the agreement, or any extension thereof. Such Certificates of Insurances shall be from an insurance company licensed by the New York State Department of Insurance with a rating of at least "A-" as published with Standard & Poor's, and a liability insurance policy with limits no less than **\$2000, 000.00** per claim. If during the term of the policy, the carrier's rating falls below "A-", the liability insurance must be replaced no later than the renewal date of the policy with an insurer acceptable to the State of New York. Such policies shall name the STATE UNIVERSITY OF NEW YORK as an additional insured. The policy shall designate the State University of New York as the loss payee and shall contain a provision that the State University of New York shall receive at least thirty (30) day's notice prior to material change, cancellation or expiration of any such policy.

Workers Compensation Insurance & Disability Benefits Coverage

All employees of the Successful Bidder shall be adequately and properly covered by Workers' Compensation Insurance and Disability Benefits coverage for all work related to the resultant contract. Such policies shall name the STATE UNIVERSITY OF NEW YORK as an additional insured and are to be written by recognized and well-rated insurance companies authorized to transact business in the State of New York. The Successful Bidder shall deliver certificates of such coverage, or proof that such coverage is not required, in the required format, as required by the Workers' Compensation Board, to the following when the agreement is signed by the parties and thereafter not less than thirty (30) days prior to material change or cancellation of such coverage.

Section 15 Additional Terms and Conditions

- (1) The terms and conditions of the State University of New York Construction Agreement (Form 7554-09) shall apply, and is provided as an attachment to this IFB.
- (2) The resulting agreement shall be binding upon its execution by both parties and, if required by New York State law, upon the approval of the Attorney General and the Office of the State Comptroller.
- (3) The agreement may be revised at any time upon mutual consent of the parties in writing. Such written consent will not be effective until signed by both parties and, if required by New York State law, approved by the Attorney General and the Office of the State Comptroller.
- (4) The relationship of the Successful Bidder to the University shall be that of independent contractor.
- (5) Compliance with the post-employment restrictions of the Ethics in Government Act is required.

- (6) The submission of a proposal constitutes a binding offer to perform and provide said services.
- (7) In the event the Successful Bidder uses partners, subcontracts or subcontractors, the Successful Bidder will remain responsible for compliance with all specifications and performance of all obligations under the contract resulting from this IFB. For the resulting agreement, the Successful Bidder will be the prime contractor.
- (8) The University will not be liable for any costs associated with the preparation, transmittal, or presentation of any proposals or materials submitted in response to this IFB.
- (9) Public announcements or news releases regarding this IFB or any subsequent award of a contract must not be made by any Bidder without the prior written approval of SUNY.
- (10) The Successful Bidder is responsible for compliance with all applicable rules and regulations pertaining to cities, towns, counties and State where the services are provided, and all other laws applicable to the performance of the resulting contract. The Successful Offeror shall provide all necessary safeguards for safety and protection as set forth by the United States Department of Labor, Occupational Safety and Health Administration.
- (11) The Successful Bidder will be responsible for the work, direction and compensation of its employees, consultants, agents and contractors. Nothing in the resulting agreement or the performance thereof by the Successful Bidder will impose any liability or duty whatsoever on the University including, but not limited to, any liability for taxes, compensation, commissions, Workers' Compensation, disability benefits, Social Security, or other employee benefits for any person or entity.
- (12) In the event the Successful Bidder is required to be reimbursed for travel, Bidder shall be reimbursed at rates not to exceed the current NYS Schedule of Allowable Reimbursable Travel Expenses. Refer to the U.S. Government Administration Rates for Travel at: <http://www.gsa.gov>
- (13) In addition, the University reserves the right to:
 - a. Not accept any and all proposals received in response to this IFB.
 - b. To terminate any resulting contract for: (1) unavailability of funds; (2) cause; (3) convenience; (4) in the event it is found that the certification filed by the Bidder in accordance with State Finance Law §§139-j and 139-k are found to be intentionally false or intentionally incomplete; and if applicable, the Department of Taxation and Finance Contractor Certification Form ST-220CA was false or incomplete. Upon such finding the University may exercise its termination right by providing written notification to the Bidder in accordance with the written notification terms of the contract.
 - c. Request certified audited financial statements for the past three (3) completed fiscal years and/or other appropriate supplementation including, but not limited to, interim financial statements and credit reports.
 - d. Contact any or all references.
 - e. Request clarifications from Bidders for purposes of assuring a full understanding of responsiveness, and further to permit revisions from all Bidders determined to be susceptible to being selected for contract award, prior to award.
 - f. Advise Bidder of any objectionable employee(s) and/or subcontractor(s) and request their removal from the project. Such removal shall not be reasonably withheld by the Bidder.

NAME OF BIDDER

ADDRESS OF BIDDER

**PROPOSAL
FOR**

Project Number: SU-050116
Project Name: **Music Building Humidification**

Date: 051916

TO THE STATE UNIVERSITY OF NEW YORK:

1. **The Work Proposed Herein Will Be Completed Within 365 Calendar Days, Starting 10 Calendar Days After The Contract Approval Date Of The New York State Comptroller.** In the event the bidder fails to complete such work by said date or dates, or within the time to which such completion may have been extended in accordance with the Contract Documents, the bidder agrees to pay the University liquidated damages in an amount equal to the values indicate in the Liquidated Damages Schedule below for each calendar day of delay in completing the work.

=====

LIQUIDATED DAMAGES SCHEDULE

<u>Contract Amount</u>	<u>Liquidated Damages</u>
Under \$100,000.....	\$100/day
\$100,000-\$499,999.....	\$200/day
\$500,000-\$999,999.....	\$300/day
\$1MM-\$1,999,999.....	\$400/day
\$2MM-\$3,499,999.....	\$500/day
\$3.5MM-\$5MM.....	\$700/day
Over \$5MM (to be determined by the University in each instance)	\$____/day

=====

2. The bidder hereby declares that it has carefully examined all Bidding and Contract Documents and that it has personally inspected the actual location of the work, together with the local sources of supply, has satisfied itself as to all the quantities and conditions, and understands that in signing this Proposal, it waives all right to plead any misunderstanding regarding the same.

3. The bidder further understands and agrees that it is to do, perform and complete all work in accordance with the Contract Documents and to accept in full compensation therefore the amount of the Total Bid, modified by such additive or deductive alternates, if any, as are accepted by the University.

4. The bidder further agrees to accept the unit prices, if any, set forth in paragraph (5) of this proposal, except as the same may be modified pursuant to the provisions of Section (5) of the Information to Bidders, as full payment for the amount of the credit to the University for any deletions, additions, modifications or changes to the portion or portions of work covered by said unit prices.

5. **BID AMOUNT**

BASE BID (does not include allowances)

\$ _____
(in numbers)

(in words)

b. **ALLOWANCES:** In accordance with the Schedule I and Section 4.05 of Agreement, the bidder further agrees to the following additions to the Base Bid:

Work or Materials Description	Amount in Words	Amount in Figures
Siemens Building Technologies (Building Management Systems Controls)	Two hundred forty nine thousand eight hundred and seventeen dollars and ten cents	\$249,817.10

c. **ALTERNATES:** In accordance with Section B of the General Requirements the bidder proposes the following additions to or deductions from the Base Bid for the alternates listed below:

Alternate Number	Add/Deduct	Amount in Words	Amount in Figures
1	Add	Demo existing ceiling and existing lighting fixture and Furnish and Install new drop ceiling with recessed lights at West corridor. See SK1	
2	Add	Demo existing ceiling and existing light fixture, Furnish and Install new drop ceiling and recessed lights at front lobby. See attached SK2	

d. **UNIT PRICES:** In accordance with Section (5) paragraph (2) of the Information to Bidders and Section 4.04 of the Agreement the bidder or the University may insert unit prices for the work or materials listed below for clarification .

Work or Materials Description	Amount in Words	Amount in Figures
<u>Type ERH-A</u> 0.9KW, 277V coil power, 277V control power, single phase, one step, 8" high, 10" wide.		
<u>Type ERH-B</u> 0.9KW, 277V coil power, 277V control power, single		

phase, one step, 8" high, 14" wide.		
Type ERH-C 0.9KW, 277V coil power, 277V control power, single phase, one step, 8" high, 18" wide.		
Type ERH-D 0.9KW, 277V coil power, 277V control power, single phase, one step, 8" high, 28" wide.		
Type ERH-E 0.9KW, 277V coil power, 277V control power, single phase, one step, 8" high, 30" wide.		
Ductwork Cleaning (per square foot)		
Electrical Breakers (per each)		

7. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief: (a) the prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor; (b) unless otherwise required by law, the prices have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and (c) no attempt has been made or will be made by the bidder to induce any person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (a), (b) and (c) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where (a), (b), and (c) above shall have not been complied with, the bid shall not be considered for award nor shall any award be made unless the Campus President, or designee, or Vice Chancellor for Capital Facilities, or designee, determines that such disclosure was not made for purposes of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of this Section.

8. The bidder agrees that if awarded the Contract, it will commence work within (10) calendar days

after date of receipt of a fully executed Agreement and that it will fully complete the work by the date stated herein.

9. The bidder acknowledges the receipt of the following addenda, but agrees that it is bound by all addenda whether or not listed herein.

Addendum Number	Date	Addendum Number	Date
_____	___/___/___	_____	___/___/___
_____	___/___/___	_____	___/___/___
_____	___/___/___	_____	___/___/___

10. The bidder submits herewith bid security in an amount not less than five (5) percent of the Total Bid. In the event that (a) the bidder's Total Bid is the lowest one submitted and the bidder does not timely provide the Post-Bid Information required by the Information for Bidders or (b) this Proposal is accepted by the University and the bidder shall refuse or neglect, within ten (10) calendar days after date of receipt of Agreement, to execute and deliver said Agreement in the form provided herein, or to execute and deliver a Performance Bond and a Labor and Material Bond in the amounts required and in the form prescribed, the bidder shall be liable to the University, as liquidated damages, for the amount of the bid security or the difference between the Total Bid of the bidder and the Total Bid of the bidder submitting the next lowest bid, whichever sum shall be higher, otherwise the total amount of the bid security will be returned to the bidder in accordance with the provisions set forth in the Information for Bidders. The University may apply the bid security in full or partial payments, as the case may be, of said liquidated damages and in the event the bid security is less than the amount of liquidated damages to which the University is entitled, the bidder shall pay the difference, upon demand, to the University.
11. The bidder certifies that all wood products that are to be used in the performance of this Contract shall be in accordance with the Specifications and provisions of Section 167 b. of the State Finance Law which Section prohibits the purchase and use of tropical hardwoods.
12. The bidder affirms that it understands and agrees to comply with the procedures of the Fund relative to permissible contacts as required by Sections 139-j(3) and 139-j-(6)(b) of the State Finance Law.
13. The bidder certifies that all information provided or to be provided to the Fund in connection with this procurement is, as required by Section 139-k of the State Finance Law, complete, true and accurate.

Dated ____/____/____

Firm's Federal ID Number or Social Security Number as applicable _____

Legal name of person, partnership, joint venture or corporation:

By _____
(signature)

Title _____

ACKNOWLEDGMENT FOR THE PROPOSAL

THE LEGAL ADDRESS OF THE BIDDER

Telephone No. _____ Facsimile No. _____

If a Corporation

Name	Address
_____ PRESIDENT _____	
_____ SECRETARY _____	
_____ TREASURER _____	

If a Partnership

Name of Partners	Address
_____	_____
_____	_____
_____	_____

If a Joint Venture

Name of Members	Address
_____	_____
_____	_____
_____	_____

If an Individual

Name of Individual	Address
_____	_____



STATE UNIVERSITY OF NEW YORK BID BOND

BOND NO. _____

KNOW ALL PERSONS BY THESE PRESENTS, that _____

having an office at _____

(hereinafter called the "Principal") and the _____

a corporation created and existing under the laws of the State of _____

having its principal office at _____

(hereinafter called the "Surety") are held and firmly bound unto the State University of New York (hereinafter called the "University") in the full and just sum of

_____ dollars (\$ _____)
(in words) (in figures)

good and lawful money of the United States of America, or in the full and just sum of the difference between the Total Bid of the Principal and the Total Bid of the bidder submitting the next lowest bid, whichever sum shall be higher, for the payment of which said sum of money, well and truly to be made and done, the Principal binds itself, its heirs, executors, administrators, successors and assigns and the Surety binds itself, its successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted to the "University" a Proposal for Project No. _____

Titled _____

which Proposal is incorporated herein by reference and made a part hereof as fully and to the same extent as if set forth at length herein;

NOW, THEREFORE, the condition of this obligation is such that in the event (1) the Principal's Total Bid is the lowest one submitted and the Principal timely provides the Post-Bid Information required under Section 8 of the Information for Bidders or (2) the "University" shall accept the Proposal of the Principal and the Principal shall enter into a Contract with the "University" in accordance with the terms of such Proposal and/or enter into certain prescribed subcontracts in accordance with the terms of such Proposal and give such Bond or Bonds as may be specified in the Bidding or Contract Documents, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the "University" may accept the Proposal of the Principal and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal has hereunto set its hand and seal and the Surety has caused this instrument to be signed by its _____ and its corporate seal to be hereunto affixed this

_____ day of _____, 19_____

Principal By _____
If Corporation, affix Corporate Seal

Surety By _____
If Corporation, affix Corporate Seal

ACKNOWLEDGMENTS FOR BID BOND

(Acknowledgment by Principal, unless it be a Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 19 _____, before me personally came _____
_____, to me known and known to me to be the person(s) described
in and who executed the foregoing instrument and acknowledged that he / she executed the same.

Notary Public

(Acknowledgment by Principal, if a Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 19 _____, before me personally came _____
_____, to me known, who, being by me duly sworn, did
depose and say that he / she resides in _____;
that he / she is the _____

of the _____,
the corporation described in and which executed the foregoing instrument; that he / she knows the seal of said
corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of
Directors of said corporation and that he / she signed their name thereto by like order.

Notary Public

(Acknowledgment by Surety Company)

STATE OF)
) ss.:
COUNTY OF)

On this _____ day of _____, 19 _____, before me personally came _____
_____, to me known, who, being by me duly sworn, did depose
and say that he / she resides in _____;
that he / she is the _____

of the _____,
the corporation described in and which executed the foregoing instrument; that he / she knows the seal of said
corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the order of the Board
of Directors of said corporation, and that he / she signed their name thereto by like order; and that the liabilities of said
company do not exceed its assets as ascertained in the manner provided by the laws of the State of New York.

Notary Public

State University of New York AGREEMENT

Contract No. _____

This Agreement made as of the _____ day of _____, 20____, for Contract Number _____ by and between STATE UNIVERSITY OF NEW YORK, a corporation organized and existing under the laws of the State of New York, with its principal office located at State University Plaza, Albany, New York 12246, on behalf of State University of New York at _____ located at _____ hereinafter referred to as "University" and _____ having its principal office located at _____, hereinafter referred to as "Contractor".

Federal ID or
Social Security No. _____

The University and the Contractor agree as follows:

1. The Contractor shall perform all work and duties required for the construction of Project Number _____, titled _____, as contained in the Contract Documents. Subject to authorized adjustments the work and duties contained in the same shall be completed within _____ calendar days starting 10 calendar days after the approval date of the New York State Comptroller. The Contractor agrees to pay the University liquidated damages in accordance with paragraph 1 of the Proposal for each calendar day of delay in completing the work.
2. The University shall pay and the Contractor shall accept for the performance of work of the above referenced Project, the total contract compensation of \$_____, (in figures), _____ (in word)s.

ARTICLE I

General Provisions

Section 1.01 Definitions

Where the following words and expressions are used in the Contract Documents it is understood that they have the meaning set forth as follows:

CONSULTANT	The Architect, Engineer, Landscape Architect, or Surveyor named in the Notice to Bidders or such other person or firm designated by the University to provide general administration of the Contract and inspection of the work.
BIDDING DOCUMENTS	The Notice to Bidders, Information for Bidders and Proposals
BONDS	Performance Bond and Labor and Material Bond
CONTRACT OR CONTRACT DOCUMENTS	The Agreement, Project Manual, Proposal, Bonds, Specifications, Contract Drawings, Addenda issued prior to the opening of bids and Change Orders issued after the award of the Contract.
UNIVERSITY	State University of New York
NOTICE OF AWARD	Letter of Intent
PROJECT	The facility or facilities to be constructed including all usual, appropriate and necessary attendant work shown on, described in or mentioned in the Contract.
SITE	The area within the Contract limit lines, as shown on the Drawings, and all other areas upon which the Contractor is to perform work.
WORK	The using, performing, installing, furnishing and supplying of all materials, equipment, labor and incidentals necessary or proper for or incidental to the successful completion of the Project and the carrying out of all duties and obligations imposed upon the Contractor by the Contract.
NOT IN CONTRACT, "N.I.C."	Indicates equipment furnished by the Owner and installed under another construction contract or by another contractor, or operations at the site not included as part of this Contract.

PROVIDE, PROVIDED

Mean that the Contractor shall furnish and install all materials and labor for the item so specified.

Section 1.02 Captions

The titles or captions of Articles and Sections of the Contract are intended for convenience and reference purposes only and in no way define, limit or describe the scope or intent thereof or of the Contract or in any way affect the Contract.

Section 1.03 Nomenclature

Materials, equipment or other work described in words which have a well-known, technical or trade meaning shall be interpreted as having such meaning in connection with the Contract.

Section 1.04 Contract Documents

- (1) This agreement
- (2) Exhibit A and A-1
- (3) Here the list of the remaining contract exhibits and appendix should be cited.

The Contract, together with all exhibits thereto, constitutes the entire agreement between the parties hereto and no statement, promise, condition, understanding, inducement or representation, oral or written, expressed or implied, which is not contained herein shall be binding or valid and the Contract shall not be changed, modified, or altered in any manner except by an instrument in writing executed by the parties hereto.

Section 1.05 Successors and Assigns

To the extent allowed by the terms of "Exhibit A", the Contract shall bind the successors, assigns and representatives of the parties hereto. The University reserves the right to have the State University Construction Fund (Fund) act on its behalf at any time or duration of this Agreement. Such designation of the Fund to act on the behalf of the University shall be in writing and addressed to the Contractor and signed by the University.

Section 1.06 Accuracy and Completeness of Contract Documents

- (1) The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. The intention of the Documents is to include all materials, plant, equipment, tools, skill and labor of every kind necessary for the proper execution of the work and also those things which may be reasonably inferable from the Contract Documents as being necessary to produce the intended results.
- (2) The Contract Documents contemplate a finished piece of work of such character and quality as is reasonably inferable from them. The Contractor acknowledges that the contract consideration includes sufficient money allowance to make its work complete and operational and in compliance with good practice and it agrees that inadvertent minor discrepancies or omissions or the failure to show details or to repeat on any part of the Contract Documents the figures or notes given on another shall not be the cause for additional charges or claims. In case of a conflict between any part or parts of the Contract Documents with any other part or parts thereof, as contrasted with an omission or failure to show details or to repeat on any part of the Contract Documents the figures or notes given on another part thereof, the following shall be given preference, in the order hereinafter set forth, to determine what work the Contractor is required to perform: (a) Addenda (later dates to take preference over earlier dates); (b) Amendments to Agreement; (c) Agreement; (d) Specifications; (e) Schedules; (f) Large scale detail Drawings (detail drawings having a scale of 3/4" and over); (g) Large scale plan and section Drawings (plan and section drawings having a scale equal to or larger than that used for the basic floor or site plan, as the case may be); (h) Small scale detail Drawings (detail drawings having a scale of less than 3/4"); and (i) Small scale plan and section Drawings (plan and section drawings having a scale less than that used for the basic floor or site plan, as the case may be). In the event of such a conflict between or among parts of the Contract Documents that are entitled to equal preference, the more expensive way of doing the work, the better quality or greater quantity of material shall govern unless the University otherwise directs.

Section 1.07 Organization of Contract Documents

The Specifications and Drawings are generally divided into trade sections for the purpose of ready references, but such division is arbitrary and such sections shall not be construed as the prescription by the Consultant or the University of the limits of the work of any subcontractor or as a determination of the class of labor or trade necessary for the fabrication, erection, installation or finishing of the work required. The Contractor will be permitted to allot the work of subcontractors at its own discretion regardless of the grouping of the Specifications and Drawings. It shall be the Contractor's responsibility to settle definitively with each subcontractor the portions of the work which the latter will be required to do. The University and the Consultant assume no responsibility whatever for any jurisdiction claimed by any of the trades involved in the work.

Section 1.08 Furnishing of Contract Documents

The Contractor shall be furnished, free of charge, with as many copies of the Specifications and Drawings as it may reasonably request, in the judgment of the University, within fifteen (15) working days after the Notice of Award. Any other copies of the Specifications and Drawings which the Contractor may desire can be obtained by it from the Consultant at the latter's cost of duplication thereof.

Section 1.09 Examination of Contract Documents and Site

By executing the Contract, the Contractor agrees: that it has carefully examined the Contract Documents together with the site of the proposed work as well as its surrounding territory; that it is fully informed regarding all the conditions affecting the work to be done and the labor and materials to be furnished for the completion of the Contract; and that its information has been acquired by personal investigation and research and not in the estimates and records of the University.

Section 1.10 Invalid Provisions

Revision: November 2015

If any term or provision of the Contract Documents or the application thereof to any person, firm or corporation or circumstance shall, to any extent, be invalid or unenforceable, the remainder of the Contract Documents, or the application of such terms or provisions to persons, firms or corporations or circumstances other than those to which it is held invalid or unenforceable, shall not be affected thereby and each term or provision of the Contract Documents shall be valid and be enforced to the fullest extent permitted by law.

Section 1.11 No Collusion or Fraud

Reference "Exhibit A" which is attached to and made a part of this Agreement.

Section 1.12 Notices

Any notice to either party hereunder must be in writing signed by the party giving it and shall be served either personally, by facsimile or registered mail of the United State Post Office and individuals indicated below:

TO THE UNIVERSITY: To the Director of Purchasing at the campus where the project is located.

and a copy to: Vice Chancellor for Capital Facilities
State University of New York
State University Plaza
Albany, New York 12246

TO THE CONTRACTOR: At the address indicated on page 1 of this Agreement
Or to such other addressee as may be hereafter designated by notice. All notices become effective only when received by the addressee.

Section 1.13 Singular-Plural; Male-Female

As used in the Contract Documents, the singular of any word or designation, whenever necessary or appropriate, shall include the plural and vice versa, and the masculine gender shall include the female and neuter genders and vice versa.

ARTICLE II

Contract Administration and Conduct

Section 2.01 Consultant's Status

- (1) The Consultant, as the University's representative, shall provide general administration of the Contract and inspection of the work. The Consultant will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the work, and it will not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents. The Consultant's duties, services and work shall in no way supersede or dilute the Contractor's obligation to perform the work in conformance with all Contract requirements, but it is empowered by the University to act on its behalf with respect to the proper execution of the work and to give instructions when necessary to require such corrective measures as may be necessary, in its professional opinion, to insure the proper execution of the Contract or to otherwise protect the University's interest.
- (2) The Consultant shall have the authority to stop the work or to require the prompt execution thereof whenever such action may be necessary, in its professional opinion, to insure the proper execution of the Contract or to otherwise protect the interests of the University.
- (3) Except as otherwise provided in the Contract, the Consultant shall determine the amount, quality, acceptability, fitness and progress of the work covered by the Contract and shall decide all questions of fact which may arise in relation to the interpretation of the plans and Specifications, the performance of the work and the fulfillment by the Contractor of the provisions of the Contract. The Consultant shall in the first instance be the interpreter of the provisions of the Contract and the judge of its performance and it shall use its power under the Contract to enforce its faithful performance.

Section 2.02 Finality of Decisions

- (1) Any decision or determination of the Consultant under the provisions of the Contract shall be final, conclusive and binding on the Contractor unless the Contractor shall, within ten (10) working days after such decision, make and deliver to the University a verified written statement of its contention that the decision of the Consultant is contrary to a provision of the Contract. The University shall thereupon determine the validity of the Contractor's contention. Pending decision by the University, the Contractor shall proceed in accordance with the Consultant's decision.
- (2) Wherever it is provided in the Contract Documents that an application must be made to the University and/or determination made by the University, the University's decision on such application and/or its determination under the Contract Documents shall be final, conclusive and binding upon the Contractor unless the same shall be determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary or so grossly erroneous as necessarily to imply bad faith and unless the Contractor, within ten (10) working days after receiving notice of the University's decision or determination, files a written statement with the University and the Consultant that it reserves its rights in connection with the matters covered by said decision or determination.

Section 2.03 Claims and Disputes

- (1) If the Contractor claims (i) that any work it has been ordered to do is extra work or (ii) that it has performed or is going to perform extra work or (iii) that any action or omission of the University or the Consultant is contrary to the terms and provisions of the Contract, it shall:
 - a. Promptly comply with such order;
 - b. File with the University and the Consultant, within five (5) working days after being ordered to perform the work claimed by it to be extra work or within five (5) working days after commencing performance of the extra work, whichever date shall be the earlier, or within five (5) working days after the said action or omission on the part of the University or the Consultant occurred, a written notice of the basis of its claim and request a determination thereof;
 - c. File with the University and the Consultant, within thirty (30) calendar days after said alleged extra work was required to be performed or said alleged extra work was commenced, whichever date shall be the earlier, or said alleged action or omission by the University or the Consultant occurred, a verified detailed statement, with documentary evidence, of the items and basis of its claim;
 - d. Produce for the University's examination, upon notice from the University, all its books of account, bills, invoices, payrolls, subcontracts, time books, progress records, daily reports, bank deposit books, bank statements, checkbooks and canceled checks, showing all of its actions and transactions in connection with or relating to or arising by reason of its claim, and submit persons in its employment and in its subcontractors' employment for examination under oath by any person designated by the University to investigate any claims made against the University under the Contract, such examination to be made at the offices of the Contractor; and
 - e. Proceed diligently, pending and subsequent to the determination of the University with respect to any such disputed matter, with the performance of the Contract and in accordance with all instructions of the University and the Consultant.
- (2) The Contractor's failure to comply with any or all parts of subdivision b of paragraph (1) of this Section shall be deemed to be (i) a conclusive and binding determination on its part that said order, work, action or omission does not involve extra work and is not contrary to the terms and provisions of the Contract; and (ii) a waiver by the Contractor of all claims for additional compensation or damages as a result of said order, work, action or omission. The provisions of subdivision b of paragraph (1) of this Section are for the purpose of enabling the University to avoid waste of public funds by affording it promptly the opportunity to cancel or revise any order, change its plans, mitigate or remedy the effects of circumstances giving rise to a claim or take such other action as may seem desirable and to verify any claimed expenses or circumstances as they occur. Compliance with such provisions is essential whether or not the University is aware of the circumstances of any order or other circumstances which might constitute a basis for a claim and whether or not the University has indicated it will consider a claim in connection therewith.
- (3) No person has power to waive or modify any of the foregoing provisions and, in any action against the University to recover any sum in excess of the sum certified by the University to be due under or by reason of the Contract, the Contractor must allege in its complaint and prove at the trial compliance with the provisions of this Section.
- (4) Nothing in this Section shall in any way affect the University's right to obtain an examination before trial or a discovery and inspection in any action that might be instituted by or against the University or the Contractor.

Section 2.04 Omitted Work

The University reserves the right at any time during the progress of the work to delete, modify or change the work covered by the Contract, by a Change Order thereto providing for either a reduction or omission of any portion of the work, without constituting grounds for any claim by the Contractor for allowances for damages or for loss of anticipated profits and in such event a deduction shall be made from the Contract consideration, the amount of which is to be determined in accordance with the provisions of Section 4.02 of the Agreement.

Section 2.05 Extra Work

- (1) The University reserves the right at any time during the progress of the work to add, modify or change the work covered by the Contract by a Change Order thereto providing for extra work of either a qualitative or quantitative nature and in such event the Contract consideration shall be increased by an amount to be determined in accordance with the provisions of Section 4.02 of the Agreement and the completion date for all or any part of the work shall be extended for such period of time as may be determined by the University as necessary, because of the extra work, to complete the work or any part thereof.
- (2) Nothing in the Contract Documents shall excuse the Contractor from proceeding with the extra work as directed and, except as otherwise specifically provided for in a Change Order, the terms and conditions of the Contract Documents shall be fully applicable to all extra work.
- (3) The Contractor shall have no claim for extra work if the performance of such work, in the judgment of the Consultant, is made necessary or desirable because of any act or omission of the Contractor which is not in accordance with the Contract.
- (4) Notwithstanding the provisions of Section 2.02 of the Agreement and any other provisions of the Contract Documents to the contrary, the University, after conferring with the Consultant, shall have the right to overrule a determination or decision of the Consultant, that relates to whether certain work is included in the Contract Documents or is extra work, which he or she believes is incorrect; in the event an officer exercises such right, his or her determination or decision shall be final, conclusive and binding upon the Contractor and the University unless the same shall be determined by a court of competent jurisdiction to have been fraudulent, capricious, arbitrary or so grossly erroneous as necessarily to imply bad faith.

Section 2.06 Contractor to Give Personal Attention

- (1) The Contractor shall give its constant personal attention to all the work while it is in progress and shall place the working charge of a

competent and reliable full-time superintendent acceptable to the Consultant and the University who shall have authority to act for the Contractor and who shall be accountable to the Consultant to the extent provided in the Contract. Unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in its employ, such superintendent shall not be changed without the written permission of the Consultant and the University.

- (2) When the Contractor and its superintendent are temporarily absent from the site of the work, the Contractor or its superintendent shall designate a responsible supervisory employee to receive such orders as the Consultant or its representative may give. At no time shall any work be conducted on the site in the absence of an individual present who has been so designated by the Contractor or its superintendent as having authority to receive and execute instructions given by the Consultant or its representative.

Section 2.07 Employment of Workers

The Contractor shall at all times employ competent and suitable workers and equipment which shall be sufficient to prosecute all the work to full completion in the manner and time specified. All workers engaged in specially or skilled work shall have had sufficient experience in such work to properly and satisfactorily perform the same. Should the Consultant deem any employee of the Contractor or any subcontractor incompetent, careless, insubordinate or otherwise objectionable or whose continued employment on the work is deemed by the Consultant to be contrary to the public interest, it shall so advise the Contractor and the latter shall dismiss or shall cause the subcontractor, if such employee is employed by the latter, to dismiss such employee and such employee shall not again be employed on the work to be performed under the Contract without obtaining the prior written approval of the Consultant.

Section 2.08 Detailed Drawings and Instructions

Upon timely notice by the Contractor that supplementary information is required, the Consultant shall furnish 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/or instructions.

Section 2.09 Contract Documents to Be Kept at Site

The Contractor shall keep at the site of the work a copy of the Drawings and Specifications and shall at all times give the Consultant and the University access thereto.

Section 2.10 Permits and Building Codes

The Contractor shall obtain from the proper authorities all permits legally required to carry on its work, pay any and all taxes and fees legally required and shall be responsible for conducting its operations in accordance with the provisions of such permits. Except as otherwise expressly provided in the Contract Documents, all of the work covered by this Contract which is to be performed on property owned by the State University of New York is not subject to the building code of any city, county or other political subdivision of the State of New York. It is, however, subject to the provisions of the New York State Uniform Fire Prevention and Building Code and the applicable Federal and State health and labor laws and regulations. The building permit for the work shall be issued by the Campus Code Compliance Officer.

Section 2.11 Surveys

- (1) From the data shown on the Drawings and identified at the site by the Consultant, a licensed surveyor, to be designated and paid for by the University, shall establish one (1) fixed bench mark and one (1) fixed base line at the site. The Contractor shall work from the bench marks and base lines shown on the Drawings, identified at the site by the Consultant and established at the site by the aforesaid surveyor and shall establish such supplementary bench marks and base lines that are required in order for it to lay out the work. The Contractor shall be responsible for all measurements that may be required for execution of the work to the exact position and elevation as prescribed in the Specifications, shown on the Drawings, or as the same may be modified at the direction of the Consultant to meet changed conditions or as a result of modifications to the work covered by the Contract.
- (2) The Contractor shall furnish at its own expense such stakes and other required equipment, tools and materials, and all labor as may be required in laying out any part of the work. If, for any reason, monuments are disturbed, it shall be the responsibility of the Contractor to reestablish them, without cost to the University, as directed by the Consultant. The Consultant may require that construction work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed work or the work in progress.
- (3) In all multiple-story construction, the Contractor shall establish and maintain line marks at each floor level and grade marks four (4) feet above the finished floor at each floor level.

Section 2.12 Site Conditions

- (1) The Contractor acknowledges that it has assumed the risk and that the Contract consideration includes such provision as it deems proper for all physical conditions and subsurface conditions as it could reasonably anticipate encountering from the provisions of the Contract Documents, borings, rock cores, topographical maps and such other information as the University or the Consultant made available to it prior to the University's receipt of bids or from its own inspection and examination of the site prior to the University's receipt of bids.
- (2) In the event that the Contractor encounters subsurface physical conditions or other latent physical conditions at the site differing substantially from those shown on or described or indicated in the Contract Documents and which could not have been reasonably anticipated from the aforesaid information made available by the University or the Consultant or from the Contractor's aforesaid inspection and examination of the site, it shall give immediate notice to the Consultant of such conditions before they are disturbed. The Consultant will thereupon promptly

investigate the conditions and, if it finds that they do substantially differ from that which should have been reasonably anticipated by the Contractor, it shall make such changes in the Drawings and Specifications as may be necessary and a Change Order shall be issued, the amount of which shall be determined in accordance with the provisions of Section 4.02, to reflect any increase or decrease in the cost of, or the time required for, performance of the Contract as a result of any of the aforesaid changes made by the Consultant and/or as a result of such unanticipated subsurface conditions.

Section 2.13 Right to Change Location

When additional information regarding the subsurface conditions becomes available to the University as a result of the excavation work, further testing or otherwise, it may be found desirable to change the location, alignment, dimensions or grades to conform to such conditions. The University reserves the right to make such reasonable changes in the work as, in its opinion, may be considered necessary or desirable, such changes and any adjustments in the Contract consideration as a result thereof are to be made in accordance with the provisions of Sections 2.04, 2.05 and 4.02 of the Agreement.

Section 2.14 Unforeseen Difficulties

Except as otherwise expressly provided in Section 2.12 of the Agreement and in other Sections of the Contract Documents, the Contractor acknowledges that it has assumed the risk and that the Contract consideration includes such provisions as it deems proper for any unforeseen obstacles or difficulties which it may encounter in the performance of the work.

Section 2.15 Moving Materials and Equipment

Should it become necessary, in the judgment of the Consultant, at any time during the course of the work to move materials which are stored on the site and equipment which has been temporarily placed thereon, the Contractor upon request of the Consultant shall move them or cause them to be moved at its sole cost and expense; provided, however, if materials and equipment have been stored or placed by the Contractor at a location on the site expressly approved, in writing, by the consultant and the same are moved or caused to be moved by the Contractor at the Consultant's request, such removal shall be deemed extra work and the Contractor shall be compensated therefore in accordance with the provisions of Section 4.02 of the Agreement.

Section 2.16 Other Contracts

- (1) Prior to and during the progress of the work hereunder the University reserves the right to let other contracts relating to the Project or in connection with work on sites within the Contract limit lines or adjoining or adjacent to that on which the work covered by this Contract is to be performed. In the event such other contracts are let, or have previously been let, the Contractor and such other contractors shall coordinate their work with each other, arrange the sequence of their work to conform with the progressive operation of all the work covered by such contracts and afford each other reasonable opportunities for the introduction and storage of their materials, supplies and equipment and the execution of their work. If the Contractor or such other contractors contend that their work or the progress thereof is being interfered with by the acts or omissions of the other or others or that there is a failure to coordinate or properly arrange the sequence of the work on the part of the Contractor or such other contractors, they shall, within five (5) working days of the commencement of such interference or failure of coordination or failure to perform work in proper sequence, give written notification to the University and the Consultant of such contention. Upon receipt of such notification or on its own initiative, the Consultant shall investigate the situation and issue such instructions to the Contractor or such other contractors with respect thereto as it may deem proper. The Consultant shall determine the rights of the Contractor and of such other contractors and the sequence of work necessary to expedite the completion of all work covered by this Contract in relation to the work covered by said other contracts.
- (2) The Contractor agrees that it has and will make no claim for damages against the University by reason of any act or omission to act by any other contractor or party or in connection with the Consultant's or University's acts or omissions to act in connection with such other contractor, but the Contractor shall have a right to recover such damages from the other contractors under a provision similar to the following provision which has been or will be inserted in the Contract with such other contractors.
- (3) Should any other contractor, having or who shall hereafter have a contract with the University relating to the Project or in connection with the work on sites adjoining or adjacent to that on which the work covered by this Contract is to be performed, sustain any damage, during the progress of the work hereunder, through any act or omission of the Contractor, the Contractor agrees to reimburse such other contractor for all such damages and it further agrees to indemnify and save harmless the University and the State of New York from all claims for such damages.
- (4) If the proper and accurate performance of the work covered by the Contract depends upon the proper performance and execution of work not included herein or depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the Consultant any defects in such work that render it unsuitable for proper execution and results. Its failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the execution of the work covered by the Contract, except as to latent defects which may be discovered thereafter.

Section 2.17 Inspection and Testing

- (1) All materials and workmanship shall be subject to inspection, examination and testing by the Consultant and the University at all times during the performance of the work and at all places where the work is carried on. Except as otherwise herein specified, the University shall pay for the cost of inspection, examination and testing by the Consultant or the University. If, however, the tests and any attendant re-inspection or re-examination prove that the materials and/or work tested do not meet the requirements of the Contract, then the entire cost of such tests is to be borne by the Contractor. The Consultant will have the right to reject defective material and workmanship furnished by the Contractor or require its correction. The Contractor, without charge therefore, shall satisfactorily and promptly correct all rejected work and replace all rejected material with proper material.

- (2) The Contractor shall promptly segregate and remove from the site of the work all rejected material and work. If the Contractor shall fail to proceed at once with the replacing of rejected material and/or correction of defective workmanship, the University may, by contract or otherwise, replace such material and/or correct such workmanship, and charge the costs thereof to the Contractor and/or it may cancel the Contract and terminate the Contractor's employment as provided in the Agreement.
- (3) The Contractor, without additional charge therefore, shall promptly furnish all reasonable facilities, labor and materials necessary for the safe and convenient inspection and testing that may be required by the Consultant or the University.
- (4) If the Contract Documents or the Consultant's instructions or the applicable laws, ordinances or regulations of any governmental authority require any part of the work covered by the Contract to be specially tested or inspected, the Contractor shall give the Consultant timely notice of its readiness for such testing or inspection or, if the same is to be performed by a governmental authority, of the date fixed therefore. If any such work, without the written permission of the Consultant, should be covered up prior to such testing or inspection, the Contractor, at its sole cost and expense, must, if directed by the Consultant, uncover the same for testing or inspection and reconstruct the same after the tests or inspection are conducted. All certificates of inspection or testing, involving the Contractor's work, required to be obtained from governmental authorities are to be secured by the Contractor at its sole cost and expense.
- (5) Should it be considered necessary or advisable by the Consultant at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out same, the Contractor, upon request, shall furnish all necessary facilities, labor and material to perform such examination. If the work subject to such examination is found to be defective or nonconforming in any manner due to the fault of the Contractor or any of its subcontractors, such uncovering or destruction and necessary reconstruction, even though such includes work not covered in the Contract, shall be at the expense of the Contractor. If, however, such work after testing and examination is found to be satisfactory, the University will pay the Contractor the cost of such uncovering or destruction and reconstruction, such cost to be determined as in the case of extra work as provided in Section 4.02.
- (6) Inspection of material and furnished articles to be incorporated in the work may be made at the place of production, manufacture or shipment unless otherwise stated herein. The inspection of material and workmanship for final acceptance as a whole or in part will be made at the site of the work.

Section 2.18 Subcontractors

- (1) Except for subcontractors designated by the University, or required to be named at any earlier date, pursuant to the provisions of the Information for Bidders, within thirty (30) calendar days after Notice of Award, the Contractor must submit a written statement to the Consultant giving the name and address of all proposed subcontractors. Said statement must contain a description of the portion of the work and materials which the proposed subcontractors are to perform and furnish and any other information tending to prove that the proposed subcontractors have the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and provisions of the Contract Documents.
- (2) If the Consultant finds that the proposed subcontractors are qualified, it will so notify the Contractor within ten (10) working days after receipt of the aforesaid information. If the determination is to the contrary, however, the Consultant within such period will notify the Contractor of such determination and the latter, unless it decides to do such work itself and is qualified, in the Consultant's opinion, to do such work, must, within ten (10) working days thereafter, submit similar information with respect to other proposed subcontractors.
- (3) The Consultant's approval of a subcontractor and/or the University's designation of a subcontractor pursuant to the provisions of the Contract Documents shall not relieve the Contractor of any of its responsibilities, duties and liabilities hereunder. The Contractor shall be solely responsible to the University for the acts or defaults of such subcontractors and of such subcontractors' officers, agents and employees, each of whom shall, for this purpose, be deemed to be the agent or employee of the Contractor to the extent of its subcontract.
- (4) The Contractor shall be fully responsible for the administration, integration, coordination, direction and supervision of all of its subcontractors and of all work and it shall check all space requirements of the work and coordinate and adjust the same so that conflicts in space do not occur in the work being performed by it with its own employees and with the work being performed by its subcontractors and so that all equipment, piping, wiring, etc., can be installed, where possible, in the spaces allowed for the same.
- (5) No subcontractor shall be permitted to work at the site until (a) it has furnished satisfactory evidence to the Consultant of the insurance required by law; (b) in the case of a Project involving a federal grant, it has furnished satisfactory evidence to the Consultant of the same type and amount of liability insurance as that required of the Contractor by Section 5.06 of the Agreement; and (c) except for subcontractors designated by the University pursuant to the provisions of the Information for bidders, it has been approved by the Consultant.
- (6) Within seven (7) working days after the Contractor receives payment from the University on account of a progress payment application for the percentage of the work done, it shall pay each of its subcontractors the sum contained in said payment for the percentage of said subcontractor's work, less the same amount retained therefrom by the University under the terms of the Contract Documents or in consequence of any legal proceedings or statutory liens, and less any amounts due the Contractor under the subcontract for work not performed or not properly or timely performed by the subcontractor. In the event any subcontractor is not paid by the Contractor, the former should immediately notify the University of such fact. Notwithstanding the foregoing, no retention or withholding of payment by the university shall affect the Contractor's obligation to pay all subcontractors, agents, employees or other parties for goods or services provided in connection with the work.
- (7) The Contractor shall execute with each of its subcontractors and shall require all subcontractors to execute with their sub-subcontractors a written agreement which shall bind the latter to the terms and provisions of this Contract insofar as such terms and provisions are applicable to the work to be performed by such subcontractors. The Contractor shall require all subcontractors and sub-subcontractors to promptly, upon request, file with the Consultant and the University a copy of such agreements, from which the price and terms of payment may be deleted.
- (8) If for sufficient reason, at any time during the progress of the work to be performed hereunder, the Consultant determines that any subcontractor or sub-subcontractor is incompetent, careless or uncooperative, the Consultant will notify the Contractor accordingly and

immediate steps will be taken by the Contractor for cancellation of such subcontract or sub-subcontract. Such termination, however, shall not give rise to any claim by the Contractor or by such subcontractor or sub-subcontractor for loss of prospective profits on work unperformed and/or work unfurnished and a provision to that effect shall be contained in all subcontracts and sub-subcontracts.

- (9) No provisions of this Contract shall create or be construed as creating any contractual relation between the University and any subcontractor or sub-subcontractor or with any person, firm or corporation employed by, contracted with or whose services are utilized by the Contractor.

Section 2.19 Shop Drawings and Samples

- (1) The Contractor, in accordance with the approved Shop Drawing and Sample schedule and with such promptness and in such sequence as to cause no delay in the work, shall submit for the Consultant's approval all Shop Drawings and Samples called for under the Contract or requested by the Consultant.
- (2) Shop Drawings shall establish the actual detail of the work, indicate proper relation to adjoining work, amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.
- (3) All Shop Drawings and Samples shall be thoroughly checked by the Contractor for compliance with the Contract Documents before submitting them to the Consultant for approval and all Shop Drawings shall bear the Contractor's recommendation for approval certifying that they have been so checked. Any Shop Drawings submitted without this stamp of approval and certification, and Shop Drawings which, in the Consultant's opinion, are incomplete, contain numerous errors or have not been checked or only checked superficially, will be returned unchecked by the Consultant for resubmission by the Contractor. In checking Shop Drawings, the Contractor shall verify all dimensions and field conditions and shall check and coordinate the Shop Drawings of any section or trade with the requirements of all other sections or trades whose work is related thereto, as required for proper and complete installation of the work.
- (4) Samples must be of sufficient size or number to show the quality, type, range of color, finish and texture of the material. Each Sample shall be properly labeled to show the nature of the material, trade name of manufacturer, name and location of the work where the material represented by the Sample is to be used and the name of the Contractor submitting the Sample. Transportation charges to the Consultant must be prepaid on Samples forwarded to it.
- (5) Shop Drawings and Samples, submitted by the Contractor in accordance with the approved Shop Drawing and Sample schedule, will be reviewed by the Consultant within fifteen (15) working days and if satisfactory will be approved. A Shop Drawing, when approved, will be returned to the Contractor. If not satisfactory, the Drawings and Samples will be appropriately marked and returned to the Contractor for correction thereof, in which event the Contractor shall resubmit to the Consultant a corrected copy of the Shop Drawing or a new Sample, as the case may be. The Contractor shall make any correction required by the Consultant and shall appropriately note any changes or revisions on the Shop Drawing, dated to correspond with the date of the Consultant's request for the change. Upon approval of the Shop Drawing by the Consultant, the Contractor shall promptly furnish to the Consultant as many copies thereof as the Consultant may reasonably request.
- (6) At the time of submission of a Shop Drawing or Sample, the Contractor shall inform the Consultant and the University in writing of any deviation in the Shop Drawing or Sample from the requirements of the Contract Documents. Unless such deviation is specifically noted by the Contractor with a notation that such deviation will result in extra work for which the Contractor requests payment or requires additional time, the Contractor shall be deemed to have waived any claim for extra work, additional compensation or payment or an extension of time with respect to all work shown on, described in or related to the Shop Drawing or Sample.
- (7) The Consultant's approval of Shop Drawings or Samples is for design only and is not a complete check on the method of assembly, erection or construction. Approval shall in no way be construed as: (a) permitting any departure whatsoever from the Contract Documents, except where the Contractor, in accordance with the provisions of paragraph 6 of this Section, has previously notified the University and the Consultant of such departure; (b) relieving the Contractor of full responsibility for any error in quality of materials, details, dimensions, omissions or otherwise that may exist; (c) relieving the Contractor of full responsibility for adequate field connections, erection techniques, bracing or deficiencies in strength; (d) relieving the Contractor of full responsibility for satisfactory performance of all work and coordination with the work of all subcontractors and other contractors; or (e) permitting departure from additional details or instructions previously furnished by the Consultant.
- (8) No work requiring a Shop Drawing or Sample shall be commenced until a Shop Drawing or Sample is approved in writing by the Consultant and all such work shall be: (a) in accordance with the approved Shop Drawing, provided the latter conforms in all respects to the Contract Documents or to such deviations therefrom as have been previously noted by the Contractor in accordance with the provisions of paragraph 6 of this Section; and (b) in conformance in all respects to the sample furnished to and approved by the Consultant and, unless otherwise specified, as new and of good quality.

Section 2.20 Equivalents - Approved Equal

A. EQUIVALENTS OR APPROVALS - GENERAL

- (1) The words "similar and equal to", "or equal", "equivalent", and such other words of similar content and meaning shall, for the purposes of this Contract, be deemed to mean similar and equivalent to one of the named products. For the purposes of subdivisions A and B of this Section and for purposes of the Bidding Documents, the word "products" shall be deemed to include the words "articles", "materials", "items", "equipment" and "methods". Whenever in the Contract Documents one or more products are specified, the words "similar and equal to" shall be deemed inserted.
- (2) Whenever any product is specified in the Contract Documents by a reference to the name, trade name, make or catalog number of any manufacturer or supplier, the intent is not to limit competition, but to establish a standard of quality which the Consultant has determined is

necessary for the Project. A Contractor may at its option use any product other than that specified in the Contract Documents provided the same is approved by the Consultant in accordance with the procedures set forth in subdivision B of this Section. In all cases the Consultant shall be the sole judge as to whether a proposed product is to be approved and the Contractor shall have the burden of proving, at its own cost and expense, to the satisfaction of the Consultant, that the proposed product is similar and equal to the named product. In making such determination the Consultant may establish such objective and appearance criteria as it may deem proper that the proposed product must meet in order for it to be approved.

- (3) Nothing in the Contract Document shall be construed as representing, expressly or implicitly, that the named product is available or that there is or there is not a product similar and equal to any of the named products and the Contractor shall have and make no claim by reason of the availability or lack of availability of the named product or of a product similar and equal to any named product.
- (4) The Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Consultant in considering a product proposed by the Contractor or by reason of the failure of the Consultant to approve a product proposed by the Contractor.
- (5) Requests for approval of proposed equivalents will be received by the Consultant only from the Contractor.

B. EQUIVALENTS OR APPROVALS AFTER BIDDING

- (1) Requests for approval of proposed equivalents will be considered by the Consultant after bidding only in the following cases: (a) the named product cannot be obtained by the Contractor because of strikes, lockouts, bankruptcies or discontinuance of manufacture and the Contractor makes a written request to the Consultant for consideration of the proposed equivalent within ten (10) calendar days of the date it ascertains it cannot obtain the named product; or (b) the proposed equivalent is superior, in the opinion of the Consultant, to the named product; or (c) the proposed equivalent, in the opinion of the Consultant, is equal to the named product and its use is to the advantage of the University, e.g., the University receives an equitable credit, acceptable to it, as a result of the estimated cost savings to the Contractor from the use of the proposed equivalent or the University determines that the Contractor has not failed to act diligently in placing the necessary purchase orders and a savings in the time required for the completion of the construction of the Project should result from the use of the proposed equivalent; or (d) the proposed equivalent, in the opinion of the Consultant, is equal to the named product and less than ninety (90) calendar days have elapsed since the Notice of Award of the Contract.
- (2) Where the Consultant pursuant to the provisions of the subdivision approves a product proposed by a Contractor and such proposed product requires a revision or redesign of any part of the work covered by this Contract, all such revision and redesign and all new Drawings and details required therefore shall be subject to the approval of the Consultant and shall be provided by the Contractor at its own cost and expense.
- (3) Where the Consultant pursuant to the provisions of this Section approves a product proposed by a Contractor and such proposed product requires a different quantity and/or arrangement of duct work, piping, wiring, conduit or any other part of the work from that specified, detailed or indicated in the Contract Documents, the Contractor shall provide the same at its own cost and expense.

Section 2.21 Patents, Trademarks and Copyrights

The Contractor acknowledges that the Contract consideration includes all royalties, license fees and costs arising from patents or trademarks in any way involved in the work, provided, however, that the Contract consideration shall not be deemed to have included therein any royalty, license fee or cost arising from a patent or trademark for a design prepared by the Consultant and neither the Contractor nor the University shall have any liability in connection therewith. Where the Contractor is required or desires to use any product, device, material or process covered by patent or trademark, the Contractor shall indemnify and save harmless the University and the State of New York from any and all claims, actions, causes of action or demands, for infringement by reason of the use of such patented product, device, material or process, and shall indemnify the University and the State of New York from any cost, liability, damage and expense, including reasonable attorneys' fees and court costs, which it may be obligated to incur or pay by reason of any claim or infringement at anytime both before or after the University's final acceptance of all the work to be performed under the Contract.

Section 2.22 Possession Prior to Completion

If before the final completion of all the work it shall be deemed advisable or necessary by the University to take over, use, occupy or operate any part of the completed or partly completed work or to place or install therein equipment and furnishings, the University, upon reasonable written notice to the Contractor, shall have the right to do so and the Contractor will not in any way interfere therewith or object to the same. Such action by the University shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract Documents and the Contractor acknowledges that such action by the University does not in any way evidence the completion of the work or any part thereof or in any way signify the University's acceptance of the work or any part thereof, provided, however, that the period for the Contractor's warranties and guarantees under the Contract for the work so occupied or operated shall be deemed to commence on the date said work is occupied or operated. The Contractor agrees to continue the performance of all work covered by the Contract in a manner which will not unreasonably interfere with such takeover, use, occupancy, operation, placement or installation.

Section 2.23 Completion and Acceptance

A. PARTIAL COMPLETION AND ACCEPTANCE

If before the final completion of all the work any portion of the permanent construction has been satisfactorily completed and the same will be immediately useful to the University, the latter may, by written notice, advise the Contractor that it accepts such portion of the work. Such actions by the University shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract with respect to any work not so completed and accepted.

B. SUBSTANTIAL COMPLETION

When all the work covered by the Contract is substantially completed, i.e., has reached such point of completion that the Project can be fully occupied and used for the purposes for which it was intended, the Contractor shall give written notice thereof to the University and the Consultant. The latter will then promptly make an inspection of the work and, if they shall determine that all the work is substantially completed, they shall so advise the Contractor. Such action shall in no way affect the obligations of the Contractor under the terms and provisions of the Contract with respect to any uncompleted (including untested or deferred work), unaccepted or corrective work or in any way affect, limit or preclude the issuance by the Consultant, from time to time thereafter, of "Punch Lists", i.e., lists of uncompleted or corrective work which the Contractor is to promptly complete and/or correct.

C. FULL COMPLETION AND ACCEPTANCE

After the completion of all the work the Contractor shall give written notice to the University and the Consultant that all the work is ready for inspection and final acceptance. The University and the Consultant shall promptly make such inspection and, if they shall determine that all the work has been satisfactorily completed, the University shall thereupon by written notice advise the Contractor that it accepts such work.

Section 2.24 Record Drawings

- (1) Prior to acceptance by the University of all work covered by the Contract, the Contractor shall furnish to the Consultant one (1) set of current Contract Drawings on which the Contractor has recorded, using colored pencil, in a neat and workmanlike manner, all instances where actual field construction differs from work as indicated on the Contract Drawings. These "Record" Drawings shall show the following information: (a) all significant changes in plans, sections, elevations and details, such as shifts in location of walls, doors, windows, stairs and the like made during construction; (b) all significant changes in foundations, columns, beams, openings, concrete reinforcing, lintels, concealed anchorage and "knock-out" panels made during construction; (c) final location of electric panels, final arrangement of electric circuits and any significant changes made in electrical design as a result of Change Orders or job conditions; (d) final location and arrangement of all mechanical equipment and major concealed plumbing, including, but not limited to, supply and circulating mains, vent stacks, sanitary and storm water drainage; and (e) final location and arrangement of all underground utilities, connections to building and/or rerouting of existing utilities, including, but not limited to, sanitary, storm, heating, electric, signal gas, water and telephone.
- (2) Shop Drawings shall not be acceptable as "Record" Drawings.
- (3) The Contractor agrees to provide Record Drawings on "electronic media" or "hard copy" at the discretion of the University at no extra cost.

Section 2.25 Guarantees

- (1) The Contractor, at the convenience of the University, shall remove, replace and/or repair at its own cost and expense any defects in workmanship, materials, ratings, capacities or characteristics occurring in or to the work covered by the Contract within one (1) year or within such longer period as may otherwise be provided in the Contract, the period of such guarantee to commence with the University's final acceptance of all work covered under the Contract or at such other date or dates as the University may specify prior to that time, and the Contractor, upon demand, shall pay for all damage to all other work resulting from such defects and all expenses necessary to remove, replace and/or repair such other work which may be damaged in removing, replacing or repairing the said defects. The obligations of the Contractor under the provisions of this paragraph or any other guarantee provisions of the Contract Documents are not limited to the monies retained by the University under the Contract.
- (2) Unless such removal, replacement and/or repair shall be performed by the Contractor within ten (10) working days after it receives written notice from the University specifying such defect, or if such defect is of such a nature that it cannot be completely removed, repaired and/or replaced within said ten (10) day period and the Contractor shall not have diligently commenced removing, repairing and/or replacing such defect within said ten (10) day period and shall not thereafter with reasonable diligence and in good faith proceed to do such work, the University may employ such other person, firm or corporation as it may choose to perform such removal, replacement and/or repair and the Contractor agrees, upon demand, to pay to the University all amounts which it expends for such work.

Section 2.26 Default of Contractor

- (1) In addition to those instances specifically referred to in other Sections hereof, the University shall have the right to declare the Contractor in default of the whole or any part of the work if:
 - a. The Contractor makes an assignment for the benefit of creditors pursuant to the statutes of the State of New York; or if
 - b. A voluntary or involuntary petition in bankruptcy is filed by or against the Contractor; or if
 - c. A receiver or receivers are appointed to take charge of the Contractor's property or affairs; or if
 - d. The Contractor shall sublet, assign, transfer, convey, or otherwise dispose of the Contract other than as herein specified; or if
- (2) Before the University shall exercise its right to declare the Contractor in default by reason of the conditions set forth in this subsection, it shall give the Contractor three (3) working days' notice of its intention to declare the Contractor in default and unless, within such three (3) day period, the Contractor shall make arrangements, satisfactory to the University, to correct and/or eliminate the conditions set forth in the University's aforesaid notice, the Contractor may be declared in default at the expiration of such three (3) day period or at the expiration of such longer period of time as the University may determine. In addition to those instances specifically referred to above, the University shall have the right to declare the Contractor in default of the whole or any part of the work if, in the sole opinion of the University:

- a. The Contractor becomes insolvent; or if
 - b. The Contractor fails to commence work when notified to do so by the Consultant; or if
 - c. The Contractor shall abandon the work; or if
 - d. The Contractor shall refuse to proceed with the work when and as directed by the Consultant; or if
 - e. The Contractor shall without just cause reduce its working force to a number which, if maintained, would be insufficient, in the opinion of the University, to complete the work in accordance with the approved time progress schedule, and shall fail or refuse to sufficiently increase such working force when ordered to do so by the Consultant; or if
 - f. The Contractor is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the work, or the award of necessary subcontracts, or the placing of necessary material and equipment orders; or if
 - g. The work cannot be completed within the time herein provided therefore or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the University's opinion, attributable to conditions within the Contractor's control; or if
 - h. The work is not completed within the time herein provided therefore or within the time to which the Contractor may be entitled to have such completed extended; or if
 - i. The Contractor is or has been willfully or in bad faith violating any of the provisions of this Contract; or if
 - j. The Contractor is not or has not been executing the Contract in good faith and in accordance with its terms.
- (3) The right to declare in default for any of the grounds specified or referred to shall be exercised by the University sending the Contractor a written notice setting forth the ground or grounds upon which such default is declared. Upon receipt of notice that it has been declared in default, the Contractor shall immediately discontinue all further operations under the Contract and shall immediately quit the site, leaving untouched all plant, materials, equipment, tools and supplies then on site.
- (4) The University, after declaring the Contractor in default, may then have the work completed by such means and in such manner, by contract, with or without public letting, or otherwise, as it may deem advisable, utilizing for such purpose such of the Contractor's plant, materials, equipment, tools and supplies remaining on the site, and also such subcontractors as it may deem advisable, or it may call upon the Contractor's surety at its own expense to do so.
- (5) In the event that the University declared the Contractor in default of the work or any part of the work, the Contractor, in addition to any other liability to the University hereunder or otherwise provided for or allowed by law, shall be liable to the University for any costs it incurs for additional architectural and engineering services necessary, in its opinion, because of the default and the total amount of liquidated damages from the date when the work should have been completed by the Contractor in accordance with the terms hereof to the date of actual completion of the work, both of which items shall be considered as expenses incurred by the University in completing the work and the amount of which may be charged against and deducted out of such monies as would have been payable to the Contractor or its surety if the work had been completed without a default.
- (6) If the University completes the work, the Consultant shall issue a certificate stating the expenses incurred in such completion, including the cost of re-letting. Such certificates shall be final, binding and conclusive upon the Contractor, its surety, and any person claiming under or through the Contractor, as to the amount thereof.
- (7) The expense of such completion, as so certified by the Consultant, shall be charged against and deducted out of such monies as would have been payable to the Contractor if it had completed the work; the balance of such monies, if any, subject to the other provisions of the Contract, to be paid to the Contractor without interest after such completion. Should the expense of such completion, so certified by the Consultant, exceed the total sum which would have been payable under the Contract if the same had been completed by the Contractor, any such excess shall be paid by the Contractor to the University upon demand.
- (8) In the event the University shall determine to complete the work without calling upon the Contractor's surety to do so, the Contractor shall not be entitled, from and after the effective date of the declaration of the default, to receive any further payment under the Contract until the said work shall be wholly completed and accepted by the University.
- (9) In case the University shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractors or persons whom the University may engage to complete the work as to which the Contractor was declared in default.
- (10) The provisions relating to declaring the Contractor in default as to the entire work shall be equally applicable to a declaration of partial default, except that the University shall be entitled to utilize for completion of the part of the work as to which the Contractor was declared in default only such plant, materials, equipment, tools and supplies as had been previously used by the Contractor on such part.
- (11) In completing the whole or any part of the work, the Consultant and the University shall have the power to depart from, change or vary the terms and provisions of the Contract; provided, however, that such departure, change or variation is made for the purpose of reducing the time or expense of such completion. Such departure, change or variations, even to the extent of accepting a lesser or different performance, shall not affect the conclusiveness of the Consultant's certificate of the cost of completion, nor shall it constitute a defense to any action to recover the amount by which such certificate exceeds the amount which would have been payable to the Contractor hereunder but for its default.

- (12) The provisions of this Section shall be in addition to any and all other legal or equitable remedies provided by this Agreement and otherwise available by law.

Section 2.27 Termination

- (1) The performance of work under this Contract may be terminated by the University, in whole or in part, whenever the University shall determine that such termination is in the best interest of the University; or in the event the State Finance Law Sections 139-j and 139-k certifications are found to be intentionally false or intentionally incomplete; or in the event the information provided in Sales Tax Certifications ST-220TD and/or ST-220CA is found to be false or incomplete. Any such termination shall be effected by a notice in writing to the Contractor specifying the date upon which such termination shall become effective and the extent to which performance of the Contract shall be terminated. Such termination shall be effective on the date and to the extent specified in said notice.
- (2) Upon receipt of a notice of termination, and except as otherwise directed in writing by the University, the Contractor shall:
- Discontinue all work and the placing of all orders for materials and facilities otherwise required for the performance thereof;
 - Cancel all existing orders and subcontracts to the extent such orders and subcontracts relate to the performance of work terminated by the notice of termination;
 - Take such actions as may be necessary to secure to the University the benefits of any rights of the Contractor under orders or subcontracts which relate to the performance of work terminated by the notice of termination, including, but not limited to, the assignment to the University, in the manner and to the extent directed by the University, all the right, title and interest of the Contractor under the orders or subcontracts so terminated and canceled. In the event of such assignment, the University shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination and cancellation of such orders and subcontracts;
 - Transfer title and deliver to the University, in accordance with the direction of the University, all materials, supplies, work in process, facilities, equipment, machines or tools produced as a part of or acquired by the Contractor in connection with the work terminated by said notice, and all plans, Drawings, Working Drawings, sketches, Specifications and information for use in connection therewith; provided, however, that the Contractor may retain any of the foregoing if it so elects and forgoes reimbursement therefore;
 - Take such action as may be necessary or as the Consultant or the University may prescribe for the protection and preservation of all property in the possession or control of the Contractor in which the University, under the provisions of the Contract, has or may acquire an interest.
- (3) Notwithstanding the foregoing, should the notice of termination relate to only a portion of the work covered by the Contract, the Contractor will proceed with the completion of such portions of the work as are not terminated.
- (4) The University will pay and the Contractor shall accept, in full consideration for the performance and completion of the portions of the work as are not terminated, a sum calculated by determining the percentage the portions of the work not terminated bear to the total amount of the work covered by the Contract, and by multiplying the Contract consideration by such percentage the product thereof being the amount to be paid to the Contractor. The University shall determine the amount of such consideration in accordance with the foregoing.
- (5) Upon compliance by the Contractor with the foregoing provisions of this Section and subject to deductions for payments previously made, the University, for the portions of the work terminated, shall compensate the Contractor as follows:
- By reimbursing the Contractor for actual expenditures made with respect to such work, including expenditures made in connection with any portion thereof which may have been completed prior to termination, as well as expenditures made after termination in completing those portions of the work covered by the Contract which the Contractor may have been required by the notice of termination to complete. The University shall determine the allocability and amount of such expenditures.
 - By reimbursing the Contractor for all actual expenditures made, with the prior written approval of the University or pursuant to a court judgment, in settling or discharging any outstanding contractual obligations or commitments incurred or entered into by the Contractor in good faith with respect to the Contract and resulting from the termination thereof.
 - By reimbursing the Contractor for all actual expenditures made after the effective date of the notice of termination resulting from or caused by the Contractor taking necessary action or action prescribed by the Consultant or the University for the protection and preservation of all property in the possession or control of the Contractor in which the University, under the provisions of the Contract, has or may acquire an interest.
 - By paying the Contractor a markup, which is to be calculated in the same manner as that provided for in subdivision c of paragraph (1) of Section 4.02 for extra work, on the foregoing expenditures, which markup is to cover the Contractor's overhead and profit; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, said markup shall be reduced by one-third.
- (6) The sum of all amounts payable under this Section, plus the sum of all amounts previously paid by the University under the provisions of the Contract, shall not exceed the amount of the Contract consideration. In no event shall the Contractor be entitled to any payment for loss of anticipated profits on uncompleted work and the University shall not be liable for the same.
- (7) Termination by the University under the provisions of this Section shall be without prejudice to any claims or rights which the University may have against the Contractor. The University may retain from the amount due to the Contractor under the provisions of this Section such monies as may be necessary to satisfy any claim which the University may have against the Contractor in connection with the Contract; provided, however, that the University's failure to retain such monies shall not be deemed a waiver of any of its rights or claims against the

Contractor.

- (8) Notwithstanding the foregoing, where the Contractor and the Consultant can agree upon another method of determining the amount of the consideration to be paid to the Contractor under the provisions of the Section, such method, subject to the approval of the University, may, at the option of the University, be substituted for the method set forth above.

ARTICLE III

Time of Performance

Section 3.01 Commencement, Prosecution and Completion of Work

- (1) The Contractor agrees that it will begin the work herein embraced within ten (10) calendar days after the Contract approval date of the New York State Comptroller and that it will prosecute the same with such diligence that all work covered by the Contract shall be entirely completed and performed on or before the time specified on page A-1 of the Agreement.
- (2) The Contractor further agrees that time is of the essence in this Contract and that the work shall be prosecuted in such manner and with sufficient plant and forces to complete all the work by the specified completion date.

Section 3.02 Time Progress Schedule

- (1) Within thirty (30) calendar days after receipt of the Notice of Award, the Contractor, unless otherwise directed by the University, shall submit to the University and the Consultant for their approval its proposed working plan and schedule for its first ninety (90) calendar days of operation. The working plan and schedule shall be in the form of suitable charts, diagrams or bar graphs and shall be based on the Contractor's logic and time estimates. Such plan and schedule shall be sufficiently detailed to show clearly, in sequence, all salient features of the work of each trade including: the anticipated time of commencement and completion of such work and the interrelationship between such work, submission of Shop Drawings and Samples for approval, approval of Shop Drawings and Samples, placing of orders of materials, fabrication and delivery of materials, installation and testing of materials, contiguous or related work under other contracts, and other items pertinent to the work.
- (2) Within ninety (90) calendar days after receipt of the Notice of Award, the Contractor, unless otherwise directed by the University, shall submit to the University and the Consultant for their approval its proposed working plan and schedule for all the work covered by the Contract. Said proposed working plan and schedule shall be prepared in accordance with the form and requirements set forth in the preceding paragraph.
- (3) The aforesaid proposed working plan and schedule shall be revised by the Contractor until they are satisfactory to the University and the Consultant, and the same shall be periodically revised thereafter and submitted by the Contractor to the University and the Consultant for approval at such time or times as the University or the Consultant may request.
- (4) The proposed working plan and schedule, including any revision or revisions thereof, when approved by both the University and the Consultant shall be known as the time progress schedule. The time progress schedule, as the same may be revised from time to time by the Contractor and approved by the University and the Consultant, shall be strictly adhered to by the Contractor.
- (5) If through the fault of the Contractor or any subcontractor the Contractor shall fail to adhere to the time progress schedule, it must promptly adopt such other and additional means and methods of construction as will make up for the time lost and will assure completion in accordance with such schedule.
- (6) The University's or the Consultant's approval of the Contractor's time progress schedule or of its time, means and/or methods of construction, including any revisions thereof, and/or their failure to reject the same shall not relieve the Contractor of its obligation to accomplish the result required by the Contract, nor shall the exercise of such right to reject, create or give rise to any claim, action or cause of action, legal, equitable or otherwise, against the Consultant or the University.

Section 3.03 Time Schedule for Shop Drawings and Samples

- (1) Within sixty (60) calendar days after the date specified for the commencement of the work, the Contractor, unless otherwise directed by the Consultant, shall submit to the latter for approval a proposed time schedule covering the preparation and submission of all Shop Drawings and Samples. The proposed schedule will be revised by the Contractor until it is satisfactory to the Consultant and it shall be periodically revised thereafter and submitted by the Contractor to the Consultant for approval at such time or times as the Consultant may request.
- (2) The aforesaid schedule, as the same may be revised from time to time by the Contractor, after approval by the Consultant, shall be strictly adhered to by the Contractor.

Section 3.04 Notice of Conditions Causing Delay

- (1) Within ten (10) working days after the commencement of any condition which is causing or may cause delay in completion, the Contractor must notify the Consultant and the University in writing of the effect, if any, of such condition upon the time progress schedule, and must state why and in what respects, if any, the condition is causing or may cause such delay.
- (2) Failure to strictly comply with this requirement may, in the discretion of the University, be deemed sufficient cause to deny any extension of time on account of delay in completion arising out of or resulting from any change, extra work, suspension, or other condition.

Section 3.05 Extension of Time

- (1) An extension or extensions of time for the completion of the work may be granted by the University subject to the provisions of this Section, but only upon written application therefore by the Contractor to the University and the Consultant.
- (2) An application for an extension of time must set forth in detail the source and the nature of each alleged cause of delay in the completion of the work, the date upon which each such cause of delay began and ended and the number of days of delay attributable to each of such causes. It must be submitted prior to completion of the work.
- (3) If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the work caused solely: (a) by the acts or omissions of the University, its trustees, officers, agents or employees; or (b) by the acts or omissions of other contractors, not including subcontractors of the Contractor, on this Project; or (c) by unforeseeable supervening conditions entirely beyond the control of either party hereto (such as, but not limited to, acts of God or the public enemy, war or other national emergency making performance temporarily impossible or illegal, or strikes or labor disputes).
- (4) The Contractor shall, however, be entitled to an extension of time for such causes only for the number of calendar days of delay which the University may determine to be due solely to such causes, and then only if the Contractor shall have strictly complied with all of the requirements of this Section and Section 3.04. The University shall make such determination within ninety (90) calendar days after receipt of the Contractor's application for an extension of time; provided, however, said application complies with the requirements of this Section.
- (5) The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently, but, if at all, only for the actual period of delay in completion of the work as determined by the University, irrespective of the number of causes contributing to produce such delay. If one of several causes of delay operating concurrently results from any act, fault or omission of the Contractor or of its subcontractors or materialmen, and would of itself (irrespective of the concurrent causes) have delayed the work, no extension of time will be allowed for the period of delay resulting from such act, fault or omission.
- (6) The granting of an application for an extension of time for causes of delay other than those herein referred to shall be entirely within the discretion of the University.
- (7) If the Contractor shall claim to have sustained any damages by reason of delays, extraordinary or otherwise, or hindrances which it claims to be due to any action, omission, direction or order by the University or the Consultant, the Contractor shall be entitled only to an extension of time as hereinabove provided and shall not have or assert any claim or prosecute any suit, action, cause of action or proceeding against the University based upon such delays or hindrances, unless such delays or hindrances were caused by the University's bad faith or its willful, malicious, or grossly negligent conduct, or un contemplated delays, or delays so unreasonable that they constitute an intentional abandonment of the contract by the University, or delays resulting from the University's breach of a fundamental obligation of the contract.

Section 3.06 Contractor's Progress Reports

After commencement of the work the Contractor shall furnish the Consultant with written monthly reports setting forth the condition and general progress of the work, the percentage of each part of the work that has been finished, those parts of the work which have been completed within the scheduled time and those parts of the work which have not been finished within the scheduled time, and the general progress of the work that is being performed away from the site and the approximate date when such work will be finished and delivered to the site.

ARTICLE IV

Payment

Section 4.01 Compensation to Be Paid Contractor

The University shall pay to the Contractor and the latter shall accept as full and complete payment for the performance of this Contract, subject to additions or deductions as provided herein, the sum indicated on page 1 of this Agreement which sum is the amount of the total contract compensation. The Contractor shall provide complete and accurate billing invoices to the University in order to receive payment for its services. Billing invoices submitted to the University must contain all information and supporting documentation required by the University and the Office of the State Comptroller (OSC). **Payment for invoices submitted by the Contractor shall only be rendered electronically** unless payment by paper check is expressly authorized by the Vice President for Administration or designee, in her/his sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary New York State procedures and practices. The Contractor shall comply with the OSC procedures to authorize electronic payments. Authorization forms are available at the OSC website at www.osc.state.ny.us/epay/index.htm, by email at epunit@osc.state.ny.us or by telephone at 518-474-4032. The Contractor acknowledges that it will not receive payment on any invoices submitted under this contract if it does not comply with the OSC's electronic payment procedures, except where the Vice President or designee has expressly authorized payment by paper check as set forth above.

Section 4.02 Value of Omitted and Extra Work

- (1) The amount by which the Contract consideration is to be increased or decreased by any Change Order shall be determined by the University by one or more of the following methods:
 - a. By accepting an amount agreed upon by both parties, which amount is to be calculated in a manner similar to that provided in subdivision c hereof.
 - b. By applying the applicable price or prices set forth in the attached Schedule "I" of this Agreement or by applying a unit price agreed to

by both parties. Subject to the provisions of Sections 4.04, this method must be used if the Contract Documents contain applicable unit prices.

- c. By estimating the fair and reasonable cost of: (i) labor, including all wages, required wage supplements and insurance required by law (workers' compensation, social security, disability, unemployment, etc.) paid to or on behalf of foremen, workers and other employees below the rank of superintendent directly employed at the site of the Project; (ii) materials; and (iii) equipment, excluding hand tools, which, in the judgment of the University, would have been or will be employed exclusively and directly on the omitted work or extra work, as the case may be; and, in the case of extra work, where the same is performed directly by the Contractor, by adding to the total of such estimated costs a sum equal to 15 percent thereof, but, where the extra work is performed by a subcontractor, by adding a sum equal to 15 percent of said costs for the benefit of such subcontractor, and by adding, for the benefit of the Contractor (no further allowance will be made where extra work is performed by the sub-subcontractor), an additional sum equal to 10 percent of the first \$10,000 of the above-estimated costs, including the subcontractor's percentage override, plus 5 percent of the next \$90,000 of the total of said items, plus 3 percent of any sum in excess of \$100,000 of the total of said items. For the purposes of the aforesaid percentage overrides, the words "extra work" shall be defined as a complete item of added, modified or changed work as described in the Consultant's written instructions to the Contractor. Such "extra work" may include the work of one or more trades and/or subcontractors or sub-subcontractors and shall include all labor, materials, plant, equipment, tools and all incidentals directly and/or indirectly necessary, related, involved in or convenient to the successful completion of the extra work item. Where the Consultant's aforesaid written instructions to the Contractor involve both an increase and a reduction in similar or related work, the above percentage overrides will be applied only on the amount, if any, the cost of the increased work exceeds the cost of the reduced work.

All profit, overhead and expense of whatsoever kind and nature, other than those set forth above in items (i) through (iii), of the Contractor, its subcontractors and sub-subcontractors, are covered by the aforesaid percentage overrides and no additional payment therefore will be made by the University. The University may make such cost estimate either before or after the extra work is completed by the Contractor.

- d. By determining the actual cost of the extra work in the same manner as in the above subdivision c except that actual costs of the Contractor shall be utilized in lieu of estimated costs. The University shall have the option of utilizing this method provided it notifies the Contractor of its intent to do so prior to the time the Contractor commences performance of such extra work.
- (2) Irrespective of the method used or to be used by the University in determining the value of a Change Order, the Contractor, within fifteen (15) working days after a request for the same, must submit to the University and the Consultant a detailed breakdown of the Contractor's estimate of the value of the omitted and/or extra work.
 - (3) For the purposes of paragraph (1) hereof, the cost of equipment shall be determined, irrespective of the actual price for any rental or actual cost associated with such equipment and irrespective of whether the equipment is or is not owned by the Contractor, as follows: (a) for the first 40 hours of use by taking the monthly rate listed in the "Green Book" (the publication of the Associated Equipment Distributors of Oakbrook, Illinois) and dividing the same by 176 hours to establish an hourly rate and then multiplying such hourly rate by the actual number of hours that the equipment was used; and (b) for any period of time in excess of the first 40 hours of use by taking 50 percent of the hourly rate established in accordance with the above for equipment used for periods of less than 40 hours, and then multiplying such rate by the actual number of hours in excess of 40 hours that the equipment was used. In the event that the "Green Book" does not list the item of equipment used, the applicable rate shall be determined in the same manner as that set forth above except that the monthly rate shall be that set forth in the "Blue Book" (published by Equipment Guidebook Co. of Palo Alto, California). If no listing or rates for an item of equipment is contained in either the "Green Book" or the "Blue Book", the University shall determine the reasonable rate of rental of the particular item of equipment by such other means as it finds appropriate. The editions of the "Green Book" and the "Blue Book" to be used shall be those in effect on the date of the receipt of bids for this Contract. None of the provisions of the "Green Book" or the "Blue Book" shall be deemed referred to or included in this Contract excepting only the aforesaid monthly rates. To the cost of equipment as determined above, there is to be added the actual cost of gasoline, oil, grease and maintenance required for operation of such equipment and, in the case of equipment utilized only for extra work when, in the opinion of the Consultant, suitable equipment therefore was not available on the site, the reasonable cost of transporting said equipment to and from the site. Notwithstanding the foregoing, if the Consultant should determine that the nature or size of the equipment used by the Contractor in connection with the extra work is larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the Consultant to be suitable for the extra work, the cost of equipment will not be based upon the equipment used by the Contractor but instead will be based on the smallest or least elaborate equipment determined by the Consultant to have been suitable for the performance of the extra work.
 - (4) Unless otherwise specifically provided for in a Change Order, the compensation specified therein for extra work includes full payment for both the extra work covered thereby and for any damage or expense caused the Contractor by any delays to other work to be done under the Contract resulting from or on account of said extra work, and the Contractor waives all rights to any other compensation for said extra work, damage or expense.

Section 4.03 Adjustment for Bond and Insurance Premiums

Upon final acceptance of the work to be performed under this Contract, the University shall adjust the Contract consideration to reflect any changes in the cost of all required Bonds and liability and builder's risk insurance premiums which the Contractor had to pay for on all extra work and would have had to furnish and pay for on all omitted work. Unless such cost is agreed upon by the University and the Contractor, the University shall calculate and determine the amount of the adjustment in the Contract consideration by estimating such cost.

Section 4.04 Unit Prices

- (1) Except as otherwise provided in the second paragraph of this Section, the unit prices, set forth in the attached Schedule I will be binding upon both the University and the Contractor in determining the value of omitted and/or extra work, and, in the case of extra work, such unit prices shall be deemed to include all profit, overhead and expenses of whatever kind and nature of the Contractor, its subcontractors and sub-subcontractors, and the Contractor agrees that it shall make no claim for any profit, overhead, expense or percentage override in

connection therewith.

- (2) Where Schedule I sets forth a unit price for added and/or deducted work, the University shall have the option, whenever it is found that the quantity of changed work varies by more than 15 percent from the quantity that is stated or that can be determined by the Contract Documents at the time of execution thereof, to accept or reject such unit price for the quantity that the changed work varies by more than 15 percent from the stated or determinable quantity. Where a quantity is not specifically stated in the Contract Documents, the University's determination of the amount of said quantity included in the Contract Documents shall determine the applicability of this paragraph. Where the University, pursuant to the foregoing provisions, exercises its aforesaid option, the amount of the increase or decrease in the Contract consideration for the quantity of work which varies by more than 15 percent from the stated or determinable quantity shall be determined in accordance with the provisions of Section 4.02 of the Agreement as if there was no unit price therefore set forth in said Proposal.

Section 4.05 Allowances

- (1) The Contractor acknowledges that the Contract consideration includes the allowances set forth in the attached Schedule I and, except for quantitative allowances, it agrees to cause the work covered thereby to be done by such contractors for such sums as the University may direct. Where cash allowances are provided, the allowances shall be deemed to include the purchase of the materials and/or equipment and the delivery of the same to the job site. Unless otherwise specified in the Contract Documents, cash allowances do not include the proper installation of the materials and/or equipment or the connection for final utilities thereto; the cost of said installation and/or connection having been included in the amount of the Contract consideration.
- (2) The Contractor acknowledges that the Contract consideration includes such sums for expenses and profit on account of cash allowances as it deems proper and that it shall make no claim for expenses or profit or any percentage override in addition thereto; said items having been included in the amount of the Contract consideration.
- (3) In the event any cash allowance listed below is either higher or lower than the cost of having the work done in accordance herewith, the Contract consideration shall be adjusted to reflect such variance, the amount of said adjustment to be the difference between the amount of the allowance and the actual cost of performing the work covered thereby.
- (4) When quantitative allowances are provided, progress payments thereof to the Contractor will be based upon the applicable unit prices set forth in the attached Schedule I, subject, however to the provisions of paragraph (2) of Section 4.04. In the event any of said quantitative allowances are more than or less than the actual quantity of work performed, the Contract consideration shall be adjusted to reflect such variance, the amount of said adjustment to be determined in accordance with the provisions of Section 4.02 and Section 4.04 of the Agreement.

Section 4.06 Deductions for Unperformed and/or Uncorrected Work

- (1) Without prejudice to any other rights, remedies or claims of the University, in the event that the Contractor at any time fails or neglects to supply working forces and materials of the proper quantity and quality necessary, in the opinion of the Consultant or the University, to comply with the approved time progress schedule, or fails in any respect to prosecute the work with promptness and diligence or causes by any action or omission the stoppage or delay of or interference with the work of any other contractor having a contract with the University, or fails in the performance of any obligations and responsibilities under this Contract, then, and in that event, the University, acting itself or through the Consultant, may, upon three (3) working days' notice to the Contractor, either itself provide or have any other contractor provide any and all labor or materials or both necessary, in its opinion, to correct any aforesaid deficiency of the Contractor, and the University will thereafter back charge the Contractor by issuing a Change Order reducing the amount of the Contract consideration for all costs and expenses it incurs in connection with the correction of such deficiency.
- (2) Notwithstanding any provisions in the Contract Documents to the contrary, if the University deems it inexpedient to correct work not done in accordance with the Contract or any work damaged as a result thereof, it shall notify the Contractor of such fact and the latter shall not remedy or correct the same. In such event, however, the amount of the Contract consideration shall be decreased by an amount, determined by the University, which is equal to the difference in value of the work as performed by the Contractor and the value of the work had it been satisfactorily performed in accordance with the Contract or which is equal to the cost of performing the corrective work, whichever shall be the higher amount.

Section 4.07 Liquidated Damages

In the event that the Contractor shall fail to substantially complete all the work within the time fixed for such completion on page A-1 of the Agreement, or within the time to which such completion may have been extended, or in the event that the Contractor abandons the work and the same is not substantially completed within the aforesaid time for such completion, the Contractor must pay to the University as damages for each calendar day of delay in completing the work the amount set forth on page A-1. In view of the difficulty of accurately ascertaining the loss which the University will suffer by reason of delay in completion of the work hereunder, said sum is hereby fixed and agreed as liquidated damages which the University will suffer by reason of such delay and not as a penalty. The University may deduct and retain out of the monies which may become due hereunder to the Contractor the amount of any such liquidated damages and, in case the amount which may become due to the Contractor under the provisions of the Contract may be less than the liquidated damages suffered by the University, the Contractor shall pay the difference, upon demand, to the University.

Section 4.08 Contract Breakdown

Prior to the submission of its first application for a progress payment, the Contractor shall present to the University and the Consultant for their approval a detailed schedule showing the breakdown of the Contract consideration. Such schedule must contain the amount estimated for each part of the work and quantity survey for each part of the work. It shall also list the estimated value of the Contractor's guarantee obligations under the provisions of the Contract Documents, which is hereby fixed at \$5,000 or one-half of one percent (1/2%) of the Contract award amount, whichever is the lesser sum. Such schedule shall be revised by the Contractor until the same shall be satisfactory to the University and the Consultant and shall

not be changed after the University and the Consultant have approved the same. The amounts set forth in the schedule will not be considered as fixing the basis for additions to or deductions from the Contract consideration.

Section 4.09 Prompt Payment Requirements

- (1) For the purposes of Article XI-A of the State Finance Law, the campus for which the work is being performed is the University's designated payment office. Applications for payment must contain the approval of the Consultant before being submitted to the University.
- (2) Whenever the Consultant's approval of an application for payment is required under the Contract, the Consultant shall have fifteen (15) calendar days after receipt of such application to inspect the work before acting on the application.
- (3) This Contract is subject to the approval of the Comptroller of the State of New York. Until such approval is given, the thirty (30) day period referred to in Article XI-A of the State Finance Law for the payment of invoices without interest shall not begin.

Section 4.10 Progress Payments

- (1) Unless otherwise provided in the Contract, progress payments will be made as the work progresses upon applications submitted by the Contractor and approved by the Consultant and the University. Payment of such approved applications shall be made by the University within thirty (30) days after such approval has been given.
- (2) The University shall make progress payments to the Contractor on the basis of such approved applications, less an amount equal to 5 percent thereof, plus an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged, which it shall reserve from each such payment until all of the work covered by the Contract has been completed.
- (3) When the University and the Consultant have determined that all the work is substantially completed, or that a substantial portion of the permanent construction has been completed and accepted, the University shall make a progress payment to the Contractor, on the basis of an application submitted by the Contractor and approved by the Consultant and the University, which shall reduce the unpaid amount due to the Contractor under the terms of the Contract, including all monies retained by the University from previous progress payments to the Contractor, to an amount equal to two (2) times the cost, estimated by the Consultant, of performing, in accordance with the Contract, all uncompleted, unaccepted and corrective work, plus an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. As the remaining items of work are satisfactorily completed or corrected, the University shall make progress payments to the Contractor, on the basis of applications submitted by the Contractor and approved by the University and the Consultant, covering said items of work less an amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

Section 4.11 Applications for Progress Payments

The Contractor shall prepare all applications for progress payments for work performed, together with supporting data and computations as are deemed necessary by the Consultant to determine the accuracy of the application. The application for payment shall be submitted on the form prescribed by the University. Failure of the Contractor to submit applications for progress payments, or lack of complete and accurate supporting data, shall be sufficient reason for withholding payment until such omissions or errors are rectified. Unless otherwise directed, such applications, signed and certified as correct by the Contractor, shall be delivered by the Contractor to the Consultant once each month showing the total value of work completed and in place on the last day of the payment period covered by the application.

Section 4.12 Progress Payments for Materials Delivered to Site

- (1) Progress payments made in accordance with Section 4.10 shall include a payment for materials and equipment to be furnished and installed under the Contract, after such materials and equipment have been delivered and accepted at the site of the work.
- (2) Materials and equipment for which such progress payment has been made shall not be removed from the site, shall be stored until incorporated into the work in a location approved by the Consultant and shall be adequately protected from fire, theft and vandalism, the effects of the elements and any other damage whatsoever, and shall at all times be available for inspection by the Consultant and the University.

Section 4.13 Transfer of Title to Materials Delivered to Site

Title to all supplies and materials to be furnished or provided by the Contractor to the University pursuant to the provisions of the Contract Documents shall immediately vest in and become the sole property of the University upon delivery of such supplies and materials to the site. Notwithstanding such transfer of title, the Contractor shall have the full continuing responsibility to install such materials and supplies, protect them, maintain them in proper condition and forthwith repair, replace and make good any damage thereto without cost to the University until such time as the work covered by the Contract is fully accepted by the University. Such transfer of title shall in no way affect any of the Contractor's obligations under the Contract. In the event that, after title has passed to the University, any of such supplies and materials are rejected as being defective or otherwise unsatisfactory, title to all such supplies and materials shall be deemed to have been transferred back to the Contractor.

Section 4.14 Progress Payments for Materials Stored Off Site

- (1) Progress payments made in accordance with Section 4.10 shall include a payment for materials and equipment which are in short and/or critical supply or have been specially fabricated for the Project. Materials and equipment, for which a progress payment is made pursuant to the preceding sentence, shall be stored by the Contractor, after fabrication, until such time as their delivery to the site is required, at a facility and location approved by the Consultant; shall be adequately protected from fire, theft and vandalism, the effects of the elements and any

other damage whatsoever; and shall at all times be available for inspection by the Consultant and the University. No progress payment shall, however, be made for said materials and equipment until:

- a. The Contractor furnishes to the University a bill of sale listing quantity and costs of said materials and equipment f.o.b. point of origin;
- b. The Consultant shall have inspected said materials and equipment and recommended payment therefore; and
- c. The Contractor furnishes to the University a builder's risk insurance policy, with the broad form extended coverage endorsement, for said materials and equipment, in an amount equal to 100 percent of the value thereof, which policy shall be maintained, at the sole cost and expense of the Contractor, until said materials and equipment have been incorporated into the Project. The said insurance policy shall contain a provision that the loss, if any, is to be made adjustable with and payable to the University as trustee for the insured, i.e., the University and the Contractor, and a provision that it shall not be changed or canceled and that it will be automatically renewed upon expiration and continued in force unless the University is given fifteen (15) days' written notice to the contrary.

- (2) Materials and equipment for which a progress payment has been made by the University pursuant to this Section shall be, become and remain the sole property of the University; provided, however, that the Contractor shall have the full continuing responsibility to install such materials and equipment, to deliver it to the site, to protect it, to maintain it in proper condition and to forthwith repair, replace and make good any damage thereto without cost to the University until such time as the work covered by the Contract is fully accepted by the University. Such transfer of title shall in no way affect any of the Contractor's obligations under the Contract.

Section 4.15 Withholding of Progress Payments

Notwithstanding anything contained in the Contract to the contrary, the University may withhold payment of all or any part of a progress, final or guarantee payment, in such an amount as it may deem proper to enforce the provisions of the Contract and to satisfy the claims of third parties, when:

- a. The University shall learn of any claim, of whatever nature or kind, against the University or the Contractor, which in any way arises or is alleged to arise out of or as a result of or in connection with the performance by the Contractor of the work covered by the Contract or out of or in connection with the Contractor's operations or performance at or in the vicinity of the construction site, that, in the opinion of the University, may not be adequately covered by insurance.

If an action on such claim is timely commenced and the liability of the University and/or the Contractor shall have been established therein by a final judgment of a court of competent jurisdiction, or if such claim shall have been admitted by the Contractor to be valid, the University shall pay such judgment or admitted claim out of the monies retained by it under the provisions of the Contract and return the balance, if any, without interest, to the Contractor.

The University may withhold from the Contractor any payments retained by it until such time as all such claims are either satisfied or barred by law from being presented. At such time the University, upon written demand by the Contractor, shall return to the Contractor the amount so withheld, without interest.

- b. The Contractor has not complied with any lawful or proper direction of the Consultant or the University or their representatives concerning the work covered by the Contract or the performance of the Contract or the production of records as required under the provisions of the Contract.
- c. There exists any of the conditions, listed in Section 2.26, which would allow the University to declare the Contractor in default of the whole or any part of the work.
- d. The Contractor is a foreign contractor and has not furnished satisfactory proof that all taxes due by such Contractor under the provisions of the Tax Law have been paid. The Certificate of the New York State Tax Commission to the effect that all such taxes have been paid shall be conclusive proof of the payment of such taxes. The term "foreign contractor" as used herein means, in the case of an individual, a person who is not a resident of the State of New York; in the case of a partnership, one having one or more partners not a resident of the State; and in the case of a corporation, one not organized under the laws of the State of New York.
- e. The Contractor, upon request of the University at any time after the initial progress payment by the University to the Contractor, fails to furnish the University with such documentary evidence that the University may deem necessary to prove to it that material and labor paid for by the University under previous applications for payment submitted have been paid for by the Contractor and that there are no outstanding claims or liens in connection therewith or fails to satisfy the University that the Contractor, with good cause, has sufficiently provided for the payment and/or satisfaction of claims for said material and labor.

Section 4.16 Lien Law

The attention of the Contractor is specifically called to the provisions of the Lien Law of the State of New York, wherein funds received by a Contractor for a public improvement are declared to constitute trust funds in the hands of such Contractor to be applied first to the payment of certain claims.

Section 4.17 Substitution of Securities for Retainage

Any time after 50 percent of all the work has been completed, the University, if the progress and performance of the work is satisfactory to it, on request of the Contractor, will allow the Contractor to withdraw up to 50 percent of the aforesaid amount retained by the University by depositing with the Comptroller of the State of New York government securities, of the type and kind specified in Section 139 of the State Finance Law, having a market value not exceeding par, at the time of deposit, equal to the amount so withdrawn. The Comptroller of the State of New York shall, from time to time, collect all interest or income on the obligations so deposited, and shall pay the same, when and as collected, to the Contractor. If the deposit

is in the form of coupon bonds, the coupons as they respectively become due shall be delivered to the Contractor; provided, however, that the Contractor shall not be entitled to interest or coupons or income on any of the deposited securities, the proceeds of which have or will be used or applied by the University. In the event that the Contractor does not, in accordance with the terms and provisions of the Contract, comply with and fulfill all of its obligations and responsibilities thereunder, the Comptroller of the State of New York shall have the right to sell, assign, transfer or otherwise dispose of the aforesaid securities and the University shall have the right to use and apply all or any part of the monies obtained by the Comptroller of the State of New York from such a sale, assignment, transfer or disposition or from the collection of interest or income from said securities to the performance and fulfillment of said obligations and responsibilities. Notwithstanding the foregoing, when the University makes a payment under Section 4.10 (3) of the Agreement, it will return to the Contractor, as part of such payment, its substituted securities, and thereafter all retention of the University shall be in funds and not in substituted securities.

Section 4.18 Final Payment

Upon acceptance of all the work, except for the Contractor's guarantee obligations under Section 2.25 of the Agreement and the Contractor's guarantee obligations under any provision of the Specifications, the contractor shall prepare and submit to the University and the Consultant, for their approval, a final application for payment, which the University, within thirty (30) days after its approval of the same, shall pay. Such application and payment shall be in an amount equal to 100 percent of the Contract consideration, excluding the Contractor's guarantee obligations (reference Section 4.08), less:

- a. All previous payments by the University to the Contractor;
- b. All deductions authorized to be made by the University under the Contract; and
- c. An amount necessary, in the University's judgment, to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

Section 4.19 Acceptance of Final Payment

- (1) The acceptance by the Contractor, or by anyone claiming by or through it, of the final payment shall, except with respect to the amount retained by the University pursuant to the provisions of subdivisions b and c of Section 4.18 of the Agreement, constitute and operate as a release to the University from any and all claims of any liability for anything theretofore done or furnished for or relating to or arising out of the work covered by the Contract and for any prior act, neglect or default on the part of the University or any of its trustees, officers, agents or employees in connection therewith.
- (2) Should the Contractor refuse to accept the final payment as tendered by the University or should the Contractor refuse to execute the final application for payment without protest and without reserving any rights or claims against the University, it shall constitute a waiver of any right to interest on the amount of the payment so tendered and/or on the amount set forth in said final application for payment.

Section 4.20 Guarantee Payment

- (1) Subject to the provisions of the second paragraph of this Section, at the expiration of one (1) year after the University has accepted all the work covered by the Contract, the Contractor shall prepare and submit to the University and the Consultant, for their approval, a guarantee application for payment, which the University, within thirty (30) days after its approval of the same, shall pay. Such application and payment shall be in an amount equal to the monies retained by the University for the Contractor's guarantee obligations under the Agreement, less any monies deducted by the University under this Section. The Contractor shall not be entitled to any interest on the monies retained by the University pursuant to subdivision c of Section 4.18 of the Agreement.
- (2) In the event the Contractor does not, in accordance with the terms and provisions of the Contract, complete all corrective work or comply with and fulfill its contractual obligations, the University may use and apply all or any part of the monies retained by it to have such work or obligations performed or fulfilled by a person, firm or corporation other than the Contractor. The obligations of the Contractor, under the terms and provisions of the Contract, shall not, however, be limited to the monies retained by the University pursuant to the provisions of the Contract.
- (3) No payments may be made under this agreement for work completed more than 365 days after
{Insert Contract Closing Date}
Unless the date/duration listed on page A-1, is extended in writing by the Fund, and approved by OSC.

Section 4.21 Acceptance of Guarantee Payment

The acceptance by the Contractor, or by anyone claiming by or through it, of the guarantee payment shall constitute and operate as a release to the University from any and all claims in connection with monies retained by the University. Should the Contractor refuse to accept the guarantee payment as tendered by the University or should the Contractor refuse to execute the guarantee application for payment without protest and without reserving any rights or claims against the University, it shall constitute a waiver of any right to interest on the amount of the payment so tendered and/or on the amount set forth in said guarantee application for payment.

Section 4.22 Contractor Limited to Money Damages

Inasmuch as the Contractor can be compensated adequately by money damages for any breach of the Contract which may be committed by the

University, the Contractor agrees that no default, act or omission of the University shall constitute a material breach of the Contract entitling it to cancel or rescind the same or to suspend or abandon performance thereof; and it hereby waives any and all rights and remedies to which it might otherwise be or become entitled to because of any wrongful act or omission of the University or its representatives, saving only its right to money damages.

Section 4.23 No Estoppel or Waiver

- (1) The University shall not be precluded or estopped by any inspection, acceptance, application for payment or payment, final or otherwise, issued or made under the Contract or otherwise issued or made by it, the Consultant, or any trustee, officer, agent or employee of the University, from showing at any time the true amount and character of the work performed, or from showing that any such inspection, acceptance, application for payment or payment is incorrect or was improperly issued or made; and the University shall not be precluded or estopped, notwithstanding any such inspection, acceptance, application for payment or payment, from recovering from the Contractor any damages which it may sustain by reason of any failure on its part to comply strictly with the Contract and any monies which may be paid to it or for its account in excess of those to which it is lawfully entitled.
- (2) Neither the acceptance of all or any part of the work covered by the Contract; nor any payment therefore; nor any order or application for payment issued under the Contract or otherwise issued by the University, the Consultant, or any trustee, officer, agent or employee of the University; nor any permission or direction to continue with the performance of the Contract before or after its specified completion date; nor any performance by the University of any of the Contractor's duties or obligations; nor any aid lent to the Contractor by the University in its performance of such duties or obligations; nor any delay or omission by the University to exercise any right or remedy accruing to it under the terms of the Contract or existing at law or in equity or by statute or otherwise; nor any other thing done or omitted to be done by the University, its trustees, officers, agents or employees; shall be deemed to be a release to the Contractor or its sureties from any obligations, liabilities or undertakings in connection with the Contract or the Performance Bond or a waiver of any provision of the Contract or of any rights or remedies to which the University may be entitled because of any breach thereof, excepting only a written instrument expressly providing for such release or waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Contract, because of any breach hereof, shall be deemed a waiver of any money damages to which the University may be entitled because of such breach. No waiver by the University of any breach of the Contract shall be deemed to be a waiver of any other or any subsequent breach.

Section 4.24 Limitation of Actions

- (1) No action or proceeding shall be maintained by the Contractor, or anyone claiming under or through the Contractor, against the University, or its trustees, officers, agents or employees, upon any claim arising out of or based upon the Contract or any breach thereof or by reason of any act or omission or requirement of the University, or its trustees, officers agents or employees, unless:
 - a. Such action or proceeding is instituted in the Court of Claims for the State of New York;
 - b. The Contractor or the person claiming under or through it shall have strictly complied with all requirements relating to the giving of notices and information with respect to such claims; and
 - c. Such action or proceeding shall be commenced within one (1) year after the submission to the University of the final application for payment or, if the claim is based upon monies required to be retained for any period after the date of the final application for payment, such action is commenced within six (6) months after such monies become due and payable under the terms of the Contract; or
 - d. If the Contract is terminated or the Contractor declared in default by the University, such action is commenced within six (6) months after the date of such termination or declaration of default by the University.
- (2) Notwithstanding anything in the laws of the State of New York to the contrary, the Contractor, or anyone claiming under or through the Contractor, shall not be entitled to any additional time to begin anew any other action if an action commenced within the times herein specified is dismissed or discontinued for any reason whatsoever.

ARTICLE V

Protection of Rights and Property

Section 5.01 Accidents and Accident Prevention

The Contractor shall at all times take reasonable precautions for the safety of persons engaged in the performance of the work. The Contractor shall comply fully with all applicable provisions of the laws of the State of New York, OSHA, and with all valid rules and regulations adopted or promulgated by the agencies of the State of New York pursuant thereto. The Contractor's attention is specifically called to the applicable rules and regulations, codes and bulletins of the New York State Department of Labor.

Section 5.02 Adjoining Property

The Contractor shall be required to protect all the adjoining property and to repair or replace any such properties damaged or destroyed by it, its employees or subcontractors through, by reason of or as a result of activities under, for or related to the Contract.

Section 5.03 Emergencies

- (1) In case of an emergency which threatens loss or injury to persons or property, the Contractor will be allowed to act, without previous instructions from the Consultant or the University, in a diligent manner, to the extent required to avoid or limit such loss or injury, and it shall

notify the Consultant and the University immediately thereafter of the action taken by it and of such emergency. Where the Contractor has not taken action but has notified the Consultant or the University of an emergency which threatens loss or injury to persons or property, it shall act in accordance with the instructions and/or authorization by the Consultant or the University.

- (2) In the event that the Contractor performs extra work in accordance with the preceding paragraph, it will be compensated therefore in accordance with the provisions of Section 4.02.

Section 5.04 Fire Safety

- (1) In the event that a municipal fire alarm box is not located within 300 feet from the site of the Project, the Contractor will be required to provide at the site of the Project, at a location approved by the Consultant, a private unlisted telephone reserved for fire calls only. The phone must be in addition to regular business phones and a rule prohibiting its use for purposes other than alarm for fire or other emergencies must be strictly enforced. The phone itself should be colored red and be located at a point quickly available to all employees, including watchmen. Clear instructions for the sending of a fire alarm should be conspicuously posted by the phone and all personnel customarily at work near the phone shall be acquainted with the procedure. If such a phone is required, the Contractor, at its sole cost and expense, must provide the same from the time the University first approves the Contract breakdown to be submitted by the Contractor pursuant to the provisions of Section 4.08 up until the time the University accepts all the work covered by the Contract.
- (2) All solid fuel salamanders and U. L. approved heaters used by the Contractor or any of its subcontractors shall be arranged in a standard manner. All other salamanders used by the Contractor or any of its subcontractors shall require constant attendance of competent persons on each floor where in use.
- (3) All temporary fabric used by the Contractor or any of its subcontractors for curtains or awnings shall be either non-combustible or flame retarded so that it will not burn or propagate flame.

Section 5.05 Risks Assumed by Contractor

- (1) The Contractor solely assumes the following distinct several risks whether they arise from acts or omissions (whether negligent or not and whether supervisory or otherwise) of the Contractor, of the University, of third persons or from any other cause, including unforeseen obstacles and difficulties which may be encountered in the prosecution of the work covered by the Contract, whether such risks are within or beyond the control of the Contractor and whether such risks involve a legal duty, primary or otherwise, imposed upon the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York, excepting only risks which arise from defects in maps, plans, designs or Specifications prepared, acquired or used by the Consultant or the University, from the negligence of the University, its agents or employees or from affirmative acts of the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York or their trustees, officers, agents or employees committed with intent to cause the loss, damage and injuries herein below set forth:
 - a. The risk of loss or damage, direct or indirect, to the work covered by the Contract or to any plant, equipment, tools, materials or property furnished, used, installed or received by the University or by the Contractor or any subcontractor, materialman or worker performing services or furnishing materials for the work covered hereunder.

The Contractor shall bear such risk of loss or damage until the work covered by the Contract has been fully accepted by the University or until completion of removal of such plant, equipment, tools, materials or property from the construction site and the vicinity thereof, whichever event occurs last. In the event of such loss or damage, the Contractor shall forthwith repair, replace and/or make good any such loss or damage without cost to the University.
 - b. The risk of claims, just or unjust, by third persons against the Contractor, the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York, or the State University of New York on account of wrongful death, bodily injuries and property damage, direct or consequential, loss or damage of any kind whatsoever arising or alleged to arise out of or as a result of or in connection with the performance by the Contractor of the work covered by the Contract (whether actually caused by or resulting from the performance of the Contract) or out of or in connection with the Contractor's operations or presence at or in the vicinity of the construction site. The Contractor shall bear such risk for all such deaths, injuries, damages or losses sustained or alleged to have been sustained prior to the final acceptance by the University of all work covered by the Contract. The Contractor shall also bear the risk of claims for wrongful death occurring subsequent to said final acceptance provided such death is caused, contributed to or is a consequence of bodily injuries sustained or alleged to have been sustained prior to said final acceptance.
- (2) The Contractor shall indemnify and save harmless the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, their trustees, officers, agents or employees against all claims described above and for all costs and expenses incurred by them in the defense, settlement or satisfaction thereof, including attorneys' fees and court costs. If so directed, the Contractor shall at its own expense defend against such claims, in which event it shall not, without obtaining express advance permission from Counsel of the University, raise any defense involving in any way jurisdiction of the tribunal over the University, governmental nature of the University or the provisions of any statutes respecting suits against the University.
- (3) Neither the University's final acceptance of the work to be performed hereunder nor the making of any payment shall release the Contractor from its obligations under this Section. The enumeration elsewhere in the Contract of particular risks assumed by the Contractor or of particular claims for which it is responsible shall not be deemed to limit the effect of the provision of this Section or to imply that it assumes or is responsible for only risks or claims of the type enumerated.

Section 5.06 Insurance

(1) General Requirements

- a. Prior to the commencement of the work to be performed by the Contractor, the Contractor shall procure at its sole cost and expense, and maintain in force at all times during this Agreement until Final Payment and as further required by the contract, policies of insurance as herein set forth below. All insurance shall be written by insurance carriers approved by the University licensed to do business in the State of New York ("admitted" carriers), and rated at least "A-" by A.M. Best Company.
- b. Prior to the commencement of the work, the Contractor shall submit to the University, certificates of insurance, in a form acceptable to the University, showing evidence of compliance with all insurance requirements contained in this Agreement. Certificates of Insurance (with the exception of Workers' Compensation and Disability) must be provided on an ACORD 25 Certificate of Insurance, or an equivalent form. Certificates of Insurance shall disclose any deductible, self insured retention, aggregate limit or any exclusion to the policy that materially changes the coverage required by the contract; specify the additional insureds and named insureds as required herein; and be signed by an authorized representative of the insurance carrier or producer. Deductibles or self-insured retentions above \$25,000 are subject to approval by the University and additional security may be required. Certificates shall reference the Contract number. Only original documents will be accepted.
- c. All insurance shall provide that the required coverage apply on a primary and not on an excess or contributing basis as to any other insurance that may be available to the University for any claim arising from the Contractor's work under this Agreement, or as a result of Contractor's activities. Any other insurance maintained by the University shall be in excess of and shall not contribute with the Contractor's insurance, regardless of the "other insurance" clause contained in the University's own policy of insurance. A copy of the endorsement reflecting this requirement may be requested by the University.
- d. Not less than thirty days prior to the expiration date or renewal date, the Contractor shall supply the University with updated replacement certificates of insurance and endorsements. The Contractor shall advise the University of any letter or notification that cancels, materially changes, or non- renews the policy and Contractor shall require the insurance carrier(s) to copy the University on any letter or notification that cancels, materially changes, or non- renews the policy. If, at any time during the period of the Agreement, insurance as required is not in effect, or proof thereof is not provided to the University, the University shall have the options to (i) direct the Contractor to stop work with no additional cost or extension of time due on account thereof; or (ii) treat such failure as an event of default under Section 2.26 of the Agreement. At any time the coverage provisions and limits of the policies required herein do not meet the provisions and limits set forth in the Agreement the Contractor shall immediately cease Work on the Project. The Contractor shall not resume Work on the Project until authorized to do so by the University. Any delay or time lost as a result of the Contractor not having insurance required by the Agreement shall not give rise to a delay claim or any other claim against the University. If required by the University, Contractor shall deliver to the University within forty-five (45) days of such request, a copy of any or all policies of insurance not previously provided, certified by the insurance carrier as true and complete.
- e. Should the Contractor engage a subcontractor, the Contractor shall impose the insurance requirements of this document on those entities, as applicable. Required insurance limits should be determined commensurate with the work of the subcontractor. Contractor shall keep the subcontractor certificates of insurance on file and produce them upon the demand of the University.
- f. The aggregate insurance limits set forth herein shall apply separately to each contract for which a certificate of insurance and/or policy is issued.
- g. Unless otherwise agreed to in writing by the University, policies must be endorsed to provide that there shall be no right of subrogation against the University. To the extent that any of the policies of insurance prohibit such a waiver of subrogation, Contractor shall secure the necessary permission to make this waiver.
- h. Except as otherwise specifically provided herein or agreed in writing, policies must be written on an occurrence basis. The insurance policy(ies) shall name the State University Construction Fund, State University of New York, State of New York, its officers, agents, and employees as additional insureds thereunder. The additional insured requirement does not apply to Workers' Compensation or Disability coverage. Include ISO Endorsement CG 20 10 11 85 or its equivalent.

(2) Specific Coverage and Limits

The Contractor shall obtain and maintain in full force and effect, the following insurance with limits not less than those described below and as required by the terms of the contract, or as required by law, whichever is greater. The Commercial General Liability policy, and any umbrella/excess policies used to meet the "Each occurrence" limits specified below, must be endorsed to be primary with respects to the coverage afforded the Additional Insureds.

- a. Commercial General Liability Insurance. A Commercial General Liability insurance policy with coverage that shall include, but not be limited to coverage for bodily injury, property damage, personal/advertising injury, premises liability, independent contractors, blanket contractual liability including tort liability of another assumed in contract, liability arising from all work and operations under this Agreement, defense and indemnification obligations, including those assumed under contract, cross liability coverage for additional insureds, products/completed operations for a term no less than three years commencing upon acceptance of the work, explosion, collapse, and underground hazards, contractor means and methods, and liability resulting from Section 240 or Section 241 of the NYS Labor Law. The limits under such policy shall not be less than (insert value)
- b. Workers Compensation and Disability Benefits as required by New York State for the life of this Agreement for the benefit of employees required to be covered by the New York State Workers Compensation Law and the New York State Disability Benefits Law. Evidence of coverage must be provided on forms specified by the Chariman of the Workers Compensation Board.

Comment [m1]:
Campus Rep Enter appropriate coverage amount
i. For contracts with a total contract value less than \$10,000,000
• \$2,000,000 each occurrence; \$2,000,000 general aggregate; and products/completed operations with an aggregate limit of \$2,000,000.
ii. For contracts with a total contract value more than \$10,000,000 up to \$50,000,000
• \$5,000,000 each occurrence; \$5,000,000 general aggregate; and products/completed operations with an aggregate limit of \$5,000,000.
iii. For contracts with a total contract value more than \$50,000,000
• \$10,000,000 each occurrence; \$10,000,000 general aggregate; and products/completed operations with an aggregate limit of \$10,000,000; or limits in excess of \$10,000,000 as determined by the University.

- c. Comprehensive Business Automobile Liability Insurance. A policy with a combined single limit for bodily injury and property damage of no less than \$1,000,000 covering liability arising out of the use of any motor vehicle in connection with the work, including owned, leased, hired, and non owned vehicles bearing, or, under the circumstances under which they are being used, required by the Motor Vehicle Laws of the State of New York to bear license plates and shall name the State of New York, State University of New York, and the State University Construction Fund as additional insureds. If the contract involves the removal of hazardous waste from the project site or otherwise transporting hazardous materials, pollution liability coverage for covered autos shall be provided by form CA 99 48 03 06 or CA 00 12 03 06 and the Motor Carrier Act Endorsement (MCS90) shall be attached.
- d. Umbrella and Excess Liability. When the limits of the Commercial General Liability, Auto, and/or Employers Liability policies procured are insufficient to meet the limits specified, the Contractor shall procure and maintain Commercial Umbrella and/or Excess Liability policies with limits in excess of the primary, provided, however, that the total amount of insurance coverage is at least equal to the requirements set forth above. Such policies shall follow the same form as the primary. Any insurance maintained by the University or additional insured shall be considered excess of and shall not contribute with any other insurance procured or maintained by the Contractor including primary, umbrella and excess liability regardless of the "other insurance" clause contained in either party's policy.
- e. Owner's Protective Liability Insurance. A policy issued to and covering the liability for damages imposed by law upon the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and The State University of New York, its trustees, officers, agents and employees, with respect to all operations under this Contract by the Contractor and its subcontractors, and/or their interest in the Project and the property upon which work under the Contract is to be performed, including in such coverage any omissions and supervisory acts of the State University Construction Fund, the Dormitory Authority and the State University of New York, its trustees, officers, agents and employees. The State University of New York shall be the named insured in the OCP Policy. OCP policy limits shall be no less than \$1,000,000 each occurrence and \$2,000,000 general aggregate.
- f. Asbestos Abatement Insurance. A liability insurance policy issued to and covering the liability, of the Contractor and/or subcontractor engaged in the removal, handling or wrapping of asbestos, if any of such work is to be performed under the Contract, for bodily injury, illness, sickness or property damage caused by exposure to asbestos in an amount not less than \$1,000,000 per occurrence and \$2,000,000 aggregate. The Contractor and/or its aforesaid subcontractor shall either obtain an endorsement to the aforesaid required insurance policy adding the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, their trustees, officers, agents or employees, as additional parties insured thereunder or shall obtain a separate owner's protective liability insurance policy for such parties with coverage similar to that required by the first sentence of this subdivision. In addition, any Contractor or subcontractor engaged in the removal, handling, or wrapping of asbestos shall, to the fullest extent permitted by law, hold harmless and indemnify the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, their trustees, officers, agents or employees, for any claims or liabilities in connection with illness or sickness arising from work performed, not performed, or which should have been performed. The Contractor shall have said hold--harmless and indemnification conditions stipulated in all Contracts with subcontractors.

Section 5.07 Builder's Risk Insurance

- (1) The Contractor shall procure and maintain, at its own cost and expense, until final acceptance of all work covered by this Contract or until the Project has been turned over for use by the State University of New York, whichever event occurs earlier, a builder's risk insurance policy covering all risks, with fire, extended coverage, vandalism and malicious mischief coverage. The policy shall cover the cost of removing debris, including demolition as may be legally necessary by operation of any law, ordinance, or regulation, and property of the State held in their care, custody and/or control.
- (2) The policy shall be in an amount equal to the Project's insurable value, i.e., the Contract consideration less the cost of the Contractor's Performance and Labor and Material Bonds; the cost of trees, shrubbery, lawn grass, plants and the maintenance of the same; the cost of demolition; the cost of excavation; the cost of foundations, piers or other supports which are below the undersurface of the lowest basement floor, or where there is no basement, which are below the surface of the ground, concrete and masonry work; the cost of underground flues, pipes or wiring; the cost of earthmoving, grading and the cost of paving, roads, walks, parking lots or athletic fields; and the cost of bridges, tunnels, dams, piers, wharves, docks, retaining walls and radio and/or television towers and antennas.
- (3) The policy may contain a provision for a \$500 deductible for each loss to a Project having an insurable value of less than \$1,500,000 and a \$1,000 deductible for each loss to a Project having an insurable value of \$1,500,000 or more.
- (4) The Builders' Risk policy shall contain an endorsement to provide that The State of New York, The University, the Contractor and its subcontractors shall be named as loss payee for the Work in order of precedence, as their interests may appear in said policy.
- (5) The Builders' Risk policy shall contain an endorsement to provide that in the event the loss occurs at an occupied facility, occupancy shall be permitted without the consent of the insurance company.
- (6) The Contractor shall have the sole responsibility to promptly report any loss to the insurer and/or its representatives and to furnish the latter with all necessary details relating to the occurrence of the loss and the amount thereof. The University, the Contractor and all subcontractors of the Contractor waive all rights, each against the others, for damages caused by fire or other perils covered by insurance provided under the terms of this Section, except such rights as they may have to the proceeds of insurance received; provided, however, this waiver shall not apply to any manufacturer, supplier or similar agent under any guarantee or warranty.
- (7) The Contractor shall not violate or permit to be violated any condition of such policy and shall at all times satisfy the fire safety requirements

of the University and the insurance company issuing the same.

- (8) The procurement and maintenance of said policy shall in no way be construed or be deemed to relieve the Contractor from any of the obligations and risks imposed upon it by this Contract or to be a limitation on the nature or extent of such obligations and risks.
- (9) Not less than thirty days prior to the expiration date or renewal date, the Contractor shall supply the University with an updated replacement certificate of insurance and endorsements. The Contractor shall advise the University of any letter or notification that cancels, materially changes, or non-renews the policy and Contractor shall require the insurance carrier(s) to copy the University on any letter or notification that cancels, materially changes, or non-renews the policy. Before the Contractor shall be entitled to have any progress payment rendered on account of the work which is to be insured pursuant to this Section, it shall furnish to the University a certificate in duplicate of the insurance herein required. Such insurance must be procured from an insurance carrier approved by the University, licensed to do business in the State of New York ("admitted" carrier), and rated at least "A-" by A.M. Best Company.
- (10) In the event that the Builders' Risk policy has been issued by a mutual insurance company, the following language shall be included: "The State University of New York is not liable for any premium or assessment under this policy of insurance. The First Named Insured is solely liable therefore."

Section 5.08 Effect of Procurement of Insurance

Neither the procurement nor the maintenance of such insurance shall in any way affect or limit the obligations, responsibilities or liabilities of the Contractor hereunder.

Section 5.09 No Third Party Rights

Nothing in the Contract shall create or give to third parties, except the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York and the State University of New York, any claim or right of action against the Contractor, the Consultant, the State University Construction Fund, the Dormitory Authority of the State of New York, the State of New York or the State University of New York beyond such as may legally exist irrespective of the Contract.

ARTICLE VI

Affirmative Action

The State University's requirements for affirmative action are set forth in "Exhibit A-1" which is attached hereto and made a part hereof, and shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein and, in the event any such provision is not inserted or is not correctly inserted, then, upon the application of either party, this Contract shall forthwith be physically amended to make such insertion or correction.

ARTICLE VII

Provisions Required by Law

Section 7.01 Provisions Deemed Inserted

Each and every provision required by law to be inserted in the Contract, including, but not limited to, the provisions set forth in Exhibit "A" which is attached hereto and made a part hereof, shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein and, in the event any such provision is not inserted or is not correctly inserted, then, upon the application of either party, this Contract shall forthwith be physically amended to make such insertion or correction.

Section 7.02 Entire Agreement

This Agreement consists of 1) the IFB; 2) the contractor's proposal; and 3) Exhibits A and A-1. This Agreement supersedes all previous understandings and agreements with respect to the Project or any of the provisions thereof. No statement, promise, condition, understanding, inducement, or representation, oral or written, expressed or implied, which is not contained herein shall be binding or valid and this Agreement shall not be changed, modified or altered in any manner except by an instrument in writing executed by the parties hereto.

Section 7.03 Hierarchy of Precedent

In the event of any controversy regarding the provisions of this Agreement, the terms of Exhibits A and A1 shall take precedence followed by this Agreement, the IFB and the contractor's proposal.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

Section 7.04 Wage Rates

The Contractor shall post the appropriate prevailing wage schedules in a conspicuous place at the construction site. The Department of Labor shall provide the Contractor with posters relating to prevailing wage rates and the same shall be displayed by the Contractor in a conspicuous place at the construction site. The Contractor shall also distribute wallet cards, to be provided by the Department of Labor, to all workers engaged at the construction site containing information relating to wage rates and telephone numbers to call if a worker believes his or her rights are being violated. The Contractor shall provide each worker with a written notice, informing them of the applicable prevailing wage requirements, and the Contractor
Revision: November 2015

must obtain a signed statement or declaration from such worker attesting to the fact that he or she has been given this information. Further, the Contractor is required to keep certified copies of its payrolls at the construction site.

Section 7.05 Contractor Responsibility

(a) *General Responsibility.* The Contractor shall at all times during the term of this Agreement remain responsible. The Contractor agrees, if requested by the SUNY Chancellor or his or her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity. (b) *Suspension of Work for Non-Responsibility.* The SUNY Chancellor, in his or her sole discretion, reserves the right to suspend any or all activities under this Agreement at any time when he or she discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Activity under this Agreement may resume at such time as the SUNY Chancellor or his or her designee issues a written notice authorizing a resumption of performance under the Agreement. (c) *Termination for Non-Responsibility.* Upon written notice to the Contractor and a reasonable opportunity to be heard with appropriate SUNY officials or staff, this Agreement may be terminated by the SUNY Chancellor or his or her designee at the Contractor's expense, where the Contractor is determined by the SUNY Chancellor or his or her designee to be non-responsible. In such event, the SUNY Chancellor or his or her designee may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach.

Section 7.06 – Governing Law

This Agreement shall be governed, construed and enforced in accordance with the laws of New York State, excluding New York State's choice of law principles, and all claims relating to or arising out of this Agreement or the breach thereof, whether sounding in contract, tort or otherwise, shall likewise be governed by the laws of New York State, excluding the New York choice of law principles. Consultant agrees to submit itself to such courts' jurisdiction.

Agency Certification: "In addition to the acceptance of this Contract, it is certified that an originally executed copy of this signature page will be attached to an exact copy of the Contract Documents, and forwarded to the Contractor".

STATE UNIVERSITY OF NEW YORK

By: _____ Date ____/____/____ Agency Code _____
(campus official)

CONTRACTOR

(If Corporation, Affix Seal)

By: _____ Date ____/____/____

(If Corporation, Affix Seal)

Approved as to Form:

ATTORNEY GENERAL OF THE STATE OF NEW YORK

By: _____ Date ____/____/____

COMPTROLLER OF THE STATE OF NEW YORK

By: _____ Date ____/____/____

ACKNOWLEDGMENTS
(ACKNOWLEDGMENT BY AN INDIVIDUAL)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20____, before me personally came _____
_____, to me known and known to me to be the person(s) described in and who executed
the foregoing instrument and he/she acknowledged to me that he/she executed the same.

Notary Public

(ACKNOWLEDGMENT BY A PARTNERSHIP)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 20____, before me personally came _____
_____, to me known and known to me to be the person who executed the above instrument,
who, being duly sworn by me, did for herself depose and say that they are a member of the firm of _____
_____, consisting of herself and _____
_____, that he/she executed the foregoing instrument in the firm name _____
_____, and that he/she had authority to sign the same, and that he/she did duly acknowledge to me
that he/she executed the same as the act and deed of the aforementioned firm for the purposes mentioned therein.

Notary Public

(ACKNOWLEDGMENT BY A CORPORATION)

STATE OF)
) ss.:
COUNTY OF)

On this _____ day of _____, 20____, before me personally came _____
_____, to me known, who, being duly sworn, did depose and say that he/she reside in
_____; that he/she is the _____
of the _____, the corporation described in and which
executed the foregoing instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument was such corporate seal;
that if was affixed by the order of the Board of Directors of said corporation, and that he/she signed their name thereto by like order.

Notary Public

Attach Exhibit A and Exhibit A-1

SCHEDULE I

The following Unit Prices shall apply for additional work authorized by Change Order:

UNIT PRICES

<u>Description of Unit Price</u>	<u>Amount of Unit Price</u>
----------------------------------	-----------------------------

NONE

The total bid includes the following Allowances:

ALLOWANCES

The parties to the attached contract, license, lease, amendment or other agreement of any kind (hereinafter, "contract") agree to be bound by the following clauses which are hereby made a part of the contract (the word "Contractor" herein refers to any party other than the State, whether a Contractor, licensor, licensee, lessor, lessee or any other party):

1. EXECUTORY CLAUSE. In accordance with Section 41 of the State Finance Law, the State shall have no liability under this contract to the Contractor or to anyone else beyond funds appropriated and available for this contract.

2. PROHIBITION AGAINST ASSIGNMENT
Except for the assignment of its right to receive payments subject to Article 5-A of the State Finance Law, the Contractor selected to perform the services herein are prohibited in accordance with Section 138 of the State Finance Law from assigning, transferring, conveying, subletting or otherwise disposing of its rights, title or interest in the contract without the prior written consent of SUNY and attempts to do so are null and void. Notwithstanding the foregoing, SUNY may, with the concurrence of the New York Office of State Comptroller, waive prior written consent of the assignment, transfer, conveyance, sublease or other disposition of a contract let pursuant to Article XI of the State Finance Law if the assignment, transfer, conveyance, sublease or other disposition is due to a reorganization, merger or consolidation of Contractor's its business entity or enterprise and Contractor so certifies to SUNY. SUNY retains the right, as provided in Section 138 of the State Finance Law, to accept or reject an assignment, transfer, conveyance, sublease or other disposition of the contract, and to require that any Contractor demonstrate its responsibility to do business with SUNY.

3. COMPTROLLER'S APPROVAL. (a) In accordance with Section 112 of the State Finance Law, Section 355 of New York State Education Law, and 8 NYCRR 316, Comptroller's approval is not required for the following contracts: (i) materials; (ii) equipment and supplies, including computer equipment; (iii) motor vehicles; (iv) construction; (v) construction-related services; (vi) printing; and (vii) goods for State University health care facilities, including contracts for goods made with joint or group purchasing arrangements.

(b) Comptroller's approval is required for the following contracts: (i) contracts for services not listed in Paragraph (3)(a) above made by a State University campus or health care facility certified by the Vice Chancellor and Chief Financial Officer, if the contract value exceeds \$250,000; (ii) contracts for services not listed in Paragraph (3)(a) above made by a State University campus not certified by the Vice Chancellor and Chief Financial Officer, if the contract value exceeds \$50,000; (iii) contracts for services not listed in Paragraph (3)(a) above made by health care facilities not certified by the Vice Chancellor and Chief Financial Officer, if the contract value exceeds \$75,000; (iv) contracts whereby the State University agrees to give something other than money, when the value or reasonably estimated value of such consideration exceeds \$10,000; (v) contracts for real property transactions if the contract value exceeds \$50,000; (vi) all other contracts not listed in Paragraph 3(a) above, if the contract value exceeds \$50,000, e.g. SUNY acquisition of a business and New York State Finance Article 11-B contracts and (vii) amendments for any amount to contracts not listed in Paragraph (3)(a) above, when as so amended, the contract exceeds the threshold amounts stated in Paragraph (b) herein. However, such pre-approval shall not be required for any contract established as a centralized contract through the Office of General Services or for a purchase order or other transaction issued under such centralized contract.

(c) Any contract that requires Comptroller approval shall not be valid, effective or binding

upon the State University until it has been approved by the Comptroller and filed in the Comptroller's office.

4. WORKERS' COMPENSATION BENEFITS. In accordance with Section 142 of the State Finance Law, this contract shall be void and of no force and effect unless the Contractor shall provide and maintain coverage during the life of this contract for the benefit of such employees as are required to be covered by the provisions of the Workers' Compensation Law.

5. NON-DISCRIMINATION REQUIREMENTS.
To the extent required by Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, (including gender identity or expression), national origin, sexual orientation, military status, age, disability, predisposing genetic characteristics, marital status or domestic violence victim status. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this contract shall be performed within the State of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex, or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 thereof, Contractor agrees that neither it nor its subcontractors shall by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. Contractor is subject to fines of \$50.00 per person per day for any violation of Section 220-e or Section 239 as well as possible termination of this contract and forfeiture of all moneys due hereunder for a second or subsequent violation

6. WAGE AND HOURS PROVISIONS. If this is a public work contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, neither Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. Additionally, effective April 28, 2008, if this is a public work contract covered by Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by SUNY of any SUNY-approved sums due and owing for work done upon the project.

7. NON-COLLUSIVE BIDDING CERTIFICATION.
In accordance with Section 139-d of the State Finance Law, if this contract was awarded based on the submission of competitive bids, Contractor affirms, under penalty of perjury, and each person signing on behalf of Contractor, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that its bid was arrived at independently and without collusion aimed at restricting competition. Contractor further affirms that, at the time Contractor submitted its bid, an authorized and responsible person executed and delivered it to SUNY a non-collusive bidding certification on Contractor's behalf.

8. INTERNATIONAL BOYCOTT PROHIBITION.
In accordance with Section 220-f of the Labor Law and Section 139-h of the State Finance Law, if this contract exceeds \$5,000, the Contractor agrees, as a material condition of the contract, that neither the Contractor nor any substantially owned or affiliated person, firm, partnership or corporation has participated, is participating, or shall participate in an international boycott in violation of the federal Export Administration Act of 1979 (50 USC App. Sections 2401 *et seq.*) or regulations thereunder. If such Contractor, or any of the aforesaid affiliates of Contractor, is convicted or is otherwise found to have violated said laws or regulations upon the final determination of the United States Commerce Department or any other appropriate agency of the United States subsequent to the contract's execution, such contract, amendment or modification thereto shall be rendered forfeit and void. The Contractor shall so notify the State Comptroller within five (5) business days of such conviction, determination or disposition of appeal (2 NYCRR 105.4).

9. SET-OFF RIGHTS. The State shall have all of its common law, equitable and statutory rights of set-off. These rights shall include, but not be limited to, the State's option to withhold for the purposes of set-off any moneys due to the Contractor under this contract up to any amounts due and owing to the State with regard to this contract, any other contract with any State department or agency, including any contract for a term commencing prior to the term of this contract, plus any amounts due and owing to the State for any other reason including, without limitation, tax delinquencies or monetary penalties relative thereto. The State shall exercise its set-off rights in accordance with normal State practices including, in cases of set-off pursuant to an audit, the finalization of such audit by the State, its representatives, or the State Comptroller.

10. RECORDS. The Contractor shall establish and maintain complete and accurate books, records, documents, accounts and other evidence directly pertinent to performance under this contract (hereinafter, collectively, "the Records"). The Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The State Comptroller, the Attorney General and any other person or entity authorized to conduct an examination, as SUNY and its representatives and entities involved in this contract, shall have access to the Records during normal business hours at an office of the Contractor within the State of New York or, if no such office is available, at a mutually agreeable and reasonable venue within the State, for the term specified above for the purposes of inspection, auditing and copying. SUNY shall take reasonable steps to protect from public disclosure any of the Records which are

exempt from disclosure under Section 87 of the Public Officers Law (the "Statute") provided that: (i) the Contractor shall timely inform an appropriate SUNY official, in writing, that said Records should not be disclosed; and (ii) said Records shall be sufficiently identified; and (iii) designation of said Records as exempt under the Statute is reasonable. Nothing contained herein shall diminish, or in any way adversely affect, SUNY's or the State's right to discovery in any pending or future litigation.

11. IDENTIFYING INFORMATION AND PRIVACY NOTIFICATION.

Identification Number(s). Every invoice or New York State Claim for Payment submitted to the State University of New York by a payee, for payment for the sale of goods or services or for transactions (e.g., leases, easements, licenses, etc.) related to real or personal property must include the payee's identification number. The number is any or all of the following: (i) the payee's Federal employer identification number, (ii) the payee's Federal social security number, and/or (iii) the payee's Vendor Identification Number assigned by the Statewide Financial System. Failure to include such number or numbers may delay payment. Where the payee does not have such number or numbers, the payee, on its invoice or Claim for Payment, must give the reason or reasons why the payee does not have such number or numbers.

(b) Privacy Notification. (1) The authority to request the above personal information from a seller of goods or services or a lessor of real or personal property, and the authority to maintain such information, is found in Section 5 of the State Tax Law. Disclosure of this information by the seller or lessor to the State University of New York is mandatory. The principal purpose for which the information is collected is to enable the State to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their tax liabilities and to generally identify persons affected by the taxes administered by the Commissioner of Taxation and Finance. The information will be used for tax administration purposes and for any other purpose authorized by law. (2) The personal information is requested by the purchasing unit of the State University of New York contracting to purchase the goods or services or lease the real or personal property covered by this contract or lease. The information is maintained in the Statewide Financial System by the Vendor Management Unit within the Bureau of State Expenditures, Office of the State Comptroller, 110 State Street, Albany, New York 12236.

12. EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITIES AND WOMEN.

(a) In accordance with Section 312 of the Executive Law and 5 NYCRR 143, if this contract is: (i) a written agreement or purchase order instrument, providing for a total expenditure in excess of \$25,000.00, whereby a contracting agency is committed to expend or does expend funds in return for labor, services, supplies, equipment, materials or any combination of the foregoing, to be performed for, or rendered or furnished to the contracting agency; or (ii) a written agreement in excess of \$100,000.00 whereby a contracting agency is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; or (iii) a written agreement in excess of \$100,000.00 whereby the owner of a State assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project, then the following shall apply and by signing this agreement the Contractor certifies and affirms that it is Contractor's equal employment opportunity policy that:

(1) The Contractor will not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age, disability or marital status, and will undertake or

continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. Affirmative action shall mean recruitment, employment, job assignment, promotion, upgradings, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation;

(2) at SUNY's request, Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein; and

(3) Contractor shall state, in all solicitations or advertisements for employees, that, in the performance of the State contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

(b) Contractor will include the provisions of "1", "2" and "3", above, in every subcontract over \$25,000.00 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (the "Work") except where the Work is for the beneficial use of the Contractor. Section 312 does not apply to: (i) work, goods or services unrelated to this contract; or (ii) employment outside New York State. The State shall consider compliance by a Contractor or sub-contractor with the requirements of any federal law concerning equal employment opportunity which effectuates the purpose of this section. SUNY shall determine whether the imposition of the requirements of the provisions hereof duplicate or conflict with any such federal law and if such duplication or conflict exists, SUNY shall waive the applicability of Section 312 to the extent of such duplication or conflict. Contractor will comply with all duly promulgated and lawful rules and regulations of the Department of Economic Development's Division of Minority and Women's Business Development pertaining hereto.

13. **CONFLICTING TERMS.** In the event of a conflict between the terms of the contract (including any and all attachments thereto and amendments thereof) and the terms of this Exhibit A, the terms of this Exhibit A shall control.

14. **GOVERNING LAW.** This contract shall be governed by the laws of the State of New York except where the Federal supremacy clause requires otherwise.

15. **LATE PAYMENT.** Timeliness of payment and any interest to be paid to Contractor for late payment shall be governed by Article 11-A of the State Finance Law to the extent required by law.

16. **NO ARBITRATION.** Disputes involving this contract, including the breach or alleged breach thereof, may not be submitted to binding arbitration (except where statutorily authorized) but must, instead, be heard in a court of competent jurisdiction of the State of New York.

17. **SERVICE OF PROCESS.** In addition to the methods of service allowed by the State Civil Practice Law & Rules ("CPLR"), Contractor hereby consents to service of process upon it by registered or certified mail, return receipt requested. Service hereunder shall be complete upon Contractor's actual receipt of process or upon the State's receipt of the return thereof by the United States Postal Service as refused or undeliverable. Contractor must promptly notify the State, in writing, of each and every change of address to which service of process can be made. Service by the State to the last known address shall be sufficient. Contractor will have thirty (30) calendar days after service hereunder is complete

in which to respond.

18. **PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS.** The Contractor certifies and warrants that all wood products to be used under this contract award will be in accordance with, but not limited to, the specifications and provisions of State Finance Law §165 (Use of Tropical Hardwoods), which prohibits purchase and use of tropical hardwoods, unless specifically exempted, by the State or any governmental agency or political subdivision or public benefit corporation. Qualification for an exemption under this law will be the responsibility of the contractor to establish to meet with the approval of the State. In addition, when any portion of this contract involving the use of woods, whether supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid proposal that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in Section 165 of the State Finance Law. Any such use must meet with the approval of the State, otherwise, the bid may not be considered responsive. Under bidder certification, proof of qualification for exemption will be the responsibility of the Contractor to meet with the approval of the State.

19. **MacBRIDE FAIR EMPLOYMENT PRINCIPLES.** In accordance with the MacBride Fair Employment Principles (Chapter 807 of the Laws of 1992), the Contractor hereby stipulates that Contractor and any individual or legal entity in which the Contractor holds a ten percent or greater ownership interest and any individual or legal entity that holds a ten percent or greater ownership interest in the Contractor either (a) have no business operations in Northern Ireland, or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles (as described in Section 165(5) of the State Finance Law), and shall permit independent monitoring of compliance with such principles.

20. **OMNIBUS PROCUREMENT ACT OF 1992.** It is the policy of New York State to maximize opportunities for the participation of New York State business enterprises, including minority and women-owned business enterprises as bidders, subcontractors and suppliers on its procurement contracts.

Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development
Division for Small Business
30 South Pearl St., 7th Floor
Albany, NY 12245
Tel: 518-292-5100
Fax: 518-292-5884
email: opa@esd.ny.gov

A directory of certified minority and women-owned business enterprises is available from:

NYS Department of Economic Development
Division of Minority and Women's Business Development
633 Third Avenue
New York, NY 10017
212-803-2414

email: mwbecertification@esd.ny.gov
<https://ny.newnycontracts.com/FrontEnd/VendorSearchPublic.asp>

The Omnibus Procurement Act of 1992 requires that by signing this bid proposal or contract, as applicable, Contractors certify that whenever the total bid amount is greater than \$1 million:

(a) The Contractor has made reasonable efforts to encourage the participation of New York State Business Enterprises as suppliers and subcontractors, including certified minority and women-owned business enterprises, on this project, and has retained the documentation of

these efforts to be provided upon request to SUNY;

(b) The Contractor has complied with the Federal Equal Employment Opportunity Act of 1972 (P.L. 92-261), as amended;

(c) The Contractor agrees to make reasonable efforts to provide notification to New York State residents of employment opportunities on this project through listing any such positions with the Job Search Division of the New York State Department of Labor, or providing such notification in such manner as is consistent with existing collective bargaining contracts or agreements. The contractor agrees to document these efforts and to provide said documentation to the State upon request; and

(d) The Contractor acknowledges notice that SUNY may seek to obtain offset credits from foreign countries as a result of this contract and agrees to cooperate with SUNY in these efforts.

21. RECIPROCITY AND SANCTIONS

PROVISIONS. Bidders are hereby notified that if their principal place of business is located in a country, nation, province, state or political subdivision that penalizes New York State vendors, and if the goods or services they offer will be substantially produced or performed outside New York State, the Omnibus Procurement Act of 1994 and 2000 amendments (Chapter 684 and Chapter 383, respectively) require that they be denied contracts which they would otherwise obtain. Contact the NYS Department of Economic Development, Division for Small Business, 30 South Pearl Street, Albany, New York 12245, for a current list of jurisdictions subject to this provision.

22. COMPLIANCE WITH NEW YORK STATE INFORMATION SECURITY BREACH AND NOTIFICATION ACT. Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law Section 899-aa; State Technology Law Section 208).

23. COMPLIANCE WITH CONSULTANT DISCLOSURE LAW If this is a contract for consulting services, defined for purposes of this requirement to include analysis, evaluation, research, training, data processing, computer

programming, engineering, environmental health and mental health services, accounting, auditing, paralegal, legal or similar services, then in accordance with Section 163(4-g) of the State Finance Law, the Contractor shall timely, accurately and properly comply with the requirement to submit an annual employment report for the contract to SUNY, the Department of Civil Service and the State Comptroller.

24. PURCHASES OF APPAREL AND SPORTS EQUIPMENT. In accordance with State Finance Law Section 165(7), SUNY may determine that a bidder on a contract for the purchase of apparel or sports equipment is not a responsible bidder as defined in State Finance Law Section 163 based on (a) the labor standards applicable to the manufacture of the apparel or sports equipment, including employee compensation, working conditions, employee rights to form unions and the use of child labor; or (b) bidder's failure to provide information sufficient for SUNY to determine the labor conditions applicable to the manufacture of the apparel or sports equipment.

25. PROCUREMENT LOBBYING. To the extent this agreement is a "procurement contract" as defined by State Finance Law Sections 139-j and 139-k, by signing this agreement the contractor certifies and affirms that all disclosures made in accordance with State Finance Law Sections 139-j and 139-k are complete, true and accurate. In the event such certification is found to be intentionally false or intentionally incomplete, the State may terminate the agreement by providing written notification to the Contractor in accordance with the terms of the agreement.

26. CERTIFICATION OF REGISTRATION TO COLLECT SALES AND COMPENSATING USE TAX BY CERTAIN STATE CONTRACTORS, AFFILIATES AND SUBCONTRACTORS. To the extent this agreement is a contract as defined by Tax Law Section 5-a, if the Contractor fails to make the certification required by Tax Law Section 5-a or if during the term of the contract, the Department of Taxation and Finance or SUNY discovers that the certification, made under penalty of perjury, is false, then such failure to file or false certification shall be a material breach of this contract and this contract may be terminated, by providing written notification to the Contractor

in accordance with the terms of the agreement, if SUNY determines that such action is in the best interests of the State.

27. IRAN DIVESTMENT ACT. By entering into this Agreement, Contractor certifies in accordance with State Finance Law §165-a that it is not on the "Entities Determined to be Non-Responsive Bidders/Offerers pursuant to the New York State Iran Divestment Act of 2012" ("Prohibited Entities List") posted at: <http://www.oqs.ny.gov/about/regs/docs/ListofEntities.pdf>

Contractor further certifies that it will not utilize on this Contract any subcontractor that is identified on the Prohibited Entities List. Contractor agrees that should it seek to renew or extend this Contract, it must provide the same certification at the time the Contract is renewed or extended. Contractor also agrees that any proposed Assignee of this Contract will be required to certify that it is not on the Prohibited Entities List before the contract assignment will be approved by the State.

During the term of the Contract, should the state agency receive information that a person (as defined in State Finance Law §165-a) is in violation of the above-referenced certifications, the state agency will review such information and offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment activity which is in violation of the Act within 90 days after the determination of such violation, then the state agency shall take such action as may be appropriate and provided for by law, rule, or contract, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

The state agency reserves the right to reject any bid, request for assignment, renewal or extension for an entity that appears on the Prohibited Entities List prior to the award, assignment, renewal or extension of a contract, and to pursue a responsibility review with respect to any entity that is awarded a contract and appears on the Prohibited Entities list after contract award.

THE FOLLOWING PROVISIONS SHALL APPLY ONLY TO THOSE CONTRACTS TO WHICH A HOSPITAL OR OTHER HEALTH SERVICE FACILITY IS A PARTY

28. Notwithstanding any other provision in this contract, the hospital or other health service facility remains responsible for insuring that any service provided pursuant to this contract complies with all pertinent provisions of Federal, state and local statutes, rules and regulations. In the foregoing sentence, the word "service" shall be construed to refer to the health care service rendered by the hospital or other health service facility.

29. (a) In accordance with the 1980 Omnibus Reconciliation Act (Public Law 96-499), Contractor hereby agrees that until the expiration of four years after the furnishing of services under this agreement, Contractor shall make available upon written request to the Secretary of Health and Human Services, or upon request, to the Comptroller General of the United States or any of their duly authorized representatives, copies of this contract, books, documents and records of the Contractor that are necessary to certify the nature and extent of the costs hereunder.

(b) If Contractor carries out any of the duties of the contract hereunder, through a subcontract having a value or cost of \$10,000 or more over a twelve-month period, such subcontract shall contain a clause to the effect that, until the expiration of four years after the furnishing of such services pursuant to such subcontract, the subcontractor shall make available upon written request to the Secretary of Health and Human Services or upon request to the Comptroller General of the United States, or any of their duly authorized representatives, copies of the subcontract and books, documents and records of the subcontractor that are necessary to verify the nature and extent of the costs of such subcontract.

(c) The provisions of this section shall apply only to such contracts as are within the definition established by the Health Care Financing Administration, as may be amended or modified from time to time.

1. DEFINITIONS. The following terms shall be defined in accordance with Section 310 of the Executive Law:

STATE CONTRACT herein referred to as "State Contract", shall mean: (a) a written agreement or purchase order instrument, providing for a total expenditure in excess of twenty-five thousand dollars (\$25,000.00), whereby the State University of New York ("University") is committed to expend or does expend funds in return for labor, services including but not limited to legal, financial and other professional services, supplies, equipment, materials or a combination of the foregoing, to be performed for, or rendered or furnished to the University; (b) a written agreement in excess of one hundred thousand dollars (\$100,000.00) whereby the University is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; and (c) a written agreement in excess of one hundred thousand dollars (\$100,000.00) whereby the University as an owner of a state assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project.

SUBCONTRACT herein referred to as "Subcontract", shall mean any agreement for a total expenditure in excess of \$25,000 providing for services, including non-staffing expenditures, supplies or materials of any kind between a State agency and a prime contractor, in which a portion of the prime contractor's obligation under the State contract is undertaken or assumed by a business enterprise not controlled by the prime contractor.

WOMEN-OWNED BUSINESS ENTERPRISE herein referred to as "WBE", shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (a) at least fifty-one percent (51%) owned by one or more United States citizens or permanent resident aliens who are women; (b) an enterprise in which the ownership interest of such women is real, substantial and continuing; (c) an enterprise in which such women ownership has and exercises the authority to control independently the day-to-day business decisions of the enterprise; (d) an enterprise authorized to do business in this state and independently owned and operated; (e) an enterprise owned by an individual or individuals, whose ownership, control and operation are relied upon for certification, with a personal net worth that does not exceed three million five hundred thousand dollars (\$3,500,000), as adjusted annually on the first of January for inflation according to the consumer price index of the previous year; and (f) an enterprise that is a small business pursuant to subdivision twenty of this section.

A firm owned by a minority group member who is also a woman may be certified as a minority-owned business enterprise, a women-owned business enterprise, or both, and may be counted towards either a minority-owned business enterprise goal or a women-owned business enterprise goal, in regard to any Contract or any goal, set by an agency or authority, but such participation may not be counted towards both such goals. Such an enterprise's participation in a Contract may not be divided between the minority-owned business enterprise goal and the women-owned business enterprise goal.

MINORITY-OWNED BUSINESS ENTERPRISE herein referred to as "MBE", shall mean a business enterprise, including a sole proprietorship, partnership or corporation that is: (a) at least fifty-one percent (51%) owned by one or more minority group members; (b) an enterprise in which such minority ownership is real, substantial and continuing; (c) an enterprise in which such minority ownership has and exercises the authority to control independently the day-to-day business decisions of the enterprise; (d) an enterprise authorized to do business in this state and independently owned and operated; (e) an enterprise owned by an individual or individuals, whose ownership, control and operation are relied upon for certification, with a personal net worth that does not exceed three million five hundred thousand dollars (\$3,500,000.00), as adjusted annually on the first of January for inflation according to the consumer price index of the previous year; and (f) an enterprise that is a small business pursuant to subdivision twenty of this section.

MINORITY GROUP MEMBER shall mean a United States citizen or permanent resident alien who is and can demonstrate membership in one of the following groups: (a) Black persons having origins in any of the Black African racial groups; (b) Hispanic persons of Mexican, Puerto Rican, Dominican, Cuban, Central or South American of either Indian or Hispanic origin, regardless of race; (c) Native American or Alaskan native persons having origins in any of the original peoples of North America. (d) Asian and Pacific Islander persons having origins in any of the Far East countries, South East Asia, the Indian Subcontinent or Pacific Islands.

CERTIFIED ENTERPRISE OR BUSINESS shall mean a business verified as a minority or women-owned business enterprise pursuant to section 314 of the Executive Law. A business enterprise which has been approved by the New York Division of Minority & Women Business Development (“DMWBD”) for minority or women-owned enterprise status subsequent to verification that the business enterprise is owned, operated, and controlled by minority group members or women, and that also meets the financial requirements set forth in the regulations.

2. TERMS. The parties to the attached State Contract agree to be bound by the following provisions which are made a part hereof (the word "Contractor" herein refers to any party other than the University:

1(a) Contractor and its Subcontractors shall undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. For these purposes, affirmative action shall apply in the areas of recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.

(b) Prior to the award of a State Contract, the Contractor shall submit an equal employment opportunity (EEO) policy statement to the University within the time frame established by the University.

(c) As part of the Contractor's EEO policy statement, the Contractor, as a precondition to entering into a valid and binding State Contract, shall agree to the following in the performance of the State Contract: (i) The Contractor will not discriminate against any employee or applicant for employment, will undertake or continue existing programs of affirmative action to ensure that

minority group members and women are afforded equal employment opportunities without discrimination, and shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on State Contracts;(ii) The Contractor shall state in all solicitations or advertisements for employees that, in the performance of the State Contract, all qualified applicants will be afforded equal employment opportunities without discrimination; (iii) At the request of the University the Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate, and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein.

(d) Form 108 - Staffing Plan To ensure compliance with this Section, the Contractor shall submit a staffing plan to document the composition of the proposed workforce to be utilized in the performance of the Contract by the specified categories listed, including ethnic background, gender, and Federal occupational categories. Contractors shall complete the Staffing plan form and submit it as part of their bid or proposal or within a reasonable time, but no later than the time of award of the contract.

(e) Form 112 - Workforce Employment Utilization Report (“Workforce Report”)

(i) Once a contract has been awarded and during the term of Contract, Contractor is responsible for updating and providing notice to SUNY of any changes to the previously submitted Staffing Plan. This information is to be submitted on a quarterly basis during the term of the contract to report the actual workforce utilized in the performance of the contract by the specified categories listed including ethnic background, gender, and Federal

occupational categories. The Workforce Report must be submitted to report this information.

(ii) Separate forms shall be completed by Contractor and any subcontractor performing work on the Contract.

(iii) In limited instances, Contractor may not be able to separate out the workforce utilized in the performance of the Contract from Contractor's and/or subcontractor's total workforce. When a separation can be made, Contractor shall submit the Workforce Report and indicate that the information provided related to the actual workforce utilized on the Contract. When the workforce to be utilized on the contract cannot be separated out from Contractor's and/or subcontractor's total workforce, Contractor shall submit the Workforce Report and indicate that the information provided is Contractor's total workforce during the subject time frame, not limited to work specifically under the contract.

(f) Contractor shall comply with the provisions of the Human Rights Law, all other State and Federal statutory and constitutional non-discrimination provisions. Contractor and subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.

(g) The Contractor shall include the provisions of this section in every Subcontract in such a manner that the requirements of the provisions will be binding upon each Subcontractor as to work in connection with the State Contract, including the requirement that Subcontractors shall undertake or continue existing programs of

affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination, and, when requested, provide to the Contractor information on the ethnic background, gender, and Federal occupational categories of the employees to be utilized on the State Contract.

(h) To ensure compliance with the requirements of this paragraph, the University shall inquire of a Contractor whether the work force to be utilized in the performance of the State Contract can be separated out from the Contractor's and/or Subcontractors' total work force and where the work of the State Contract is to be performed. For Contractors who are unable to separate the portion of their work force which will be utilized for the performance of this State Contract, Contractor shall provide reports describing its entire work force by the specified ethnic background, gender, and Federal Occupational Categories, or other appropriate categories which the agency may specify.

(i) The University may require the Contractor and any Subcontractor to submit compliance reports, pursuant to the regulations relating to their operations and implementation of their affirmative action or equal employment opportunity program in effect as of the date the State Contract is executed.

(j) If a Contractor or Subcontractor does not have an existing affirmative action program, the University may provide to the Contractor or Subcontractor a model plan of an affirmative action program. Upon request, the Director of DMWBD shall provide a contracting agency with a model plan of an affirmative action program.

(k) Upon request, DMWBD shall provide the University with information on specific recruitment sources for minority group members and woman, and contracting agencies shall make such information available to Contractors

3. Contractor must provide the names, addresses and federal identification numbers of certified minority- and women-owned business enterprises which the Contractor intends to use to perform the State Contract and a description of the Contract scope of work which the Contractor intends to structure to increase the participation by Certified minority- and/or women-owned business enterprises on the State Contract, and the estimated or, if known, actual dollar amounts to be paid to and performance dates of each component of a State Contract which the Contractor intends to be performed by a certified minority- or woman-owned business enterprise. In the event the Contractor responding to University solicitation is joint venture, teaming agreement, or other similar arrangement that includes a minority-and women owned business enterprise, the Contractor must submit for review and approval: i. the name, address, telephone number and federal identification of each partner or party to the agreement; ii. the federal identification number of the joint venture or entity established to respond to the solicitation, if applicable; iii. A copy of the joint venture, teaming or other similar arrangement which describes the percentage of interest owned by each party to the agreement and the value added by each party; iv. A copy of the mentor-protégé agreement between the parties, if applicable, and if not described in the joint venture, teaming agreement, or other similar arrangement.

4. PARTICIPATION BY MINORITY GROUP MEMBERS AND WOMEN. The University shall determine whether Contractor has made conscientious and active efforts to employ and utilize minority group members and women to perform this State Contract based upon an analysis of the following factors:

(a) Whether Contractor established and maintained a current list of recruitment sources for minority group members and

women, and whether Contractor provided written notification to such recruitment sources that contractor had employment opportunities at the time such opportunities became available.

(b) Whether Contractor sent letters to recruiting sources, labor unions, or authorized representatives of workers with which contractor has a collective bargaining or other agreement or understanding requesting assistance in locating minority group members and women for employment.

(c) Whether Contractor disseminated its EEO policy by including it in any advertising in the news media, and in particular, in minority and women news media.

(d) Whether Contractor has attempted to provide information concerning its EEO policy to Subcontractors with which it does business or had anticipated doing business.

(e) Whether internal procedures exist for, at a minimum, annual dissemination of the EEO policy to employees, specifically to employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions. Such dissemination may occur through distribution of employee policy manuals and handbooks, annual reports, staff meetings and public postings.

(f) Whether Contractor encourages and utilizes minority group members and women employees to assist in recruiting other employees.

(g) Whether Contractor has apprentice training programs approved by the N.Y.S. Department of Labor which provides for training and hiring of minority group members and women.

(h) Whether the terms of this section have been incorporated into each Subcontract which is entered into by the Contractor.

5. PARTICIPATION BY MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES. Based upon an analysis of the following factors, the

University shall determine whether Contractor has made good faith efforts to provide for meaningful participation by minority-owned and women-owned business enterprises which have been certified by DMWBD:

(a) Whether Contractor has actively solicited bids for Subcontracts from qualified M/WBEs, including those firms listed on the Directory of Certified Minority and Women-Owned Business Enterprises, and has documented its good faith efforts towards meeting minority and women owned business enterprise utilization plans by providing, copies of solicitations, copies of any advertisements for participation by certified minority- and women-owned business enterprises timely published in appropriate general circulation, trade and minority- or women-oriented publications, together with the listing(s) and date(s) of the publications of such advertisements; dates of attendance at any pre-bid, pre-award, or other meetings, if any, scheduled by the University, with certified minority- and women-owned business enterprises, and the reasons why any such firm was not selected to participate on the project.

(b) Whether Contractor has attempted to make project plans and specifications available to firms who are not members of associations with plan rooms and reduce fees for firms who are disadvantaged.

(c) Whether Contractor has utilized the services of organizations which provide technical assistance in connection with M/WBE participation.

(d) Whether Contractor has structured its Subcontracts so that opportunities exist to complete smaller portions of work.

e) Whether Contractor has encouraged the formation of joint ventures, partnerships, or other similar arrangements among Subcontractors.

(f) Whether Contractor has requested the services of the Department of Economic

Development (DED) to assist Subcontractors' efforts to satisfy bonding requirement.

(g) Whether Contractor has made progress payments promptly to its Subcontractors.

(h) Whether the terms of this section have been incorporated into each Subcontract which is entered into by the Contractor. It shall be the responsibility of Contractor to ensure compliance by every Subcontractor with these provisions.

6. MWBE Utilization Plan.

(a) The Contractor represents and warrants that Contractor has submitted an MWBE Utilization Plan prior to the execution of the contract.

(b) MWBE Utilization Plan (Form 7557-107).

Contractors are required to submit a Utilization Plan on Form 7557-107 with their bid or proposal. Complete the following steps to prepare the Utilization Plan:

- i. list NYS Certified minority- and women-owned business enterprises which the Contractor intends to use to perform the State contract;
- ii. insert a description of the contract scope of work which the Contractor intends to structure to increase the participation by NYS Certified minority- and women-owned enterprises on the State contract;
- iii. insert the estimated or, if known, actual dollar amounts to be paid to and performance dates of each component of a State contract which the Contractor intends to be performed by a NYS Certified minority- or women-owned business; and

(c) Any modifications or changes to the agreed participation by NYS Certified MWBEs after the Contract Award and during the term of the contract must be reported on a revised MWBE Utilization Plan and

submitted to the SUNY University-wide MWBE Program Office.

(d) The University will review the MWBE Utilization Plan and will issue the Contractor a written notice of acceptance or deficiency within twenty (20) day of its receipt. A notice of deficiency shall include the:

- i. list NYS Certified minority- and women-owned business enterprises which the Contractor intends to use to perform the State contract;
- ii. name of any MWBE which is not acceptable for the purpose of complying with the MWBE participation goals;
- iii. reasons why it is not an acceptable element of the Contract scope of work which the MWBE Program Office has determined can be reasonably structured by the Contractor to increase the likelihood of participation in the Contract by MWBEs; and
- iv. other information which the MWBE Program Office determines to be relevant to the MWBE Utilization Plan.

(e) The Contractor shall respond to the notice of deficiency within seven (7) business days of receipt by submitting to the University a written remedy in response to the notice of deficiency.

- i. If the written remedy that is submitted is not timely or is found to be inadequate, the University-wide MWBE Program Office shall notify the Contractor and direct the Contractor to submit, within five (5) business days, a request for partial or total waiver of MWBE participation goals on forms provided by the University-wide MWBE Program Office.
- ii. Failure to file the waiver form in a timely manner

may be grounds for disqualification of the bid or proposal.

(f) The University may disqualify a Contractor as being non-responsive under the following circumstances:

- i. If a Contractor fails to submit a MWBE Utilization Plan;
- ii. If a Contractor fails to submit a written remedy to a notice of deficiency in a MWBE Utilization Plan;
- iii. If a Contractor fails to submit a request for waiver; or
- iv. If the MWBE Program Office determines that the Contractor has failed to document Good Faith Efforts.

(g) Contractor agrees to use such MWBE Utilization Plan for the performance of MWBEs on the Contract pursuant to the prescribed MWBE goals set forth in Section III-A of this Appendix.

(h) Contractor further agrees that a failure to submit and/or use such MWBE Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, SUNY shall be entitled to any remedy provided herein, including but not limited to, a finding of Contractor non-responsiveness.

7. Waivers.

(a) For Waiver Requests Contractor should use (Form 7557-114) – Waiver Request.

(b) If the Contractor, after making good faith efforts, is unable to comply with MWBE goals, the Contractor may submit a Request for Waiver form documenting good faith efforts by the Contractor to meet such goals. If the documentation included with the waiver request is complete the University shall evaluate the request and issue a written notice of acceptance or

denial within twenty (20) days of receipt.

(c) If University, upon review of the MWBE Utilization Plan and updated Quarterly MWBE Contractor Compliance Reports determines that Contractor is failing or refusing to comply with the Contract goals and no waiver has been issued in regards to such non-compliance, the University may issue a notice of deficiency to the Contractor. The contractor must respond to the notice of deficiency within seven (7) business days of receipt. Such response may include a request for partial or total waiver of MWBE Contract Goals.

8. Quarterly MWBE Contractor Compliance Report.

Contractor is required to submit a Quarterly MWBE Contractor Compliance Report (Form 7557-114) to the University by the 5th day following each end of quarter over the term of the Contract documenting the progress made towards achievement of the MWBE goals of the Contract.

9. GOALS. (a) GOALS FOR MINORITY AND WOMEN WORK FORCE PARTICIPATION.

(i) The University shall include relevant work force availability data, which is provided by the DMWBD, in all documents which solicit bids for State Contracts and shall make efforts to assist Contractors in utilizing such data to determine expected levels of participation for minority group members and women on State Contracts.

(ii) Contractor shall exert good faith efforts to achieve such goals for minority and women's participation. To successfully achieve such goals, the employment of minority group members and women by Contractor must be substantially uniform during the entire term of this State Contract. In addition, Contractor should not participate in the transfer of employees from one employer or project to another for the sole

purpose of achieving goals for minority and women's participation.

(b) GOALS FOR MINORITY AND WOMEN-OWNED BUSINESS ENTERPRISES PARTICIPATION.

For all State Contracts in excess of \$25,000.00 whereby the University is committed to expend or does expend funds in return for labor, services including but not limited to legal, financial and other professional services, supplies, equipment, materials or a combination of the foregoing or all State Contracts in excess of \$100,000.00 whereby the University is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon, Contractor shall exert good faith efforts to achieve a participation goal of fifteen percent (15 %) for Certified Minority-Owned Business Enterprises and fifteen (15%) for Certified Women-Owned Business Enterprises.

10. ENFORCEMENT.

The University will be responsible for enforcement of each Contractor's compliance with these provisions. Contractor, and each Subcontractor, shall permit the University access to its books, records and accounts for the purpose of investigating and determining whether Contractor or Subcontractor is in compliance with the requirements of Article 15-A of the Executive Law. If the University determines that a Contractor or Subcontractor may not be in compliance with these provisions, the University may make every reasonable effort to resolve the issue and assist the Contractor or Subcontractor in its efforts to comply with these provisions. If the University is unable to resolve the issue of noncompliance, the University may file a complaint with the DMWBD.

Failure to comply with all of the requirements herein may result in a finding of non-responsiveness, non-responsibility and/or a breach of contract, leading to the withholding of funds or such other actions, remedies or enforcement proceedings as allowed by the Contract.

11. DAMAGES FOR NON COMPLIANCE.

Where the University determines that Contractor is not in compliance with the requirements of the Contract and Contractor refuses to comply with such requirements, or if Contractor is found to have willfully and intentionally failed to comply with

the MWBE participation goals, Contractor shall be obligated to pay liquidated damages to the University. Such liquidated damages shall be calculated as an amount equaling the difference between:

- a. All sums identified for payment to MWBEs had the Contractor achieved the contractual MWBE goals; and
- b. All sums actually paid to MWBEs for work performed or materials supplied under the Contract.

In the event a determination has been made which requires the payment of liquidated damages and such

identified sums have not been withheld by the University, Contractor shall pay such liquidated damages to the University within sixty (60) days after such damages are assessed, unless prior to the expiration of such sixtieth day, the Contractor has filed a complaint with the Director of the Division of Minority and Woman Business Development pursuant to Subdivision 8 of Section 313 of the Executive Law in which event the liquidated damages shall be payable if Director renders a decision in favor of the University.



STATE UNIVERSITY OF NEW YORK LABOR AND MATERIAL BOND

KNOW ALL PERSONS BY THESE PRESENTS, that _____

(hereinafter called the "Principal") and _____

(hereinafter called the "Surety") are held and firmly bound to the State University of New York (hereinafter called the "University") in the full and just sum of:

_____ dollars (\$) _____
(in words) (in figures)

good and lawful money of the United States of America, for the payment of which sum of money, well and truly to be made and done, the Principal binds itself, its heirs, executors, administrators, successors and assigns and the Surety binds itself, its successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract bearing date on the _____ day of _____, 19____, with the "University" for the work contained in Project No. _____, a copy of which Contract is annexed to and hereby made a part of this Bond as though herein set forth in full; and

WHEREAS, the "University" has required this Bond guaranteeing prompt payment of monies due to all persons furnishing the Principal or any subcontractor of the Principal with labor or materials in the prosecution of the work provided in such Contract;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall promptly pay all monies due to all persons furnishing the Principal or any subcontractor of the Principal with labor or materials in the prosecution of the Contract, then this obligation shall be null and void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, the said Surety, for value received, hereby stipulates and agrees that no change, extension, alteration or addition to the terms of the said Contract or Specifications accompanying the same, shall in any way affect its obligations under this Bond, and it does hereby waive notice of any such change, extension, alteration or addition; and further.

PROVIDED, HOWEVER, the place of trial of any action on this Bond shall be in the county in which the said Contract was to be performed, or if said Contract was to be performed in more than one county, then in any such county, and not elsewhere; and further

PROVIDED, HOWEVER, this Bond shall be enforceable in accordance with the terms and provisions of Section 137 of the State Finance Law.

IN WITNESS WHEREOF, the Principal has hereunto set its hand and seal and the Surety has caused this instrument to be signed by its attorney-in-fact and its corporate seal to be hereto affixed this _____ day of _____, 19____

Principal By _____
If Corporation, affix Corporate Seal

Surety By _____
If Corporation, affix Corporate Seal



STATE UNIVERSITY OF NEW YORK PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS, that _____

(hereinafter called the "Principal") and _____

(hereinafter called the "Surety") are held and firmly bound to the State University of New York (hereinafter called the "University") in the full and just sum of:

_____ dollars (\$ _____)
(in words) *(in figures)*

good and lawful money of the United States of America, for the payment of which sum of money, well and truly to be made and done, the Principal binds itself, its heirs, executors, administrators, successors and assigns and the Surety binds itself, its successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract bearing date on the _____ day of _____, 19_____, with the "University" for the work contained in Project No. _____, a copy of which Contract is annexed to and hereby made a part of this Bond as though herein set forth in full; and

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, its representatives or assigns, shall well and faithfully comply with and perform all the terms, covenants and conditions of said Contract on its part to be kept and performed and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to the true intent and meaning of said Contract, including repair and/or replacement of defective work and guarantees of maintenance for the periods stated in the Contract, and shall fully indemnify and save harmless the "University" from all cost and damage which it may suffer by reason of failure to do so, and shall fully reimburse and repay the "University" for all outlay and expense which the "University" may incur in making good any such default, and shall protect the said "University" against, and pay any and all amounts, damages, costs and judgments which may or shall be recovered against said "University" or its trustees, officers, agents or employees or which the said "University" may be called upon to pay to any person or corporation by reason of any damages arising or growing out of the doing of said work, or the repair of maintenance thereof, or the manner of doing the same, or the neglect of the said Principal, or its agents, or the improper performance of the said work by the said Principal, or its agents, or the infringement of any patent or patent rights by reason of the use of any materials furnished or work done as aforesaid or otherwise, then this obligation shall be null and void, otherwise to remain in full force and effect;

PROVIDED, HOWEVER, the said Surety, for value received, hereby stipulates and agrees, if requested to do so by the "University," to fully perform and complete the work mentioned and described in said Contract, pursuant to the terms, conditions, and covenants thereof, if for any cause the Principal fails or neglects to so fully perform and complete such work and the Surety further agrees to commence such work of completion within ten (10) calendar days after written notice thereof from the "University" and to complete such work within ten (10) calendar days from the expiration of the time allowed the Principal in the Contract for the completion thereof; and further

PROVIDED, HOWEVER, the Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety and its Bond shall be in no way impaired or affected by an extension of time, modification, omission, addition, or change in or to the said Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer of any work to be performed or any monies due or to become due thereunder or by the "University's" takeover, use, occupancy or operation of any part or all of the work covered by the Contract; and said Surety does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts, transfers, takeovers, uses, occupancies or operations, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to said Surety as though done or omitted to be done by or in relation to said Principal.

IN WITNESS WHEREOF, the Principal has hereunto set its hand and seal and the Surety has caused this instrument to be signed by its attorney-in-fact and its corporate seal to be hereto affixed this _____ day of _____, 19_____

Principal By _____
If Corporation, affix Corporate Seal

Surety By _____
If Corporation, affix Corporate Seal

**ACKNOWLEDGMENTS FOR LABOR AND MATERIAL BOND
AND PERFORMANCE BOND**

(Acknowledgment by Principal, unless it be a Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 19____, before me personally came _____
_____, to me known and known to me to be the person(s) described
in and who executed the foregoing instruments and acknowledged that he / she executed the same.

Notary Public

(Acknowledgment by Principal, if a Corporation)

STATE OF NEW YORK)
) ss.:
COUNTY OF)

On this _____ day of _____, 19____, before me personally came _____
_____, to me known, who, being duly sworn, did depose
and say that he / she resides in _____;
that he / she is the _____
of the _____,
the corporation described in and which executed the foregoing instruments; that he / she knows the seal of said
corporation; that the seal affixed to said instruments is such corporate seal; that it was so affixed by order of the Board of
Directors of said corporation and that he / she signed their name thereto by like order.

Notary Public

(Acknowledgment by Surety Company)

STATE OF)
) ss.:
COUNTY OF)

On this _____ day of _____, 19____, before me personally came _____
_____, to me known, who, being by me duly sworn, did depose
and say that he / she resides in _____;
that he / she is the _____
of the _____,
the corporation described in and which executed the foregoing instruments; that he / she knows the seal of said
corporation; that the seal affixed to said instruments is such corporate seal; that it was so affixed by the order of the
Board of Directors of said corporation, and that he / she signed their name thereto by like order; and that the liabilities of
said company do not exceed its assets as ascertained in the manner provided by the laws of the State of New York.

Notary Public

**Affirmation AND Disclosure and Certification
with respect to State Finance Law §§ 139-j and 139-k**

A complete copy of the State University of New York Procurement Lobbying Policy and Procedure is available for review at <http://www.suny.edu/sunypp/>.

Procurement Description: _____ Procurement Proposal No: _____
--

A. Affirmation with respect to State Finance Law §§ 139-j and 139-k:

Offerer AFFIRMS that it has reviewed and understands the Policy and Procedure of the State University of New York relating to State Finance Law §§ 139-j and 139-k, and agrees to comply with State University's procedure relating to Contacts with respect to this procurement.

B. Disclosure & Certification with respect to State Finance Law §§ 139-j and 139-k:

1. Has a Governmental Entity, as defined in State Finance Law §139-j(l)(a), made a determination of non-responsibility with respect to the Offerer within the previous four years where such finding was due to a violation of State Finance Law §139-j or the intentional provision of false or incomplete information with respect to previous determinations of non-responsibility?

___ No

___ Yes If yes, identify the following details:

Governmental Entity which made the finding: _____

Date of finding: _____

Basis of finding: _____

2. Has a Governmental Entity terminated or withheld a procurement contract with the Offerer because of violations of State Finance Law § 139-j or the intentional provision of false or incomplete information with respect to previous determinations of non-responsibility?

___ No

___ Yes If yes, identify the following details:

Governmental Entity which terminated the contract: _____

Date of contract termination or withholding: _____

Identify the related procurement contract: _____

Offerer CERTIFIES that all information provided by Offerer with respect to its compliance with State Finance Law §§ 139-j and 139-k is complete, true and accurate.

Name of Offerer: _____

Address: _____

Signature of Person Submitting Form: _____

Name (printed or typed): _____

Title: _____

Date: _____

Contractor:

Contractor's:

- ◆ Vendor Responsibility Construction Questionnaire
- ◆ Financial Statement
- ◆ Affidavit of No Change

State of New York / State University of New York

**MINORITY AND WOMEN'S BUSINESS - EQUAL EMPLOYMENT
OPPORTUNITY PROGRAM POLICY STATEMENT**

Policy Statement

The _____ commits to carrying out the intent of the New York State
(Name of Campus, Consultant, Contractor)
Executive Law, Article 15-A which assures the meaningful participation of minority and
women's business enterprises in contracting and the meaningful participation of minorities and
women in the workforce on activities financed by public funds.

Minority Business Officer

_____ is designated as the Minority Business Enterprise Officer
(Name of Designated Officer)
responsible for administering the Minority and Women's Business-Equal Employment
Opportunity (M/WBE-EEO) program.

M/WBE Contract Goals

_____ % Minority Business Enterprise Participation

_____ % Women's Business Enterprise Participation

EEO Contract Goals

10% Minority Labor Force Participation

03% Female Labor Force Participation

(Authorized Representative)

Title: _____

Date: _____

M/WBE UTILIZATION PLAN

INSTRUCTIONS: This form must be submitted with any bid, proposal, or proposed negotiated contract or within a reasonable time thereafter, but prior to contract award. This Utilization Plan must contain a detailed description of the supplies and/or services to be provided by each certified Minority and Women-owned Business Enterprise (M/WBE) under the contract. Attach additional sheets if necessary.

Offeror's Name:

Address:

City, State, Zip Code:

Telephone No.:

Authorized Representative:

Authorized Signature:

Federal Identification No.:

Location of Work: SUNY at Purchase

Project No.:

M/WBE Goals in the Contract: MBE % WBE %

EEO Goals in the Contract: MBE % WBE %

1. Certified M/WBE Subcontractors/Suppliers Name, Address, Email Address, Telephone No.	2. Classification	3. Federal ID No.	4. Detailed Description of Work (Attach additional sheets, if necessary)	5. Dollar Value of Subcontracts/ Supplies/Services and intended performance dates of each component of the contract.
1.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
2.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
3.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
4.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
5.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
6.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
7.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			

8.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			
9.	NYS ESD CERTIFIED <input type="checkbox"/> MBE <input type="checkbox"/> WBE			

6. IF UNABLE TO FULLY MEET THE MBE AND WBE GOALS SET FORTH IN THE CONTRACT, OFFEROR MUST SUBMIT A REQUEST FOR WAIVER FORM (M/WBE 104).

PREPARED BY (Signature): DATE: NAME AND TITLE OF PREPARER (Print or Type): SUBMISSION OF THIS FORM CONSTITUTES THE OFFEROR'S ACKNOWLEDGEMENT AND AGREEMENT TO COMPLY WITH THE M/WBE REQUIREMENTS SET FORTH UNDER NYS EXECUTIVE LAW, ARTICLE 15-A, 5 NYCRR PART 143, AND THE ABOVE-REFERENCED SOLICITATION. FAILURE TO SUBMIT COMPLETE AND ACCURATE INFORMATION MAY RESULT IN A FINDING OF NONCOMPLIANCE AND POSSIBLE TERMINATION OF YOUR CONTRACT.	TELEPHONE NO.: 	EMAIL ADDRESS:
--	-------------------------------	-------------------------------

	FOR M/WBE USE ONLY	
	REVIEWED BY: 	DATE:
UTILIZATION PLAN APPROVED: <input type="checkbox"/> YES <input type="checkbox"/> NO Date: _____ Contract No.: _____ Project No. (if applicable): _____ Contract Award Date: _____ Estimated Date of Completion: _____ Amount Obligated Under the Contract: _____ Description of Work: _____ NOTICE OF DEFICIENCY ISSUED: <input type="checkbox"/> YES <input type="checkbox"/> NO Date: _____ NOTICE OF ACCEPTANCE ISSUED: <input type="checkbox"/> YES <input type="checkbox"/> NO Date: _____		

**NEW YORK STATE
VENDOR RESPONSIBILITY QUESTIONNAIRE
CONSTRUCTION**

For any competitively bid construction contract of \$100,000 or more, or when proposed for subcontract work valued at \$100,000 or more, complete and submit the appropriate Office of the State Comptroller's Vendor Responsibility Questionnaire:

http://www.osc.state.ny.us/vendrep/forms_vendor.htm:

- For-Profit Construction (CCA-2) Questionnaire ([PDF Version](#)) ([MS Word Version](#))
 - Attachment A: Completed Construction Contracts ([PDF Version](#)) ([MS Word Version](#))
 - Attachment B: Uncompleted Construction Contracts ([PDF Version](#)) ([MS Word Version](#))
 - Attachment C: Financial Information ([PDF Version](#)) ([MS Excel Version](#))

- Not-for-Profit Construction Questionnaire ([PDF Version](#)) ([MS Word Version](#))
 - Attachment A: Completed Construction Contracts ([PDF Version](#)) ([MS Word Version](#))
 - Attachment B: Uncompleted Construction Contracts ([PDF Version](#)) ([MS Word Version](#))
 - Attachment C: Financial Information ([PDF Version](#)) ([MS Excel Version](#))

All questions must be answered. Whenever more space is needed to answer any question, or you wish to give further explanation, attach additional pages.

If you have submitted one of the above forms within 12 months of the bid date with any contracting agency, as long as the information remains unchanged and accurate, you may submit a complete certified copy of the form, together with an Affidavit of No Change (see page 4 of 4 of this form), to the State University of New York campus with which you are bidding. A campus may require additional information deemed necessary for its review.

Also complete the Financial Statement forms provided here as pages 2 and 3.

Note that your response to Form UF-15 must contain two parts:

1. Either one of the Vendor Responsibility Questionnaires indicated above, or an Affidavit of No Change
2. The Financial Statement

FINANCIAL STATEMENT

As of _____
(Date)

ASSETS

1. <u>Current Assets</u>		
2. Cash		\$ _____
3. Accounts receivable – less allowance for doubtful accounts		_____
Retainers included in accounts receivable	\$ _____	
Claims included in accounts receivable not yet approved or in litigation	_____	
4. Notes receivable – due within one year		_____
5. Inventory – materials		_____
6. Contract costs in excess of billings on uncompleted contracts		_____
7. Accrued income receivable		_____
Interest	_____	
Other (list) _____	_____	
Total accrued income receivable	_____	
8. Deposits		_____
Bid and plan _____		
Other (list) _____	_____	
Total Deposits	_____	
9. Prepaid Expenses		_____
Income Taxes	_____	
Insurance	_____	
Other (list) _____	_____	
Total Prepaid Expenses	_____	
10. <u>Other Current Assets</u>		
(list) _____	_____	
Total other current assets	_____	
11. Total current assets		_____
12. <u>Investments</u>		
Listed securities – present market value	_____	
Unlisted securities – present value	_____	
13. Total investments		_____
14. <u>Fixed Assets</u>		
Land	_____	
Building and Improvements	_____	
Leasehold improvements	_____	
Machinery and equipment	_____	
Automotive Equipment	_____	
Office furniture and fixtures	_____	
Other (list) _____	_____	
Total	_____	
Less accumulated depreciation	_____	
15. Total fixed assets – net		_____
16. <u>Other Assets</u>		
Loans receivable - officers	_____	
- employees	_____	
- shareholders	_____	
Cash surrender value of officers' life insurance	_____	
Organization expense – net of amortization	_____	
Notes receivable – due after one year	_____	
Other (list) _____	_____	
17. Total Other Assets		_____
18. TOTAL ASSETS		=====

LIABILITIES

19.	<u>Current Liabilities</u>		
20.	Accounts Payable	\$	_____
21.	Loans from shareholders – due within one year		_____
22.	Notes payable – due within one year		_____
23.	Mortgage payable – due within one year		_____
24.	Other payable – due within one year		_____
	(list) _____	\$	_____
	Total other payables – due within one year		_____
25.	Billings in excess of costs and estimated earnings		_____
26.	Accrued expenses payable - salaries and wages		_____
	- payroll taxes		_____
	- employees' benefits		_____
	- insurance		_____
	- other		_____
	Total accrued expenses payable		_____
27.	Dividends payable		_____
28.	Income taxes payable - state		_____
	- federal		_____
	- other		_____
	Total income expenses payable		_____
	Total current liabilities		_____
29.	<u>Deferred Income Taxes Payable</u> - state		_____
	- federal		_____
	- other		_____
	Total deferred income taxes		_____
30.	<u>Long Term Liabilities</u>		
	Loans from shareholders – due after one year		_____
	Notes payable – due after one year		_____
	Mortgage – due after one year		_____
	Other payables – due after one year		_____
	(list) _____		_____
	Total long term liabilities		_____
31.	<u>Other Liabilities</u>		
	(list) _____		_____
	Total other liabilities		_____
32.	Total Liabilities		_____

Net Worth

33.	Net Worth (if proprietorship or partnership)		_____
34.	Stockholders' Equity		
	Common stock issued and outstanding		_____
	Preferred stock issued and outstanding		_____
	Retained earnings		_____
	Total		_____
	Less: Treasury stock		_____
	Total stockholders' equity		_____
35.	TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY		_____

NOTE: IF ADDITIONAL SPACE IS REQUIRED, PLEASE NOTE AND ATTACH SCHEDULE TO STATEMENT

36. Dated this _____ day of _____, 20__.

NAME OF ORGANIZATION	BY
	TITLE

**STATE UNIVERSITY OF NEW YORK
AFFIDAVIT OF NO CHANGE**

STATE OF NEW YORK)
) ss.:
COUNTY OF)

The undersigned, being duly sworn, deposes and says:

1. I am an officer/owner of _____ (hereinafter the "Contractor"), which is currently submitting a bid on a "University" Contract.
2. Contractor previously submitted a New York State Vendor Responsibility Questionnaire for Construction within one year prior to the date hereof to _____ in connection with a bid on another State or "University" Contract.
3. Attached is an accurate and true copy of such previously submitted New York State Vendor Responsibility Questionnaire for Construction.
4. I hereby certify that, with the exception of the information specified in Section III of the Questionnaire, there has been no material change in the information pertaining to the Contractor specified on such attached Questionnaire, except as follows:

5. I hereby certify that there has been no change in the information pertaining to the uncompleted construction contracts of the Contractor specified in Section III of the Questionnaire, except as follows:

Name:
Title:
Date:

Sworn to before me this _____ day
of _____, 20__

Notary Public



STATE UNIVERSITY OF NEW YORK CERTIFICATE OF INSURANCE

This is to certify to the State University of New York that the insurance policies listed below have been issued by the undersigned and are in full force and effect on the date borne by this Certificate.

Name of Insured Contractor: _____

Address of Insured Contractor: _____

Project Location and Certificate Holder (Campus): _____ SUNY Project No.: _____

Project Title: _____

KIND OF INSURANCE	LIMITS OF LIABILITY	POLICY NO	EFFECTIVE	EXPIRATION
Workers' Compensation	As required by law			
		Carrier: _____		
Contractor's Comprehensive General Liability	\$ _____ Each Occurrence			
Bodily Injury Liability and Property Damage Liability	\$ _____ Aggregate			
	\$ _____ Combined Single Limit	Carrier: _____		
Contractor's Automobile Liability				
Bodily Injury Liability and Property Damage Liability	\$ _____ Each Accident or Occurrence			
	\$ _____ Combined Single Limit	Carrier: _____		
Owner's Protective Liability	\$ _____ Each Occurrence			
Bodily Injury Liability and Property Damage Liability	\$ _____ Aggregate			
	\$ _____ Combined Single Limit	Carrier: _____		
Asbestos Abatement Insurance (If Applicable)	\$ _____ Each Occurrence			
	\$ _____ Aggregate			
	\$ _____ Combined Single Limit	Carrier: _____		
Builder's Risk (See Page 2)	\$ _____			
		Carrier: _____		
Excess or Umbrella	\$ _____			
		Carrier: _____		

Name of Insurance Agency (if any)	Phone ()
Authorized Representative (Original Signature Required – No Stamp)	Date

As an inducement to the "University" to approve the above signed as an insurance company issuing the policies listed above and this Certificate as being in compliance with the construction contract between the "University" and the contractor named above, the above signed insurance company, duly licensed to do business in the State of New York, hereby agrees as follows:

1. That the insurance policies listed above conform, with either the requirements set forth in Item 3 of the Request for Proposal for Contracts that do not exceed \$20,000, or set forth in Sections 5.06, 5.07, and 5.08 of Article V of the Agreement between the "University" and the Contractor for contracts that exceed \$20,000.
2. The insurer(s) issuing the above policy(ies) will notify the "University" as soon as practicable if such a policy(ies) are or will be changed, cancelled or not renewed.
3. That the "University" shall not be liable for the payment of the premium on any of the insurance policies listed above and that such premium shall be payable by the Contractor named above who shall also receive any dividends or other refunds due under the above-listed insurance policies.
4. The Insurer certifies that there is no inconsistency or conflict with or between any of the terms, provisions and conditions hereof and any of the terms, provisions and conditions of the policies listed above except for the following: _____

5. That without the above signed foregoing agreements neither it nor this Certificate of Insurance would be approved by the "University."



STATE UNIVERSITY OF NEW YORK CALCULATION OF BUILDER'S RISK INSURANCE

Date: _____

SUNY Project No.: _____

Contract Amount: \$ _____

Non-insurable Items (amounts to be determined from Contractor's approved breakdown):

1. Cost of the Contractor's Performance and Labor and Material Bonds. \$ _____
2. Cost of trees, shrubbery, lawn grass, plants and the maintenance of same. \$ _____
3. Cost of demolition. \$ _____
4. Cost of excavation. \$ _____
5. Cost of foundations, piers or other supports which are below the undersurface of the lowest basement floors, or where there is no basement, which are below the surface of the ground. Concrete and Masonry work. \$ _____
6. Cost of underground flues, pipes or wiring. \$ _____
7. Cost of earthmoving, grading, and the cost of paving, roads, walks, parking lots and athletic fields. \$ _____
8. Cost of bridges, tunnels, dams, piers, wharves, docks, retaining walls and radio and/or television towers and antennas. \$ _____

Total Non-insurable Items: (-)\$ _____

Amount of Builder's Risk Insurance to be Procured: \$ _____

Office of the State Comptroller
DIVISION OF PRE-AUDIT AND ACCOUNTING RECORDS
BUREAU OF STATE EXPENDITURES

New York State Labor Law, Section 220-a
Prime Contractor's Certification

1. That I am an officer of _____
and am duly authorized to make this affidavit on behalf of the prime contractor on public contract
No. _____.
2. That I fully comprehend the terms and provisions of Section 220-a of the Labor Law.
3. That, except as herein stated, there are no amounts due and owing to or on behalf of laborers
employed on the project by the contractor. (Set forth any unpaid wages and supplements, if none,
so state).

Name	Amount
_____	_____
_____	_____
_____	_____

4. That the contractor hereby files every verified statement(s) required to be obtained by the
contractor from the subcontractor(s).
5. That, upon information and belief, except as stated herein, all laborers (exclusive of executive
or supervisory employees) employed on the project have been paid the prevailing wages and
supplements for their services through _____, (if more than one subcontractor
list name and date separately) the last day worked on the project by their subcontractor(s), (Set
forth any unpaid wages and supplements, if none, so state and utilize clause 5 (A)).

Name	Amount
_____	_____
_____	_____
_____	_____

(5A) That the contractor has no knowledge of amounts owing to or on behalf of any laborers of its
subcontractor(s).

New York State Labor Law, Section 220-a
Prime Contractor's Certification
(Page 2)

6. In the event it is determined by the Commissioner of Labor that the wages or supplements or both of any such subcontractor(s) have not been paid or provided pursuant to the appropriate schedule of wages and supplements, then the contractor shall be responsible for payment of such wages and supplements pursuant to the provision of Section 223 of the Labor Law.

Signature

Print Name

Title

ACKNOWLEDGEMENT:

STATE OF NEW YORK
COUNTY OF _____: SS.:

On this _____ day of _____ 19 _____

before me personally came _____ to me known and known to me to be the person described in an who executed for foregoing instrument and acknowledged that he executed the same

Notary Public

County

If this affidavit is verified by an oath administered by a notary public in a foreign country other than Canada, it must be accompanied by a certificate authenticating the authority of the notary who administers the oath. (See CPLR § 2309(c); Real Property Law, § 311, 312).

Office of the State Comptroller
DIVISION OF PRE-AUDIT AND ACCOUNTING RECORDS
BUREAU OF STATE EXPENDITURES

New York State Labor Law, Section 220-a
Subcontractor's Certification

1. That I am an officer of _____
a subcontractor on public contract No. _____ and I am
duly authorized to make this affidavit on behalf of the firm.
2. That I make this affidavit in order to comply with the provisions of Section 220-a of the Labor Law.
3. That on _____ we received from _____
the prime contractor a copy of the initial/revised schedule of wages and supplements
Prevailing Rate Schedule Case Number _____ (PRC) specified in the public
improvement contract.
4. That I have reviewed such schedule(s), and agree to pay the applicable prevailing wages and
to pay or provide the supplements specified therein.

Signature

Print Name

Title

ACKNOWLEDGEMENT:

STATE OF NEW YORK
COUNTY OF _____ : SS.:

On this _____ day of _____ 19 _____

before me personally came _____ to me
known and known to me to be the person described in an who executed for foregoing instrument
and acknowledged that he executed the same.

Notary Public

County

If this affidavit is verified by an oath administered by a notary public in a foreign country other
than Canada, it must be accompanied by a certificate authenticating the authority of the notary who
administers the oath. (See CPLR § 2309(c); Real Property Law, § 311, 312).

Office of the State Comptroller
DIVISION OF PRE-AUDIT AND ACCOUNTING RECORDS
BUREAU OF STATE EXPENDITURES

New York State Labor Law, Section 220-a
Sub-subcontractor's Certification

1. That I am an officer of _____ a subcontractor to _____ a subcontractor of _____, the prime contractor on public improvement contract No. _____ and I am duly authorized to make this affidavit on behalf of the firm.
2. That I make this affidavit in order to comply with the provisions of Section 220-a of the Labor Law.
3. That on _____ we received from _____ the (subcontractor of the) (contractor) a copy of the (initial) (revised) schedule of wages and supplements Prevailing Rate Schedule Case Number _____ (PRC) specified in the public improvement contract.
4. That I have reviewed such schedule(s), and agree to pay the applicable prevailing wages and to pay or provide the supplements specified therein.

Signature

Print Name

Title

ACKNOWLEDGEMENT:

STATE OF NEW YORK
COUNTY OF _____ :SS.:

On this _____ day of _____ 19 _____ before me personally came _____ to me known and known to me to be the person described in an who executed for foregoing instrument and acknowledged that he executed the same.

Notary Public

County

If this affidavit is verified by an oath administered by a notary public in a foreign country other than Canada, it must be accompanied by a certificate authenticating the authority of the notary who administers the oath. (See CPLR § 2309(c); Real Property Law, § 311, 312).

STATE UNIVERSITY OF NEW YORK
RELEASE

The undersigned hereby acknowledges that pursuant to Contract/Purchase Order Number _____
dated ____ / ____ / ____ , where in the undersigned agreed to perform the work contained in Project
Number _____ titled _____
_the State University of New York has paid or will pay the undersigned, or entity represented by or through the
undersigned, the sum of _____
(\$ _____) dollars.

Said amount being the full and entire sum due from the State University of New York to the undersigned under
the above contract, except for monies retained by the University pursuant to the provisions of contract, including,
but not limited to, money, if any, due to the undersigned by reason of extra work, labor or materials furnished or
performed in connection with, relating to, or arising out of the subject matter of said contract. In consideration of
such payment, the undersigned hereby releases and discharges the State of New York and the State University
of New York, their officers, agents and employees, of and from all claims of liability to the undersigned for
anything furnished or performed in connection therewith, relating to or arising out of the contract or out of the work
covered by said contract, including, but not limited to, all claims for extra work, labor or materials and for any prior
act, neglect, or default on the part of the State of New York or the State University of New York or any of their
officers, agents, or employees in connection therewith, except for the aforesaid retained monies.

The undersigned further acknowledges that neither the aforesaid payment nor acceptance by the State University
of New York of the work covered by the above contract shall in any way or manner operate as, or constitute, a
release or waiver of the undersigned's obligations, undertakings, or liabilities under said contract or in any way
affect or limit the same.

In witness whereof, the undersigned has caused its name to be subscribed and its seal affixed this
_____ day of _____ 19____ .

(name of contractor)

(corporate seal)

by _____

Division 1 - General Requirements
SECTION A - Description of Work

1. Work to be Done

The work to be done under the Contract, in accordance with the Contract Documents, consists of performing, installing, furnishing and supplying all materials, equipment, labor and incidentals necessary or convenient for the construction of Project Number **SU-030116** titled Purchase College, Music Building Humidification and carry out all of the duties and obligations imposed upon the Contractor by the Contract Documents.

All preheat coil and cooling coil replacement and related equipment and work to be performed so as to make air conditioning available when required (August 29th, 2016). This work will be summer 2016 work to be performed between August 1st, 2016 and August 30th 2016.

All reheat coils installation and related equipment and work to be performed so as to make available when required (August 29th, 2016). This work shall not start prior to August 1st, 2016. Temporary heating or cooling to building is contractor responsibility during this time at all occupied spaces.

All humidifier installation and related equipment and work to be performed between July 15th, 2016 to August 29th, 2016. Winter December 16th 2016 to January 25th 2017 and if needed May 19th 2017 until June 30th 2017.

Air handlers AHU-1, AHU-2 and AHU-3 can be shut down when the building minimally occupied August 1st and August 29th 2016. During this shutdown period contractor will provide temporary heat or cooling and ventilation to the occupied spaces. The building shall remain in operation when the building is occupied in fall semester starting August 30th 2016,

The main features of the work shall include, but not be limited to the following:

Humidification of Piano Practice Room on the plaza level of the Music Building.
Controls upgrade for AC-1, AC-2 and AC-3 in the Music Building.
Testing and Balancing for AC1, AC-2 and AC-3. Field Verify ceiling heights in all rooms as some rooms has significantly high ceiling.

Alternate 1 can be performed between July 15th 2016 to August 29th, 2016. December 16th 2016 to January 25th 2017

Alternate 2 can be performed between July 15th 2016 to August 29th, 2016. December 16th 2016 to January 25th 2017

Testing balancing of all units will be performed December 15th to January 25th 2017 or June of 2017.

2. Work Not Included:

Work not included in the work of the Contract are those items marked "N.I.C"; movable furnishings, except those specifically specified or indicated on the Drawings; and items marked "by others".

SECTION B - Alternates

1. General

- a. Refer to Proposal Form. State thereon the amount to be added to or deducted from the Total Bid for the Alternates described herein.

- b. Extent and details of the Alternates are indicated on the Drawings, and described in the Specifications.
- c. Where reference is made in the description of the Alternate to products, materials, or workmanship, the specification requirements applicable to similar products, materials or workmanship in the Total Bid shall govern the products, materials, and workmanship of the Alternate as if these specification requirements were included in full in the description of the Alternates.

2. Alternates

Alternate 1:

Demolition of existing drop ceiling and lights and furnish and installing new lights and ceiling at plaza level west corridor refer to SK-1, SK-2

Alternate 2:

Demolition of existing drop ceiling and lights and furnish and installing new lights and ceiling at Plaza level lobby refer to SK-3, SK-4

SECTION C - Special Conditions

1. Cutting and Patching

- a. The Contractor shall do all cutting, fitting, and patching of its work that may be required to make its several parts come together properly and fitted as shown upon or reasonably implied from the Drawings and Specifications for the completed project.
- b. Any cost caused by defective or ill-timed work shall be borne by the Contractor. Except as otherwise expressly provided in the Contract Documents, the Contractor shall not cut or alter the work of any other Contractor or existing work without the consent of the University.
- c. Existing construction, finishes, equipment, wiring, etc., that is to remain and which is damaged or defaced by reason of work done under this contract shall be restored by the Contractor to a condition satisfactory to the University, or replaced with new, at no additional cost.
- d. Existing surfaces, materials, and work shall be prepared as necessary to receive the new installations. Such preparatory work shall be as required by the conditions and in each case shall be subject to approval by the University.
- e. Newly exposed work or surfaces which are presently concealed shall be made to match existing corresponding or adjoining new surfaces as directed, and the materials and methods to be employed shall be subject to approval by the University.
- f. All new, altered, or restored work in the building shall match existing corresponding work in the material, construction finish, etc., unless otherwise specified or required by the drawings.

2. Clean-Up

- a. Periodic Cleaning: The Contractor shall at all times during the progress of the work keep the Site free from accumulation of waste matter or rubbish and shall confine its apparatus, materials and operations of its workmen to limits prescribed by law or by the Contract Limit Lines, except as the latter may be extended with the approval of the University. Cleaning of the structure(s), once enclosed, must be performed daily and removal of waste matter or rubbish

must be performed at least once a week.

- b. Final Clean Up: Upon completion of the work covered by the Contract, the Contractor shall leave the completed project ready for use without the need of further cleaning of any kind and with all work in new condition and perfect order. In addition, upon completion of all work, the Contractor shall remove from the vicinity of the work and from the property owned or occupied by the State of New York, the State University of New York or the University, all plant, buildings, rubbish, unused materials, concrete forms and other materials belonging to it or used under its direction during construction or impairing the use or appearance of the property and shall restore such areas affected by the work to their original condition, and, in the event of its failure to do so, the same shall be removed by the University at the expense of the Contractor, and it and its surety shall be liable therefor.

3. Temporary Access and Parking

See Supplemental Special Conditions for Construction.

4. Field Meetings

Periodic job meetings will be scheduled by the Consultant and the University during the course of construction. The Contractor, and, upon request of the Consultant and the University, its principal subcontractors and manufacturer's representatives, shall attend such meetings and be prepared to furnish answers to questions on progress, workmanship, or any other subject on which the Consultant and the University might reasonably require information.

5. Operating Instructions and Manuals

The Contractor shall furnish three (3) complete sets of operating instructions and manuals which shall include definite and specific instructions on all mechanical and electrical systems involved in the Project. Said instructions and manuals should set forth: (1) the manner of operation; (2) the necessary precautions and care to be followed; (3) periodic prevention maintenance requirements; and (4) a complete set of spare parts lists, catalogs, service manuals and manufacturing data on said systems. Said instructions and manuals are to be made available by the Contractor for review and comment by the University a minimum of six (6) weeks prior to the scheduled completion of the Project.

6. Utility Shutdowns and Cut Overs

- a. Except as otherwise expressly provided in the Contract Documents, the Contractor shall be responsible for submitting to the University, for its approval, a proposed schedule of all utility shutdowns and Cut-overs of all types which will be required to complete the Project; said schedule should contain a minimum of two (2) week's advance notice prior to the time of the proposed shutdown and cut over. Most campuses of the State University of New York are in full operation 12 months of the year, and shutdowns and Cut-overs, depending upon their type, generally must be scheduled on weekends, at night, or during holiday periods. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or Cut-overs.
- b. Temporary Connections: In the event the Contractor shall disrupt any existing services, the Contractor shall immediately make temporary connection to place such service back into operation and maintain the temporary connection until the Contractor makes the permanent connection. All work must be acceptable to the University.

7. Temporary Power for Construction Activities

Electrical energy will be available at no cost to the Contractor from existing outlets or panels from locations approved by the College. This power may be used for small power tools (not exceeding 1/2 HP), etc., and the Contractor shall not exceed the capacity of the existing circuits being used. The Contractor shall be responsible for providing all necessary connections, cables, etc. and removal of the same at completion of construction with approval from the University. The Contractor shall in no way modify the

existing circuits at the panel boards to increase capacities of the circuits. If the required power load exceeds the capacities of the available power sources, the Contractor shall be responsible and pay for furnishing and installing all necessary temporary power poles, cables, fused disconnect switches, transformers and electric meters necessary to provide a temporary power system for the project, and remove the same at completion. Install all temporary wiring and equipment and make all connections in conformity with the National Electrical Code. Make all replacements required by temporary use of the permanent wiring system. Provide ground fault protection.

8. Sanitary Facilities

The Contractor will be permitted to use existing toilet and janitor closet facilities as designated by the College provided the existing facilities are not misused, defaced, or left in an unsanitary condition. If the University deems that the existing facilities have been subject to misuse or left unsanitary, the Contractor shall be informed and caused to install and maintain (at its own cost) temporary, sanitary facilities at approved locations. The Contractor shall also be held responsible for the cost of cleaning and repair of any damage to said existing facilities and adherence to health and sanitary codes of the State of New York.

9. Temporary Heat

- a. In those locations where it is required by the conditions of the work, the Contractor shall provide and pay for all temporary heating, coverings and enclosures necessary to properly protect all work and materials against damage by dampness and cold, dry out the work, and facilitate the completion thereof. Fuel, equipment, materials, operating personnel and the methods used therefor shall be at all times satisfactory to the University and adequate for the purpose intended. The Contractor shall maintain the critical installation temperatures, provided in the technical provisions of the specifications hereof, for all work in those areas where the same is being performed.
- b. Maintenance of proper heating, ventilation and adequate drying out of the work is the responsibility of the Contractor. Any work damaged by dampness, insufficient or abnormal heating shall be replaced to the satisfaction of the University by and at the sole cost and expense of the Contractor.
- c. The Contractor shall provide all necessary, temporary heating for the efficient and effective work by itself and all trades engaged in the work. Unless otherwise specified, the minimum temperature shall be 50 degrees F at all places where work is actually being performed within the project (where enclosed). Before and during the placing of wood finish and the application of other interior finishing, varnishing, painting, etc., and until final acceptance by the University of all work covered by the Contract, the Contractor shall, unless otherwise specified in the Contract Documents, provide sufficient heat to produce a temperature of not less than 68 degrees F nor more than 78 degrees F.

10. Temporary Light

The contractor shall install, maintain and remove Underwriter's Label temporary lighting sockets, light bulbs, and intermittent power sockets as approved by the University. The minimum temporary lighting to be provided is at the rate of 1/4 watt per square foot and be maintained for 24 hours, 7 days per week at stairs and exit corridors; in all other spaces, temporary lighting is to be maintained during working hours. Installation shall be in accordance with the National Electric Code.

11. Temporary Water for Construction Purposes

Water for construction is available through the campus system without charge to the Contractor from location designated by the College. The Contractor shall obtain the necessary permission, make all connections, as required, furnish and install all pipes and fittings, and remove the same at completion of work. The Contractor must provide for waste water discharge and shall take due care to prevent damage to existing structures or site and the waste of water. All pipes and fittings must be maintained in perfect

condition at all times.

12. Conducting Work

- a. All work is to be conducted in such a manner as to cause a minimum degree of interference with the College's operation and academic schedule.
- b. Safe and direct entrance to and exiting from the existing buildings shall be maintained at all times during regular hours while construction is in progress.
- c. No construction work will start in any area until the Contractor has all the required materials on-site.
- d. The Contractor and its employees shall comply with College regulations governing conduct, access to the premises, and operation of equipment.
- e. The building shall not be left "open" overnight or during any period of inclement weather. Temporary weather tight closures shall be provided for/by the Contractor to protect the structure and its contents.

13. Safety and Protective Facilities

- a. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the Staff, students, the work and property at all times, including Saturdays, Sundays, holidays and other times when no work is being done.
- b. The Contractor shall erect, maintain and remove appropriate barriers or other devices, including mechanical ventilation systems, as required by the conditions of the work for the protection of users of the project area, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA and National Fire Prevention Association 241, for safeguarding of structures during construction.

14. Protection of Existing Structures, Vegetation and Utilities

The Contractor, during the course of its work, shall not damage any buildings, structures and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric power and lighting and telephone cables, lawns, curbs, plants and other improvements. Any damage resulting from the Contractor's operations shall be repaired or replaced at its expense.

15. Abbreviations and References

The following abbreviations may be used in these Specifications:

N.A.	Not Applicable
N.I.C	Not in Contract.
Fed. Spec. or F.S.	Federal Specifications
SUCF	State University Construction Fund
University or SUNY	State University of New York
College	A Campus of the State University of New York

16. Use of Elevators

The Contractor shall be permitted to make temporary use of elevators designated by the University and provided such use does not interfere with the normal activities of the College. Large and heavy items shall not be placed in elevators, and suitable padding shall be provided whenever a cab is used for construction purposes. Elevator pits shall be kept free of debris and dust by frequent cleaning out. The elevators shall be restored to original condition satisfactory to the University at the end of construction activities. Use of

the top of the elevator may be permitted after obtaining approval of the University.

17. Salvage of Materials

Remove and legally dispose of all debris and other materials resulting from the alterations to State University property. The following items shall remain the property of the University and shall be stored at the site as directed by the University:

- *Any doors or door hardware indicated to be returned to Campus as noted in the construction documents.*
- *Window treatments.*
- *Misc. Items. – College Representative will walk site with Contractor and tag all items that are to be returned to Campus prior to beginning of demolition.*

18. Storage of Materials

- a. The Contractor shall store materials and equipment within the contract limits in areas on the site as designated by the University.
- b. All materials shall be stored in a neat and orderly manner, and shall be protected against the weather by raised floored weatherproof temporary storage facility or trailer.
- c. Security for stored materials shall be the responsibility of the Contractor.
- d. Storage of materials is not permitted on the roof of any building.

19. Shop Drawings and Samples - (Refer to Section 2.19 of the Agreement)

- a. The Contractor shall submit to the University for its approval five (5) sets of prints of all shop drawings required by the specifications. Those marked:
 - "REJECTED" are not in accordance with the Contract Documents and shall be resubmitted.
 - "REVISE AND RESUBMIT" Contractor shall correct and resubmit.
 - "MAKE CORRECTIONS NOTED": The contractor shall comply with corrections and may proceed. Resubmittal is not required.
 - "APPROVED - NO EXCEPTIONS TAKEN": The contractor may proceed.
- b. All shop drawings and/or submittals used on the construction site must bear the impression of the consultant's review stamp as well as the General Contractor's review stamp, indicating the status of review and the date of review.
- c. All shop drawings shall reflect actual site conditions and accurate field dimensions. Dimensioned shop drawings shall be submitted for all fabricated items. Incomplete submittals will be rejected without review.
- d. All shop drawings, submittals and samples shall include:
 - 1). Date and revision dates.
 - 2). Project title and number.
 - 3). Names of:
 - a). Contractor
 - b). Subcontractor
 - c). Supplier
 - d). Manufacturer
 - 4). Identification of products or materials: Include Department of State (DOS) file number, manufacturers' name and market name of all covered products and

applicable materials in accordance with Part 1120 of the Code. This information may be obtained by contacting the DOS, Office of Fire Prevention and Control: 518-474-6746 [voice] and 518- 474-3240 [FAX])

20. U.S. Steel

All structural steel, reinforcing steel, or other major steel items to be incorporated in the work shall, if this Contract is in excess of \$100,000, be produced or made in whole or substantial part in the United States, its territories or possessions.

21. Non-Asbestos Products

- a. All materials specified herein shall contain no asbestos.
- b. Provide "Contains No Asbestos" permanent labels applied to the exterior jacket of all pipe insulation at 20 foot intervals with a minimum of one (1) label for each service in each work area.

22. Material Safety Data Sheet

The contractor shall submit MSDS (Material Safety Data Sheet) for all chemicals, solvents, and materials specified or proposed to be used on this project.

23. Architect's/Engineer's Seal

In accordance with Rules and Regulations of the New York State Education Law, Title 8, Part 69.5(b), to all plans, specifications and reports to which the seal of an architect has been applied, there shall also be applied a stamp with appropriate wording warning that it is a violation of the law for any person, unless acting under the direction of a licensed architect, to alter an item in any way. If an item bearing the seal of an architect is altered, the altering architect shall affix to his item the seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration.

24. Construction Permit

The Code Compliance Manager for the State University Campus will, as required by law, issue a Construction Permit for this Project. The project is not subject to any local building code or permit requirements, except for work that the Contractor is to perform on property located outside of the boundaries of the campuses of the State University of New York.

25. Other Contracts

There may be other contracts let for work to be done in adjacent areas and, as such, this Contractor and such other contractors shall coordinate their work to conform with progressive operation of all the work covered by such contracts, and afford each other reasonable opportunities for the introduction and storage of their supplies, materials, equipment, and the execution of their work.

26. Asbestos

If the work to be done under this contract contains the abatement of asbestos the following shall apply:

- a. Applicable Regulations -All work to be done under this Contract shall be in compliance with Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York (cited as 12 NYCRR Part 56) as amended effective November 9, 1994.
- b. Applicable Variance - The abatement contractor is responsible for obtaining any variance not issued to date that he feels may be applicable to the policies/procedures

as set forth in 12 NYCRR Part 56.

- c. Owner Project Fact Sheet -The Contractor shall complete and submit as much information as possible on the Asbestos Material Fact Sheet to the University in triplicate prior to the project startup. Completion of the Fact Sheet shall be submitted prior to acceptance.
- d. Patent Infringement - The State University of New York and the State University Construction Fund have been given notice by a law firm representing GPAC, Inc. that the use of its process/procedure for asbestos containment and removal constitutes a patent infringement. All potential contractors are hereby notified that they may have to obtain a license to use certain patented Negative Air Containment systems, and that any liability of the University in connection therewith is covered by Section 2.21 of the Agreement. Therefore, all potential contractors are hereby notified that after opening of the bids they must advise the University as to the system they intend to use for Negative Air Containment and provide the University with either a copy of their license to use the same or written documentation, signed by an authorized officer of their surety, that their performance bond guarantees the Contractor's indemnification covering patent claims.
- e. Air Monitoring - The abatement contractor shall be responsible for hiring and paying an independent third party firm to perform the requirements of air monitoring as called for in Subpart 56-17 of 12 NYCRR Part 56.
- f. Testing - The University and Campus reserve the right to employ an independent testing laboratory to perform testing on the work and air sampling. The Contractor shall be required to cooperate with the testing laboratory.
- g. Disposal Procedures - It is the responsibility of the asbestos contractor to determine current waste handling, transportation and disposal regulations for the work site and for each waste disposal landfill. The asbestos contractor must comply fully with these regulations, all appropriate U.S. Department of Transportation, EPA and Federal, State and local entities' regulations, and all other then current legal requirements. Submit originals or copies of all pertinent manifests in triplicate to the University.
- h. Submittals - Prior to commencement of the work on this project, the Contractor must submit the following to the University:
 - 1). Copy of original insurance policy.
 - 2). Copy of Department of Labor notification.
 - 3). Owner Fact Sheet.
 - 4). Copy of EPA notification.
- i. Special Requirements -
 - 1) Size, location, and quantities of all pipes, joints, ducts, valves, tees, etc. must be field verified by all prospective bidders. Information given on the drawings and specifications is for general orientation and information only.
 - 2) The Contractor shall have at least one English-speaking supervisor on the ob site at all times while the project is in progress.
 - 3) Prior to the commencement of work involving asbestos demolition, removal, renovation, the Contractor must submit to the University the name of its on-site asbestos supervisor responsible for such

operations, together with documentation that such supervisor has completed an Environmental Protection Agency-approved training course for asbestos supervisors.

27. Wage Rates and Supplements

The rates of wages and supplements determined by the Industrial Commissioner of the State of New York as Prevailing in the locality of the site at which the work will be performed can be found at: <https://applications.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1284441>

The Prevailing Wage Case Number (PRC#) assigned to this project is: 2016004920

Special Conditions for Construction

Part 1 – Use of Premise

1.1 General

- A. Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. *For purposes of this provision, "site" shall include all existing structures.*
- B. Each Contractor's use of premises is limited only as outlined in this section and/or any other section of the specifications, or at the College's discretion, to perform work or to retain other contractors on portions of Project.
- C. Coordination with Other Contractors:
 - 1). The Contractor will need to have their portion of the Work coordinated with other Contractors working on the site so that their work conforms to the progressive operation of all the work covered under other contracts that the College has let on this site.
 - 2). Each Contractor shall afford other Contractors reasonable opportunities for the introduction and storage of their supplies, materials, equipment, and execution of their work.
 - 3). If the Contractor or such other contractors contend that their work of the progress thereof is being interfered with by the acts or omissions of the others or that there is a failure to coordinate or properly arrange the sequence of the work on the part of the Contractor or such other contractors, they shall, within five (5) working days of the commencement of such interference or failure of coordination or failure to perform work in proper sequence, give written notification to the College of such contention. Upon receipt of such notification or on its own initiative, the College shall investigate the situation and issue such instructions to the Contractor or such other contractors with respect thereto as it may deem proper. The College shall determine the rights of the Contractor and of such other contractors and the sequence of work necessary to expedite the completion of the work covered by said other contracts.
- D. All work is to be conducted in such a manner as to cause a minimum degree of interference with the College's operations and academic schedule. Contractor is to coordinate their work with the College's classroom schedule.
- E. The Contractor and its employees shall comply with all College regulations governing conduct, access to the premises, and operation of equipment.
- F. Maintain all paths of egress and keep clear of all materials and debris.
- G. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, and other adjacent occupied or used facilities without written permission from College.
- H. Should it become necessary, in the judgment of the College, at any time during the course of the Work to move materials which are stored on the site and equipment which has been temporarily placed thereon, the Contractor upon request of the College shall move them or cause them to be moved at its sole cost and expense; provided, however, if materials and equipment that have been stored or placed by the Contractor at a location on the site expressly approved, in writing, by the College and the same are moved or caused to be moved by the Contractor at the College's request, such removal shall be deemed extra work and the Contractor shall be compensated.

1.2 Campus Regulations

- A. The contractor and his/her employees, subcontractors, etc., will not fraternize with any building or campus occupants. This includes but is not limited to students, faculty, and employees of the State other than those designated, visitors and guests. At no time will it be appropriate to say anything derogatory to the above referenced individuals. Harassment, verbal or otherwise, of the above referenced individuals will **not** be tolerated. If an incident arises, the Contractor will be directed to **permanently remove** the employee from the site.
- B. No drugs are permitted on campus.
- C. No smoking is permitted in the buildings.

- D. The contractor, employees and sub-contractors are required to stay within the construction boundary lines at all times.
- E. The contractor, employees, and sub-contractors must recognize the fact that this is an institute for learning. Flexibility will be required during certain times of the academic year.

1.3 Use of Permanent Utilities

- A. The written request for permission for use of the system from the College shall include, as a minimum, the conditions and reasons for use and provisions for and effect on equipment warranties. In the event that the College accepts the Contractors use of the permanent utility for the balance of the Work, the Contractor shall be fully responsible for it, and shall pay all costs for operation, power, restoration and maintenance of same.
- B. If the existing facilities are not adequate for the Contractor, locate temporary facilities where they will serve Project adequately and result in minimum interference with performance of the Work and disruption to the College. Any temporary facilities location is to be reviewed and approved by College's Representative.

1.4 Storage and Staging of Materials

- A. The following shall apply to this project
 - 1). The Contractor shall store materials and equipment within areas designated on construction documents.
 - 2). Security for stored equipment and materials shall be the responsibility of the Contractor.
 - 3). The Contractor shall at all times keep access routes, and parking and staging areas clean of debris and other obstructions resulting from the work.

1.5 Temporary Power for Construction Activities

- A. Electrical energy, as it exists within the work area, will be available at **no** cost to the Contractor from existing outlets or panels from locations approved by the College. As this site is still under construction, if electrical power is not available in the area of work, it is the Contractor's responsibility to provide necessary power to perform the Work. Typically available power may be used for small power tools (not exceeding ½ HP).

1.6 Temporary Lighting / Heating & Cooling / Water

- A. Electrical lighting, as it exists within the work area, is available to the contractor at **no** cost. As this site is still under construction, if electrical lighting is not available in the area of work, it is the Contractor's responsibility to provide necessary temporary equipment to perform the Work at its cost.

1.7 Temporary Sanitary Facilities

- A. Toilet, Water, and Drinking Water Facilities: The Contractor shall make arrangements with the College for use of the existing toilet, water, and drinking water facilities if available. It is the Contractor's responsibility to maintain the facility during the construction and restore to original state upon completion of the project.

1.8 Temporary Parking

- A. Contractor is to abide to the following:
 - 1). The Contractor and its employees shall be subject to all the rules and regulations of the College, including parking regulations. The College is regulated by New York State Vehicle and Traffic Laws.
 - 2). The Contractor and its employees shall only park in the designated areas in Lot #W-2. There shall be no parking in other areas of the campus (unless prior written authorization is provided by the College Chief of Police).
 - 3). Parking violations are subject to fines and are the sole responsibility of the Contractor or its employees. Vehicles that are parked illegally may be towed at the expense of the owner/driver.
 - 4). All vehicles are required at all times to register with the College's Public Safety Unit.

- 5). There is \$35.00 fee for parking permits. The fee is per vehicle and permits need to be display whenever the vehicle is parked on campus.

1.9 Temporary Support Facilities

- A. Construction Aids: Provide all items, such as lifting devices, all scaffolding, staging, platforms, runways, ladders; and all temporary flooring, as required by the various trades for the proper execution of the Work. Provide such construction aids with proper guys, bracing, guards, railings and other safety devices as required by the governing authorities and OSHA.
- B. Elevator and Loading Dock Usage: The Contractor shall make all arrangements with the College's Representative for the use of elevators as required for transporting material and workmen to the work areas and for the disposal of rubbish and waste materials.

1.10 Safety and Protection of Facilities

- A. The Contractor shall provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the Faculty and Staff, students, the work, and the property at all times, including Saturdays, Sundays, holidays, and other times when no work is being done. The Contractor shall submit a safety plan which shall be certified by a Certified Safety Professional from the Board of Certified Safety Professionals (www.bcsp.org).
- B. The Contractor shall erect, maintain and remove appropriate barriers or other devices, including mechanical ventilation systems, as required by the conditions of the work for the protection of the users of the project area, adjoining areas, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws and regulations, including OSHA and National Fire Prevention Association 241, for safeguarding of structures during construction.
- C. Fire safety during construction:
- 1). The Contractor shall provide all temporary equipment, labor and materials required for compliance with the applicable provisions of Chapter 14, Fire Safety during Construction and Demolition, of the Fire Code of New York State.
 - 2). For areas and spaces under their control, the Contractor shall comply with Chapter 14 of the Fire Code of New York State, titled "Fire Safety during Construction and Demolition". Subject to approval by the College's Consultant and the College, the Contractor shall designate one person as the **fire prevention program superintendent**. This superintendent shall be responsible for the fire prevention program required by Section 1408 of the Fire Code of New York State and implementing the minimum safeguards for construction, alteration, and demolition operations that provide reasonable safety to life and property from fire during the Contractor's operations. Responsibilities also include developing and maintaining pre-fire plans per 1408.2, the training of the Contractor's workforce per 1408.3, maintenance of the fire protection equipment per 1408.4, supervising hot work operations per 1408.5, and implementing temporary impairment to existing fire protection systems per 1408.6 & 1408.7. This superintendent shall also provide periodic written reports at the field meetings and respond to questions raised concerning compliance with Chapter 14 of the Fire Code of New York State.
- D. Contractor shall comply with Labor Law Section 220-h; provide workers certified as having successfully completed the OSHA 10-hour construction safety and health course; and comply with applicable NYS DOL rules and regulations for monitoring and reporting compliance.

D. Temporary Fire Protection:

GC to provide temporary Fire Protection as per New York Codes.

F. Fire Watch Requirements:

- 1). If any of the work of the Contractor;
 - a) Disables any fire suppression systems, standpipes systems, fire alarm systems, fire detection systems, smoke control systems and/or smoke vents as defined in Chapter 9 of the Fire Code of New York State (FCNYS).
 - b) Involves welding, cutting, open torches and other hot work as defined in Chapter 26 of the FCNYS and/or involves demolition activities that are hazardous in nature as defined in Chapter 14 of the FCNYS.

Then the Contractor shall provide a fire watch or perform the work during the hours where the building is scheduled by the College to be closed, in accordance with Section 901.7 of the FCNYS, for structures that have campus occupancy.

- 2). If a fire watch is required, the Contractor shall provide all labor that is required. The Contractor shall:
 - a) Contact the New York State Department of State Office of Fire Prevention and Control (OFPC) at 41 State Street, Albany, NY 12231-0001, Phone: (518) 474-6746, Fax: (518) 474-3240, e-mail: fire@dos.state.ny.us and obtain its currently amended recommendation for fire watch procedures. Review the OFPC recommendations and notify the College's Consultant and/or College Representative if there are significant discrepancies with the requirements of this section.
 - b) Review the fire watch procedures with the College's alarm monitoring staff (University Police – 914-251-6900) and the fire department prior to disabling a fire protection system. Submit a plan for the fire watch for approval by the College's Consultant and/or College Representative, and schedule a pre-system shutdown meeting with the College's Consultant and/or College Representative.
 - c) Employ, instruct and maintain competent fire watch personnel. Provide the sufficient number of dedicated personnel that are required to patrol all portions of the means of egress system in the facility in the period of time required.
 - d) Notify University Police (UPD) prior to and at the conclusion of the fire watch.
 - e) Employ competent personnel to fix the fire protection system (see section 1.11 below).
- 3). Fire Watch Duties: Personnel serving as a fire watch have the following duties:
 - a) Conduct periodic patrols of the entire facility as specified below.
 - b) Identify any fire, life or property hazards.
 - c) Notify the UPD if a fire is discovered by call (914-251-6911), with the exact address and type of emergency.
 - d) Notify occupants of the facility of the need to evacuate. If sirens or public address function of the alarm system are still functional, use them to assist with evacuation of the building.
 - e) Have access to at least one means of direct communication with UPD. A cell phone is acceptable.
 - f) Maintain a written log of fire watch activities.
 - g) Have knowledge of the location and use of fire protection equipment, such as fire extinguishers. (Note: The fire watch will not perform fire-fighting duties beyond the scope of the ordinary citizen).
 - h) Perform no other duties that are not directly part of the fire watch duties.
- 4). Frequency of Inspections: Fire watch personnel should patrol the entire facility every 30 minutes except in the following situations, where patrols shall be every 15 minutes:
 - a) The facility has people sleeping.
- 5). Record Keeping: A fire watch log should be maintained at the facility. The log should show the following:
 - a) Address of the facility.
 - b) Times that the patrol has completed each tour of the facility.
 - c) Name of the person(s) conducting the fire watch.
 - d) Records of communication(s) to the University Police.
 - e) Record of other information directed by the College's Consultant and/of the College Representative.

1.11 Modifications / Alterations to Campus Existing Fire Alarm Systems

NA

Part 2 – Party Responsibilities

2.1 Information and Services Required of the College

- A. Furnished Information: College shall furnish (if available) surveys, existing plans, or other required information describing physical characteristics, legal limitation and utility locations for the site of the Project, and a legal description of the site. These documents are for information purposes only. They are to be field verified by the Contractor for accuracy. The College will not be responsible if actual conditions vary from what is indicated on the documents. Plans will be released to awarded Bidder in PDF electronic format.
- B. College’s Right to Stop the Work: If Contractor fails to correct Work which is not in accordance with the requirements outlined, or fails to carry out Work in accordance with the Contract Documents, the College, by written order signed personally or by an agent specifically so empowered by the College in writing, may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the College to stop the Work shall not give rise to a duty on the part of the College to exercise this right for the benefit of Contractor or any other person or entity.
- C. College’s Right to Carry Out the Work: If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten (10) business-day period after receipt of written notice from College to commence and continue correction of such default or neglect with diligence and promptness, College may, without prejudice to other remedies College may have, correct such deficiencies. *College may offset* from payments then or thereafter due Contractor the cost of correcting such deficiencies, including compensation for Consultant’s additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall pay the difference to the College.

2.2 Information and Services Required of the Contractor

- A. Review of Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with the information furnished by the College, and shall at once report to the College Representative errors, inconsistencies or omissions discovered.
- B. Review of Field Conditions: Contractor shall, *sufficiently in advance of undertaking the Work*, take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to Contractor with the Contract Documents. Errors, inconsistencies or omissions discovered shall be reported to the College Representative at once. *If Contractor performs any construction activity which involves an error, inconsistency or omission which Contractor knew of or should reasonably have known of, without notice to College, Contractor shall assume responsibility for such performance and shall bear all costs of correction.*
- C. Construction Schedule: Contractor, promptly after being awarded the Contract, shall prepare and submit for College Representative, a Contractor’s construction schedule for the Work.
- D. Supervision:
 - 1). Contractor shall supervise and direct the Work, using Contractor's best skill and attention. Contractor shall be solely responsible for and have control over *construction means*, methods, techniques, sequences and procedures *including safety programs and procedures*, and for coordinating all portions of the Work under the Contract.
 - 2). Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Contract. Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

- 3). Contractor shall be responsible for inspection of related portions of Work already performed, *as well as existing conditions*, to determine that such are in proper condition to receive subsequent Work.
- E. Contractor shall be responsible to College for acts and omissions of Contractor's employees, Subcontractors and their agents and employees, and other *persons or entities directly or indirectly employed by them* performing portions of the Work under a contract with Contractor
- F. Cutting and Patchwork:
- 1). Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.
 - 2). Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying or load-deflection ratio.
 - 3). Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety (i.e., mechanical systems, plumbing, fire alarm, etc.).
 - 4). Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 5). Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 6). Dispose of demolished items and materials promptly.
 - 7). Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
 - 8). Existing utilities services to the College must be maintained at all times. If the Contractor is required to affect these services in order to complete the Work, Contractor must obtain written permission from the College prior to this work (also see Special Requirements Section). Any damage or disruption of services shall need to be repaired immediately and at the Contractor's expense.
- G. Hot Work Permits:
- 1) If the work requires any Hot Work (including cutting, welding, Thermit welding, brazing, soldering (except soldering electronics or electrical components with an electric soldering iron or gun), grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems or any other similar situation), the Contractor shall be required to obtain a Hot Work Permit issued by the College. The Contractor shall request this through the College Representative, and be given a copy of the College's "Hot Work Guidelines and Permit Process" and the permit forms to be filled out. The Contractor must request, submit, and be given a permit before any Hot Work begins.
- H. Cleaning Up:
- 1). Contractor shall *at all times* keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work Contractor shall remove from and about Project waste materials, rubbish, Contractor's tools, construction equipment, machinery and surplus materials.
 - 2). If Contractor fails to clean up as provided in the Contract Documents, College may do so and the cost thereof shall be charged to Contractor.
 - 3). If a dispute arises among Contractor, separate contractors and College as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described above, College may clean up and allocate the cost among those responsible
- I. Access to Work: Contractor shall provide College access to *all portions of* the Work in preparation and progress wherever located.

2.3 Communications Protocol for Contract Administration

- A. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, Contractor shall communicate through the College Representative to the College. Communications by and with College's consultants shall be through College Representative. Communications by and with Subcontractors and material suppliers shall be through Contractor.

PURCHASE COLLEGE - Music Building Humidification

SECTION 220010/230010/260010 - BASIC PLUMBING MECHANICAL AND ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Provide all labor, tools, materials, accessories, parts, transportation, taxes, and related items, essential for installation of the work and necessary to make work, complete, and operational. Provide new equipment and material unless otherwise called for. References to codes, specifications and standards called for in the specification sections and on the drawings mean, the latest edition, amendment and revision of such referenced standard in effect on the date of these contract documents

1.3 PERMITS

- A. Apply for and obtain all required permits and inspections, pay all fees and charges including all service charges. Provide certificate of approval from New York Board of Fire Underwriters prior to request for final payment.

1.4 CODE COMPLIANCE

- A. Provide work in compliance with the following:
 1. Building Code of New York State.
 2. Mechanical Code of New York State
 3. Plumbing Code of New York State.
 4. Fuel Gas Code of New York State.
 5. Fire Code of New York State.
 6. Energy Conservation Construction Code of New York State.
 7. New York State Department of Labor Rules and Regulations.
 8. National Electrical Code (NEC).
 9. Occupational Safety and Health Administration (OSHA).
 10. Local Codes and Ordinances.
 11. New York Board of Fire Underwriters.

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12. Combustion Toxicity Amendment to the New York State Uniform Fire Prevention and Building Code.

1.5 GLOSSARY

ACI	American Concrete Institute
AGA	American Gas Association
AGCA	Associated General Contractors of America, Inc.
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AFBMA	Anti-Friction Bearing Manufacturer's Association
AMCA	Air Moving and Conditioning Association, Inc.
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing Materials
AWSC	American Welding Society Code
AWWA	American Water Works Association
FM	Factory Mutual Insurance Company
IBR	Institute of Boiler & Radiation Manufacturers
IEEE	Institute of Electrical and Electronics Engineers
IRI	Industrial Risk Insurers
NYBFU	New York Board of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NESC	National Electrical Safety Code

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NFPA	National Fire Protection Association
NYS/DEC	New York State Department of Environmental Conservation
SBI	Steel Boiler Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UFPO	Underground Facilities Protective Organization
UL	Underwriter's Laboratories, Inc.
OSHA	Occupational Safety and Health Administration
NYS/UFIBC	New York State Uniform Fire Prevention and Building Code

1.6 ROUGHING

- A. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, interferences, etc. Make necessary changes in contract work, equipment locations, etc., as part of a contract to accommodate work to obstacles and interferences encountered. Before installing, verify exact location and elevations at work site. **DO NOT SCALE** plans. If field conditions, details, changes in equipment or shop drawing information require an important rearrangement, report same to Owner's Representative for review. Obtain written approval for all major changes before installing.
- B. Install work so that items both existing and new are operable and serviceable. Eliminate interference with removal of coils, motors, filters, belt guards and/or operation of doors. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation. Where Contractor could not reasonably be expected to find such trade interferences due to concealment in walls, ceiling or floors, such relocations will be done by Change Order, if not, included in contract work. Contractor shall relocate existing work in way of new construction. Provide new materials, including new piping and insulation for relocated work.
- C. Contractor shall coordinate work with all trades and determine exact route or location of each duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Obtain from Owner's Representative exact location of all equipment in finished areas, such as thermostat, fixture, and switch mounting heights, and equipment mounting heights. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers, and other items. Do not rough-in contract work without reflected ceiling location plans.
- D. Before roughing for equipment furnished by Owner or in other contracts, obtain from Owner and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. For equipment and connections provided in this contract, prepare roughing drawing as follows:

PURCHASE COLLEGE - Music Building Humidification

1. Existing equipment: Measure the existing equipment and prepare for installation in new location.
2. New Equipment: Obtain equipment roughing drawings and dimensions, then prepare roughing-in-drawings. If such information is not available in time, obtain an acknowledgement in writing, then make space arrangements as required with Owner's Representative.

1.7 REMOVAL WORK

- A. Where existing equipment removals are called for, submit complete list to Owner's Representative. All items that Owner wishes to retain that do not contain asbestos or PCB Material shall be delivered to location directed by Owner. Items that Owner does not wish to retain shall be removed from site and legally disposed of. Removal and disposal of material containing asbestos and/or PCB's shall be in accordance with Federal, State and Local law requirements. Where equipment is called for to be relocated, contractor shall carefully remove, clean and recondition, then reinstall. Remove all abandoned piping, wiring, equipment, lighting, ductwork, tubing, supports, fixtures, etc. Visit each room, crawl spaces, and roofs to determine total Scope of Work. The disturbance or dislocation of asbestos-containing materials causes asbestos fibers to be released into the building's atmosphere, thereby creating a health hazard to workmen and building occupants. Consistent with Industrial Code Rule 56 and the content of recognized asbestos-control work, the Contractor shall apprise all of his workers, supervisory personnel, subcontractors, Owner and Consultants who will be at the job site of the seriousness of the hazard and of proper safeguards and work procedures which must be followed, as described in New York State Department of Labor Industrial Code Rule 56.

1.8 CONCEALMENT

- A. Conceal all contract work above ceilings and in walls, below slabs, and elsewhere throughout building. If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his review. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance.

1.9 CHASES

- A. Drill holes for floor and/or roof slab openings.
- B. Multiple pipes smaller than 1 in. properly spaced and supported may pass through one 6 in. or smaller diameter opening.
- C. Seal voids in fire rated assemblies with a fire-stopping seal system to maintain the fire resistance of the assembly. Provide 18 gauge galvanized sleeves at fire rated assemblies. Extend sleeves 2 in. above floors.
- D. In wall openings, drill or cut holes to suit. Provide 18 gauge galvanized sleeves at shafts and fire rated assemblies. Provide fire-stopping seal between sleeves and wall in drywall construction. Provide fire stopping similar to that for floor openings.

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1.10 FIRE STOPPING

- A. See Specification Section 078413 - "Through-Penetration Firestop Systems" for project wide fire stopping information.

1.11 SUPPORTS

- A. Provide required supports, beams, angles, hangers, rods, bases, braces, and other items to properly support contract work. Supports shall meet the approval of the Owner's Representative. Modify studs, add studs, add framing, or otherwise reinforce studs in metal stud walls and partitions as required to suit contract work. If necessary, in stud walls, provide special supports from floor to structure above. For Precast Panels/Planks and Metal Decks, support mechanical/electrical work as determined by manufacturer and Owner's Representative. Provide heavy gauge steel mounting plates for mounting contract work. Mounting plates shall span two or more studs. Size, gauge, and strength of mounting plates shall be sufficient for equipment size, weight, and desired rigidity.
- B. Equipment, piping, conduit, raceway, etc. supports shall be installed to minimize the generation and transmission of vibration.
- C. Materials and equipment shall be solely supported by the building structure and connected framing. Gypboard, ceilings, other finishes, etc. shall not be used for support of materials and equipment.

1.12 ACCESS PANELS

- A. Provide access panels for required access to respective Contract work. Location and size shall be the responsibility of each Contract. Bear cost of construction changes necessary due to improper information or failure to provide proper information in ample time. Access panels over 324 square inches shall have two cam locks. Contractor shall provide proper frame and door type for various wall or ceiling finishes. Access panels shall be equal to "Milcor" as manufactured by Inland Steel Products Co., Milwaukee, Wisconsin. Provide General Construction Contract with a set of architectural plans with size and approximate locations of access panels shown.

1.13 CONCRETE BASES

- A. Provide concrete bases for all floor mounted equipment. Provide 3,000 lb. concrete, chamfer edges, trowel finish, and securely bond to floor by roughening slab and coating with cement grout. Bases 6 in. high (unless otherwise indicated); shape and size to accommodate equipment. Set anchor bolts in sleeves before pouring and after anchoring and leveling, fill equipment bases with grout.

1.14 HVAC EQUIPMENT CONNECTIONS

- A. Contractor is responsible for draining, filling, venting, chemically treating and restarting any systems which are affected by work shown on the Contract Documents unless specifically noted otherwise.

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- B. Provide final utility connections to all equipment as required by the equipment including, but not limited to gas piping, drains, wiring, controls. Provide equipment waste, drip, overflow and drain connections extended to floor drains.

1.15 PLUMBING EQUIPMENT CONNECTIONS

- A. Contractor is responsible for draining, filling, venting, chemically treating and restarting any systems which are affected by work shown on the Contract Documents unless specifically noted otherwise.
- B. Provide roughing and final water, waste, vent and gas connections to all equipment. Provide loose key stops, sanitary "P" traps, tailpiece, adapters, gas or air cocks, and all necessary piping and fittings from roughing point to equipment.
- C. Refer to Contract Documents for roughing schedules, and equipment and lists indicating scope of connections required.

1.16 ELECTRICAL EQUIPMENT CONNECTIONS

- A. Provide complete power connections to all electrical equipment. Provide control connections to equipment. Heavy duty NEC rated disconnect ahead of each piece of equipment. Ground all equipment in accordance with NEC.
- B. Provide for Owner-Furnished and Contractor furnished equipment all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required.

1.17 STORAGE AND PROTECTION OF MATERIALS

- A. Store materials on dry base, at least 6 in. aboveground or floor. Store so as not to interfere with other work or obstruct access to buildings or facilities. Provide waterproof/windproof covering. Remove and provide special storage for items subject to moisture damage. Protect against theft or damage from any cause. Replace items stolen or damaged, at no cost to Owner.
- B. Refer to General Conditions of the Contract.

1.18 FREEZING AND WATER DAMAGE

- A. Take all necessary precautions with equipment, systems and building to prevent damage due to freezing and/or water damage. Repair or replace, at no change in contract, any such damage to equipment, systems, and building. Perform first seasons winterizing in presence of Owner's operating staff.

1.19 LUBRICATION CHART

- A. Provide lubrication chart, 8-1/2 in. x 11 in. minimum size, typed in capital letters, mounted under clear laminated plastic; secure to wall in area of equipment. List all motors and equipment in contract. Obtain and list necessary information by name/location of equipment, manufacturer recommended types of lubrication and schedule. Lubricate motors as soon as installed and perform lubrication maintenance

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until final acceptance. Plumbing and Electrical Trades add contract items to the chart provided by the Heating Trade or provide separate charts.

1.20 FINAL INSPECTION

- A. Upon completion of all punch list items, the Contractor shall provide a copy of the punch list back to the Engineer with each item noted as completed or the current status of the item. Upon receipt, the Engineer will schedule a final inspection.

END OF SECTION

SECTION 078413 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Sections include the following:
 - 1. Division 22 and 23 Sections specifying piping penetrations.
 - 2. Division 26, 27 and 28 Sections specifying cable and conduit penetrations.

1.2 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
 - 1. Fire-resistance-rated walls including fire partitions fire barriers and smoke barriers.
 - 2. Fire-resistance-rated horizontal assemblies including floors.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E814:
 - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
 - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 in. in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
1. Types of penetrating items.
 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
- D. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Installation Responsibility: Assign installation of through-penetration firestop systems in Project to a single qualified installer.

- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory".

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated in the Through-Penetration Firestop System Schedule on Drawings.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.

5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.

3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 in. of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
 - 1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of

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Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

SCHEDULES OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM	TYPE OF PENETRANT	F-RATING	UL-CLASSIFIED SYSTEM
CIRCULAR BLANK OPENINGS	1	FA 0006,CAJ 0055,CAJ 0070	CIRCULAR BLANK OPENINGS	1	CAJ 0055, CAJ 0070
	2	FA 0006,CAJ 0055,CAJ 0070		2	CAJ 0055, CAJ 0070
	3	FA 0006, CAJ 0055		3	CAJ 0055
SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, FA 1017	SINGLE METAL PIPES OR CONDUIT	1	CAJ 1226, WJ 1021
	2	CAJ 1226, FA 1017		2	CAJ 1226, WJ 1021
	3	CAJ 1226, FA 1017		3	CAJ 1226, WJ 1041, WJ 1042
	4	CBJ 1037, CBJ 1034		4	CBJ 1034, CBJ 1037, WJ 1041, WJ 1042
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	FA 2053, FA 2025, CAJ 2109, CAJ 2098, CAJ 2141, CAJ 2167, CBJ 2021	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	CAJ 2109, CAJ 2098, CAJ 2167
	2	FA 2053, FA 2025, CAJ 2109, CAJ 2098, CAJ 2141, CAJ 2167, CBJ-2021		2	CAJ 2109, CAJ 2098, CAJ 2167
	3	FA 2054, CAJ 2109, CAJ 2098		3	CAJ 2109, CAJ 2098
SINGLE OR BUNDLED CABLES	1	FA 3007,CAJ 3095,CAJ 3096	SINGLE OR BUNDLED CABLES	1	WJ 3036, CAJ 3095, CAJ 3096
	2	FA 3007,CAJ 3095,CAJ 3096		2	WJ 3036, CAJ 3095, CAJ 3096
	3	FA 3007,CAJ 3095,CAJ 3096		3	CAJ 3095, CAJ 3096
				4	WJ 3050
CABLE TRAY	1	CAJ 4034, CAJ 4035	CABLE TRAY	1	WJ 4016, CAJ 4034, CAJ 4035
	2	CAJ 4034, CAJ 4035		2	WJ 4016, CAJ 4034, CAJ 4035
	3	CAJ 4034, CAJ 4035		3	CAJ 4034, CAJ 4035
SINGLE INSULATED PIPES	1	FA 5015, FA 5016, CAJ 5090, CAJ 5091, CAJ 5098	SINGLE INSULATED PIPES	1	CAJ 5090, CAJ 5091, CAJ 5061
	2	FA 5015, FA 5016, CAJ 5090, CAJ 5091, CAJ 5098		2	CAJ 5090, CAJ 5091, CAJ 5061
	3	FA 5016, CAJ 5090		3	CAJ 5090, CAJ 5061
	4	CBJ 5006		4	CBJ 5006, WJ 5028
ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017	ELECTRICAL BUSWAY	1	CAJ 6006, CAJ 6017
	2	CAJ 6006, CAJ 6017		2	CAJ 6006, CAJ 6017
	3	CAJ 6006, CAJ 6017		3	CAJ 6006, CAJ 6017
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046, CAJ 7051	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ 7046, CAJ 7051, WJ 7021, WJ 7022
	2	CAJ 7046, CAJ 7051		2	CAJ 7046, CAJ 7051, WJ 7021, WJ 7022
	3	CAJ 7046, CAJ 7051		3	CAJ 7046, CAJ 7051
MIXED PENETRANTS	1	CAJ 8041, CAJ 8056	MIXED PENETRANTS	1	CAJ 8041, CAJ 8056, WJ 8007
	2	CAJ 8041, CAJ 8056		2	CAJ 8041, CAJ 8056, WJ 8007
	3	CAJ 8041, CAJ 8056		3	CAJ 8041, CAJ 8056, WJ 8007
	4	CBJ 8010		4	CBJ 8010, WJ 8007
WOOD FLOOR			GYPSUM WALLBOARD ASSEMBLIES		
TYPE OF PENETRANT	F-RATING	UL-CLASSIFIED SYSTEM	TYPE OF PENETRANT	F-RATING	UL-CLASSIFIED SYSTEM

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METAL PIPES OR CONDUIT	1	FC 1009, FC 1059	METAL PIPES OR CONDUIT	1	WL 1054, WL 1058, WL 1164
	2	FC 1009, FC 1059		2	WL 1054, WL 1058, WL 1164
				4	WL 1110, WL 1111
NON-METALLIC PIPE OR CONDUIT	1	FC 2025, FC 2030, FC 2160	NON-METALLIC PIPE OR CONDUIT	1	WL 2078, WL 2075, WL 2128
	2	FC 2025, FC 2029, FC 2128		2	WL 2078, WL 2075, WL 2128
				4	WL 2184
SINGLE OR BUNDLED CABLES	1	FC 3012, FC 3044	SINGLE OR BUNDLED CABLES	1	WL 3065, WL 3111, WL 3112
	2	FC 3012		2	WL 3065, WL 3111, WL 3112
				4	WL 3139
INSULATED PIPES	1	FC 5004, FC 3036, FC 3037	CABLE TRAY	1	WL 4011, WL 4019
				2	WL 4011, WL 4019
				4	WL 8014
	2	FC 5004, FC 3036, FC 3037	INSULATED PIPES	1	WL 5028, WL 5029, WL 5047
				2	WL 5028, WL 5029, WL 5047
				4	WL 5073
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	FC 7013	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	WL 7017, WL 7040, WL 7042
				2	WL 7040, WL 7042
MIXED PENETRANTS	1	FC 8009, FC 8014	MIXED PENETRANTS	1	WL 1095, WL 8013
				2	WL 1095, WL 8013
				4	WL 8014

NOTES:

1. Jobsite conditions of each through-penetration firestop system must meet ALL details of the UL-Classified System selected.
2. If jobsite conditions do not match any UL-classified systems in the schedules above, contact Hilti for alternative systems or Engineer Judgment Drawings - 800-879-8000
3. Where more than one applicable UL-Classified System is listed in the schedules, choose the UL System which is most economical for each through-penetration firestop system.
4. Coordinate work with other trades to assure that penetration opening sizes are appropriate for penetrant locations, and vice versa.
5. For 3-hour rated gypsum walls, contact Hilti for a UL-classified system or engineer judgment drawing - 800-879-8000.

THROUGH-PENETRATION FIRESTOP SYSTEMS KEY

**FIRERESISTANCE RATED
WALL CONSTRUCTION**

(APPLICABLE DESIGNS INCLUDE
W-J, W-K, W-L AND C-*J, C-*K, C-*L SERIES)

**FIRERESISTANCE RATED
FLOOR CONSTRUCTION**

(APPLICABLE DESIGNS INCLUDE
F-A, F-B, F-C AND C-A*, C-B*, C-C* SERIES)

PENETRANT
REFER TO SCHEDULE
FOR TYPE

**THROUGH-PENETRATION
FIRESTOP SYSTEM -
PROVIDE SYSTEM IN
ACCORDANCE WITH
FIRESTOPPING SCHEDULE**

FIRE BARRIER

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 RELATED REQUIREMENTS

- A. Section 07 21 00 - Thermal Insulation: Acoustical insulation.
- B. Section 07 90 05 - Joint Sealers: Acoustical sealant.
- C. Section 28 31 00 - Fire Detection and Alarm: Fire alarm components in ceiling system.
- D. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- E. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS

- A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2004.
- B. ASTM C 636/C 636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2006.
- C. ASTM E 580/E 580M - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 2006.
- D. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 1998 (Reapproved 2005).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 6x6 inch in size illustrating material and finish of acoustical units.
- D. Samples: Submit two samples each, 6 inches long, of suspension system main runner.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.06 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

1.07 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Acoustical Units - General: ASTM E 1264, Class A.
- C. Acoustical Panels Type as scheduled: Painted mineral fiber, ASTM E 1264 Type III, with the following characteristics:
 - 1. Size: 24 x 24 inches.
 - 2. Suspension System: Exposed grid Type as scheduled.

2.02 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Same as for acoustical units.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System Type as scheduled: Formed steel, commercial quality cold rolled; intermediate-duty.

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M, and manufacturer's instructions and as supplemented in this section.

- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.
- J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.

END OF SECTION

SECTION 095300 - SUSPENDED ACOUSTICAL CEILING SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

- A. ASTM C 635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C 636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- C. ASTM E 1414 - Standard Test method for Air-born Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
- D. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products.
- E. Ceilings and Interior Systems Contractors Association (CISCA) Acoustical Ceilings: Use and Practice.
- F. UL - Fire Resistance Directory and Building Material Directory.

1.2 SYSTEM DESCRIPTION

- A. Suspended Ceiling System consisting of main runners and cross runner tees snapped together to form modules or grids for the installation of lay-in acoustical tiles or panels, air diffusers, and light fixtures.
- B. Structural Performance and Suspension System Types:
 - 1. Type ID/CG: Intermediate duty, direct hung, concealed grid. (Minimum load carrying capability of main runners: 12 lb/lin ft).

1.3 SUBMITTALS

- A. Shop Drawings: Reflected ceiling plans and details that indicate coordinating penetrations and ceiling mounted items, including the following:
 - 1. Ceiling suspension members.
 - 2. Method of attaching hangers to supporting building structure.
 - 3. Ceiling-mounted items including light fixtures; air outlets and inlets; sprinkler heads; and special moldings at walls, columns penetrations, access doors and other junctures with adjoining construction.
- B. Product Data: Manufacturer's catalog sheets, specifications, and installation instructions for the following:
 - 1. Each suspension system type specified.
 - 2. Acoustical units specified.
 - 3. Integral access units.

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C. Samples:

1. Suspension System Materials: 12 inches long of exposed suspension system, component members, including moldings, for each color and system type required.
2. Acoustical Units: 12 inches square, each type, pattern, and color specified.

D. Quality Control Submittals:

1. Certification: Manufacturer's written statement, certifying that the suspension system meets or exceeds the specified structural requirements.

1.4 QUALITY ASSURANCE

- A. Installers Qualifications: The persons installing the suspended acoustical ceiling system and their supervisor shall be personally experienced in suspended acoustical ceiling installation and shall have been regularly employed by a company installing systems for a minimum of 2 years.
- B. Surface Burning Characteristics: Tested in accordance with ASTM E 84 and complying with ASTM E 1264 for Class A products.
 1. Flame Spread: 25 or less.
 2. Smoke Developed: 50 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical units and suspension system components to the Project Site in original, unopened packages and store them in a fully enclosed space protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Open ends of acoustical unit packages 24 hours before installation to stabilize moisture content and temperature.
- C. Handle acoustical units carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Comply with acoustical units manufacturer's printed temperature and ventilation requirements before, during, and after installation.
- B. Space Enclosure: Do not install interior acoustical units until space is enclosed and weatherproof, wet work in spaces is completed, and work above ceilings is complete.

1.7 MAINTENANCE

- A. Furnish extra materials described below to match products installed, are packaged with protective covering for storage, and are identified with appropriate labels. Furnish quantities equal to 2 percent of acoustical units and exposed suspension system components installed.

PART 2 PRODUCTS

2.1 METAL SUSPENSION SYSTEM MATERIALS

- A. Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- B. Recycled Content: Provide products made from steel sheet with average recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
- C. Grid Materials:
 - 1. Double-web design main runners and cross-runner tees roll-formed from electrogalvanized cold rolled sheet steel with prefinished steel caps on flanges.
- D. Accessories:
 - 1. Wall Moldings and Trim: Steel or extruded aluminum of types and profiles indicated, or if not indicated, manufacturer's standard prefinished moldings for edge penetrations that fit type of edge detail and suspension indicated.
 - 2. Splines: Type and size required for the specified acoustical units.
 - 3. Access Components: Manufacturer's special components for required access above ceiling line.
 - 4. Acoustical Sealant: Manufacturer's recommended paintable, permanently flexible shrink and stain resistant sealant.
- E. Attachment Devices:
 - 1. Hanger Clips: Galvanized steel clips or clamps specifically designed for attachment to structural steel. Drive-on clips or clamps which depend on friction to hold the device are not acceptable.
 - 2. Wire Hangers, Braces, and Ties: Galvanized carbon steel, soft temper; prestretched. Yield stress at least 3 times design load but not less than 12 gage, .106 diameter.
 - 3. Hanger Rods: Mild steel, zinc coated, or protected with rust inhibitive paint.
 - 4. Flat Hangers: Mild steel, zinc coated, or protected with rust inhibitive paint.
 - 5. Hanger Tees: Galvanized steel, 16 gage T-hangers for attachment to precast concrete decks.
 - 6. Expansion Anchors: Double cinch type, of soft metal alloy.
 - 7. Bolts: 3/8 inch diameter, length as required for full threads of nut.
 - 8. Miscellaneous Fasteners: Bolts, screws, and other fasteners recommended by suspension system manufacturer and necessary to install the Work.

2.2 ACOUSTICAL UNIT MATERIALS

- A. Standard for Acoustical Units: Manufacturer's standard units of configuration indicated that comply with ASTM E 1414 and ASTM E 1264, conforming to the following:
 - 1. Noise Reduction Coefficient (NRC) Range: 0.50 - 0.75.
 - 2. Ceiling Attenuation Class (CAC) Range: 30 - 34.
 - 3. Light Reflectance Coefficient (LR): 0.75 or greater.
 - 4. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of pre-consumer content constitutes a minimum of 45-70% by weight.
- B. Acoustical Units:
 - 1. Mineral base with factory applied painted finish. (Type III).
- C. Tile Dimensions and Edge Details:
 - 1. Size: 12 x 12 inches; thickness 5/8 inch.
 - 2. Edges: Square, kerfed and rabbeted.
- D. Pattern Description:
 - 1. Match existing
- E. Integral Access Units: Provide 24 x 24 inch access units, formed from special suspension members and matching tile with edges modified to allow removal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing scheduled to receive the ceiling system for compliance with requirements specified. Do not install the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION OF SUSPENSION SYSTEM

- A. Install acoustical ceiling suspension system to comply with installation standard ASTM C 636, in accordance with the manufacturer's printed instructions, and CISCA "Ceiling System Handbook".
- B. Lay-out system to a balanced design with edge units no less than 50 percent of acoustical unit size.
- C. Hang suspension system independent of walls, columns, ducts, pipes, and conduit.

- D. Hangers:
1. Attach hangers to supporting construction, spaced 4 feet or maximum and within 6 inches of ends of main beams. Where ducts or other items, including items provided under related contracts (if any), interfere with the spacing of hangers, install trapeze type hangers under the obstructing items to support ceiling hangers.
 2. Wrap hanger wire ends a minimum of three times horizontally, forming tight loops and turning ends upward.
 3. Do not kink or bend hangers as a means of leveling components.
- E. Attachment of Hangers to Supporting Construction: Unless otherwise shown, secure the hangers to the construction as follows:
1. Attachment to Existing Cast-in-Place Concrete: Attach hangers to clip angles, fastened to the concrete with expansion bolts or drive pins.
 2. Attachment to Structural Steel Framing: Clinch hanger around top of flange of steel member approximately 135 degrees. If framing member supports roof planks or precast slabs, bolt hanger to center of web or weld to bottom flange. Where applicable, hanger wires may be directly double wound around steel members with wires twisted together.
 3. Attachment to Steel Joists: Secure hanger with special clip or clamp designed for such use. Where applicable, hanger wires may be directly double wound around steel members with wires twisted together.
 4. Attachment to Precast Tees, Slabs, and Planks: Insert "T" hangers through joints between the units. Where concrete fill is required, lay out and install hangers prior to placing fill.
 5. Attachment to Steel Decks: Secure hangers with welded studs. Locate studs as close to the deck supports as possible. Install studs in accordance with manufacturer's printed instructions. After installation, clean stud welds and repair the affected areas of deck and studs with cold galvanizing compound. Attach hangers to studs with double nuts.
- F. Suspension System Installation Tolerances:
1. Form right angles at intersections of main and cross runners.
 2. Install main runners level to within 1/8 inch in 12 feet. Install cross runners to within 1/32 inch of the required center distances (non-cumulative beyond 12 feet).
 3. Align vertical distance of exposed surfaces between intersecting runners to within 0.015 inch.
 4. Limit horizontal gaps in exposed surfaces of intersecting or abutting members to within 0.020 inch.
- G. Wall Moldings and Trim: Install moldings and trim of type indicated where ceilings intersect vertical surfaces. Use manufacturer's recommended fasteners suited for secure attachment to the particular substrate.
1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg of moldings before they are installed.

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2. Screw moldings to substrate at intervals not over 16 inches oc and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

3.3 INSTALLATION OF ACOUSTICAL UNITS

- A. Install acoustical units in accordance with the manufacturer's printed instructions, unless otherwise shown or specified.
 1. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
 2. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
 3. Scribe and cut acoustical units to fit accurately at borders and at penetrations.
 4. Where tiles are not supported by suspension members, install splines at unsupported joints.
 5. Keep border tiles in compression by inserting spring steel spacers between tiles and moldings. Place one spacer bar at the center of each tile.
 6. Locate integral access units to provide uniformly distributed units equal to 20 percent of the total area of each ceiling.
 7. Install integral access units in locations shown on the drawings.

3.4 CLEANING AND ADJUSTING

- A. Clean exposed surface of acoustical ceilings, including trim, wall moldings, and suspension members. Comply with manufacturer's printed instructions for cleaning and touch-up of minor finish damage.

END OF SECTION

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SECTION 220523 - VALVES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Document.

1.2 SUBMITTALS

- A. Submit manufacturer's data in accordance with Basic Mechanical and Electrical Requirements. Obtain approval prior to ordering material.
- B. Provide submittals for all items specified under Part 2 of this section.

PART 2 - PRODUCTS

2.1 VALVES - GENERAL

- A. Valves shall have following requirements:
 - 1. Working pressure stamped or cast on bodies.
 - 2. Stem packing serviceable without removing valve from line.
- B. Acceptable Manufacturers:
 - 1. Ball Valves: Apollo, Hammond, Milwaukee, Nibco, Watts.
 - 2. To establish a standard of quality and identify features, certain manufacturer's numbers are given in the following paragraphs.

2.2 DOMESTIC WATER VALVES

- A. Ball Valves:
 - 1. 3 in. and Smaller: Forged brass body, chrome plated brass ball, full port, teflon seats and stem packing, separate packing and handle nut, blowout proof stem extended for insulation, vinyl insulator for handle, 600 WOG, 125 SWP; Watts FBV Series (threaded ends) or Watts FBVS series (sweat ends).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide all valves as indicated, as required by Code and as required for proper system maintenance, isolation and safety. Provide at major building and systems sections. Provide shutoff valves on all branch lines.

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- B. Locate valves for easy access and provide separate support where necessary. Install valves with stems at or above the horizontal position. Install swing check valves in horizontal position with hinge pin level.

END OF SECTION

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SECTION 220700 - INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents.

1.2 SUBMITTAL

- A. Shall include product description, manufacturer's installation instructions, types and recommended thicknesses for each application, and location of materials.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Insulation, jackets, adhesive, and coatings shall comply with the following:
 - 1. Treatment of jackets or facing for flame and smoke safety must be permanent. Water-soluble treatments not permitted.
 - 2. Insulation, including finishes and adhesives on the exterior surfaces of pipes and equipment, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less.
 - 3. Asbestos or asbestos bearing materials are prohibited.
 - 4. Energy Conservation Construction Code of New York State.
 - 5. All adhesives and sealants used for insulation in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits as called for in the current version of U.S. Green Building Council LEED Credits EQ E4.1 and EQ E4.2.

2.2 ACCEPTABLE MANUFACTURERS

- A. Fiberglass: Knauf, Manville, Owen-Corning, Certainteed
- B. Adhesives: Childers Products, Foster.

2.3 PIPE INSULATION (RIGID FIBERGLASS TYPE)

- A. Glass Fiber: Pipe Insulation meeting ASTM C 547, ASTM C 585, and ASTM C 795; rigid, molded, noncombustible.
- B. 'K' Value: ASTM C 335, 0.23 at 75°F mean temperature. Maximum Service Temperature: 1000°F.
- C. Vapor Retarder Jacket: ASJ/SSL conforming to ASTM C 1136 Type I, secured with self-sealing longitudinal laps and butt strips.

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- D. Field-Applied PVC Fitting Covers with Flexible Fiberglass Insulation: Proto Corporation 25/50 or Indoor/Outdoor, UV-resistant fittings, jacketing and accessories, white or colored. Fitting cover system shall consist of pre-molded, high-impact PVC materials with blanket type fiberglass wrap inserts. Blanket fiberglass wrap inserts shall have a thermal conductivity ('K') of 0.26 at 75°F mean temperature. Closures shall be stainless steel tacks, matching PVC tape, or PVC adhesive per manufacturer's recommendations.
- E. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in pre-forming insulation to cover valves, elbows, tees, and flanges.

2.4 PIPE SUPPORT INSULATION INSERTS

- A. 20 lbs./cu. ft. molded fiberglass, for -120°F to +450°F service temperature, non-combustible, 0.30 thermal conductivity (k), same thickness as pipe insulation.
- B. Acceptable Manufacturers: Hamfab "H" Block, or approved equal.

2.5 MATERIALS AND SCHEDULES

- A. See Exhibits at the end of this section.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All materials shall be installed by skilled labor regularly engaged in this type of work. All materials shall be installed in strict accordance with manufacturer's recommendations, building codes, and industry standards.
- B. Locate insulation and cover seams in the least visible location. All surface finishes shall be extended in such a manner as to protect all raw edges, ends and surfaces of insulation. No glass fibers shall be exposed to the air.
- C. All pipe insulation shall be continuous through hangers, sleeves, walls, ceiling, floor, or roof openings, unless not allowed by fire stop system. Refer to Section 220500 "Basic Requirements" for firestop systems.
- D. Provide thermal insulation on clean, dry surfaces and after piping and equipment (as applicable) have been tested. Do not cover pipe joints with insulation until required tests are completed.
- E. All cold surfaces that may "sweat" must be insulated. Vapor barrier must be maintained; insulation shall be applied with a continuous, unbroken moisture and vapor seal. All hangers, supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation. Cover valves, fittings and similar items in each piping system with insulation as applied to adjoining pipe run. Extra care must be taken on piping appurtenances to insure a tight fit to the piping system.
- F. Provide protective insulation as required to prevent personal injury.
- G. All pipes shall be individually insulated.

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- H. If any insulation material becomes wet because of transit or job site exposure to moisture or water, the contractor shall not install such material, and shall remove it from the job site.
- I. All exposed surfaces shall be white, unless noted otherwise.

3.2 PIPE INSULATION

- A. Insulate piping systems including fittings, valves, flanges, unions, strainers, and other attachments installed in piping system, whether exposed or concealed.
- B. Insulation installed on piping operating below ambient temperatures must have a continuous vapor retarder. All joints, seams and fittings must be sealed. Insulation shall be continuous through hangers on all water piping and storm water piping.
- C. Hanger Shields: Refer to Section "Piping Systems and Accessories".
- D. Hanger shields shall be installed between hangers or supports and the piping insulation. Rigid insulation inserts shall be installed as required between the pipe and the insulation shields. Inserts shall be of equal thickness to the adjacent insulation and shall be vapor sealed as required.
 - 1. Pre-Insulated Type: Butt insulation to hanger shields and apply a wet coat of vapor barrier cement to the joints and seal with 3 in. wide vapor barrier tape.
 - 2. Field Insulated Type: Provide Hamfab Co. "H" blocks per manufacturers recommended spacing between pipe and shield.
 - 3. Tape shields to insulation.
- E. Joints in section pipe covering made as follows:
 - 1. All ends must be firmly butted and secured with appropriate butt-strip material. On high-temperature piping, double layering with staggered joints may be appropriate. When double layering, the inner layer should not be jacketed.
 - 2. Standard: Longitudinal laps and butt joint sealing strips cemented with white vapor barrier coating, or factory supplied pressure sensitive adhesive lap seal.
 - 3. Vapor Barrier: For cold services, Longitudinal laps and 4 in. vapor barrier strip at butt joints shall be sealed with white vapor barrier coating. Seal ends of pipe insulation at valves, flanges, and fittings with white vapor barrier coating.
- F. Fittings, Valves and Flanges:
 - 1. Domestic Cold Water: Premolded fitting insulation of the same material and thickness as the adjacent pipe insulation.
 - 2. White PVC jacketing, with continuous solvent weld of all seams. Tape all fittings.

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3.3 EXISTING INSULATION

- A. Patch existing insulation damaged during the course of the work.
- B. Jacketing for piping in existing areas shall match existing jacketing.

EXHIBIT "I" - PIPE INSULATION MATERIALS
(Notes at end of Exhibit "I")

<u>SERVICE</u>	<u>INSULATION MATERIAL</u>	<u>THICKNESS</u>	<u>REMARKS</u>
Domestic cold water	Glass fiber	3 in. and smaller: 1/2 in.	
Non potable cold water	Glass fiber	3 in. and smaller: 1/2 in.	

END OF SECTION

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SECTION 221010 - PIPING SYSTEMS AND ACCESSORIES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents.

1.2 SUBMITTALS

- A. Provide a schedule of pipe materials, fittings and connections.
- B. Provide a detailed matrix listing the specific UL approved firestop system assembly to be used for each type of piping provided and each type of construction to be penetrated along with all associated UL assembly details.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe and fittings shall be new, marked with manufacturer's name and comply with applicable ASTM and ANSI Standards.

2.2 COPPER TUBE AND FITTINGS

- A. Pipe: ASTM B88; Type L, hard temper. Soft temper only as called for. Plans show copper tube sizes.
- B. Tees, Elbows, Reducers: Wrought copper, ASME B16.22 or cast bronze, ASME B16.18; solder end connections.
- C. Unions and Flanges: 2 in. and smaller use unions, solder type, cast bronze, ground joint, 150 lb. swp.
- D. Solder Materials: No-lead solder, using alloys made from tin, copper, silver and nickel. Harris, Inc., "Stay-Safe 50" and "Bright", Engelhard "Silvabright 100", Canfield "Watersafe" or approved equal.
- E. Brazing Materials: Class BcuP-5 for brazing copper to brass, bronze to copper. Harris, Inc. "Stay-Silv 15" or approved equal.

2.3 DIELECTRIC PIPE FITTINGS

- A. Description: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.
- B. Unions: Factory fabricated, for 250 psi minimum working pressure at 180°F, threaded or solder ends, insulating material suitable for system fluid, pressure and temperature.

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- C. Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system fluid pressures and temperatures with flange insulation kits and bolt sleeves.
- D. Acceptable Manufacturers: EPCO, Capitol Manufacturing, Watts or approved equal.

2.4 HANGERS, INSERTS AND SUPPORTS

- A. Hangers, Inserts, Clamps: B-Line, Grinnell, Michigan Hanger, PHD Manufacturing.

B. Hangers:

1. Adjustable, wrought malleable iron or steel with electroplated zinc or cadmium finish. Copper plated or PVC coated where in contact with copper piping.
2. Adjustable ring type where piping is installed directly on hanger for piping 3 in. and smaller.
3. Adjustable steel clevis type for piping 4 in. and larger.
4. Nuts, washers and rods with electroplated zinc or cadmium finish.
5. Provide hot dipped galvanized finish for hangers and accessories installed in exterior locations and interior areas with moist environment conditions such as pools, pool filter rooms, areaways, garages and similar areas.

C. Spacing Schedule:

Pipe Size	Steel	Copper	Plastic	Cast Iron	Rod Size
3/4 in. to 1 in.	8 ft.	6 ft.	3 ft.	Each	3/8 in.

D. Beam Attachments:

1. C-Clamp style, locknut, restraining strap, electroplated finish, UL listed, FM approved for pipe sizes 2 in. and smaller.
2. Center loaded style with clamp attachments that engage both edges of beam, electroplated finish, UL listed, FM approved, for pipe sizes larger than 2 in., refer to "Supports" for additional requirements.

- E. Inserts: Carbon steel body and square insert nut, galvanized finish, maximum loading 1300 lbs., for 3/8 in. to 3/4 in. rod sizes, reinforcing rods on both sides, MSS-SP-69 Type 19 or approved equal.

F. Supports:

1. Provide intermediate structural steel members where required for hanger attachment. Members shall span across the bar joists at panel points of joists. Secure member to structure. Select size of members based on a minimum factor of safety of four.

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2. For Weights Under 1000 lbs.: "Drill-In" inserts, "U" shaped Channel, beam clamps or other structurally reviewed support. The factor of safety shall be at least four. Follow manufacturer's recommendations.
 3. For Weights Above 1000 lbs.: Drill through floor slabs and provide flat flush plate welded to top of rod or provide additional "Drill-In" inserts and hangers to reduce load per hanger below 1000 lbs.
 4. For Metal Decks: Drill hole through for hanger rods and imbed a welded plate in concrete or use devices designed for this application, with a safety factor of four.
 5. For Wood Construction: Provide hangers and supports designed for attachment to wood construction.
 6. Acceptable Manufacturers: Hilti, ITW Ramset, Phillips "Red Head" or approved equal.
- G. Hanger Insulation Shields:
1. Hanger insulation shields shall be provided for all water and storm water piping. Hangers shall attach directly to pipe for all remaining services.
 2. Piping 2 in. and Smaller: Pipe insulated with glass fiber insulation shall be protected at point of support by a sheet metal shield. Shield shall be #18 gauge, galvanized steel, minimum 120 degree arc, formed to fit insulation thickness and 12 in. long. Tape shields to pipe insulation.
- H. Piping systems with material not listed above shall be supported and protected in accordance with manufacturer's recommendations.

2.5 PIPING ACCESSORIES

- A. All cleanout plugs, bushings and nipples, required for instruments and gauges shall be brass.

2.6 SEALING ELEMENTS

- A. Expanding neoprene link type, watertight seal consisting of interlocking links with zinc plated bolts.
1. Acceptable Manufacturers: Thunderline "Link-Seal" Series 200, 300 or 400, Pyropac, Calipco.

2.7 FIRESTOP SYSTEM FOR OPENINGS THROUGH FIRE RATED WALL ASSEMBLIES

- A. Materials for firestopping seals shall be listed by an approved independent testing laboratory for "Through-Penetration Firestop Systems". The system shall meet the standard fire test for Through-Penetration Firestop Systems designated ASTM E814. Firestop system seals shall be provided at locations where piping pass through fire rated wall assembly. Minimum required fire resistant ratings of the assembly shall be maintained by the Firestop System. Installation shall conform with the manufacturer's

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recommendations and other requirements necessary to meet the testing laboratory's listing for the specific installation.

2.8 STRAINERS

- A. Description: Y-Pattern, self-cleaning, except where otherwise indicated, full size of connecting piping, Type 304 stainless steel screens, 125 lb. SWP, unless otherwise indicated.
- B. Copper Piping 2-1/2 in. and Smaller: Cast bronze body, threaded ends, tapped retainer cap with closure plug, 20 mesh screen, Watts #777S.

2.9 PIPING MATERIALS AND SCHEDULE

- A. See Exhibit "A", "Schedule of Piping Materials" at end of this Section for (Plumbing) piping.
- B. See Exhibit "B", "Testing" at end of this Section.

PART 3 - EXECUTION

3.1 EQUIPMENT AND SYSTEMS

- A. Install equipment and systems in accordance with provisions of each applicable Section of these Specifications, and Local/State Codes/Regulations having jurisdiction. Accurately establish grade and elevation of piping before setting sleeves. Install piping without springing or forcing, except where specifically called for, making proper allowance for expansion and anchoring. Changes in sizes shall be made with reducing fittings. Reducing couplings are not acceptable. Arrange piping at equipment with necessary offsets, unions, flanges, and valves, to allow for easy part removal and maintenance. Offset piping and change elevation as required to coordinate with other work. Avoid contact with other mechanical or electrical systems. Provide adequate means of draining and venting units, risers, circuits and systems. Conceal piping unless otherwise called for. Copper tubing shall be cut with a wheeled tubing cutter or other approved copper tubing cutter tool. The tubing must be cut square to permit proper joining with the fittings. Ream pipes after cutting and clean before installing. Cap or plug equipment and pipe openings during construction. Install piping parallel with lines of building, properly spaced to provide clearance for insulation. Make changes in direction and branch connections with fittings. Do not install valves, unions and flanges in inaccessible locations. Materials within a system and between systems shall be consistent. If this is not possible, install dielectric fittings.

3.2 PIPING OVER ELECTRICAL EQUIPMENT

- A. Contractor shall route piping to avoid installation directly over electric equipment (within 1 ft. - 6 in. horizontally and 6 ft. - 0 in. vertically), including, but not limited to panels, transformers, disconnects, starters and fused switches. In the event it cannot be avoided, the Contractor shall notify the Engineer in writing, install the piping no less than 6 ft. - 0 in. above the top of the equipment and provide a sheetmetal drip shield under the pipe which extends 3 ft. - 0 in. beyond the electrical equipment. The drip shield drain shall be piped to the nearest floor drain.

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3.3 HANGERS, INSERTS AND SUPPORTS

- A. Piping shall not be supported by wires, band iron, chains, from other piping, or by vertical expansion bolts. Support piping with individual hangers from concrete inserts, wood construction, welded supports, or beams clamps of proper configuration and loading design requirements for each location; replace if not suitable. Follow manufacturer's safe loading recommendations. Suspend with rods of sufficient length for swing and of size called for, using four (4) nuts per rod. Provide additional structural steel members, having one coat rustproof paint, where required for proper support. Provide oversized hangers where insulation/supports must pass between pipe and hanger. Provide continuous support or extra supports for plastic piping per manufacturer's requirements. Hangers, when attached to joists, shall only be placed at the top or bottom chord panel point. Only concentric type hangers are permissible on piping larger than 2-1/2 in.; "C" types are permitted for piping 2 in. and smaller on joists. Provide riser clamps for each riser at each floor. Use trapeze hangers where a group of piping can be installed.

3.4 PIPE CONNECTIONS

- A. No-Lead Solder Connections: Nonacid flux and clean off excess flux and solder.
- B. Threaded Connections: Clean out tapering threads, made up with pipe dope; screwed until tight connection. Pipe dope must be specifically selected for each application.
- C. Dielectric Pipe Fittings: Provide dielectric unions at ALL equipment connections where dissimilar metals meet. In addition, provide dielectric unions in all open type piping systems (condensing water, domestic water, etc.) where dissimilar metals are to be joined.

3.5 TESTS

- A. Refer to Exhibit "B" at the end of this section for testing of Plumbing Systems.
- B. Provide all necessary items to complete proper testing of work. Perform all testing in accordance with governing Codes, local utilities and other agencies having jurisdiction and as specified. Pay all costs to perform tests. Perform all testing in a safe manner. Isolate existing systems.
- C. Domestic Water:
 - 1. Do not cover joints with insulation until required tests are completed and the Owner's Representative accepts the system.
 - 2. Make leaks tight; no caulking permitted. Replace defective fittings, pipe or connections. Piping shall be tight and show no loss of pressure.
 - 3. Air test not acceptable as final test.
 - 4. Confirm in writing that tests and flushing have been conducted and successfully completed. Submit copy of the test report to Owner's Representative.

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3.6 PIPE LINE SIZING

- A. Pipe sizes called for are to be maintained. Pipe size changes made only as reviewed by Owner's Representative. Where discrepancy in size occurs, the larger size shall be provided.

EXHIBIT "A" - PIPING MATERIALS (PLUMBING)
(Notes at end of Exhibit "A")

<u>SERVICE</u>	<u>PIPE MATERIALS</u>	<u>FITTINGS</u>	<u>CONNECTIONS</u>
Domestic water interior/hot, cold and circulating 3 in. and smaller	Type L copper	Wrought copper or cast bronze	No-lead solder
Non-potable water	Type L copper	Wrought copper or cast bronze	No-lead solder

EXHIBIT "B" - TESTING

SERVICE

TEST REQUIREMENTS

Domestic water

Test hydrostatically at 150 PSI for two (2) hours or at 1.5 times the working pressure when working pressure exceeds 100 PSI

END OF SECTION

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SECTION 221100 - WATER SUPPLY

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents.

1.2 QUALITY ASSURANCE

- A. Follow all requirements, recommendations and appendices to comply with the following publications, codes, standards, and listings/approvals:
 - 1. New York State Health Department.
 - 2. Local municipality requirements and standards.

1.3 SUBMITTALS

- A. Provide submittals for all items specified under Part 2 of this Section.

PART 2 - PRODUCTS

2.1 WATER PIPING

- A. Piping Materials: Refer to Specification Section 221010 "Piping Systems and Accessories".

2.2 BACKFLOW PREVENTERS AND ACCESSORIES

- A. Double Check Valve Type:
 - 1. Cast bronze body, stainless steel bolts and internal parts, removable bronze seats, epoxy coated.
 - 2. Two (2) test cocks, ball valves.
 - 3. UL/FM listed and approved.
 - 4. Design Equipment: Watts Series 007.
 - 5. Acceptable Manufacturers: Ames, Febco, Wilkins, Watts.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate work with all other trades.
- B. Inspect pipe, fittings and equipment prior to installation. Remove all defective materials from the site.

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- C. Install pipe and equipment in accordance with manufacturer's recommendations and in a workmanlike manner as determined by the Owner's Representative.

3.2 BACKFLOW PREVENTERS

- A. The backflow preventer installation shall be installed in accordance to the Health Department approved drawings.
- B. Prior to installation of backflow preventers, obtain the approved drawings from the Engineer.

3.3 PIPING

- A. Run slightly off level to low points; provide drain valves at low points. Provide shock absorbers where shown, or specified. Branch headers serving flush valves shall be full size as shown. Exposed water piping in Kitchen shall be chrome plated brass (from insulation to fixture or equipment connection.). Provide dielectric pipe fittings when connecting to piping systems of dissimilar metals. All supply piping to fixtures, faucets, hydrants and flush valves shall be anchored to prevent movement.

3.4 ARRANGEMENTS

- A. Provide for application to and obtain approval from the local Water Authority for connection to municipal systems.
- B. Contact the Water Authority for the extent of their work, the costs, fees, required permits and their installation requirements. Make all arrangements, pay all costs, fees and obtain all permits. Include all costs within the base bid.

3.5 TESTS

- A. Provide all necessary items to complete proper testing of work. Perform all testing in accordance with governing codes, local utilities and other agencies having jurisdiction and as specified. Pay all costs to perform tests. Perform all testing in a safe manner.
- B. Upon completion of construction, all backflow prevention devices provided under this contract shall be tested. Tests shall be performed by a certified backflow preventer tester registered by the New York State Department of Health. Provide three (3) copies of Form DOH-1013 for each device with Part A completed by the tester. Submit forms to Engineer. Pay all costs required for testing devices, including administrative costs associated with satisfying the requirements and regulations of Water Authority and Health Department. Repair or replace any device failing the test and repeat the test.
- C. Refer to Specification Section 221010, "Piping Systems and Accessories" for pipe testing requirements.

END OF SECTION

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SECTION 230130 - MECHANICAL CLEANING OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services required for the complete installation designed in Contract Documents.
- B. Requirements for mechanical cleaning of complete existing air conveyance systems (ACS) and other mechanical components including following:
 - 1. Air Handling Unit(s) AC-1, AC-2, AC-3, RF-1, RF-2, and RF-3:
 - a. Unit enclosure.
 - b. Heating and cooling coils.
 - c. Fan assemblies (supply & return).
 - d. Condensate pan.
 - e. Filter section.
 - f. Outside air and return air plenum(s).
 - g. Outside air intake(s).
 - 2. Reheat coils (electric or hot water) and ductwork 3 feet upstream and downstream of the reheat coil.

1.2 QUALITY ASSURANCE

- A. Ductwork shall be cleaned in compliance with latest edition of the following standards:
 - 1. Assessment Cleaning and Restoration of HVAC Systems - 2006 ACR-2006 National Air Duct Cleaners Association (NADCA).
 - 2. Plans and Specifications which exceed the requirements in any of the reference standards.
- B. All sheet metal shall be fabricated and installed by an experienced Contractor specializing in this type of Work.
- C. The Duct Cleaning Contractor or subcontractor must provide a full time project supervisor, dedicated to this project, who is certified as an Air Systems Cleaning Specialist (ASCS) by the National Air Duct Cleaners Association (NADCA). Contractor must have a minimum of two ASCS personnel on staff, and have at least three (3) years of experience in commercial duct cleaning for projects similar in scope and complexity. If coating of internally lined fiberglass ductwork is included in the scope, specific project references should be supplied.

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1.3 SUBMITTALS TO THE ARCHITECT/ENGINEER

- A. Shop drawings locating all proposed duct access door locations and ceiling access holes in plaster ceilings.
- B. Provide MSDS sheets on all solvents, coatings, cleaners and disinfectants to be used on project.
- C. Access door submittals.
- D. Provide current NADCA membership certificate, plus certification certificates (ASCS) for two individuals that are currently employed by the Contractor.
- E. Provide a detailed description of cleaning methods, systems, and procedures. Include cut sheets of agitation equipment that can clean and coat up to a minimum of 50 lineal feet of ductwork per access point, in each direction, per Section 3.2 E.
- F. Provide a Reference List of similar projects in scope and complexity. Include Project Name, date, point of contact, and phone number.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MATERIALS

- A. Sanitizer: Sanitizing agents shall only be applied if active fungal growth is reasonably expected, or where unacceptable levels of fungal contamination have been confirmed through testing. Only an EPA registered sanitizer that is specifically registered for application inside HVAC/ductwork systems will be applied. Sanitizer to be applied in accordance with label instructions. Sanitizers shall not be applied to porous surfaces, such as fiberglass lining. Similar to as "BBJ" microbiocide as manufactured by BBJ Chemical Compounds.
- B. Insulation Repair Coating: Quick-setting water-based duct liner adhesive and coating designed for field application to faced or unfaced fiberglass duct liner insulation or to unfaced fiberboard or ductboard insulation that dries to form effective air erosion preventive coating, sealing and reinforcing surface. Coating resistant to fire, water, oil, grease, bacteria and fungus. Coating material must not affect thermal or acoustic properties or insulation, and conform to NFPA Standards 90A and 90B. Similar to "Tough Coat" by Vac System Industries, Inc.
- C. Coil Cleaning Solution: Shall be a neutral PH solution (non acid, non alkaline) so as to not damage or further deteriorate coil fin surfaces. The solution shall be an aqueous enzymatic concentrate for the cleaning and digestion of biological debris and common soil present on air-conditioning coils. Application must be in compliance with label instructions. Similar to AerisGuard, as manufactured by Aeris USA.
- D. Ductwork Access Doors shall be "sandwich type" access doors, as manufactured by Ductmate Industries. Access doors with sheet metal screw fasteners are not acceptable. Access doors shall be a minimum size of 16 x 12 and installed in locations as shown on drawings.

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PART 3 - EXECUTION

3.1 PRE-CLEANING PREPARATIONS

- A. Prior to start of work, the HVAC system is to be carefully inspected and checked for all conditions affecting the cleaning. Defects are to be reported in writing to the Project Engineer and work will not proceed until all defects have been documented. Commencement of work will constitute acceptance of the conditions of the area to which the cleaning work is to be performed and all defects in work resulting from such accepted service will be corrected by this trade without additional expense to the Owner.
- B. Disassemble all removable items as required for access to work area. Store the removables in a Project Engineer approved storage area until the completion of the cleaning work.
- C. Fire protection devices (such as smoke detectors, panel, etc.) shall be protected prior to cleaning procedures. They are to be cleaned and tested at the conclusion of work.
- D. The Contractor shall coordinate the shutdown and reactivating of the fire alarm system with the Owner to avoid accidental alarms during the cleaning process and related work.
- E. The Contractor shall coordinate the shutdown of the air handling equipment with the Owner before starting work, and shall conform to OSHA requirements regarding fan motor disconnect lock-out/tag-out.

3.2 GENERAL REQUIREMENTS

- A. Containment: Debris removed during cleaning shall be collected and precautions must be taken to ensure that debris is not otherwise dispersed outside the ACS during the cleaning process. After ACS cleaning, any areas which could be affected by the cleaning Contractor's work must be as clean as their condition prior to the commencement of the cleaning operation.
- B. Particulate Collection: Where the Particulate Collection Equipment is exhausting inside the building, HEPA filtration with 99.97% collection efficiency for 0.3 micron size particles shall be used. Mechanical cleaning operations shall be undertaken only with Particulate Collection Equipment in place, including adequate filtration to control debris removed from the ductwork or ceiling plenum. When the Particulate Collection Equipment is exhausting outside the building, precautions shall be taken to ensure that air does not re-enter the building.
- C. Contact Vacuuming: Where contact vacuuming is required, the vacuum equipment must be HEPA filtered. Cleaning shall be performed by the application of the vacuum in combination with a brush attachment directly to the contaminated surface.
- D. Mechanical Agitation for Ductwork Cleaning:
 - 1. The Contractor is required to remove all debris from the inside surface areas, e.g. the top, bottom and sides of rectangular duct and the entire inside circumference of round and flat oval ductwork by creating the least amount of access openings possible. No cleaning method should be used that can potentially damage

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components of the ductwork or negatively alter the integrity of the system. The following restrictions for agitation tools shall be adhered to.

2. High power/volume vacuum alone is not an acceptable method of agitation.
 3. The agitation equipment shall be the Collom Duct Cleaning System or approved equal.
 4. Approved equal agitation systems shall be accepted only if the following conditions are met:
 - a. The system is capable of thoroughly cleaning (and sanitizing) up to 50 lineal feet of ductwork in each direction per access point. Exceptions to this requirement will apply when the removal of debris requires more aggressive agitation.
 - b. A minimum of 85 cubic feet per minute (cfm) of compressed air to 110 pounds per square inch (psi) must be supplied to the air tool or nozzle in order to effectively dislodge the built-up debris.
 - c. The air tool or nozzle shall be able to follow the contours of the ductwork, i.e. the tool must be able to come in contact with all sides/surfaces of the interior of the duct.
 - d. The air tool or nozzle shall be capable of dispensing coatings and sanitizing solutions to cover the entire interior surface areas of the ductwork without creating additional access openings in order to maintain the integrity of the ductwork.
 5. Where ductwork is large enough and able to support the weight of a worker, hand tools and HEPA vacuums may be used. If workers enter the inside of the duct they must follow the OSHA confined space requirements (OSHA 29 CFR 1910.146). Collection equipment must be used during this process to assure capture of any residual or airborne debris, if determined necessary by Project Engineer.
- E. Cleaning of HVAC Unit Components and Other System Components:
1. Includes all A/C and heating coils, drain pans, humidifiers, fans, grilles, registers, and diffusers. Cleaning methods shall be employed such that all HVAC system components must be visibly clean as defined in Section 3.4. Upon completion of cleaning all components must be returned to those settings recorded just prior to cleaning operations.
- F. Controlling Odors: All reasonable measures shall be taken to control offensive odors and/or mist vapors during the cleaning process.
- G. Volume Control Devices: Dampers and any air-directional mechanical devices, including volume, fire and zone dampers inside the ductwork must have their position marked prior to cleaning, and upon completion, must be restored to their marked position. After cleaning, the dampers shall be repaired as necessary to insure proper operation and

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returned to original settings. Contractor shall indicate locations of damaged and/or repaired dampers.

- H. Access Openings: Any access openings cut for the cleaning process must be repaired so that they shall not significantly alter the airflow. All openings made to facilitate the cleaning must be sealed in accordance with industry standards and local codes, using materials acceptable, under those standards and codes. (See Specification Section 233100 and SMACNA's HVAC Duct Construction Standards - Metal and Flexible, 1985).

3.3 HEALTH AND SAFETY

- A. Cleaning Contractors shall comply with all applicable federal, state and local requirements for protecting the safety of the contractor's employees, building occupants, and the environment. In particular, all applicable standards of the Occupational Safety and Health Administration (OSHA) should be followed when working in accordance with this standard.
- B. No processes or materials shall be employed in such a manner that they will create adverse health effects to the building occupants, cleaning contractors, or general public.
- C. Disposal of Debris. All debris removed from the ACS shall be disposed of in accordance with all applicable federal, state and local requirements.

3.4 VERIFICATION

- A. Cleanliness verification shall be performed after an HVAC system component has been cleaned and prior to the application of any treatment and/or the component being used in operation, as per section 13 of ACR 2006. A visual inspection must be used to assess that the HVAC system is visually clean. An interior surface is considered visibly clean when it is free from non-adhered substances and debris. If a component is visibly clean then no further cleanliness verification is required. In the event there is disagreement concerning whether a surface is visibly clean, contractor will conduct Surface Comparison Testing, as per section 13.2 of ACR 2006.
- B. Photographs of representative areas of the ductwork and unit components of the cleaning project shall be provided in a report. Photographs must contain captions that identify both HVAC unit number and occupied space that the component serves. See Section 3.6 Post Project Report.

3.5 SEQUENCE OF WORK

- A. Since the systems must be operational during the normal work hours. The Contractor shall submit to the Owner a procedure for cleaning the ductwork and installing filters which will minimize contamination of already cleaned areas. This sequence must be approved by the Owner and Project Engineer prior to starting work.

3.6 POST PROJECT REPORT

- A. The Contractor will submit three (3) copies of the final report to the Project Engineer/Owner indicating the following:

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1. Success of the cleaning project, as verified through visual inspection.
2. The report shall contain photographic or video documentation of representative areas cleaned as part of the project. This documentation may show both before and after pictures that verify visual inspection, but at a minimum shall show after cleaning has been performed.
3. Areas of the system found to be damaged, in need of repair, and/or requiring more aggressive cleaning.

END OF SECTION

SECTION 230513 - MOTORS AND ADJUSTABLE SPEED DRIVES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 SUBMITTALS

- A. Submit manufacturer's product data on all motors and adjustable speed drives. Provide voltage, RPM, enclosure type, frame type, and rated efficiency and duty.

PART 2 - PRODUCTS

2.1 MOTORS

- A. General Requirements:
 - 1. Motors built for 60 Hz operation, three phase for 1/2 HP and larger; single phase for 1/3 HP and smaller. In compliance with NEMA Standards, wound specifically for nameplate voltage, and selected for appropriate duty and environment. 1.15 minimum service factor at rated voltage and frequency. Bearings rated 20,000 life hours. V-belt connected motors with adjustable slide rail bases and pulleys. Motors shall have Class F insulation system, with Class B temperature rise. Maximum allowable motor temperature rise for open drip-proof or totally enclosed fan cooled (TEFC) type at 1.15 service factor shall be 80°C above 40°C ambient up to 300 HP. NEMA locked rotor kVA code as required to match unit equipment torque characteristics. Single-phase motors shall be capacitor start, induction run, or split phase type. Polyphase motors shall be constant speed, squirrel cage, unless otherwise called for. Nameplates shall have as a minimum, all information as described in NEMA Standard MG-1-20.60.
 - 2. Motors for use with variable speed drive applications shall be inverter duty rated in accordance with NEMA. These motors shall meet NEMA corona inception voltage requirements, withstanding peak voltages up to 1600 volts, and be manufactured in accordance with NEMA MG-1 Part 31.
 - 3. Three phase motors rated 1 HP and greater shall be special design, copper winding, relubable ball bearings, 1.15 service factor, premium efficiency, energy-saver type with a guaranteed NEMA nominal full-load efficiency, by IEEE Standard 112 Test Method "B". Motors to have three-year warranty. Efficiency rating shall appear on nameplate, and shall be not less than as follows:

4.

MINIMUM NOMINAL FULL-LOAD MOTOR EFFICIENCY						
HP	OPEN MOTORS (RPM)			CLOSED MOTORS (RPM)		
	1200	1800	3600	1200	1800	3600
1.0	82.5	85.5	77	82.5	85.5	77.0
1.5	86.5	86.5	84	87.5	86.5	84
2.0	87.5	86.5	85.5	88.5	86.5	85.5
3.0	88.5	89.5	85.5	89.5	89.5	86.5
5.0	89.5	89.5	86.5	89.5	89.5	88.5
7.5	90.2	91.0	88.5	91.0	91.7	89.5
10	91.7	91.7	89.5	91.0	91.7	90.2
15	91.7	93.0	90.2	91.7	92.4	91.0
20	92.4	93.0	91.0	91.7	93.0	91.0
25	93.0	93.6	91.7	93.0	93.6	91.7
30	93.6	94.1	91.7	93.0	93.6	91.7
40	94.1	94.1	92.4	94.1	94.1	92.4
50	94.1	94.5	93.0	94.1	94.5	93.0

5. Nominal Motor Voltage Table:

Nominal System Voltage	Motor Nameplate
480V - 3 phase	460 volt
240V - 1 phase and 3 phase	230 volt
208V - 1 phase and 3 phase	200 volt
120V - 1 phase	115 volt

6. Motor Application; Provide the following enclosure types unless noted:

Environment/Location	Motor Enclosure Type
General Purpose	Open drip-proof, TEFC with cast iron frame, or encapsulated
Outdoors, below grade or high humidity	TEFC with cast iron frame
Hazardous	Explosion-proof
Packaged Refrigeration Compressors	Hermetic or semi-hermetic

7. Manufacturers: Need not be all of same make, but one of the following: General Electric GE XSD/E\$P, Gould, Baldor Super E, Emerson E-Line (US Motors), A.O. Smith Century E-Plus, Lincoln Ultimate E CTAC, Marathon XR1, Siemens GP100A.

B. Motor Starters:

1. Provide motor starters, etc. as listed on the Electric Equipment and Control Schedule on the drawings.
2. Starters, contactors and controllers shall comply with NEMA standards having general purpose NEMA 1 or 1B enclosure unless otherwise called for. Provide

explosion proof, weather resistant or watertight construction as required. Starters shall be minimum NEMA size 0 with solid state overloads in each phase sized per NEC, motor full load amperage, service factor, and motor operating conditions.

3. Pad lock arrangements shall be provided to lock the disconnect device in the "off" position. Magnetic starters shall be provided with a control power transformer with 120V secondary and primary and secondary fusing and be sized to accept the loads imposed there on. Starters shall have LED type pilot lights. Each starter subject to electrical interlock and/or automatic control shall have necessary auxiliary contacts.
4. Auxiliary Devices: Provide pushbutton stations, pilot lights, devices, relays, transformers, selector switches, electric thermostats, auxiliary starter contacts as required for functions called for. Provide separate relay for each speed to operate electric dampers or other devices as required for multispeed motor circuit.
5. Manual Motor Starter:
 - a. Provide all starters with thermal overload(s); and pilot light(s), and handle lock-out provisions. Gang starter with selector switch for multispeed applications. Provide single or 2-pole as required:
 - 1) 120 volt, single-pole, surface mounted: Square-D FG-5P and handle guard.
6. Manual Starter with Relay: Shall be similar to "Manual Motor Starter", above, except to include a two-gang box with relay sized for load indicated, and hand-off-automatic switch. Connect relay for 120V operation on load side of starter in "automatic" mode. Coordinate connection of Form C maintained contact for control with Mechanical Contractor.
7. Magnetic Starter: Shall be single-speed, across-the-line type rated in accordance with NEMA standards, sizes and horsepower ratings. Starters shall be mounted in NEMA 1 enclosures unless otherwise indicated. Magnetic starters shall be equipped with double break silver alloy contacts; all contacts shall be replaceable without removing starter or disconnecting power wiring. Starter shall have straight-through wiring. Coils shall be of molded construction and shall be replaceable from the front without removing starter. Overload relays shall be solid state type with replaceable control circuit module. Thermal units shall be of one-piece construction and interchangeable. Starter shall be inoperative if thermal unit is removed. Provide hand-off-auto selector switch and start-up pushbuttons and "run" pilot light in cover. Wire for maintained contact unless otherwise noted.
8. Combination Magnetic Starter: Shall be similar to "Magnetic Starter", above, except shall include disconnect switch connected ahead of starter. The disconnect handle shall be in control of the disconnect device with the door open or closed. Disconnect handle shall be clearly marked as to whether the disconnect device is "on" or "off".

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9. Packaged Control Unit: Shall be furnished and mounted by equipment provider, and connected by Electrical Contractor. Generally consists of one or more starters, disconnect switches and additional control devices prewired.
10. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:
 - a. Square-D - Design Make.
 - b. Cutler Hammer.
 - c. General Electric.
 - d. Allen-Bradley.
 - e. Siemens.

C. Adjustable Speed Drives (ASD's):

1. Provide converter, inverter, and regulator sections, suitable for variable speed-variable torque applications. Controller shall convert three phase, 60 Hz power to variable frequency, variable voltage, three phase power for motor speed control.

ASD's shall be suitable to serve as starter and disconnect and complete unit shall be approved and listed by a nationally recognized electrical testing laboratory as an assembly (including all options such as line reactors, isolation transformers, bypass equipment, etc.). Input voltage plus or minus 10%. One minute rating of 10% of rated current. The ASD shall be a full digital voltage source pulse width modulated (PWM) operation using surface mount technology. Quiet motor operation shall be provided with state of the art flux vector control techniques. The ASD, including all options, shall mount in a standard NEMA I enclosure with all components factory mounted, wired and tested. All high voltage components within the enclosure shall be isolated with steel covers. No line voltage components shall be mounted on the door. Provide:

- a. Microprocessor/controller which allows programmable settings for:
 - 1) Minimum speed
 - 2) Maximum speed
 - 3) Volts/hertz
 - 4) Maximum frequency (15 to 400 Hz)
 - 5) Minimum frequency (3 to 60 Hz)
 - 6) Acceleration (0.1 to 360 sec.)
 - 7) Deceleration (0.1 to 360 sec.)
 - 8) Current limit (50 to 110%)

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- 9) Adjustable auto restart for both number of restart attempts (0 to 5) and time interval between resets.
- b. DDC interface card with the following features:
 - 1) Capability to drive optional remote digital display of volts, amps, frequency and instantaneous electronic trip (I.E.T.) indication.
 - 2) Analog volts, amps, frequency signals to drive analog meters.
 - 3) Two sets of auxiliary totally selectable field programmable contacts.
- c. Minimum 0.95 power factor throughout the entire speed range.
- d. Instantaneous electronic trip when the current demands of the inverter exceed its intermittent rating.
- e. Auto/Manual, Start/Stop, reset switch and speed selection accessible on the front of the controller.
- f. 120 volt isolated control power.
- g. Spare form 'C' run relay contact available for Owner's use.
- h. Isolated process control interface to enable the ASD to follow 0-5 mA, 1-5 mA, 4-20 mA, 10-50 mA, 0-8 VDC, 104 VDC, or 0-10 VDC grounded or ungrounded signal from a process controller. Provide RS232 or RS485 communication module board.
- i. Filtering input line noise suppression which meets EMI-RFI requirements of the FCC and IEEE Standard 519-19E1 and does not affect other equipment in building. Sine wave distortion shall not exceed 5% total. Provide harmonic analysis and documentation as described below.
- j. Harmonic Analysis: A harmonic analysis shall be undertaken before and after the installation of the equipment, by the successful bidder which shall include current waveform analysis at the source which feeds respective ASD's. A report shall be issued to show current waveform, Crest Factor, Form Factor, and % THD for both odd and even current harmonics calculated to the 49th Harmonic. Vendor shall list the cost of optional equipment required for power quality improvement if the study shows that, as a result of the addition of the equipment covered by the specification, the harmonic distortion will approach or exceed the limitations of IEEE 519-1992, Table 10.2.
- k. The successful bidder shall perform actual field measurements of the system harmonics once the ASD equipment is installed and functioning. Minimum values required are:

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- 1) 1.5 Crest Factor
 - 2) Form Factor
 - 3) <15% THD for both odd and even current harmonics calculated to the 49th Harmonic.
 - 4) Graphic Display of current harmonics as a percentage of the fundamental current to at least the 15th harmonic.
- l. If the voltage THD exceeds 5%, the ASD manufacturer is to recommend the additional equipment required to reduce the THD to an acceptable level.
 - m. Manual bypass, with contactors so that safety functions are operational in automatic and bypass mode, sized for both motor isolation and motor starting.
 - n. Input disconnect - shall provide a positive disconnect between the controller and all phases of the incoming A-C line.

This disconnect shall be designed to mount inside the controller enclosure and include a mounting bracket and through-the-door interlocking handle with provisions for padlocking. Internal disconnect or isolation contactors to isolate the drive for service when operating in the bypass mode.
 - o. LED display on door of cabinet shall digitally indicate frequency output, voltage output, current output and first fault indication.
 - p. Provide relay contacts for remote indication of drive fault and motor running.
 - q. Restart with the motor coasting in either forward or reverse direction without tripping.
 - r. Minimum Hertz (0-50%), maximum Hertz (50-100%), acceleration, deceleration, voltage and voltage boost, adjustments accessible internally on the controller.
 - s. Ambient Temperature Range, 32°F to 100°F ambient humidity, 95% RH maximum.
 - t. Elevation up to 3300 ft. above sea level.
 - u. Inverse time and instantaneous trip overcurrent demand, 200% maximum.
 - v. Fuses, circuit breakers, and contactors as required to allow use as motor protection per NEC.

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- w. Input line undervoltage trip (90% nominal), over voltage (110% nominal). ASD to be capable of line voltage dip ride-through of 1/2 cycle.
 - x. Digital display of the following fault conditions:
 - 1) Overtemperature
 - 2) Motor overload
 - 3) High DC bus voltage
 - 4) High motor current line to line
 - 5) High motor current line to ground
 - 6) Function loss
 - 7) Low DC bus voltage
 - 8) External fault
 - y. Motor thermal overload relays sized to match motor's full load amps.
 - z. Power-on, run and trip monitor indications LED displayed on the front of the controller, with form 'C' dry contact for each.
 - aa. Line to line and line to ground short circuit protection, and ground fault protection with no drive component failure.
 - bb. Output frequency range (0-60 Hz minimum).
 - cc. Audible noise level at the motor and at the drive, 60 dB maximum A-scale at 5 ft. Also, ASD shall add no appreciable noise to motor operation.
 - dd. Fault withstand capability 42,000 RMS AISC minimum.
 - ee. Drive output: Linear with respect to input signal: Accurate to +/- 10% of speed indication. Stabilized to +/- 1% at constant input and load. Normal operating range to be 10% to 110% of rated motor speed.
 - ff. Provide line reactor for input impedance to protect drive from abnormal AC line transients. Connect line reactor internal to bypass mode (if applicable), with separate disconnect switch or contactor.
 - gg. Where new motors are provided for equipment to be operated on a ASD, the motors shall be listed for use with the ASD.
2. Design Make: Allen Bradley.
3. Acceptable Manufacturers:
- a. Allen Bradley
 - b. Eaton
 - c. General Electric
 - d. Siemens
 - e. Square D

PART 3 - EXECUTION

3.1 MOTORS

- A. Furnished by equipment manufacturer and especially manufactured and/or selected, mounted, and installed for intended use. Install motors accessible for maintenance and belt adjustment.

3.2 REPLACEMENT OF EXISTING MOTORS

- A. Verify motor characteristics, including voltage, shaft length, speed, rotation, horsepower and frame type, and provide motors as called for. Modify or replace existing motor mounts and bases to accommodate the replacement motors.

3.3 ADJUSTABLE SPEED DRIVES

- A. Set in place controllers on 4 in. high concrete base, on wall or freestanding steel frame as required. Completely erect and assemble, including shipping splits and make respective connections from terminal or terminal strips to any miscellaneous control devices.
- B. Provide respective line side power supply connections to load side power terminals. Adjust unit controls in accordance with manufacturer's instructions.
- C. Adjust unit controls in accordance with manufacturer's instructions.
- D. A factory-trained manufacturer's service representative shall provide complete start-up services at the site during construction plus a separate (after startup on a 100% correctly operating drive) 4 hour training session for the Owner.
- E. Equipment manufacturer to provide a one year full parts and labor warranty from date of start-up and Owner acceptance.

END OF SECTION

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SECTION 230519 - GAUGES AND THERMOMETERS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents.

1.2 SUBMITTAL

- A. Gauges, thermometers and thermowells.

PART 2 - PRODUCTS

2.1 WATER PRESSURE GAUGES

- A. Construction to be Bourdon tube type; 4-1/2 in. diameter minimum, dial face, stamped stainless steel, replaceable glass lens, with snap-on rings. Phosphor bronze tube, bronze bushed rotary movement, silver brazed or soldered to brass socket and brass tip. 1/4 in. bottom connection. Accuracy, one (1.0) percent of included scale range. White dial face with black numerals, graduated in pounds; equipped with bronze pulsation dampener or snubber.
- B. Make: American, Ashcroft, Crosby, Duro, Marsh, Moeller, Terrice, Weiss, Weksler, Winters.

2.2 PIPING SYSTEM THERMOMETERS

- A. Industrial type, plastic, aluminum or steel case, glass or plastic front, non-toxic organic liquid filled, red reading column, white or silver V-shaped scale, black numerals. Union flange mounted, separable socket with thermowell, extension necks where required; range as called for service. Universal adjustable type, 9 in. scale. For installation in hot water systems, graduations of 2°F., accurate to within 1°F. For installation in water systems where the maximum temperature is less than 120°F, graduations of 1°F, accurate to within 1/2°F.

2.3 PRESSURE/TEMPERATURE TEST PLUGS

- A. 1/4 in. NPT plug shall be capable of reading either a pressure or temperature. 1/8 in. o.d. dual seal core of Nordel 275°F with zero leakage from vacuum to 500 psig.
- B. Makes: Peterson Equipment Company, Sisco P/T plugs.

PART 3 - EXECUTION

3.1 WATER PRESSURE GAUGES

- A. Provide in piping systems where called for and schedule below:
 - 1. Provide 1/4 in. ball valve in each pump inlet and outlet tapping, or in piping adjacent to same. Range 30 in. vacuum to 100 psi.
 - 2. Compression tanks: 0 to 100 psi range.
 - 3. Each water make-up valve assembly: 0 to 60 psi range.

3.2 THERMOMETERS

- A. Provide thermowells mounted in oversize tee, or elbow if necessary, to provide as little restriction as possible to fluid flow. Provide thermometer stems and thermowell depths of proper length to allow accurate reading. Locate adjacent to control sensing equipment. Install and adjust angles so as to be easily read from floor.
- B. Cooling Coil: Inlet and outlet; range 20° to 120°F.
- C. Heating Coil: Inlet and outlet; range 0° to 220°F.

3.3 TEST PLUG

- A. Provide test plugs at locations as called for.

END OF SECTION

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SECTION 230523 - VALVES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services as required for the complete installation and related Work designed in Contract Documents.

1.2 SUBMITTAL

- A. Valves and accessories.

PART 2 - PRODUCTS

2.1 VALVES

- A. General: Valves shall have following requirements:
 - 1. Working pressure stamped or cast on bodies.
 - 2. Stem packing serviceable without removing valve from line.
 - 3. Valves on insulated services shall have handle extensions so that the handle is fully beyond the insulation jacketing.
- B. Make:
 - 1. Gate, Globe, and Check Valves: Jenkins, Hammond, Milwaukee, Powell, Watts, Kitz.
 - 2. Ball Valves: Apollo, Hammond, Jamesbury, Milwaukee, Watts, NIBCO, Kitz.
 - 3. Butterfly Valves: DeZurik, Jamesbury, Keystone, Milwaukee, Watts, Victaulic, Kitz.
 - 4. To establish a standard of quality and identify features, certain manufacturer's numbers are given in the following paragraphs.
- C. Gate Valves:
 - 1. 2-1/2 in. and Larger: Iron body, bronze solid wedge disc. OS&Y, flanged ends, rising stem, bolted bonnet, 125 lb. SWP, Milwaukee F-2885A.
 - 2. 2 in. and Smaller: Bronze body, bronze solid wedge disc, rising stem, threaded or union bonnet, threaded ends, 125 SWP, Milwaukee 1152.
- D. Globe Valves:
 - 1. 2-1/2 in. and Larger: Iron body, renewable seat and disc, 125 SWP, flanged ends, bolted bonnet, Milwaukee F-2981.

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2. 2 in. and Smaller: Bronze body, renewable composition or bronze disc, union bonnet, rising stem, threaded ends, 150 SWP, Milwaukee 590.
- E. Check Valves:
1. 2-1/2 in. and Larger: Iron body, renewable seat and disc, bolted flange cap, flanged ends, 125 SWP, Milwaukee F-2974.
 2. 2 in. and Smaller: Bronze, swing check, threaded ends, 125 SWP, Milwaukee 509.
 3. Silent Check Valves: Renewable seat, bronze body with bronze trim and stainless steel spring, 125 lb. SWP. Conbraco 61-500 Series.
- F. Ball Valves:
1. For chilled and hot water systems 3 in. and under: Bronze body with hardened chrome-plated brass ball, glass reinforced carbon impregnated seats, standard porting, 400 lb., W.O.G., adjustable packing gland, insulated handle, screwed or soldered ends, Watts B6000 (threaded). Provide handle extension on insulated services.
- G. Valves for Gauges and Instruments:
1. 1/4 in., bronze body, hardened chrome plated brass ball, glass reinforced carbon impregnated seats, standard porting, 400 lb. W.O.G., adjustable packing gland, screwed ends, tee handle, Watts B6000TH.
- H. Hose Thread Drain Valves:
1. Ball valve, bronze body, hardened chrome ball with hose thread end, cap and chain, Watts B6001CC (sweat connection), Watts B6000CC (threaded connection).
- I. Fusible Link Valves:
1. Level type gate valve for emergency closing of oil supply line. Spring-operated, self closing type, with spring and 165°F fusible link. Bronze valve with malleable iron handle. Port full line size. Preferred Utilities Type 110.
- J. Liquid or Vacuum Relief Valves:
1. Bronze base and bronze working parts except steel cadmium-plated springs; suitable for pressure up to 250 psi; non-pop valve suitable for use on boiler feed pump discharge, Lunkenheimer #658.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Provide valves of type called for and where required to service equipment.
2. Provide at major building and systems sections.
3. Provide chain wheels, guides, and chain loops for valves, where called for or in Mechanical Rooms where valves are mounted higher than 8'-0" AFF.
4. Isolating valves for individual fan convectors, room units, terminal units, or other similar apparatus may be inside cabinet or at connection to branch mains where accessible.
5. Locate valves with handles at horizontal position when 5 ft. or more above the floor, for greater visibility and easier use. Otherwise, locate valves with handles at or above horizontal position. Swing check valves in upright position only.
6. Butterfly valves may be used for water and low pressure (under 15 psig) steam service over 2 in. unless otherwise noted.
7. Ball valves may be used for water service through 3 in., unless otherwise noted.
8. Provide hose threaded valves at low points, strainers, equipment, and as called for.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for complete adjusting and balancing Work as required in Contract Documents.
- B. This Section specifies the requirements and procedures of, mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results.
- C. Test, adjust, and balance the following mechanical systems:
 - 1. Supply air systems, all pressure ranges; including constant volume and variable volume systems.
 - 2. Return air systems.
 - 3. Exhaust air systems.
 - 4. Hydronic systems; including constant flow and variable flow systems.
- D. This Section does not include:
 - 1. Testing boilers and pressure vessels for compliance with safety codes;
 - 2. Specifications for materials for patching mechanical systems;
 - 3. Specifications for materials and installation of adjusting and balancing devices. If devices must be added to achieve proper adjusting and balancing, refer to the respective system sections for materials and installation requirements.
 - 4. Requirements and procedures for piping and ductwork systems leakage tests.

1.2 SUBMITTALS

- A. Provide information in report form listing items required by specifications. Results shall be guaranteed. Contractor shall be subject to recall to site to verify report information before acceptance of the report by the Owner's Representative.
- B. Strategies and Procedures Plan: Within thirty (30) days of Contractor's Notice to Proceed, submit testing and balancing strategies and step-by-step procedures as specified in Section 3.1.B, "Preparation", and consistent with those listed in Part 3 of this specification.
- C. System Readiness Checklists: Within thirty (30) days of Contractor's Notice to Proceed, AABC agency shall provide system readiness checklists as specified in Section 3.1.C, "Preparation", to be used and filled out by the installing contractors verifying that systems are ready for Testing and Balancing.

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- D. Examination Report: Provide a summary report of the examination review required in Section 3.1.D to the Engineer, documenting issues that may preclude the proper testing and balancing of the systems.
- E. Certified report format shall consist of the following:
 - 1. Title sheet with job name, contractor, engineer, date, balance contractor's name, address, telephone number and contact person's name and the balancing technician's name.
 - 2. Individual test sheets for air handlers, terminal units, air distribution, exhaust fans, duct traverses, pumps, air handling coils, reheat coils, radiation, convectors, cabinet unit heaters and unit ventilators.
 - 3. Manufacturer's pump and fan curves for equipment installed with design and actual operating conditions indicated.
 - 4. Single line sketch of system marked up with terminal unit numbers, room numbers, testports locations, register, grille and diffuser numbers to correlate test sheet. Data shall be provided with reports.
 - 5. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems." or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems".

1.3 DEFINITIONS

- A. System testing, adjusting and balancing is the process of checking and adjusting all the building environmental systems to produce the design objectives. It includes:
 - 1. The balance of air and water distribution;
 - 2. Adjustment of total system to provide design quantities;
 - 3. Electrical measurement;
 - 4. Verification of performance of all equipment and automatic controls.
- B. Test: To determine quantitative performance of equipment.
- C. Adjust: To regulate the specified fluid flow rate and air patterns at the terminal equipment (e.g., reduce fan speed, throttling).
- D. Balance: To proportion flows within the distribution system (submains, branches, and terminals) according to specified design quantities.
- E. Procedure: Standardized approach and execution of sequence of work operations to yield reproducible results.

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- F. Report Forms: Test data sheets arranged for collecting test data in logical order for submission and review. This data should also form the permanent record to be used as the basis for required future testing, adjusting, and balancing.
- G. Terminal: The point where the controlled fluid enters or leaves the distribution system. There are supply inlets on water terminals, supply outlets on air terminals, return outlets on water terminals, and exhaust or return supply or outside air inlets or outlets on terminals such as registers, grilles, diffusers, and louvers.
- H. Main: Duct or pipe containing the system's major or entire fluid flow.
- I. Submain: Duct or pipe containing part of the systems' capacity and serving two or more branch mains.
- J. Branch Main: Duct or pipe serving two or more terminals.
- K. Branch: Duct or pipe serving a single terminal.

1.4 QUALIFICATIONS

- A. Follow procedures and methods published by one or more of the following:
 - 1. Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).
 - 2. Individual manufacturer requirements and recommendations.
- B. Maintain qualified personnel at project for system operation and trouble shooting. TAB contractor shall change sheaves and perform mechanical adjustments in conjunction with balancing procedure.
- C. Balancing contractor shall be current member of AABC or NEBB.
- D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in the *AABC National Standards for Total System Balance*.

1.5 GENERAL REQUIREMENTS

- A. Before concealment of systems visit the job site to verify and advise on type and location of balancing devices and test points. Make changes as required to balance facilities.
- B. Place systems in satisfactory operating condition.
 - 1. Adjusting and balancing shall be accomplished as soon as the systems are complete and before Owner takes possession.
 - 2. Prior to balancing, adjust balancing devices for full flow; fill, vent and clean hydronic systems, replace temporary filters and strainers.
 - 3. Initial adjustment and balancing to quantities as called for or as directed by the engineer, to satisfy job conditions.

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4. All outdoor conditions (Db, Wb, and a description of the weather conditions) at the time of testing shall be documented in the report.
5. Provide sheaves and belts as required to meet system performance requirements for all belt-driven fan motors 10 HP and greater. Adjust and align sheaves to obtain proper settings and operation. Verify motors are not overloading.
6. Installing contractor shall replace balancing cocks, flow balancers and dampers in new systems that cannot be manipulated to satisfy balancing requirements.
7. Identify flow balancers, balancing cocks and dampers in existing systems that cannot be manipulated to satisfy balancing requirements.
8. Traverse main ducts to determine total system air quantities after all outlets have been set prior to final adjustment if the system does not meet design requirements. A sum of room CFM's is not acceptable.
9. If duct construction and/or installation prohibits proper traverse readings, provide coil measurements at main coils and/or fresh air intake traverse with units operating in 100% outside air mode (where applicable).

1.6 CONTRACTOR RESPONSIBILITIES

- A. Provide Testing and Balancing agency one complete set of contract documents, change orders, and approved submittals in digital and hard copy formats.
- B. Controls contractor shall provide required BAS hardware, software, personnel and assistance to Testing and Balancing agency as required to balance the systems. Controls Contractor shall also provide trending report to demonstrate that systems are complete.
- C. Coordinate meetings and assistance from suppliers and contractors as required by Testing and Balancing agency.
- D. Provide additional valves, dampers, sheaves and belts as required by Testing and Balancing agency.
- E. Flag all manual volume dampers with fluorescent or other high-visibility tape.
- F. Provide access to all dampers, valves, test ports, nameplates and other appurtenances as required by Testing and Balancing agency.
- G. Installing contractor shall replace or repair insulation as required by Testing and Balancing agency.
- H. Have the HVAC systems at complete operational readiness for Testing and Balancing to begin. As a minimum verify the following:
 1. Airside:
 - a. All ductwork is complete with all terminals installed.
 - b. All volume, smoke and fire dampers are open and functional.

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- c. Clean filters are installed.
 - d. All fans are operating, free of vibration, and rotating in correct direction.
 - e. ASD start-up is complete and all safeties are verified.
 - f. System readiness checklists are completed and returned to Testing and Balancing agency.
2. Hydronics:
- a. Piping is complete with all terminals installed.
 - b. Water treatment is complete.
 - c. Systems are flushed, filled and air purged.
 - d. Strainers are pulled and cleaned.
 - e. Control valves are functioning per the sequence of operation.
 - f. All shutoff and balance valves have been verified to be 100% open.
 - g. Pumps are started, and proper rotation is verified.
 - h. Pump gauge connections are installed directly at the pump inlet and outlet flange or in discharge and suction pipe prior to any valves or strainers.
 - i. ASD start-up is complete and all safeties have been verified.
 - j. System readiness checklists are completed and returned to Testing and Balancing agency.
- I. Promptly correct deficiencies identified during Testing and Balancing.
- J. Maintain a construction schedule that allows the Testing and Balancing agency to complete work prior to occupancy.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Provide tools, ladders, recording meters, gauges, thermometers, velometers, anemometers, Pitot tubes, inclined gauge manometers, magnehelic gauges, amprobes, voltmeters, psychrometers and tachometers required.
- B. Instrumentation Calibration: Calibrate instruments at least every six (6) months or more frequently if required by instrument manufacturer.
 - 1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine Bid Documents and submittals and notify Owner's Representative and Engineer of any questions regarding balancing.
 - 1. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper Testing and Balancing of systems and equipment.
 - 2. Examine the approved submittals for HVAC systems and equipment.
 - 3. Examine equipment performance data including fan and pump curves.
- B. Prepare a Testing and Balancing Strategies and Procedures Plan that includes:
 - 1. Equipment and systems to be tested.
 - 2. Strategies and step-by-step procedures for balancing the systems.
 - 3. Instrumentation to be used.
 - 4. Sample forms with specific identification for all equipment.
- C. Prepare system-readiness checklists, as described in the *AABC National Standards for Total System Balance*, for use by contractors in verifying system readiness for Testing and Balancing. These shall include, at a minimum:
 - 1. Airside:
 - a. All ductwork is complete with all terminals installed.
 - b. All volume, smoke and fire dampers are open and functional.
 - c. Clean filters are installed.
 - d. All fans are operating, free of vibration, and rotating in correct direction.
 - e. Permanent electrical power wiring and ASD start-up is complete and all safeties are verified.
 - f. Automatic temperature-control systems are operational.
 - g. Ceilings are installed.
 - h. Windows and doors are installed.
 - i. Suitable access to balancing devices and equipment is provided.
 - j. Equipment and duct access doors are securely closed.

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2. Hydronics:
 - a. Piping is complete with all terminals installed.
 - b. Water treatment is complete.
 - c. Systems are flushed, filled and air purged.
 - d. Strainers are pulled and cleaned.
 - e. Control valves are functioning per the sequence of operation.
 - f. All shutoff and balance valves have been verified to be 100% open.
 - g. Pumps are started and proper rotation is verified.
 - h. Pump gauge connections are installed directly at the pump inlet and outlet flange or in discharge and suction pipe prior to any valves or strainers.
 - i. Permanent electrical power wiring and ASD start-up is complete and all safeties are verified.
 - j. Suitable access to balancing devices and equipment is provided.
- D. Examine construction and notify Owner's Representative and Engineer of outstanding issues related to balancing, as part of "Examination Report" submittal.
 1. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas.
 2. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, clean permanent filters are installed, and controls are ready for operation.
 3. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected, configured by the controls contractor and functioning.
 4. Examine strainers to verify that Mechanical Contractor has replaced startup screens with permanent screens and that all strainers have been cleaned.
 5. Examine two-way valves for proper installation and function.
 6. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
 7. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
 8. Examine air vents to verify that mechanical contractor has removed all air from all hydronic systems.

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9. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, weld-lets, and manual volume dampers prior to pressure testing. Note the locations of devices that are not accessible for testing and balancing.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.
- C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
- E. Check airflow patterns from the outside-air louvers and dampers and the return and exhaust-air dampers, through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and function.
- K. Check for proper sealing of air-handling unit components.

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- L. Check for proper sealing of air duct system.

3.4 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure fan static pressures to determine actual static pressure as follows:
 - a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and treating equipment.
 - a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
 - 3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
 - 4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system affect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
 - 5. Obtain approval from Engineer for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to sheaves sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
 - 6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

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1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
 - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 2. Re-measure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure terminal outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.5 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. **Compensating for Diversity:** When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a maximum set-point airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.
- B. **Pressure-Independent, Variable-Air-Volume Systems:** After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set outside-air dampers at minimum, and return-and exhaust-air dampers at a position that simulates full-cooling load.
 2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 3. Measure total system airflow. Adjust to within indicated airflow.
 4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the

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air outlets downstream from terminal units as described for constant-volume air systems.

5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the conditions but leave outlets balanced for maximum airflow.
 6. Re-measure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.
 7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that the adequate static pressure is maintained at the most critical unit.
 8. Record the final fan performance data.
- C. Pressure-Dependent, Variable-Air-Volume Systems with Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set system at maximum indicated airflow by setting the required number of terminal units at minimum airflow. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.
 2. Adjust supply fan to maximum indicated airflow with the variable-airflow controller set at maximum airflow.
 3. Set terminal units at full-airflow condition.
 4. Adjust terminal units starting at the supply-fan end of the system and continuing progressively to the end of the system. Adjust inlet dampers of each terminal unit to indicated airflow. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
 5. Adjust terminal units for minimum airflow.
 6. Measure static pressure at the sensor.
 7. Measure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.

3.6 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports for pumps, coils and heat exchangers. Obtain approved submittals and any manufacturer-recommended testing procedures. Cross check the summation of required coil and heat exchanger gpm with pump design flow rate.
- B. Verify that hydronic systems are ready for testing and balancing:

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1. Check liquid level in expansion tank and verify that tank is set to specified pressure for system fill and expansion.
2. Check that makeup water has adequate pressure to highest vent.
3. Check that control valves are in their proper positions.
4. Check that air has been purged from the system.
5. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
6. Verify that motor starters are equipped with properly sized thermal protection.

3.7 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

- A. Adjust pumps to deliver total design gpm.
 1. Measure total water flow.
 - a. Position valves for full flow through coils.
 - b. Measure flow by main flow meter, if installed.
 - c. If main flow meter is not installed, determine flow by pump total dynamic head (TDH) or exchanger pressure drop.
 2. Measure pump TDH as follows:
 - a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves or fittings.
 - b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - c. Convert pressure to head and correct for differences in gauge heights.
 - d. On single stage centrifugal pumps, verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - e. With all valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
 3. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
- B. Adjust flow measuring devices installed in mains and branches to design water flows.
 1. Measure flow in main and branch pipes.

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2. Adjust main and branch balance valves for design flow.
 3. Re-measure each main and branch after all have been adjusted.
- C. Adjust flow measuring devices installed at terminals for each space to design water flows.
1. Measure flow at all terminals.
 2. Adjust each terminal to design flow.
 3. Re-measure each terminal after all have been adjusted.
 4. Position control valves to bypass the coil and adjust the bypass valve to maintain design flow.
 5. Perform temperature tests after all flows have been balanced.
- D. For systems without pressure-independent valves or flow measuring devices at the terminals:
1. Measure and balance coils by either coil pressure drop or temperature method.
 2. If balanced by coil pressure drop, perform temperature tests after all flows have been verified.
- E. Verify final system conditions as follows:
1. Re-measure and confirm that total water flow is within design.
 2. Re-measure all final pump operating data, TDH, volts, amps, static profile.
 3. Mark all final settings.
- F. Verify that all memory stops have been set.

3.8 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

- A. Adjust the variable-flow hydronic system as follows:
1. Verify that the differential pressure (DP) sensor is located per the Contract Documents.
 2. Determine if there is diversity in the system.
- B. For systems with no diversity:
1. Follow procedures outlined for constant-flow hydronic systems.
 2. Prior to verifying final system conditions, determine the system DP setpoint.

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3. If the pump discharge valve was used to set total system flow with ASD at 60 Hz, at completion open discharge valve 100% and allow ASD to control system DP setpoint. Record pump data under both conditions.
 4. Mark all final settings and verify that all memory stops have been set.
- C. For systems with diversity:
1. Determine diversity factor.
 2. Simulate system diversity by closing required number of control valves, as approved by the design Engineer.
 3. Follow procedures outlined for constant flow hydronic systems.
 4. Open control valves that were shut. Close a sufficient number of control valves that were previously open to maintain diversity, and balance the terminals that were just opened.
 5. Prior to verifying final system conditions, determine the system DP setpoint.
 6. If the pump discharge valve was used to set total system flow with ASD at 60 Hz, at completion open discharge valve 100% and allow ASD to control system DP setpoint. Record pump data under both conditions.
 7. Mark all final settings and verify that all memory stops have been set.
- D. For systems with pressure-independent valves at the terminals:
1. Measure differential pressure and verify that it is within manufacturer's specified range.
 2. Perform temperature tests after all flows have been verified.

3.9 TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans: Zero to plus 10 percent.
 2. Air Outlets and Inlets: Plus or minus 10 percent.
 3. Minimum Outside Air: Zero to plus 10 percent.
 4. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.
 5. Heating-Water Flow Rate: Plus or minus 10 percent.
 6. Cooling-Water Flow Rate: Plus or minus 10 percent.

3.10 FINAL TEST & BALANCE REPORT

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- A. The report shall be a complete record of the HVAC system performance, including conditions of operation, items outstanding, and any deviations found during the Testing and Balancing process. The final report also provides a reference of actual operating conditions for the owner and/or operations personnel. All measurements and test results that appear in the reports must be made on site and dated by the technicians or Test and Balance Engineers.

- B. The report must be organized by systems and shall include the following information as a minimum:
 - 1. Title Page:
 - a. AABC or NEBB Certified Company Name.
 - b. Company Address.
 - c. Company Telephone Number.
 - d. Project Identification Number.
 - e. Location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.
 - i. Project Number.
 - j. Date of Report.
 - k. Certification Statement.
 - l. Name, Signature, and Certification Number.
 - 2. Table of Contents.
 - 3. National Performance Guaranty.
 - 4. Report Summary:
 - a. The summary shall include a list of items that do not meet design tolerances, with information that may be considered in resolving deficiencies.
 - 5. Instrument List:
 - a. Type
 - b. Manufacturer
 - c. Model
 - d. Serial Number

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- e. Calibration Date
- C. Required air side data - Test, adjust and record the following:
- 1. Motors:
 - a. RPM
 - b. BHP
 - c. Full load amps
 - d. Sheave sizes, number and size of belts
 - e. Shaft diameter
 - f. Complete nameplate data
 - 2. Fans:
 - a. Cfm
 - b. RPM
 - c. Suction static pressure
 - d. Discharge static pressure
 - e. Sheave sizes, number and size of belts, key sizes, shaft, diameter
 - f. Complete nameplate data
 - g. Sketch of system's inlet and outlet connections
 - h. Location of test port
 - 3. Duct: Traverse Zones
 - a. Cfm
 - b. Static Pressure
 - 4. AHU - (In both minimum O.A. and economizer modes):
 - a. Minimum outdoor air Cfm
 - b. Total discharge and return Cfm
 - c. Static profile thru unit
 - d. Complete nameplate data
 - 5. Coil:
 - a. Entering air temperature (DB/WB)
 - b. Leaving air temperature (DB/WB)
 - c. Static differential
 - d. Face velocity and area
 - e. Cfm
 - f. Complete nameplate data
 - 6. Registers/Grilles/Diffusers:
 - a. Cfm
 - b. Set, adjust and record air flow pattern
 - 7. Filter Banks:

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- a. Nameplate data
 - b. Static pressure drop
- D. Required Fluid Data: Test, adjust and record the following:
1. Heat Transfer Devices: Including, but not limited to air handlers, convectors, fin tube radiation sections, unit ventilators, fan coils, cabinet heaters, unit heaters, heat pumps, heat exchangers.
 - a. GPM (coil and bypass)
 - b. Entering water temperature
 - c. Leaving water temperature
 - d. Water pressure drop
 - e. Complete nameplate data
 2. Pumps:
 - a. Check rotation
 - b. GPM
 - c. Pump off pressures (suction and discharge)
 - d. Running suction pressure
 - e. Running discharge pressure
 - f. Running load amps
 - g. RPM - motor
 - h. Complete nameplate motor and pump
 - i. Marked up pump curve illustrating final operating conditions
- E. One (1) copy of the final test and balance report shall be sent directly to the Engineer of Record. Provide five (5) additional copies to the Contractor.

END OF SECTION

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SECTION 230710 - INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents.

1.2 SUBMITTAL

- A. Shall include product description, manufacturer's installation instructions, types and recommended thicknesses for each application, and location of materials.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Insulation, jackets, adhesive, and coatings shall comply with the following:
 - 1. Treatment of jackets or facing for flame and smoke safety must be permanent. Water-soluble treatments not permitted.
 - 2. Insulation, including finishes and adhesives on the exterior surfaces of ducts, pipes, and equipment, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less.
 - 3. Asbestos or asbestos bearing materials are prohibited.
 - 4. Energy Conservation Construction Code of New York State.
 - 5. All adhesives and sealants used for insulation in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits as called for in the current version of U.S. Green Building Council LEED Credits EQ E4.1 and EQ E4.2.

2.2 MAKES

- A. Fiberglass: Knauf, Manville, Owen-Corning, Certainteed.
- B. Adhesives: Childers Products, Foster.

2.3 PIPE INSULATION (RIGID FIBERGLASS TYPE)

- A. Glass Fiber: Knauf 1000248 Pipe Insulation meeting ASTM C 547, ASTM C 585, and ASTM C 795; rigid, molded, noncombustible.
- B. 'K' Value: ASTM C 335, 0.23 at 75°F mean temperature. Maximum Service Temperature: 1000°F.
- C. Vapor Retarder Jacket: ASJ/SSL conforming to ASTM C 1136 Type I, secured with self-sealing longitudinal laps and butt strips.

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- D. Field-Applied PVC Fitting Covers with Flexible Fiberglass Insulation: Proto Corporation 25/50 or Indoor/Outdoor, UV-resistant fittings, jacketing and accessories, white or colored. Fitting cover system consists of pre-molded, high-impact PVC materials with blanket type fiberglass wrap inserts. Blanket fiberglass wrap inserts shall have a thermal conductivity ('K') of 0.26 at 75°F mean temperature. Closures to be stainless steel tacks, matching PVC tape, or PVC adhesive per manufacturer's recommendations.
- E. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in pre-forming insulation to cover valves, elbows, tees, and flanges.

2.4 DUCT INSULATION

- A. Duct insulation shall have a thermal resistance (R) value identification mark by the manufacturer applied no less than every 10 feet, as per the Energy Conservation Construction Code of New York State.
- B. Flexible Fiber Glass Blanket:
 - 1. Knauf Duct Wrap meeting ASTM C 553 Types I, II and III, and ASTM C 1290; Greenguard compliant; flexible, limited combustible.
 - 2. 'K' Value of 0.27 at 75°F mean temperature. Maximum Service Temperature (Faced): 250°F.
 - 3. Vapor Retarder Jacket: FSK conforming to ASTM C 1136 Type II.
 - 4. Installation: Maximum allowable compression is 25%. Securement: Secured in place using outward cinching staples in combination with appropriate pressure-sensitive aluminum foil tape, or in combination with glass fabric and vapor retarder mastic.
 - 5. Density: Minimum 1.0 PCF.
- C. Rigid Fiber Glass Board
 - 1. Knauf Insulation Board meeting ASTM C 612 Type IA and IB; rigid.
 - 2. 'K' Value of 0.23 at 75°F mean temperature. Maximum Service Temperature: 450° F.
 - 3. Vapor Retarder Jacket: ASJ conforming to ASTM C 1136 Type I, or FSK or PSK conforming to ASTM C 1136 Type II.
 - 4. Securement: Secured in place using adhesive and mechanical fasteners spaced a minimum of 12 in. on center with a minimum of 2 rows per side of duct. Insulation shall be secured with speed washers and all joints, breaks and punctures sealed with appropriate pressure-sensitive foil tape, or glass fabric and vapor retarder mastic.
 - a. Concealed Areas: Minimum 3 lb./ft.³.

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- b. Exposed Areas: 6 lb./ft.³ minimum density for duct less than 8 ft. - 0 in. above finished floor.

2.5 MATERIALS AND SCHEDULES

- A. See Exhibits at the end of this section.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All materials shall be installed by skilled labor regularly engaged in this type of work. All materials shall be installed in strict accordance with manufacturer's recommendations, building codes, and industry standards.
- B. Locate insulation and cover seams in the least visible location. All surface finishes shall be extended in such a manner as to protect all raw edges, ends and surfaces of insulation. No glass fibers shall be exposed to the air.
- C. All pipe or duct insulation shall be continuous through hangers, sleeves, walls, ceiling or floor openings, or sleeves unless not allowed by fire stop system.
- D. Provide thermal insulation on clean, dry surfaces and after piping, ductwork and equipment (as applicable) have been tested. Do not cover pipe joints with insulation until required tests are completed.
- E. All cold surfaces that may "sweat" must be insulated. Vapor barrier must be maintained; insulation shall be applied with a continuous, unbroken moisture and vapor seal. All hangers, supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation. Cover valves, fittings and similar items in each piping system with insulation as applied to adjoining pipe run. Extra care must be taken on piping appurtenances to insure a tight fit to the piping system. Valve extension stems require Elastomeric insulation that is tight fitting to the adjoining fiberglass system insulation. Pumps, strainers, air separators, drain valves, etc. must be totally encapsulated with Elastomeric insulation.
- F. Items such as boiler manholes, handholds, clean-outs, ASME stamp, and manufacturers' nameplates, may be left un-insulated unless omitting insulation would cause a condensation problem. When such is the case, appropriate tagging shall be provided to identify the presence of these items. Provide neatly beveled edges at interruptions of insulation.
- G. Provide protective insulation as required to prevent personnel injury: Piping from zero to seven feet above all floors and access platforms including hot (above 140°F) piping and any other related hot surface.
- H. All pipes shall be individually insulated.
- I. If any insulation material has become wet because of transit or job site exposure to moisture or water, the contractor shall not install such material, and shall remove it from the job site.

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3.2 PIPE INSULATION

- A. Insulate piping systems including fittings, valves, flanges, unions, strainers, and other attachments installed in piping system, whether exposed or concealed.
- B. Insulation installed on piping operating below ambient temperatures must have a continuous vapor retarder. All joints, seams and fittings must be sealed.
- C. Hanger Shields: Refer to Section "Piping Systems and Accessories"
- D. Metal shields shall be installed between hangers or supports and the piping insulation. Rigid insulation inserts shall be installed as required between the pipe and the insulation shields. Inserts shall be of equal thickness to the adjacent insulation and shall be vapor sealed as required.
 - 1. Pre-Insulated Type: Butt insulation to hanger shields and apply a wet coat of vapor barrier cement to the joints and seal with 3 in. wide vapor barrier tape.
 - 2. Field Insulated Type: Provide Hamfab Co. "H" blocks per manufacturers recommended spacing between pipe and shield.
 - 3. Tape shields to insulation.
- E. Joints in section pipe covering made as follows:
 - 1. All ends must be firmly butted and secured with appropriate butt-strip material. On high-temperature piping, double layering with staggered joints may be appropriate. When double layering, the inner layer should not be jacketed.
 - 2. Standard: Longitudinal laps and butt joint sealing strips cemented with white vapor barrier coating, or factory supplied pressure sensitive adhesive lap seal.
 - 3. Vapor Barrier: For cold services, Longitudinal laps and 4 in. vapor barrier strip at butt joints shall be sealed with white vapor barrier coating. Seal ends of pipe insulation at valves, flanges, and fittings with white vapor barrier coating.
- F. Fittings, Valves and Flanges:
 - 1. Chilled Water: Premolded fitting insulation of the same material and thickness as the adjacent pipe insulation. Vapor seal with white vapor barrier coating.
 - 2. Hot Services and Domestic Cold Water: Premolded fitting insulation of the same material and thickness as the adjacent pipe insulation.
 - 3. White PVC jacketing, with continuous solvent weld of all seams. Tape all fittings.
- G. Apply either aluminum or PVC jacketing to exposed insulated pipe, valves, fittings, and specialties, at an elevation of 8 feet or less above finished floor in mechanical/electrical rooms, penthouses, and services aisles/pipe chases. Fittings of aluminum-jacketed piping may be either aluminum or standard PVC fitting covers. Jacketing for piping in existing areas shall match existing jacketing.

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3.3 DUCTWORK INSULATION

- A. Provide external thermal insulation for duct. Not required where ducts have internal acoustical insulation. Make special provisions at dampers, damper motors, thermometers, instruments, and access doors. Apply as follows:
 - 1. Rigid Board Type: Impale board over mechanical fasteners, welded pins or adhered clips, 12 in. to 18 in. centers; minimum of two rows per side. Secure insulation with washer clips. Self-adhesive clips are not acceptable. Seal breaks and joints in vapor barrier with 4 in. wide matching tape or 4 in. glass-fab applied with BF 35-00. Apply tape over corner beading where exposed. Staple all joints.
 - 2. Flexible Blanket Type: Install Duct Wrap to obtain specified R-value using a maximum compression of 25%. Installed R-value shall be per ASHRAE 90.1-2004 or other design criteria. Firmly butt all joints. The longitudinal seam of the vapor retarder must be overlapped a minimum of 2 in. Where vapor retarder performance is required, all penetrations and damage to the facing shall be repaired using pressure-sensitive foil tape, or mastic prior to system startup. Pressure-sensitive foil tapes shall be a minimum 3 in. wide and shall be applied with moving pressure using a squeegee or other appropriate sealing tool. Closure shall have a 25/50 Flame Spread/Smoke Developed Rating per UL 723. Duct Wrap shall be additionally secured to the bottom of rectangular ductwork over 18 in. wide using mechanical fasteners on 18 in. centers. Self-adhesive clips are not acceptable. Care should be exercised to avoid over-compression of the insulation during installation.

3.4 EXISTING INSULATION

- A. Patch existing insulation damaged during the course of the work.
- B. Insulate existing piping, ductwork, and equipment as called for.
- C. Jacketing for piping in existing areas shall match existing jacketing.

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EXHIBIT "I" - PIPE INSULATION MATERIALS

<u>SERVICE</u>	<u>INSULATION MATERIAL</u>	<u>THICKNESS</u>	<u>REMARKS</u>
Hot water and glycol/hot water (200°F and lower)	Glass fiber	2 in. and Larger: 2 in. 1-1/2 in. and Smaller: 1-1/2 in.	
Chilled water, glycol/chilled water	Glass fiber	All Sizes: 1-1/2 in.	

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EXHIBIT "II" - DUCT INSULATION MATERIALS

<u>SERVICE</u>	<u>INSULATION MATERIAL</u>	<u>THICKNESS</u>	<u>REMARKS</u>
HVAC Supply	Within mechanical rooms or exposed at 8 feet or less above finished floor: Rigid fiberglass1-1/2 in.	Min. R value of 5
	Concealed: Flexible fiberglass2 in	Min. R value of 5

END OF SECTION

SECTION 230800 - COMMISSIONING OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.
- B. Section 011800 – Commissioning Requirements contains general information pertaining to the commissioning of all systems.

1.2 DESCRIPTION

- A. Commissioning is a systematic process of verifying that all building systems perform interactively according to the owner’s operational needs, the design documents, manufacturer’s recommendations, good engineering and workmanship practices. This is achieved by beginning in the design phase and documenting the owners requirements and continuing through construction, acceptance and the warranty period with actual verification of performance. The commissioning process shall encompass and coordinate the traditionally separate functions of system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training.
- B. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
 - 1. Verify that applicable equipment and systems are installed according to the contract documents, manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
 - 2. Verify and document proper performance of equipment and systems.
 - 3. Verify that O&M documentation provided for the project is complete, accurate and represents the actual installed equipment.
 - 4. Verify that the Owner’s operating personnel are adequately trained.
- C. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.
- D. Abbreviations: The following are common abbreviations used in the Specifications. Definitions are found in Article 1.03.

A/E - Architects and Design Engineers	EC - Electrical Representative
CxA - Commissioning Authority	FT - Functional Performance Test
CC - Controls Representative	GC - General Contractor
CTR - Installers	MC - Mechanical Representative
Cx - Commissioning	PFI - Pre-Functional Inspection
Cx Plan - Commissioning Plan Document	PM - Project Manager (of the owner)
PC - Plumbing Representative	TAB - Test and Balance Contractor

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1.3 RESPONSIBILITIES

- A. The responsibilities of various parties in the commissioning process are provided in this section. Further specific responsibilities, when required, of the mechanical representative, TAB, controls representative, plumbing representative and those of the electrical representative are described in their particular contract specifications and documents. It is noted that the services for the owner's Project Manager, Architect, HVAC mechanical and electrical designers/engineers and Commissioning Authority are not provided for in this contract. That is, the Contractor is not responsible for providing their services, and those responsibilities are listed here only for clarification of the commissioning process.

- B. All Parties
 - 1. Follow the Commissioning Plan.
 - 2. Attend the commissioning scoping meeting and additional meetings as necessary.

- C. Commissioning Authority (CxA)
 - 1. The CxA is not responsible for design concept, design criteria, compliance with codes, design or construction scheduling, cost estimating, or construction management. The CxA may assist with problem solving non-conformance or deficiencies, but ultimately that responsibility resides with the GC and A/E. The primary role of the CxA is to develop and coordinate the execution of the Commissioning Plan, observe and document system performance. Specifically, that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractor will provide all tools or the use of tools to start, check-out and functionally test equipment and systems, except for specified testing with portable data-loggers, which shall be supplied and installed by the CxA.
 - 2. Construction and Acceptance Phase
 - a. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
 - b. Coordinate the commissioning work and, with the GC and CTRs, verify that commissioning activities are being scheduled into the master schedule.
 - c. Revise the Commissioning Plan as necessary.
 - d. Plan and conduct a commissioning scoping meeting.
 - e. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up and checkout procedures.
 - f. Before startup, gather and review the current control sequences and interlocks and work with installers and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.

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- g. Review equipment submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.
- h. Write and distribute prefunctional inspections. The CxA will provide the GC and installers a list of the required submittals. The Contractor bears all costs associated with providing the requested submittals to the CxA without any additional cost to the Owner, CxA or others.
- i. Develop an enhanced start-up and initial systems checkout plan with CTRs.
- j. Perform site visits, as necessary, to observe component and system installations. Attends selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
- k. Witness all or part of the HVAC piping test and flushing procedure, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify owner's project manager of any deficiencies in results or procedures.
- l. Witness all or part of any ductwork testing and cleaning procedures, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify owner's project manager of any deficiencies in results or procedures.
- m. With necessary assistance and review from the Contractor and installers, write the functional performance test procedures for equipment and systems. This may include energy management control system trending, stand-alone datalogger monitoring or manual functional testing.
- n. Perform pre-functional inspections by selected equipment inspections, site observation and spot-checking.
- o. Evaluate systems startup procedures by reviewing start-up reports and by selected site observation.
- p. Review TAB execution plan.
- q. Execute, with the assistance of the Contractor and installers, functional testing of the control system before, or in conjunction with, the HVAC system TAB. Coordinate retesting as necessary until satisfactory performance is achieved.
- r. Review air and water systems TAB by spot testing, by reviewing completed reports and by selected site observation after receiving the final TAB report.
- s. Analyze any functional performance trend logs and monitoring data to verify performance.
- t. Maintain a master deficiency and resolution log and a separate testing record. Provide the GC, PM and installers with written progress reports and test results with recommended actions.
- u. Review equipment warranties to verify that the Owner's responsibilities are clearly defined.
- v. Oversee and approve the training of the Owner's operating personnel.
- w. Compile and maintain a commissioning record and Systems Energy Manual.
- x. Review the preparation of O&M manuals.

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- y. Provide a final commissioning report.
- z. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
- aa. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.
- bb. Identify any warranty phase deficiencies and provide detailed documentation to the Contractor.

D. General Contractor (GC)

1. Construction and Acceptance Phase

- a. Include the cost of supporting commissioning in the contract price.
- b. Attend a commissioning scoping meeting and other commissioning team meetings.
- c. Furnish a copy of all construction documents, addenda, change orders and submittals and shop drawings related to commissioned equipment to the CxA. The CxA will forward a request to the GC for copies of the submittals that the CxA is required to review concurrently with the engineer as required by the LEED guidelines. The Contractor bears all costs associated with providing the requested submittals to the CxA without any additional cost to the Owner, CxA or others.
- d. Provide the requisite readiness notification to the CxA for equipment prefunctional inspections and functional testing utilizing forms provided by the CxA.
- e. Participate in pre-functional inspections, startup and functional testing of all equipment, as directed by the CxA.
- f. Review the functional performance test procedures submitted by the CxA, prior to testing.
- g. Review commissioning progress and deficiency reports.
- h. Coordinate the resolution of deficiencies identified by the CxA.
- i. Document the completion and/or action taken for the resolution of deficiencies as directed by the CxA and described in the Cx Plan utilizing forms provided by the CxA.
- j. Coordinate and perform the training of owner personnel. Notify the CxA when training will be taking place.
- k. Ensure that all installers execute their commissioning responsibilities according to the Contract Documents and schedule.
- l. Prepare O&M manuals, according to the Contract documents, including clarifying and updating the original sequences of operation to as-built conditions.
- m. Assist the CxA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.

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- n. Ensure that installers execute seasonal or deferred functional performance testing, witnessed by the CxA, according to the specifications.
- o. Ensure that installers correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

E. Installers (CTRs)

- 1. Construction and Acceptance Phase
 - a. Attend all commissioning scoping meetings and other commissioning team meetings.
 - b. Provide the requisite readiness notification to the GC for equipment prefunctional inspections and functional testing.
 - c. Participate in pre-functional inspections, startup and functional testing of all equipment, as directed by the CxA.
 - d. Review the functional performance test procedures submitted by the CxA, prior to testing.
 - e. Have the Controls Contractor (CC) provide the necessary passwords and system access to the BMS to allow the CxA to overwrite set points and other systems parameters. The access level should be at the highest level possible with the exception of allowing the CxA to modify the programming sequences.
 - f. Review commissioning progress and deficiency reports.
 - g. Coordinate the resolution of deficiencies identified by the CxA.
 - h. Document the completion and/or action taken for the resolution of deficiencies as directed by the CxA and described in the Cx Plan.
 - i. Coordinate and perform the training of owner personnel.
 - j. Prepare O&M manuals, according to the Contract documents, including clarifying and updating the original sequences of operation to as-built conditions.
 - k. Assist the CxA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.
 - l. Ensure that seasonal or deferred functional performance testing, is executed and witnessed by the CxA, according to the specifications.
 - m. Ensure deficiencies are corrected and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

F. Equipment Suppliers

- 1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
- 2. Assist in equipment commissioning with CTRs as per the contract documents.
- 3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor.
- 4. Provide the information requested by the CxA regarding equipment sequences of operation and testing procedures.
- 5. Review test procedures for equipment installed by factory representatives.

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1.4 SYSTEMS TO BE COMMISSIONED

- A. The following systems will be commissioned in this project. The Owner and the CxA reserves the right to amend this list at anytime during the construction and acceptance process.

HVAC

1. Existing DDC system and existing Units
2. Air Handling Units
3. Return Fans
4. Humidifiers

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested.
- B. Special equipment, tools, instruments, (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents, shall be included in the base bid price to the Contractor and left on site, except for stand-alone datalogging equipment that may be used by the CxA.
- C. Datalogging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.
- D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications.

PART 3 - EXECUTION

3.1 MEETINGS

- A. Scoping Meeting – The CxA will schedule, plan and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the CxA. Information gathered from this meeting will allow the CxA to revise the Commissioning Plan to its final version, which will also be distributed to all parties.
- B. Prefunctional Inspection (PFI) Meeting – The CxA will schedule, plan and conduct a PFI meeting with the entire commissioning team in attendance to kickoff the PFI phase.
- C. Functional Performance Testing Meeting – The CxA will schedule, plan and conduct a functional performance test meeting with the entire commissioning team in attendance to kickoff the FT phase. The Controls Representative (CC) will play a critical role in the Functional Performance Testing. The CC's Project Manager will be required to attend this meeting.

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- D. Miscellaneous Meetings – Progress meetings will be scheduled and conducted by the CxA, as necessary. Other meetings will be planned and conducted by the CxA as the construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular CTRs. The CxA will plan these meetings and will minimize unnecessary time being spent by CTRs.

3.2 REPORTING

- A. The CxA will provide regular reports to the Owner, PM, GC, and A/E depending on the management structure, with increasing frequency as construction and commissioning progresses.
- B. The CxA will regularly communicate with all members of the commissioning team, keeping them apprised for commissioning progress, and scheduling changes through memos, progress reports, etc.
- C. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.
- D. A final summary report by the CxA will be provided to the Owner. The report will include:
 - 1. A brief summary report that includes a list of participants and roles, brief building description, overview of commissioning and testing scope, and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the CxA regarding the adequacy of the equipment, documentation, and training meeting the contract documents in the following areas:
 - a. Equipment meeting the equipment specifications
 - b. Equipment installation
 - c. Functional performance and efficiency
 - d. Equipment documentation
 - e. Operator Training
 - 2. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment and operations, future actions, recommended commissioning process changes, etc. shall also be listed.
 - 3. Also included in the Commissioning Record shall be the issues log, commissioning plan, progress reports, submittal and O&M manual reviews, training record, test schedules, construction checklists, start-up reports, functional tests and trend log analysis.
- E. The CxA will compile a Systems Manual that consists of the following:
 - 1. Space and use descriptions
 - 2. Single line drawings and schematics for major systems (to be provided by the design engineer)
 - 3. Control drawings and sequences of control (to be provided by the controls contractor)
 - 4. Table of all setpoints and implications when changing them
 - 5. Schedules
 - 6. Instructions for operation of each piece of equipment for emergencies, seasonal adjustment, startup and shutdown

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7. Instructions for energy savings operations and descriptions of the energy savings strategies in the facility
8. Recommendation for recommissioning the facility
9. Energy tracking recommendations

3.3 SUBMITTALS

- A. The CxA will provide the Contractor with a specific request for the type of submittal documentation the CxA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At a minimum the request will include the manufacturer and model number, the manufacturer's printed installation and detailed startup procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the CxA. All documentation requested by the CxA will be included by the CTRs in their O&M manual contributions.
- B. The CxA will review submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CxA will notify the Owner, PM, GC or A/E as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission. The CxA does not have approval responsibility, but is required to review the submittals concurrently with the engineer as required by LEED guidelines.
- C. The CxA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.
- D. These submittals to the CxA do not constitute compliance for O&M manual documentation. The O&M manuals are the responsibility of the Contractor, though the CxA will review them.

3.4 SYSTEM START-UP AND TESTING

- A. General Requirement
 1. All systems and system components shall be tested by the CTRs and in the presence of the Owner and Design Consultants if desired by the Owner and Design Consultants to demonstrate compliance with specified requirements. To minimize the time of commissioning, contracting, and Design Consultant team members, testing shall be done in seasonal single blocks of time insofar as possible.
 2. The Contractor shall notify the CxA fourteen (14) days prior to scheduled functional performance tests, of the scheduled completion date of the installation verification and prefunctional inspections.
 3. All testing shall be conducted under specified design operating conditions as approved by the CxA and Design Consultants.

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4. All elements of systems shall be tested to demonstrate that total systems satisfy all requirements of these Specifications. Testing shall be accomplished on a hierarchical basis. Each piece of equipment shall be tested for proper operation, and functionality of safety devices, followed by each system's subsystem, followed by the entire system, followed by any interlocks to other major systems.
5. All special testing materials and equipment shall be provided by the CTR. This includes, but is not limited to, proprietary equipment, hand-held control parameter/setpoint adjustment tools, water/air flow balancing readout and adjustment tools.
6. One copy of all factory test reports and records as well as all start-up documentation shall be provided to the CxA.

B. Test Procedure Development and Test Documentation

1. At least fourteen (14) days prior to startup of the mechanical system, the CTR shall inform the CxA, the Owner's representative and Design Consultants of the intention to start up the system.

C. Installation Verification Requirements

1. All systems and system components shall be checked and verified by the CTR that they have been installed according to the drawings, specifications, and manufacturer's written instructions, and that all connections have been made correctly. Discrepancies shall be corrected and resolved to the satisfaction of the engineer and CxA prior to proceeding any further with pre-functional inspections.
2. Each system of interlocked system components shall be observed and verified by the CTR that it is ready to function as specified.
3. Verification of complete and proper installation shall be completed prior to the CxA authorizing functional performance testing.
4. The installation verification shall be documented by the CTR in a written format for each system/piece of equipment as designated by the CxA. Each certificate of readiness shall be dated and initialed by the Contractor and clearly stating any items that are deficient or have not been completed. The protocols for this will be further clarified in the Commissioning Plan.

D. Pre-functional Inspection Requirements

1. The CxA will provide the inspection forms for each system and equipment.
2. Completion of the pre-functional inspections is the responsibility of the CxA.
3. Prior to the CxA performing the pre-functional inspection, the CTRs shall check the equipment for proper installation, adjustments, and shall calibrate the equipment to verify that it is ready to perform as specified.
4. Verification of complete and proper installation shall be completed prior to performing functional performance tests.

E. Functional Performance Testing Requirements

1. A functional performance test shall be performed on each complete system. Each function shall be demonstrated to the satisfaction of the CxA based on the written test procedure developed by the CxA to demonstrate conformance to the requirements of the Contract Documents.
2. Each functional performance test shall be performed, witnessed and signed off by the CxA. The CxA and the CTRs will perform the functional testing together. Any exceptions to this will be made clear to the Owner as to the reason and justification.
3. The functional performance testing shall be conducted in accordance with prior approved procedures and documented as required.
4. The Contractor shall notify the contracting team, the CxA, and Design Consultants, at least two weeks prior to the date of schedule functional performance tests. The seasonal functional performance test periods shall be scheduled over a single block of days. The schedule of functional performance tests shall be based on the construction completion schedule.

3.5 FUNCTIONAL TESTING SUPPORT REQUIREMENTS

A. General Requirements

1. This section provides brief descriptions of the testing and support the Contractor and installers will be required to provide to perform the functional testing of the equipment for the project.

B. Air Handling Equipment

1. The installer(s) will be required to demonstrate all safeties (personnel and mechanical e.g. over-pressurization and freezestat); local device operation (dampers, vortex vanes, variable speed drives, humidifiers, heating and cooling coils, heat transfer equipment, etc; any local controls including temperature and fan speed control; and integrated 3rd party Building Management System controls including all related devices and sequence of operations.
2. The Cx Authority will define the tests and procedures in the Cx Plan as well as the individuals required to support the testing.
3. For an air handling unit a representative will be required to manually operate all hand valves and the controls representative will be required to demonstrate their systems' integrated performance. Any local controls such as variable speed drives or equipment controls will require the representative who was responsible for the programming and setting up of the equipment to document the set points and demonstrate the performance of their equipment.
4. Any fire or smoke devices will be tested by contractor that installed that device. The annunciation or shut-down of equipment based on the devices status will be demonstrated by the contractor responsible for the system that initiates and/or completes the shut down sequence.

C. BMS Interface

1. The BMS installer will be required to demonstrate that all specified hardware and software has been provided; graphical user interfaces are complete, displaying current data that updates and refreshes within the times listed in the specification;

all specified network connections (e.g. to the internet/LAN/WAN) are established; login and system security is set up; utilities for alarming (local and remote), scheduling, reporting, trending, graphic templates/editing capability are programmed and complete.

2. The BMS installer will be required to verify and certify in writing that all input and out points are operating properly, calibrated and annunciate properly on the BMS. These points will then be verified by the CxA in the presence of the BMS installer.
3. The BMS installer will be required to verify and certify in writing that all sequences of operations that were programmed by the BMS installer are operating as per the design intent. The demonstration of these sequences will be performed at least once by the installing contractor as part of their independent commissioning process and then in the presence of the CxA, as directed by the CxA.
4. All reports, alarms and graphics must be fully completed and certified, in writing by the installing contractor, that these items are completed and have been verified by the installing contractor. This includes, but is not limited to:
 - a. All system graphics including BacNet, Lon or ModBus interfaces.
 - b. Alarms including setpoints, graphical annunciation, cell phone annunciation, email annunciation, etc.
 - c. Trending of any point defined by the CxA.
5. All alarms. Any alarm that is to be annunciated will include the appropriate text describing the alarm. System code or any other code that is not immediately intuitive to the system operator is not acceptable. The owner will not be responsible for programming or developing any text for the annunciation of the alarms on any device. This includes local panels, BMS interface or remote wireless annunciation or notification.
6. The CxA will perform a point-to-point verification of all digital outputs, digital inputs, analog outputs, analog inputs, universal inputs and universal outputs. The controls contractor is required to be present during this testing.
7. The CxA will test all sequences of operations for selected equipment. The controls contractor is required to be present during this testing.

D. Equipment Controls

1. The installer(s) will be required to demonstrate that all specified graphical user interfaces are operational, allowing the user to change set points, equipment schedules, trend data collection parameters, etc.; the equipment operates automatically via the BMS per the specified sequence of operations; equipment scheduling and optimal start is functional (through trending); alarm routing and management is functional; automatic re-start of equipment (e.g. after power failure) is functional; integrated 3rd party Building Management System controls (including all related devices and sequences of operation).
2. The Cx Authority will define the tests and procedures in the Cx Plan as well as the individuals required to support the testing.
3. The controls representative will be required to demonstrate their systems' integrated performance.

E. Return Fan System Testing

1. The installer(s) will be required to demonstrate all safeties (personnel and mechanical e.g. low static pressure); local device operation (dampers, etc.); and

2. The controls representative will be required to demonstrate their systems' integrated performance. Any local controls or equipment controls will require the representative who was responsible for the programming and setting up of the equipment to document the set points and demonstrate the performance of their equipment.

F. Supply Fans

1. The installer(s) will be required to demonstrate all safeties (personnel and mechanical e.g. low static pressure); local device operation (dampers, etc.); and any integrated 3rd party Building Management System controls including all related devices and sequences of operation.
2. The controls representative will be required to demonstrate their systems' integrated performance. Any local controls or equipment controls will require the representative who was responsible for the programming and setting up of the equipment to document the set points and demonstrate the performance of their equipment.
3. The fan installer will be required to demonstrate the fan installed meet the performance defined in the submittal and fan curve.
4. A representative will be required to manually operate all hand valves, and the controls contractor will be required to demonstrate their systems' integrated performance. Any local controls will require the representative who was responsible for the programming and setting up of the equipment to document the set points and demonstrate the performance of their equipment.

G. Humidifiers

1. The installer(s) will be required to demonstrate the programmed values of the minimum and maximum relative humidity settings.
2. The installer(s) will be required to demonstrate the humidifier's interlocked relative humidity sensor is being accurately tracked by the BMS system's relative humidity sensor installed next to each other in the duct.
3. The installer(s) will be required to demonstrate all safeties; local controllers and BMS interface are operating as designed.

3.6 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

- A. Documentation – The CxA shall witness and document the results of all functional performance tests using the specific forms developed by the CxA for that purpose.

B. Non Conformance

1. The CxA will record the results of the PFIs and functional tests utilizing the appropriate documentation. All deficiencies or non-conformance issues shall be noted and reported to the Owner, PM, GC and CTRs.
2. Reports of the deficiencies identified will be provided to the project team by the CxA. Individual forms identifying the deficiencies for each trade will also be provided. These forms are utilized for the contractor to inform the CxA of the action taken to address the deficiency items and these forms must be returned in a timely manner to the CxA.

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3. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases, the deficiency and resolution will be documented by the CxA.
 4. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or compromising acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owner.
 5. Cost of Retesting
 - a. The cost for the Installer to repeat a pre-functional inspection or functional test, if they are responsible for the deficiency, shall be theirs.
 - b. The time for the CxA to direct any retesting required because a specific prefunctional inspection of start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be backcharged to the appropriate CTR.
 6. The Contractor shall respond in writing to the CxA at least as often as commissioning meetings are scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
- C. Failure Due to Manufacturer Defect or Improper Installation - If 10%, or three, whichever is greater, of identical pieces of equipment (size alone does not constitute a difference) fail to perform to the Contract Documents (either mechanically or substantively) due to manufacturing defect or improper installation, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CxA, PM, A/E or Owner. In such case, the Contractor shall provide the Owner with the following:
1. Within one week of notification from the A/E (via the CxA), the installer or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the CxA or PM within two weeks of the original notice.
 2. Within two weeks of the original notification, the installer or manufacturer shall provide a signed and dated written explanation of the problem, cause of failures, etc., and all proposed solutions, which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
 3. The CxA, G/C and PM will determine whether a replacement of all identical units or a repair is acceptable.
 4. Two examples of the proposed solution will be installed by the Contractor and the CxA will be allowed to test the installations for up to one week, upon which the CxA or PM will decide whether to accept the solution.
 5. Upon acceptance, the installer and/or manufacturer shall replace or repair all identical items, at their expense, and extend warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.
- D. Approval – The CxA documents each satisfactorily demonstrated functional test.

3.7 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals

1. The specific content and format requirements for the standard O&M manuals are detailed in the contract documents. Special requirements for the controls representative and TAB are detailed in the contract documents.
2. Prior to substantial completion, the CxA shall review the O&M manuals, documentation and redline as-builts for systems that were commissioned to verify compliance with the specifications. The CxA will communicate deficiencies in the manuals to the CTRs, PM, GC, A/E or Owner as requested. Upon successful review of the corrections, the CxA recommends approval and acceptance of these sections of the O&M manuals to the PM, GC, A/E and Owner. The CxA also reviews each commissioned equipment's warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E's review of the O&M manuals according to the A/E contract.

3.8 TRAINING OF OWNER PERSONNEL

- A. The GC shall be responsible for training coordination and scheduling and for ultimately ensuring that training is completed. The GC shall inform the CxA when training will be scheduled.
- B. The CxA shall be responsible for overseeing and approving the content and adequacy of the training of the Owner personnel for commissioned equipment.
- C. The CxA shall interview the facility manager and lead engineer to determine the special needs and areas where training would be most valuable. The Owner and CxA shall decide how rigorous the training should be for each piece of commissioned equipment.
- D. In addition to these general requirements, the specific training requirements of Owner's personnel by CTRs, as detailed in the specifications, shall be provided.
- E. Each CTR and vendor responsible for training will submit a written training plan to the CxA, for review and approval prior to training. The plan will cover the following elements:
 1. Equipment (included in training)
 2. Intended audience
 3. Location of training
 4. Objectives
 5. Subjects covered (description, duration of discussion, special methods, etc.)
 6. Duration of training on each subject
 7. Instructor for each subject and qualifications
 8. Methods (classroom lecture, video, site walk thru, actual demonstrations, etc.)
- F. The CxA develops criteria for determining that the training was satisfactorily completed, including attending some of the training.

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3.9 DEFERRED TESTING

- A. Unforeseen Deferred Tests – If any inspection or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of inspections and functional testing may be delayed upon approval of the PM or Owner. These tests will be conducted in the same manner as the seasonal test as soon as possible. Services of necessary parties will be negotiated.
- B. Seasonal Testing – During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system’s design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate CTRs, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-builts due to the testing will be made.

3.10 WRITTEN WORK PRODUCTS

- A. The commissioning process generates a number of written work products described in various parts of the specifications. The Commissioning Plan lists all the formal written work products, describes briefly their contents, who is responsible to create them, and, who receives and approves them. In summary the written products are:

<u>Product</u>	<u>Developed By</u>
1. Final Commissioning Plan	CxA
2. Commissioning Schedules	CxA, GC and CTRs
3. Equipment Documentation Submittals	CTRs
4. Sequence Clarifications	A/E and CTRs as needed
5. Pre-Functional Inspection Forms	CxA
6. Pre-Functional Inspections	CxA
7. Startup and Initial Checkout Plans	CTRs
8. Final TAB Report	TAB CTR
9. Commissioning Progress Record	CxA
10. Deficiency Reports	CxA
11. Functional Test Procedures	CxA
12. O&M Manuals	CTRs
13. Commissioning Record	CxA
14. Overall Training Plans	GC and CTRs
15. Specific Training Syllabus	CxA
16. Final Commissioning Report	CxA

END OF SECTION 230800

SECTION 230923 - BUILDING MANAGEMENT SYSTEM - DDC LOGIC

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Drawings. Extend existing Building Management System (BMS), to perform the functions described in this Section. All new equipment shall be compatible with the existing system. Provide wiring and conduit required to connect devices furnished as a part of, or accessory to, this automatic control system. Control wiring is defined as wiring up to and including 120 volts. Install wiring in accordance with requirements of the National Electrical Code. Provide all required devices for proper system operation, including special electrical switches, transformers, relays, pushbutton stations, etc.
1. All Actuation of valves and dampers shall be electric unless specifically called out elsewhere in the specifications or drawings.
- B. The BMS System shall have the following capabilities as described in these specifications:
1. The network controllers and operator's workstations shall be connected directly to the Owner's Ethernet Network. The network controller shall also contain SNMP for integration to the Owner's Network Controllers System.
 2. Off site access for Owner's personnel shall be provided and shall have full workstation capability from remote location. Identical graphical displays shall be provided for offsite access to match the displays at the on-site Operator's Workstation. Connection to the site shall be via a high speed Ethernet connection.
 3. The Network Controller must act directly as the WEB server. It must directly generate the HTML code to the requesting user (i.e. WEB browser), eliminating the need and reliance on any PC-based WEB server hardware or software.
 4. The system shall be capable of supporting the email of alarms.
 5. All system variables in the temperature control system shall be Microsoft variables allowing them to be displayed and manipulated in other Microsoft products.
 6. Network controllers shall all be flash upgradeable and not require changing chips for upgrades.
 7. Short term logging of historical data shall be provided for every DDC input and output in the system. Each point shall capable of being logged for a minimum of 2 weeks.

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- C. The BMS shall consist of PC-based workstations and microcomputer controllers of modular design providing distributed processing capability, and allowing future expansion of both input/output points and processing/control functions. Further, the system shall be the backbone framework for the Security/Card Access/CCTV system through the front-end software.
- D. The system shall consist of the following components:
 - 1. Provide Ethernet-based network controllers as described in this specification. Controllers shall connect directly to the Operator Workstation over Ethernet, provide communication to the Standalone Digital Control Units and/or other Input/Output Modules and serve as a gateway to equipment furnished by others.
 - 2. Provide the necessary quantity and types of standalone controllers to meet the requirements of the project for mechanical equipment control including air handlers, central plant control, and terminal unit control. Each standalone controller shall operate completely standalone, containing all of the I/O and programs to control its associated equipment.
 - 3. A high speed Ethernet connection to the site shall be used for offsite access to the site. Coordinate with the Owner's IT professionals for high speed system access and shall comply with Owner's requirements to maintain the level of security required by the Owner. Coordinate with Owner and provide VPN (Virtual Private Network) as required, to comply with the Owner's IT professionals requirements.
 - 4. BACnet Protocol Integration - BACnet:
 - a. The neutral protocol used between systems will be BACnet over Ethernet and comply with ASHRAE BACnet standard 135-2003.
 - b. A complete Protocol Implementation Conformance Statement shall be provided for all BACnet system devices.
 - c. The ability to command share point object data, change of state data and schedules between the host and BACnet systems shall be provided.

1.2 QUALITY ASSURANCE

- A. The complete automatic temperature control system shall be comprised of electric control devices with a microprocessor based Direct Digital Control System. All work shall be installed only by skilled mechanics employed by the BMS contractor or subcontractor.
- B. The BMS Contractor/SubContractor shall have a minimum of five (5) years experience in systems of similar size, type and complexity installed within a 100 mile radius.
- C. The BMS Contractor/SubContractor shall have a local service department (within a 50 mile radius) and have available a minimum of three (3) factory trained technicians within a 24 hour period.
- D. All components shall be fully tested and documented to operate as a complete system.

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- E. Supplier must guarantee that all replacement parts will be carried in stock for a period of ten (10) years minimum from the date that the system is commissioned.
- F. Electrical standards: Provide electrical products that comply with the following agency approvals:
 - 1. UL 916; Energy Management Systems for Temperature Control components and ancillary equipment
 - 2. UL 873; Temperature Indication and Regulating Equipment
 - 3. FCC, Part 15, Subpart J, Class A Computing Devices
- G. All products shall be labeled with the appropriate approval markings. System installation shall comply with NFPA, NEMA, Local and National codes.

1.3 ACCEPTABLE MAKES

- A. The complete Building Management System is designed and based on that manufactured by Siemens.
- B. Acceptable Make: Siemens Building Technologies.

1.4 SUBMITTALS

- A. Submit for review, a brochure containing the following:
 - 1. Detailed piping and wiring control diagrams and systems description for each system under control.
 - 2. Detailed layout and nameplate list for component control panels and DDC panels.
 - 3. Submit a valve and damper schedule showing size, pressure drop configuration, capacity, and locations. Provide apparatus bulletins and data sheets for all control system components.
 - 4. A complete listing of input and output points, control loops and/or routines, including time of day functions, and facilities management system functions for each controlled system. This listing shall include point logical names, identifiers, and alarmable ranges.
 - 5. Provide as part of a separate submittal a hard copy of all graphics showing system components, sensor locations, setpoints and fixed/variable data. Engineer shall review and approve graphic format prior to final acceptance of system.

1.5 SCOPE OF WORK

- A. Except as otherwise noted, the control system shall consist of all Ethernet Network Controllers, Standalone Digital Control Units, workstations, software, sensors, transducers, relays, valves, dampers, damper operators and other accessory equipment,

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along with a complete system of electrical interlocking wiring as required to fill the intent of the specification and provide for a complete and operable system.

- B. The BMS Contractor/SubContractor shall review and study all HVAC drawings and the entire specification to familiarize themselves with the equipment and system operation and to verify the quantities and types of dampers, operators, alarms, etc. to be provided.
- C. All interlocking, wiring and installation of control devices associated with the equipment shall be provided under this Contract. The BMS Contractor/SubContractor shall demonstrate the operation of the system to the Owner and prove that it complies with the intent of the drawings and specifications.

1.6 WORK INCIDENTAL TO TEMPERATURE CONTROL CONTRACTOR

- A. The BMS Contractor/SubContractor shall furnish the following materials, installation by the HVAC Contractor:
 - 1. For piping work:
 - a. Control valves in piping.
 - b. Power and controls wiring to the valves actuators.
- B. The Contractor (HVAC Contractor) shall provide the following materials.
 - 1. Motor starters and adjustable speed drives.
 - 2. Cutting and Patching work for to complete the controls work including controls wiring.
 - 3. For piping work:
 - a. Immersion sensing wells for piping systems. To be coordinated with the BMS Contractor / SubContractor.
 - b. Valved pressure taps.
 - 4. For sheet metal work:
 - a. All automatic dampers, the HVAC Contractor shall assemble multiple section dampers with required interconnecting linkages and extend required number of shafts through duct for external mounting of damper and motors.
 - b. The HVAC Contractor shall provide access doors and other means of access through ducts or ceilings and walls for service and adjustment of controllers, valves, and dampers.
- C. Control manufacturer shall furnish written details, instructions and supervision for the above trades to ensure proper installation size, and location of any equipment furnished for installation by the contractor.

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- D. The BMS Contractor shall provide the following:
 - 1. For sheet metal work:
 - a. Electric actuators for automatic dampers.
 - b. Electrical power and controls wiring to the damper actuators

1.7 CONTROL SYSTEM GUARANTEES

- A. Guarantee the new control system to be free from defects in material and workmanship, for a period of one (1) year after final acceptance. Guarantee system to:
 - 1. Maintain temperatures within 1°F above and below setting.
 - 2. Humidity devices shall maintain relative humidity conditions within 3% of span 0-100% RH.
- B. Provide one (1) year maintenance service of control components, to start concurrently with the guarantee specified above. Such service shall include software updates and 24 hour, 7 day emergency and seasonal inspection and adjustment of operating controls and replacement of parts or instruments found deficient and defective during this period.
- C. Provide monitoring of the DDC system as soon as the system is operating and then for a minimum of one (1) year (24 hours/day, 7 days/week) after the acceptance date. A monthly report will be sent to the Owner with a description of general system status and any alarms or off-normal conditions.
- D. Guarantee future availability of continuous, 24 hour, 7 day a week service for the systems through available maintenance contracts.

1.8 SYSTEM ADJUSTMENT AND CALIBRATION

- A. When the Work has been completed, completely adjust and calibrate the control system. Review the operation of each system input and output, control loops and/or software routings, timing functions, operator entered constants and facilities management functions and observe that they perform their intended functions. When above procedure has been completed and the control system is operating satisfactorily, submit a letter with one (1) copy of completed values and points log to the Owner's Representative advising them that the control system is 100% complete and operates in accordance with the Contract Documents.
- B. After review and approval of points log by the Engineer, the BMS Contractor shall schedule a technician on site for field review of system components, operation and graphics as part of final system appearance.

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1.9 INSTRUCTIONS TO THE OWNER'S REPRESENTATIVE

- A. Provide competent control technicians to instruct the Owner's operating personnel and turn over three (3) copies of maintenance manual. Provide a total of ten (10) hours of instruction at the site, six (6) hours during start-up and four (4) hours after six (6) months. Instruction sessions shall be scheduled at the Owner's convenience.

PART 2 - PRODUCTS

2.1 CONTROL DEVICES

A. Control Valves:

1. Sized by BMS Contractor/SubContractor and guaranteed to meet the heating and cooling requirements. Water valves shall be sized on the basis of 15% of the total system pressure drop, but not more than 10 ft. of head drop. Steam valves shall be sized for no more than a 5 psig pressure drop, or 30% (max.) of design steam pressure, whichever is smaller. Pressure drop for valves shall be submitted for review, including all CV values.
2. Valves shall be equal percentage type, equipped with characteristic type throttling plug, #316, stainless steel or Monel stem, removable composition discs, and rubber diaphragms. Provide with necessary features to operate in sequence with other valves or damper operators and adjustable throttling range as required by the sequence of operations.
3. Valves in 2 in. and smaller shall be screwed bodies; 2-1/2 in. and larger shall be flanged bodies; designed for 125 psi operating pressure. Arranged to fail-safe as called for; tight closing and quiet operating.
4. Electric Operators:
 - a. Provide 24 VAC control operators which are 0-10 VDC input proportional with spring return as needed by control sequence and designed for water service valve bodies. Operator shall be synchronous motor driven with up to 150 in. lb. force and force sensor safety stop.

B. Temperature Sensors:

1. All temperature devices shall use precision thermistors accurate to $\pm 0.36^{\circ}\text{F}$ over a range of -30 to 230°F .
2. Standard space sensors shall be provided in an off white, or white, enclosure for mounting on a standard electrical box.
3. Provide manual adjustment slider with \pm programmable scale. Programmable scale shall have the capability to be limited via the DDC System.
4. Provide a local LCD display for viewing the space temperature.

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5. Duct temperature sensors shall incorporate a thermistor bead embedded at the tip of a stainless steel tube. Probe style duct sensors shall be used in air handling applications where the air stream temperature is consistent and is not stratified. Averaging sensors shall be employed in all mixing plenum and coil discharge applications and in any other application where the temperature might otherwise be stratified. The averaging sensor tube shall contain at least four thermistor sensors.
 6. Immersion sensors shall be employed for measurement of temperature in all chilled water, hot water and glycol applications. Thermal wells shall be brass or stainless steel for non-corrosive fluids below 250°F and 300 series stainless steel for all other applications.
- C. Humidity Sensors:
1. Humidity sensors shall be polymer resistance type.
 2. Space humidity sensors shall have a sensing range of 05 to 95% with accuracy of +/- 3% RH.
 3. Duct sensors and Outdoor air humidity sensors shall have a sensing range of 05 to 95% RH with accuracy of +/- 3% RH. Sensors shall be suitable for ambient temperature conditions of -40 to 212°F.
- D. Electric Thermostats:
1. Provide a low voltage thermostat for control of single zone heating and air conditioning unit as specified in the sequence of operation. Electric thermostats shall include a display of the current space temperature as well as a mechanism for adjusting the setpoint locally. Aquastats on unit heaters shall stop the fan when the water temperature is below 100°F.
- E. Electric Operators (Damper):
1. Provide 24 VAC control operators which are 0-10 VDC input proportional or two position with spring return as needed by control sequence and designed to operate control dampers. Operator shall be synchronous motor driven with up to 150 in. lb. force sensor safety stop and return as required.
- F. Dampers:
1. Automatic Air Dampers: Furnished as part of "Sheet Metal and Ductwork Accessories Construction" Section 233100.
- G. Damper Actuators
1. Electric Operators:
 - a. Provide 24 VAC control operators which are 0-10 VDC input proportional with spring return as needed by control sequence and

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designed for water service valve bodies. Operator shall be synchronous motor driven with up to 150 in. lb. force and force sensor safety stop.

H. Pressure Sensors:

1. Air pressure or differential air pressure measurements in the range of 0 to 10" water column shall be accurate to $\pm 1\%$ of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Acceptable manufacturer shall be Setra model C-264.
2. Liquid pressure or differential liquid pressure measurements shall be accurate to $\pm 0.25\%$ of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Unit shall be provided with isolation and bypass manifold for start-up and maintenance operations. Acceptable manufacturer shall be Setra model C-230.
3. Steam pressure measurements shall be accurate to $\pm 0.13\%$ of range using a solid-state sensing element. The range of the instrument selected shall be 2 times the operating pressure of the sensed variable. Unit shall be provided with isolation and bypass manifold for start-up and maintenance operations. Acceptable manufacturer shall be Setra model C-207.

I. Current Measurement Devices:

1. Measurement of three-phase power shall be accomplished with a kW/kWh transducer. The instrument shall utilize direct current transformer inputs to calculate the instantaneous value (kW) and a pulsed output proportional to the energy usage (kWh). Provide Veris Model 6000 Power Transducer or approved equal.

J. Duct Mounted Air Flow Stations and Fan Inlet Air Flow Stations:

1. Provide one thermal dispersion airflow/temperature measurement device (ATMD) at each duct location (or at each fan inlet) where indicated on the plans, schedules and/or control schematics.
 - a. Fan inlet measurement devices shall not be used unless specifically indicated on drawings or schedules.
 - 1) Inlet mounted probes shall not materially impact fan performance ($< 2\%$ difference) or increase sound ratings. Physical mounting shall be at the face of the inlet bell and not within the throat of the fan.
 - b. Each ATMD shall consist of one to four sensor probes and a single, remote transmitter. Each sensor probe shall consist of one to eight independent sensor nodes in a gold anodized, aluminum 6063 alloy tube for duct mounting, or adjustable zinc plated steel rods for fan inlet mounting, both using 304 stainless steel mounting brackets.

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- c. Each sensor node shall consist of two hermetically sealed bead-in-glass thermistors. Chip thermistors of any type or packaging are not acceptable.
 - d. The temperature output of the ATMD shall be used in place of the specified temperature measuring device (TMD) when the location of the ATMD and TMD are effectively the same.
 - e. Thermistors shall be potted in an engineering thermoplastic assembly using water-proof, marine epoxy and not be damaged by moisture or direct contact with water.
 - f. Signal processing circuitry on or in the sensor probe is not acceptable.
 - g. Each sensing node shall individually wind tunnel calibrated at 16 points to NIST traceable airflow standards.
 - h. Each sensing node shall be individually calibrated in constant temperature oil baths at 3 points to NIST traceable temperature standards.
 - i. All internal wiring between thermistors and probe connecting cables shall be Kynar jacketed.
 - j. Manufacturer shall provide UL listed, FEP jacketed, plenum rated cable(s) between sensor probes and the remote transmitter.
2. Measurement Performance
- a. Each sensing node shall have a temperature accuracy of $\pm 0.14^{\circ}\text{F}$ (0.08°C) over the entire operating temperature range of -20°F to 160°F (-28.9°C to 71°C).
 - b. Each sensing node shall have an airflow accuracy of $\pm 2\%$ of reading.
 - c. The ATMD shall be capable of measuring airflow rates over the full range of 0 to 5,000 FPM (25.4 m/s) in ducts and 0 to 10,000 FPM (50.8 m/s) in fan inlets between -20°F and 160°F (-28.9°C to 71°C).
3. Integral Transmitter and Communications
- a. The transmitter shall be powered by 24 VAC, be over-voltage and over-current protected, and have a watchdog circuit to provide continuous operation after power failures and/or brown-outs.
 - b. The power requirement for the ATMD shall not exceed 22 V-A.
 - c. The transmitter shall determine the airflow rate and temperature of each sensing node prior to averaging.
 - d. The transmitter shall have two isolated and fused analog output signals and one RS-485 network connection.

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- e. Each analog output shall be field configurable as linear 0-5/1-5 VDC, 0-10/2-10 VDC or 4-20mA signals.
 - f. One analog output signal shall provide the average airflow rate.
 - g. One analog output signal shall be field configurable to output the average temperature, the velocity weighted temperature or a binary airflow alarm.
 - h. The RS-485 network connection shall be field configurable as BACnet MS/TP or Modbus RTU.
 - i. The RS-485 connections shall be capable of transmitting the average airflow rate, average temperature, individual airflow rates of each sensor node, and individual temperatures of each sensor node and system status.
 - j. All integrated circuits shall be industrial rated for operation down to -40°F.(-40°C)
 - k. All electrical plugs, receptacles and circuit board interconnects shall be gold plated.
4. Listings and Certifications
- a. The ATMD shall be UL 973 listed.
 - b. The ATMD shall be BTL listed.
 - c. The duct and plenum mounted ATMD shall carry CE Mark for European shipments indicating successful satisfaction of all requirements contained in the EMC Directives or when otherwise required in the destination country.
5. The manufacturer's authorized representative shall review and approve placement and operating airflow rates for each measurement location indicated on the plans, prior to fabrication and installation.
6. Design Equipment: Ebtron Gold Series - C Density.
7. Make: Ebtron or approved equal.
- K. Safety/Status Devices:
- 1. Low Limit Detector: Electric type, with 20 ft. long serpentine element, with manual reset and auxiliary contacts to the DDC, set for 37°F for "freeze" protection and 55°F for fan discharge application. Provide a 20 ft. long element for every 25 sq. ft. of coil face area.
 - 2. High Limit Detector: High limit thermostats shall be located as directed, and shall be manual reset type set at 120°F in the return and 180°F in the discharge. Thermostats shall be double pole so as to provide input capability for alarm at the temperature control system.

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3. Fan status shall be provided through adjustable range current sensing element on the fan motor.

L. Miscellaneous Devices:

1. Provide necessary, relays, transformers, required for a complete and operable system.

2.2 CONTROL CABINETS

- A. BMS control panels shall be fully enclosed cabinet, baked enamel, steel, aluminum or composite material construction and shall meet the requirements of NEMA 1 enclosures. Panels shall have hinged door with a locking latch. Cover exposed electrical connections. Each component on front panel shall have an appropriate engraved label describing its function. Components inside the panel shall be appropriately labeled for ease of identification. Stick-on labels are not acceptable. Panels shall be either free-standing or wall-mounted. Provide support steel framing.

2.3 BUILDING MANAGEMENT SYSTEM

- A. The BMS system shall consist of Network Controllers, standalone or application specific controllers, input/output unit modules, operator workstations, and file servers to support system configurations. The BMS system shall provide control, alarm detection, scheduling, reporting and information management for the entire facility.
- B. The BMS shall be capable of being segmented, through software, into multiple local area networks per floor of building, distributed over a wide area network or sharing a single file server. This enables workstations to manage wide area network, and/or the entire system with all devices being updated and sharing the most current database. In the case of a single workstation system, the workstation shall contain the entire database - with no need for a separate file server.
- C. For multi-workstation systems, a file server shall be utilized capable of residing directly on the Owner's Ethernet TCP/IP preferred network with no required gateways. This network may be dedicated for temperature control systems only so it does not interfere with other networks.
- D. In addition to the above local area network and wide area network, the workstation software shall be capable of managing remote systems via remote high speed network as a standard component of the software.
- E. The BMS system shall be scalable and expandable at all levels of the system using the same software interface and controllers.
 1. The system shall use the same application programming language for all equipment: Operator Workstation, Network Controllers, Remote Site Controllers and Standalone, or application specific, Digital Controllers.

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- F. The BMS system design shall include solutions for the integration of the following "open systems" protocols: BACnet, LonTalk and digital data communication to third party microprocessors such as chiller controllers, fire panels and variable frequency drives (VFD's).
 - 1. The system shall also provide the ability to program custom ASCII communication drivers, which shall reside in the network control unit, for communication to third party systems and devices. These drivers shall provide real time monitoring and control of the third party systems.

2.4 NETWORK CONTROLLERS

- A. Network Controllers shall be microprocessor based, multi-tasking, multi-user, and employ a real time operating system. Each Network Controller panel shall consist of modular hardware including power supply, CPU board, and input/output modules. A sufficient number of Network Controllers shall be supplied to fully meet the requirements of this specification and the point list on the drawings.
- B. All Network Controllers on the Ethernet TCP/IP LAN/WAN shall be capable, out-of-the box, to be set up as a Web Server. The Network Controllers shall have the ability to store HTML code and "serve" pages to a web browser. This provides the ability for any computing device utilizing a TCP/IP Ethernet connection and capable of running a standard Internet browser (Microsoft Internet Explorer, Netscape Navigator, etc.) to access real-time data from the entire Temperature Control System via any Network Controllers.
 - 1. Graphics and text-based web pages shall be constructed using standard HTML code. The interface shall allow the user to choose any of the standard text or graphics-based HTML editors for page creation. It shall also allow the operator to generate custom graphical pages and forms.
 - 2. The WEB server interface shall be capable of password security, including validation of the requesting PC's IP address. The WEB server interface shall allow the sharing of data or information between any controller or process or network interface (BACnet, LonTalk and TCP/IP) that the Temperature Control System has knowledge of, regardless of where the point is connected on the Temperature Control System network or where it is acquired from.
 - 3. The network controller shall act directly as the WEB server. It shall directly generate HTML code to the requesting user (i.e. WEB browser), eliminating the need for and reliance on any PC-based WEB server hardware or software. To simplify graphic image space allocation, HTML graphic images, if desired, shall be stored in any shared network device. The Web server shall have the ability to acquire any necessary graphics using standard pathing syntax within the HTML code mounted within the Temperature Control System WEB server. External WEB server hardware and software are not acceptable.
- C. Hardware Specifications:
 - 1. A minimum of 4MB of RAM shall be provided for Network Controllers with expansion up to 8MB.

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2. Each Network Controller shall provide communication to both the Workstation(s) and the field buses. In addition, each Network Controller shall have at least three other communications ports that support a telephone modem, portable service tool, serial printer and connection to third party controllers such as a chiller control panel. On a LAN/WAN system, the Network Controller shall be provided with a 10Mbps plug-in Ethernet TCP/IP network interface card (NIC).
3. Input/Output (I/O): Each Network Controller shall support the addition of the following types of inputs and outputs:
 - a. Digital Inputs for status/alarm contacts.
 - b. Counter Inputs for summing pulses from meters.
 - c. Thermistor inputs for measuring temperatures in space, ducts and thermowells.
 - d. Analog inputs for pressure, humidity, flow and position measurements.
 - e. Digital Outputs for on/off equipment control.
 - f. Analog Outputs for valve and damper position control, and capacity control of primary equipment.
4. The system shall employ a modular I/O design to allow easy expansion. Input and output capacity is to be provided through plug-in modules of various types or DIN-mountable IOU modules. It shall be possible to combine I/O modules as desired to meet the I/O requirements for individual control applications.
5. Each Network Controller shall include a battery-backed, real time clock, accurate to 10 seconds per day. The Real Time Clock shall provide the following: time of day, day, month, year, and day of week. In normal operation, the system clock shall be based on the frequency of the AC power. The system shall automatically correct for daylight savings time and leap years.
6. The power supply for the Network Controllers shall be auto sensing, 120-220VAC, 60/50 Hz power, with a tolerance of $\pm 20\%$. The controller shall contain over voltage surge protection, and require no additional AC power signal conditioning. Optionally, if indicated on the drawings, the power supply shall accept an input voltage of (-48 VDC).
7. Upon restoration of power after an outage, the Network Controller shall automatically and without human intervention: Update all monitored functions; resume operation based on current, synchronized time and status, and implement special start-up strategies as required.
8. Each Network Controller with the standard 120-220VAC power supply shall include a programmable DC power backup system rated for a minimum of 72 hours of battery backup to maintain all volatile memory or, a minimum of 2 hours of full UPS including modem power. This power backup system shall be

configurable such that at the end of a settable timeframe of running on full UPS, the unit shall shut off full UPS and switch to memory retention-only mode for the remainder of the battery power. The system shall allow the simple addition of more batteries to extend the above minimum battery backup times.

D. Software:

1. The Network Controller shall contain flash ROM as the resident operating system. Application software shall be RAM resident. Application software shall only be limited by the amount of RAM memory. There shall be no restrictions placed on the type of application programs in the system. Each Network Controller shall be capable of parallel processing, executing all control programs simultaneously. Any program may affect the operation of any other program. Each program shall have the full access of all I/O facilities of the processor. This execution of control function shall not be interrupted due to normal user communications including interrogation, program entry, printout of the program for storage.
2. The application software shall be user programmable. This includes all strategies, sequences of operation, control algorithms, parameters, and setpoints. The source program shall be English language-based and programmable by the user. The language shall be structured to allow for the easy configuration of control programs, schedules, alarms, reports, telecommunications, local displays, mathematical calculations, passwords, and histories. The language shall be self-documenting. Users shall be able to place comments anywhere in the body of a program. Program listings shall be configurable by the user in logical groupings.

E. Control Software:

1. The Network Controller shall have the ability to perform the following pre-tested control algorithms:
 - a. Proportional, Integral plus Derivative Control (PID).
 - b. Two Position Control.
 - c. Digital Filter.
 - d. Ratio Calculator.
 - e. Equipment Cycling Protection.
2. Mathematical Functions: Each controller shall be capable of performing basic mathematical functions (+, -, *, /), squares, square roots, exponential, logarithms, Boolean logic statements, or combinations of both. The controllers shall be capable of performing complex logical statements including operators such as >, <, =, and, or, exclusive or, etc. These shall be able to be used in the same equations with the mathematical operators and nested up to five parentheses deep.

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3. Energy Management Applications: Network Controllers shall have the ability to perform any or all of the following energy management routines:
 - a. Time of Day Scheduling
 - b. Calendar Based Scheduling
 - c. Holiday Scheduling
 - d. Temporary Schedule Overrides
 - e. Optimal Start
 - f. Optimal Stop
 - g. Night Setback Control
 - h. Enthalpy Switchover (Economizer)
 - i. Peak Demand Limiting
 - j. Temperature Compensated Duty Cycling
 - k. CFM Tracking
 - l. Heating/Cooling Interlock
 - m. Hot/Cold Deck Reset
 - n. Static Pressure Reset/Optimizing
 - o. Supply Air Temperature Reset
4. Each controller shall be capable of logging any system variable over user defined time intervals ranging from 1 second to 1440 minutes. Any system variables (inputs, outputs, math calculations, flags, etc.) can be logged in history. A maximum of 25,000 values can be stored in each log. Each log can record either the instantaneous, average, minimum or maximum value of the point. Logs can be automatic or manual. Logged data shall be downloadable to the Operator Workstation for long term archiving based upon user-defined time intervals, or manual command.
5. Alarm Management: For each system point, alarms can be created based on high/low limits or conditional expressions. All alarms shall be tested each scan of the Network Controller and can result in the display of one or more alarm messages or reports.
 - a. Up to 8 alarms can be configured for each point in the controller.
 - b. Messages and reports can be sent to a local terminal, to the front-end workstation(s), or via modem to a remote-computing device.
 - c. Alarms shall be generated based on their priority. A minimum of 255 priority levels shall be provided.
 - d. If communication with the Operator Workstation is temporarily interrupted, the alarm shall be buffered in the Network Controller. When communications return, the alarm shall be transmitted to the Operator Workstation if the point is still in the alarm condition.
6. The Network Controller shall be able to generate user-definable reports to a locally connected printer or terminal. The reports shall contain any combination of text and system variables. Report templates shall be able to be created by users in a word processing environment. Reports can be displayed based on any logical condition or through a user command.

2.5 WORKSTATION SOFTWARE

A. General Description:

1. The software architecture shall be object-oriented in design, a true 32-bit application suite utilizing Microsoft's OLE, COM, DCOM and ODBC technologies. These technologies shall make it easy to fully utilize the power of the operating system to share, among applications (and therefore to the users of those applications), the data available from the Temperature Control System.
 - a. The workstation functions shall include monitoring and programming of all BMS controllers. Monitoring consists of alarming, reporting, graphic displays, long term data storage, automatic data collection, and operator-initiated control actions such as schedule and setpoint adjustments.
 - b. Programming of controllers shall be capable of being done either off-line or on-line from any operator workstation. All information shall be available in graphic or text displays. Graphic displays shall feature animation effects to enhance the presentation of the data, to alert operators of problems, and to facilitate location of information throughout the BMS system. All operator functions shall be selectable through a mouse.
2. The file server database engine shall be Microsoft SQL Server, or another ODBC-compliant, relational database program. This ODBC (Open Database Connectivity) compliant database engine shall allow for an Owner to utilize "their" choice of database and due to its "open" architecture, shall allow an Owner to write custom applications and/or reports that communicate directly with the database avoiding data transfer routines to update other applications. The system database shall contain all point configurations and programs in each of the controllers that have been assigned to the network. In addition, the database shall contain all workstation files including color graphic, alarm reports, text reports, historical data logs, schedules, and polling records.
3. The BMS workstation software shall allow the creation of a custom, browser-style interface linked to the user that has logged into the workstation software. This interface shall support the creation of "hot-spots" that the user may link to view/edit any object in the system or run any object editor or configuration tool contained in the software. Furthermore, this interface shall be able to be configured to become a user's "PC Desktop" - with all the links that a user needs to run other applications. This, along with the Microsoft Office Professional 2010 user security capabilities, shall enable a system administrator to setup workstation accounts that not only limit the capabilities of the user within the BMS software but may also limit what a user can do on the PC and/or LAN/WAN. This might be used to ensure, for example, that the user of an alarm monitoring workstation is unable to shutdown the active alarm viewer and/or unable to load software onto the PC.

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4. The software shall be designed so that each user of the software can have a unique username and password. This username/password combination shall be linked to a set of capabilities within the software, set by and editable only by, a system administrator. The sets of capabilities shall range from View only, Acknowledge alarms, Enable/disable and change values, Program, and Administer. The system shall allow the above capabilities to be applied independently to each and every class of object in the system. The system shall allow a minimum of 256 users to be configured per workstation. There shall be an inactivity timer adjustable in software that automatically logs off the current operator after the timer has expired.
5. The workstation software shall use a familiar Windows Explorer style interface for an operator or programmer to view and/or edit any object (controller, point, alarm, report, schedule, etc.) in the entire system. In addition, this interface shall present a "network map" of all controllers and their associated points, programs, graphics, alarms, and reports in an easy to understand structure. All object names shall be alphanumeric and use Windows long filename conventions. Object names shall not be required to be unique throughout the system allowing for point naming convention consistency. For example, each Air Temperature Unit Controller can have an input called Space Temperature and a setpoint called CFM Setpoint.
 - a. The configuration interface shall also include support for template objects. These template objects shall be used as building blocks for the creation of the BMS database. The types of template objects supported shall include all data point types (input, output, string variables, setpoints, etc.), alarm algorithms, alarm notification objects, reports, graphics displays, schedules, and programs. Groups of template object types shall be able to be set up as template subsystems and systems. The template system shall prompt for data entry if necessary. The template system shall maintain a link to all "child" objects created by each template. If a user wishes to make a change to a template object, the software shall ask the user if he/she wants to update all of child objects with the change. This template system shall facilitate configuration and programming consistency and afford the user a fast and simple method to make global changes to the BMS.
6. Color Graphic Displays: The system shall allow for the creation of user defined, color graphic displays for the viewing of mechanical and electrical systems, or building schematics. These graphics shall contain point information from the database including any attributes associated with the point (engineering units, etc.). In addition, operators shall be able to command equipment or change setpoints from a graphic using the mouse. Requirements of the color graphic subsystem include:
 - a. LCD active matrix, resolution 1366 x 768 displays. The user shall have the ability to import AutoCAD generated picture files as background displays.

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- b. A built-in library of animated objects such as dampers, fans, pumps, buttons, knobs, gauges, and graphs which can be "dropped" on a graphic using a software configuration "wizard". These objects shall enable operators to interact with the graphic displays in a manner that mimics their mechanical equivalents found on field installed control panels. Using the mouse, operators shall be able to adjust setpoints, start or stop equipment, modify PID loop parameters, or change schedules.
 - c. Status changes or alarm conditions shall be able to be highlighted by objects changing screen location, size, color, text, blinking or changing from one display to another.
 - d. Graphic panel objects shall be able to be configured with multiple "tabbed" pages allowing an operator to quickly view individual graphics of equipment, which make up a subsystem or system.
 - e. Ability to link graphic displays through user defined objects, alarm testing, or the result of a mathematical expression. Operators shall be able to change from one graphic to another by selecting an object with a mouse - no menus will be required.
7. The software shall allow for the automatic collection of data and reports from any controller through either a hardwire or modem communication link. The frequency of data collection shall be completely user-configurable.
8. The software shall be capable of accepting alarms directly from controllers, or generating alarms based on evaluation of data in controllers and comparing to limits or conditional equations configured through the software. Any alarm (regardless of its origination) shall be integrated into the overall alarm management system and shall appear in all standard alarm reports, be available for operator acknowledgment, and have the option for displaying graphics, or reports. Alarm management features shall include:
- a. A minimum of 255 alarm notification levels, or classes of alarms. Each notification level shall establish a unique set of parameters for controlling alarm display, acknowledgment, keyboard annunciation, alarm printout and record keeping.
 - b. Automatic logging in the database of the alarm message, point name, point value, connected controller, timestamp, username and time of acknowledgement, username and time of alarm silence (soft acknowledgement).
 - c. Automatic printing of the alarm information or alarm report to an alarm printer or report printer.
 - d. Playing an audible beep or audio (wav) file on alarm initiation or return to normal.

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- e. Sending an email or alphanumeric page to anyone listed in a workstation's email account address list on either the initial occurrence of an alarm and/or if the alarm is repeated because an operator has not acknowledged the alarm within a user-configurable timeframe. The ability to utilize email and alphanumeric paging of alarms shall be a standard feature of the software integrated with the operating system's mail application interface (MAPI). No special software interfaces shall be required.
 - f. Individual alarms shall be able to be re-routed to a workstation or workstations at user-specified times and dates. For example, a critical high temperature alarm can be configured to be routed to a Facilities Dept. workstation during normal working hours (7am-6pm, Mon-Fri) and to a Central Alarming workstation at all other times.
 - g. An active alarm viewer shall be included which can be customized for each user or user type to hide or display any alarm attributes.
 - h. The font type and color, and background color for each alarm notification level as seen in the active alarm viewer shall be customizable to allow easy identification of certain alarm types or alarm states.
 - i. The active alarm viewer can be configured such that an operator shall type in text in an alarm entry and/or pick from a drop-down list of user actions for certain alarms. This ensures accountability (audit trail) for the response to critical alarms.
9. The software shall contain a built-in custom report generator, featuring word processing tools for the creation of custom reports. These custom reports shall be able to be set up to automatically run or be generated on demand. Each workstation shall be able to associate reports with any word processing or spreadsheet program loaded on the machine. When the report is displayed, it shall automatically spawn the associated report editor such as MS Word, WordPerfect, NotePad, or Lotus 123.
- a. Reports can be of any length and contain any point attributes from any controller on the network.
 - b. The report generator shall have access to the user programming language in order to perform mathematical calculations inside the body of the report, control the display output of the report, or prompt the user for additional information needed by the report.
 - c. It shall be possible to run other executable programs whenever a report is initiated.
 - d. Report Generator activity can be tied to the alarm management system, so that any of the configured reports can be displayed in response to an alarm condition.

- e. Standard reports shall include:
 - 1) Points in each controller
 - 2) Points in alarm
 - 3) Disabled points
 - 4) Overridden points
 - 5) Operator activity report
 - 6) Alarm history log
 - 7) Program listing by controller with status
 - 8) Network status of each controller

- 10. Spreadsheet-Style Reports: The software shall allow the simple configuration of row/column (spreadsheet-style) reports on any class of object in the system. These reports shall be user-configurable and shall be able to extract live (controller) data and/or data from the database. The user shall be able to set up each report to display in any text font, color and background color. In addition, the report shall be able to be configured to filter data, sort data, and highlight data that meets user-defined criteria.

- 11. HTML Reporting: The above spreadsheet-style reports shall be able to be run to an HTML template file. This feature shall create an HTML "results" file in the directory of the HTML template. This directory can be shared with other computer users, which shall allow those users with access to the directory to "point" their web browser at the file and view the report.

- 12. Scheduling: It shall be possible to configure and download from the workstation schedules for any of the controllers on the network.
 - a. Time of day schedules shall be in a calendar style and shall be programmable for a minimum of one year in advance. Each standard day of the week and user-defined day types shall be able to be associated with a color so that when the schedule is viewed it is very easy, at-a-glance, to determine the schedule for a particular day even from the yearly view. To change the schedule for a particular day, a user shall simply click on the day and then click on the day type.

 - b. Each schedule shall appear on the screen viewable as the entire year, monthly, week and day. A simple mouse click shall allow switching between views. It shall also be possible to scroll from one month to the next and view or alter any of the schedule times.

 - c. Schedules shall be assigned to specific controllers and stored in their local RAM memory. Any changes made at the workstation shall be automatically updated to the corresponding schedule in the controller.

- 13. The programmer's environment shall include access to a superset of the same programming language supported in the controllers. In this environment, the programmer shall be able to configure application software off-line (if desired) for custom program development, write global control programs, system reports, wide area networking data collection routines, and custom alarm management software. On the same screen as the program editor, the programming

environment shall include dockable debug and watch bars for program debugging and viewing updated values and point attributes during programming. In addition, a wizard tool shall be available for loading programs from a library file in the program editor.

14. The workstation software shall have an application to save and restore field controller memory files. This application shall not be limited to saving and reloading an entire controller - it shall also be able to save/reload individual objects in the controller. This allows off-line debugging of control programs, for example, and then reloading of just the modified information.
15. The workstation software shall have the capability to easily configure groups of data points with trend logs and display the trend log data. A group of data points shall be created by drag-and-drop method of the points into a folder. The trend log data shall be displayed through a simply menu selection. This data shall be able to be saved to file and/or printed.
16. The workstation software shall automatically log and timestamp every operation that a user performs at a workstation, from logging on and off a workstation to changing a point value, modifying a program, enabling/disabling an object, viewing a graphic display, running a report, modifying a schedule, etc.
17. Fault Tolerant File Server Operation: The system shall provide the option to provide fault tolerant operation in the event of the loss of the CPU, disk drives, or other hardware required to maintain the operational integrity of the system. Operational integrity includes all user interfaces, monitoring of alarm points and access points, and executing access control functions. Fault tolerant technology is not provided unless specifically stated.
 - a. The switchover mechanism provided shall be automatic. Should the failure be caused by hardware, then the system shall immediately switch to the Backup computer. Should the system failure be caused by software (instruction or data), the system shall not pass the faulted code to the Backup computer, otherwise the Backup shall fail in the same manner of the Primary computer.
 - b. Switchover to the Backup computer shall be initiated and effective (complete) in a manner and time frame that precludes the loss of event data, and shall be transparent to the system users, except for an advisory alarm message indicating that the switchover has occurred.
 - c. When the system fails-over from the Primary to the Backup computer, no alarm or other event shall be lost, and the Backup computer shall take control of all system functions.
 - d. A single component failure in the system shall not cause the entire system to fail. All system users shall be informed of any detectable component failure via an alarm event. System users shall not be logged off as a result of a system failure or switchover.

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- e. The Primary computer shall provide continual indication that the Backup computer is unavailable until such time that the fault has been purged.

2.6 WEB BROWSER INTERFACE

- A. Provide a web browser interface that will be accessible to any computer on the Owner's Intranet with Microsoft Internet Explorer 8.0 or higher. The system shall support a minimum of 5 simultaneous users to access the system. The Web Browser Interface shall include the following features.
 - 1. Day-to-day operation of the system shall be accessible through a standard web browser interface, allowing technicians and operators to view any site in the system from anywhere on the network.
 - 2. The browser-based interface must share the same graphical displays as the Operator Workstations, presenting dynamic data on site layouts, floor plans, and equipment graphics. The browser's graphics shall also support commands to change setpoints, enable/disable equipment and start/stop equipment.
 - 3. Through the browser interface, operators must be able to navigate through the entire system, and change the value or status of any point in any controller. Changes are effective immediately to the controller, with a copy stored in the system database.
 - 4. Through the browser interface, operators must be able to view pre-defined groups of points, with their values updated automatically.
 - 5. Through the browser interface, operators must be able to change schedules - change start and stop times, and add new times to a schedule.
 - 6. Through the browser interface, operators must be able to create and edit card access personnel records, and assign the card to any and all sites for access, in any combination.
 - 7. Through the browser interface, operators must be able to view reports of access events and access privileges. Reports must be available based on start and end time, door, area, and person. Invalid attempts must be color-coded red in the report.
 - 8. Through the browser interface, operators must be able to view live and recorded video from any digital video recorder on the network. The interface must offer an easy method of selecting the camera to view, and for recorded video, must offer selections for start and stop time when searching video clips.
 - 9. All commands and user activity through the browser interface shall be recorded in the system's activity log, which can be later searched and retrieved by user, date, or both.
 - 10. The same user accounts shall be used for the browser interface and for the operator workstations. Operators must not be forced to memorize multiple passwords.

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11. The system shall be expandable to up to 25 concurrent browser-based users per server.

2.7 SURGE SUPPRESSION (SP) RECEPTACLE

- A. Provide at each DDC panel and operator workstation locations, a surge suppression receptacle with metal oxide varistor to dissipate the electrical energy of voltage spikes. 20 ampere, duplex, NEMA 5-20R configuration. Back and side wiring, high impact nylon body.
- B. Acceptable Make: Hubbell 5352-S.

2.8 GRAPHICS

- A. System Graphic:
 1. The equipment drawing will be three-dimensional. The values on the screen shall be reported in real time as well as dynamic to be updated as the value changes.
 2. All components of the drawing will show their actual field location and position. Sensors will be in the exact location in reference to piping and air stream. Icons or "library" images imported during the construction of the drawing will be accurate in depiction of the device and any interaction with other components of the drawing, i.e. don't draw piping into the motor of a pump icon.
 3. If there are size limitations or clutter from the number of components a link to a sub graphic having the same layout will be used to clarify.
- B. Space Graphic:
 1. Floor plan drawings will be linked to the supplying air handling unit or in some cases to the exhaust fan. Electronic floor plans to be provided by Architect/Engineer.
 2. Floor plans showing areas served by more than one air handling unit will have the areas color-coded by air handling unit. If the air-handling unit serves different floors the color will be consistent for an air-handling unit for all floors.
 3. If an area has control other than DDC it will be noted with text and left white in the background.
 4. A temperature zone serving more than one space shall have a unique pattern, to distinguish that zone from other temperature zones. The patterns should slight enough as to not obscure the space temperature, room number and borders detail but visible enough to be able to distinguish between different zones. A different "peppering" of symbols (of + ^ * ≈) or patterns (hex, herringbone, verticals, etc.) will be used to define the zones.
 5. Temperature zones dedicated to only one space will not have to be detailed.

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6. Remote physical points such as differential monitors and the like shall be shown in their installed location.
- C. The second level of graphics shall be all the DDC points to be installed under the contract overlaid on building floor plan and the Air Handling Unit and its associated systems. Electronic floor plans to be provided by Architect/Engineer.
- D. Description of Operation:
1. The approved description of operation will appear on a text graphic in 12-point text written in paragraph form.
 2. Additional notes may appear on the equipment graphic in an appropriate location.
- E. Layout:
1. The subject device of equipment graphic will be centrally located on the drawing.
 2. At the top center, the name of the equipment device will be displayed with its room number. Immediately below the PM# will be displayed. On a third line will be the capacity of the device in units common to that device i.e. air handling units in CFM, pumps in GPM.
 3. The top right hand corner will contain links to associated graphics. The Description of Operation, submittal graphic, space graphic and graphic index page will be typical. Other links may be required. All graphic pages will have backward link to return to the main System Graphic.
 4. The top left-hand corner will contain global data. Outside Air would be the most common other values may be required when related to the device operation. If the global data functions within the program of this unit, the point referenced in the program will be displayed.
 5. The lower left-hand corner will display the operational modes of the device. Occupied, warm up, winterized and economizer would be common. Other modes will be displayed if the unit uses them.
 6. In the upper right-hand area, just below the links, the setpoints of the device will be displayed. All setpoints in the various control loops of the device, DA temp, static pressure, MA will be placed in columns as the drawing permits.
 7. The date of the last revision of the graphic will be displayed in the lower right corner.
- F. Text:
1. Text will contrast with the background for easy reading.
 2. The text will be free floating without borders or boxes unless specifically required.

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- G. The graphics shall include approved schematic of the equipment, sequence of operation and all wiring interface diagrams.
- H. The graphic shall include all new and existing systems, equipment and spaces.

PART 3 - EXECUTION

3.1 GENERAL SYSTEM REQUIREMENTS

- A. The control of each system shall be guaranteed to perform as described in the Sequence of Operation on the drawings. Equipment, remote switches, in finished rooms shall be flush-mounted, if possible. Interlock supply and return fans, humidifiers with fans, condensers or cooling towers with air conditioning equipment and similar situations demanding coordinated operation.
- B. All existing DDC controllers and sensors removed from the project shall be turned over the Owner in good condition.
- C. This contract shall be responsible for decommissioning of the temperature control systems being removed and modifications to existing system graphics and software programming.

3.2 SYSTEM COMPONENTS

- A. Valves: Union or flanged connected. Locate close to apparatus controlled with pipe reducers and increasers located closest to valve. Locate, arrange, and pipe per installation diagram.
- B. Mounting height for all room thermostats or sensors shall be 48 in. to the top of the cover.
- C. Locate thermostats on walls symmetrical with adjacent items. Verify exact room location to avoid doors, fixed and portable equipment. Install to minimize damage. Do not install adjacent to lighting dimmers or other heat generating equipment.
- D. Dampers and Damper Operators: Tag dampers for proper location. Install per manufacturer's printed instruction as to motor size and quantity, linkage arrangement, drive connection point. Adjust to close tightly. Allow for conduit sleeve or blank space for roof fan dampers. Where ducts are insulated, set damper operators at least 2 in. away from side of duct to allow for insulation.

3.3 SMOKE DAMPERS AND FIRE/FAN SHUT DOWN

- A. Division 26 "Electric" to provide a signal to stop air handling unit fans and close air handling unit smoke dampers upon activation of the fire alarm system. Wiring to be directly to the motor starter. An end switch shall prevent the operation of the air handling unit fans until its corresponding smoke dampers are open.
- B. Division 26 "Electric" shall also provide a signal to the DDC control system that the fire alarm system is activated.

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3.4 SYSTEM TESTING AND COMMISSIONING

- A. At the time of installation, systems shall be tested for control device operation prior to the systems acceptance. A report of each systems performance shall be submitted to the Owner's Representative. The report shall include:
 - 1. Field verification and demonstration checklist of analog input calibration, analog output operation, digital input function, and digital output operation.
 - 2. Trend log of inputs and output, printed every two hours, for one (1) week.
 - 3. Refer to "Instructions and Adjustments".

3.5 EXISTING CONTROL DEVICES

- A. The bid for the control work shall be based on the premise that exiting control devices are operational and are not in need of repair and replacement, unless otherwise noted.
- B. This contractor shall notify the Owner's Representative of existing control devices that need to be replaced or repaired that may be noticed in the process of installation of new work.

3.6 SYSTEM DESCRIPTION - GENERAL

- A. All systems shall maintain the scheduled or otherwise noted minimum outside air ventilation rate (based on 15 cfm or 20 cfm per person) during occupied hours.
- B. Provide normally open hot water and normally closed cooling coil valves.
- C. Provide normally open return air damper, normally closed relief air and normally closed outside air dampers and operators.
- D. Mode of operation (occupied/unoccupied) including building warm-up and pull-down cycles, as well as all system functions shall be programmable and controlled by the BMS system.
- E. Shutdown of air handling units and fans due to a fire alarm shall be by the Electrical Contractor. The fire alarm system will send a signal to the BMS system for monitoring purposes only. The BMS system will provide a staggered restart of the units once the alarm is cleared.
- F. All setpoints shall be adjustable.
- G. Two (2) outside air temperature sensors and two (2) outside air humidity sensors are to be provided as general inputs to the BMS system. The pair of readings shall be averaged for use by the system. If an individual reading is found to be out of range by comparison, then the other reading shall be used, and an alarm shall be generated.

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3.7 CONTROL SEQUENCE

- A. Refer to Drawings M-801 and M-802.

END OF SECTION

Proposal

Attn: Mechanical Contractors

Date:	4/14/2016
Proposal #:	510-01142016
Limiting Date:	30 Days

Project: **SUNY Purchase Music Bldg.**

Location: Music Building

Proposal: Siemens Industry, Inc. is pleased to provide the following—

The detail scope of work with clarifications and/or exclusions for this project is attached for your review and approval. Our terms and conditions are also attached for your review.

Net Price: **\$232,658.54**

Remarks: Plus applicable Taxes see attached price breakdown

- TAX
- This is a taxable project - Tax will be added to the invoice
 - This is a capital improvement project - Certificate to be provided by the purchaser or tax will be added to the invoices
 - This is a tax exempt project – Certificate to be provided by the purchaser or tax will be added to the invoices

Proposal Accepted:
Siemens Industry, Inc. is authorized to proceed with the work as proposed.

Proposal Submitted:
Siemens Industry, Inc.,

Purchaser _____

By _____

Title _____

Date _____

Signature _____

Seller Siemens Industry, Inc.

By Bruce A.Sumner

Title Account Executive

Date 4-14-2016

Signature _____

Siemens Industry, Inc.
8 Fernwood Road
Florham Park NY 07932

Tel: (973) 396-4267 Fax: (973) 575-7968
Email: bruce.sumner@siemens.com
Mobile: (973) 703-8009

I. Scope of Work:

The job consists of the following:

- There are two existing AHU located in the MER. These units are currently being controlled by Siemens via two existing MBC controllers. Both controllers are quite full. Most of the end devices are being controlled via pneumatic end devices. All pneumatic end devices are to be removed (by others) and replaced by Siemens with electronic devices (valves installed by others). Siemens may elect to upgrade both of these controllers under this agreement. The control points and devices on AHU's will be as seen on drawing M-801 5/27/11
- There are (4) pumps that will be controlled via P-1 interface to new VFDs (drives provided and installed by others)
- The (5) new humidifiers (Provided and installed by others) will be monitored and controlled by new TEC controllers and place on the new floor level network and tied into the respective controllers
- There are a total of (6) Multi zones each with multiple dampers. Siemens will control each zone and zone temperature as per drawing M-802.
- Add one (1) duct temperature sensor and one (1) humidity sensor for each of the five (5) zones being worked on (total of 10 devices hard wired)

Siemens Industry, Inc.

9/27/2011

SUNY Purchase Music Building AHU-1&2 OGS Pricing for Siemens material

PART #	DESCRIPTION	QTY	ogs Unit Price	Total
GCA166.1U	MOD(V) SR,24V,MED	48	\$208.99	\$10,031.52
QFM2100	SENSOR (DUCT) RH: 0-10VDC	11	\$112.74	\$1,240.14
134-1504	LOW TEMP DETECTOR, FREEZE	2	\$114.71	\$229.42
269-062	SENSING TUBE	8	\$11.08	\$88.64
533-380-24	D/AV TEMP SENSOR 20/120F	6	\$82.33	\$493.98
PXC100-PE96.A	PXC MOD, P2 TX-I/O, 96 NODE, APOGEE	2	\$2,561.60	\$5,123.20
PXX-485.3	PXC MOD EXPANSION MODULE, 3 RS-485	2	\$322.96	\$645.92
PXA-SB115V192VA	SERVICE BOX 115V, 24 VAC, 192 VA	2	\$452.40	\$904.80
TXM1.16D	16 DIGITAL INPUT MODULE	4	\$398.18	\$1,592.72
TXM1.8X-ML	8 UNIV I/O MODULE W/4-20MA W/OVD&LCD	6	\$660.19	\$3,961.14
TXM1.6R-M	6 RELAY OUTPUT MODULE W/OVR	4	\$398.18	\$1,592.72
TXS1.12FA	24VDC SUPPLY 1200MA, 4 A FUSE	2	\$224.00	\$448.00
TXS1.EF4	BUS CONNECTION 10A FUSE	2	\$61.20	\$122.40
TXA1.K24	ADDRESS KEYS	4	\$14.80	\$59.20
OUTSIDE PURCHASE	Air flow measuring station	4	\$2,178.00	\$8,712.00
PXA-ENC19	19 enclosures	3	\$267.02	\$801.06
Txb1.P1	Bus interface module	3	\$299.48	\$898.44
RIBU1C	Relay in a box	20	\$85.00	\$1,700.00
QAC2030 U	OA sensor temp	2	\$22.28	\$44.56
TXM1.8X	AO/AI Module Plain	14	\$431.07	\$6,034.98
590-280	Setra static pressure trans	4	\$178.05	\$712.20
H906	Current Sensor	6	\$75.00	\$450.00
QAA22SS.FWSN	Temp Room Sensor/ with setpoint	17	\$26.73	\$454.41
QFA32SS.FWSN	Humidity room Sensor with setpoint	7	\$83.16	\$582.12

544-343-48	48 " Rigid AV	2	\$63.71	\$127.42
544-343-36	36" Rigid AV	15	\$63.71	\$955.65
291-06175	2,5" 3-way Mixing Vlv	3	\$1,597.31	\$4,791.93
274-03079	1.5" nc 2-way Vlv	2	\$775.92	\$1,551.84
274-03080	2" nc 2-way Vlv	1	\$887.91	\$887.91
291-06120	2.5" no 2-way Vlv	3	\$1,447.90	\$4,343.70
TOTAL PARTS				\$59,582.02

Labor Breakout	Hours	OGS rate	TOTAL
Engineering	160	\$162.69	\$ 26,030.04
Project management	88	162.69	\$ 14,316.72
Specialist	200	133.68	\$ 27,736.00
mechanic	48	156.12	<u>\$ 7,493.76</u>
			\$75,576.52

SUB Contractor mark up 20%

Sub	\$78,000	\$97,500.00
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Total pricing breakdown:

Labor	\$75,576.52
Material	\$59,582.02
Subcontractor	<u>\$97,500.00</u>
Total	\$232,658.54
Tax if applicable 7.375 %	<u>\$17,158.57</u>
<u>Total with tax if applicable</u>	\$249,817.10

SUNY Exhibit A terms and conditions apply.

II. Specifically Included by Siemens:

1. All plenum rates wire for communication to upstairs
2. Extension and connection to the existing Siemens Building Management System.
3. Engineering, shop drawings and riser diagram update
4. Project management and supervision
5. One-year warranty all parts
6. Programming and startup of new Siemens equipment

=

III. Specifically Excluded by Siemens:

1. VFD's
2. Overtime
3. Dampers or installation
4. Installation of valves
5. Work in areas with asbestos.
6. Per Project Aggregate Insurance.
7. Building Permits and Fees.
8. Demolition of any existing equipment unless specified

IV. Clarifications:

INSTALLATION TERMS AND CONDITIONS (REV. 10/09)

These Terms and Conditions are incorporated by reference and form an integral part of each proposal or agreement between Siemens Industry, Inc., Building Technologies Division. ("SIEMENS") and the party for whom the Work is to be performed ("Customer"). The portions of each proposal or agreement relating to "Scope of Work" or "Proposed Solution" (in either case "Scope"), together with these Terms and Conditions, are collectively referred to as the "Agreement".

Article 1: General

1.1 (a) The Agreement, when accepted in writing by Customer and approved by an authorized representative of SIEMENS, constitutes the entire, complete and exclusive agreement between the parties relating to the services ("Services") and the equipment ("Equipment") to be provided by SIEMENS as described in the Scope (such Services and Equipment collectively referred to as "Work") and shall supersede and cancel all prior agreements and understandings, written or oral, relating to the subject matter of the Agreement. The Agreement and any rights or obligations thereunder may not be assigned by either party without the prior written consent of the other, except that either party may assign this Agreement to its affiliates and SIEMENS may use subcontractors in the performance of the Work.

(b) The terms and conditions of this Agreement shall not be modified or rescinded except in writing, signed by an authorized representative of SIEMENS. SIEMENS' performance under this Agreement is expressly conditioned on Customer's assenting to all of the terms of this Agreement, notwithstanding any different or additional terms contained in any writing at any time submitted or to be submitted to SIEMENS by Customer relating to the Work.

(c) The terms and conditions set forth herein shall supersede, govern and control any conflicting terms of the Proposed Solution or the Proposal.

(d) Nothing contained in this Agreement shall be construed to give any rights or benefits to anyone other than the Customer and SIEMENS without the express written consent of both parties. All obligations arising prior to this Agreement and all provisions of this Agreement allocating responsibility or liability between the parties shall survive the completion of the Work and the termination of this Agreement.

1.2 This Agreement shall be governed by and enforced in accordance with the laws of the State of Illinois. All claims or disputes arising under this Agreement shall be litigated in the State, Commonwealth, or Province in which the Work is being provided to Customer hereunder.

Article 2: Work by SIEMENS

2.1 SIEMENS will perform the Work expressly described in this Agreement and in any work release documents or change orders that are issued under this Agreement and signed by the parties. The Work performed by SIEMENS shall be conducted in a manner consistent with the degree of care and skill ordinarily exercised by reputable firms performing the same or similar work in the same locale acting under similar circumstances and conditions.

2.2 SIEMENS shall perform the Work during its normal working hours, Monday through Friday, excluding holidays, unless otherwise agreed herein.

2.3 SIEMENS is not required to conduct safety or other tests, install new devices or equipment or make modifications to any Equipment beyond the Scope set forth in this Agreement. Any Customer request to change the Scope or the nature of the Work must be in the form of a mutually agreed change order, effective only when executed by all parties hereto.

2.4 All reports and drawings specifically prepared for and deliverable to Customer pursuant to this Agreement ("Deliverables") shall become Customer's property upon full payment to SIEMENS. SIEMENS may retain file copies of such deliverables. All other reports, notes, calculations, data, drawings, estimates, specifications, manuals, other documents and all computer programs, codes and computerized materials prepared by or for SIEMENS are instruments of SIEMENS' work ("Instruments") and shall remain SIEMENS' property. To the extent specified in the Scope, Customer, its employees and agents ("Permitted Users") shall have a right to make and retain copies of Instruments except uncompiled code, and to use all Instruments, provided however, the Instruments shall not be used or relied upon by any parties other than Permitted Users, and such use shall be limited to the particular Work and location for which the Instruments were provided. All Deliverables and Instruments provided to Customer are for Permitted Users' use only for the purposes disclosed to SIEMENS, and Customer shall not transfer them to others or use them or permit them to be used for any extension of the Work or any other project or purpose, without SIEMENS' express written consent. Any reuse of Deliverables or Instruments for other work or locations without the written consent of SIEMENS, or use by any party other than Permitted Users will be at Permitted Users' risk and without liability to SIEMENS; and Customer shall indemnify, defend and hold SIEMENS harmless from any claims, losses or damages arising therefrom.

2.5 Customer acknowledges that SIEMENS, in the normal conduct of its business, may use concepts and improved skills and know-how developed while performing other contracts. Customer acknowledges the benefit which may accrue to it though this practice, and accordingly agrees that anything in this Agreement notwithstanding, Siemens may continue, without payment of a royalty, this practice of using concepts and improved skills and know-how developed while performing this Agreement.

2.6 SIEMENS shall be responsible for any portion of the Work performed by any subcontractor of SIEMENS. SIEMENS shall not have any responsibility, duty or authority to direct, supervise or oversee any contractors of Customer or their work or to provide the means, methods or sequence of their work or to stop their work. SIEMENS' work and/or presence at a site shall not relieve others of their responsibility to Customer or to others. SIEMENS shall not be liable for the failure of Customer's contractors or others to fulfill their responsibilities, and Customer agrees to indemnify, hold harmless and defend SIEMENS against any claims arising out of such failures

Article 3: Responsibilities of Customer

- 3.1** Customer, without cost to SIEMENS, shall:
- (a) Designate a contact person with authority to make decisions for Customer regarding the Work and provide SIEMENS with information sufficient to contact such person in an emergency. If such representative cannot be reached, any request for work received from a person located at Customer's premises will be deemed authorized by Customer, and SIEMENS will, in its discretion, act accordingly.;
 - (b) Provide or arrange for reasonable access and make all provisions for SIEMENS to enter any site where Work is to be performed;
 - (c) Permit SIEMENS to control and/or operate all facility controls, systems, apparatus, equipment and machinery necessary to perform the Work;
 - (d) Furnish SIEMENS with all available information pertinent to the Work;
 - (e) Furnish SIEMENS with all approvals, permits and consents from government authorities and others as may be required for performance of the Work except for those SIEMENS has expressly agreed in writing to obtain;
 - (f) Notify SIEMENS promptly of any site conditions requiring special care, and provide SIEMENS with any available documents describing the quantity, nature, location and extent of such conditions;
 - (g) Comply with all laws and provide any notices required to be given to any government authorities in connection with the Work, except such notices SIEMENS has expressly agreed in writing to give;
 - (h) Provide SIEMENS with Material Safety Data Sheets that conform to OSHA requirements related to all Hazardous Materials located at the site;
 - (i) Furnish to SIEMENS any contingency plans related to the site; and
 - (j) Furnish the specified operating environment, including without limitation, suitable, clean, stable, properly conditioned electrical power to all Equipment; telephone lines, capacity and connectivity as required by such Equipment; and heat, light, air conditioning and other utilities in accordance with the specifications for the Equipment.

3.2 Customer acknowledges that the technical and pricing information contained in this Agreement is confidential and proprietary to SIEMENS and agrees not to disclose it or otherwise make it available to others without SIEMENS' express written consent.

3.3 Customer acknowledges that it is now and shall at all times remain in control of the project site. Except as expressly provided herein, SIEMENS shall not be responsible for the adequacy of the health or safety programs or precautions related to Customer's activities or operations, Customer's other contractors, the work of any other person or entity, or Customer's site conditions. SIEMENS is not responsible for inspecting, observing, reporting or correcting health or safety conditions or deficiencies of Customer or others at Customer's site. So as not to discourage SIEMENS from voluntarily addressing health or safety issues at Customer's site, in the event SIEMENS does address such issues by making observations, reports, suggestions or otherwise, SIEMENS shall not be liable or responsible on account thereof.

3.4 Customer is solely responsible for any removal, replacement or refinishing of the building structure or finishes that may be required to gain access to the Work.

3.5 Customer shall properly dispose of all ballasts, mercury bulb thermostats, used oil, contaminated filters, contaminated absorbents, refrigerant and any other Hazardous Materials that at any time are present at Customer's premises, in accordance with all applicable federal, state, and local laws, regulations, and ordinances.

Article 4. Changes; Delays; Excused Performance

4.1 As the Work is performed, conditions may change or circumstances outside SIEMENS' reasonable control (including changes of law) may develop which would require SIEMENS to expend additional costs, effort or time to complete the Work, in which case SIEMENS will notify Customer and an equitable adjustment will be made to SIEMENS' compensation and time for performance. In the event conditions or circumstances require the Work to be suspended or terminated, SIEMENS shall be compensated for Work performed and for costs reasonable incurred in connection with the suspension or termination.

4.2 SIEMENS shall not be responsible for loss, delay, injury, damage or failure of performance that may be caused by circumstances beyond its control, including but not restricted to acts or omissions by Customer or its employees, agents or contractors, Acts of God, war, civil commotion, acts or omissions of government authorities, fire, theft, corrosion, flood, water damage, lightning, freeze-ups, strikes, lockouts, differences with workmen, riots, explosions, quarantine restrictions, delays in transportation, or shortage of vehicles, fuel, labor or materials. In the event of such delay or failure, the time for performance shall be extended by a period equal to the time lost plus a reasonable recovery period and the compensation shall be equitably adjusted for additional costs SIEMENS incurs due to such delay.

Article 5: Compensation

5.1 SIEMENS shall be compensated for the Work at its prevailing rates and reimbursed for costs and expenses (plus reasonable profit and overhead) incurred in its performance of the Work. All other services, including but not limited to the following, shall be separately billed or surcharged on a time and materials basis: (a) emergency work performed at Customer's request, if inspection does not reveal any deficiency covered by the Agreement; (b) work performed other than during SIEMENS'

normal working hours; and, (c) work performed on equipment not covered by the Agreement.

5.2 SIEMENS may invoice Customer on a monthly or other progress billing basis. Invoices are due and payable upon receipt or as otherwise set forth in the Agreement. If any payment is not received when due, SIEMENS may deem Customer to be in breach hereof and may enforce any remedies available to it hereunder or at law, including without limitation, acceleration of payments and suspension or termination of the Work at any time and without notice and shall be entitled to compensation for the Work previously performed and for costs reasonably incurred in connection with the suspension or termination. In the event any payment due hereunder is not made when due, the Customer agrees to pay, on demand, as a late charge, one and one-half percent (1.5%) of the amount of the payment per month, limited by the maximum rate permitted by law, of each overdue amount (including accelerated balances) under the Agreement, Customer shall reimburse SIEMENS for SIEMENS' costs and expenses (including reasonable attorneys' and witnesses' fees) incurred for collection under this Agreement. In the event of a dispute by Customer regarding any portion or all of an invoiced amount, it shall notify SIEMENS in writing of the amount in dispute and the reason for its disagreement within 21 days of receipt of the invoice, the undisputed portion shall be paid when due, and interest on the disputed, unpaid portion shall accrue as aforesaid, from the date due until the date of payment, to the extent that such amounts are finally determined to be payable to SIEMENS.

5.3 Except to the extent expressly agreed in writing, SIEMENS' fees do not include any taxes, excises, fees, duties or other government charges related to the Work, and Customer shall pay such amounts or reimburse SIEMENS for any amounts it pays. If Customer claims a tax exemption or direct payment permit, it shall provide SIEMENS with a valid exemption certificate or permit and indemnify, defend and hold SIEMENS harmless from any taxes, costs and penalties arising out of same.

Article 6: Warranty, Insurance and Allocation of Risk

6.1 (a) Until one year from either the date the Equipment is installed or the date of first beneficial use, whichever first occurs, all Equipment manufactured by SIEMENS or bearing its nameplate will be free from defects in material and workmanship arising from normal use and service.

(b) Labor for all Work under this Agreement is warranted to be free from defects for ninety (90) days after the earlier of the date the Work is substantially completed or the date of first beneficial use.

6.2 (a) The limited warranties set forth in Section 6.1 will be void as to, and shall not apply to, any Work (i) repaired, altered or improperly installed by any person other than SIEMENS or its authorized representative; (ii) subjected to unreasonable or improper use or storage, used beyond rated conditions, operated other than per SIEMENS' or the manufacturer's instructions, or otherwise subjected to improper maintenance, negligence or accident; (iii) damaged because of any use of the Work after Customer has, or should have, knowledge of any defect in the Work; or (iv) Equipment not manufactured, fabricated and assembled by SIEMENS or not bearing SIEMENS' nameplate. However, SIEMENS assigns to Customer, without recourse, any and all assignable warranties available from any manufacturer, supplier, or subcontractor of such Equipment and will assist Customer in enforcement of such assigned warranties.

(b) Any claim under the limited warranty granted above must be made in writing to SIEMENS within thirty (30) days after discovery of the claimed defect unless discovered directly by SIEMENS. Such limited warranty only extends to Customer and not to any subsequent owner of the Equipment. Customer's sole and exclusive remedy for any Work not conforming with this limited warranty is limited to, at SIEMENS' option, (i) repair or replacement of defective components of covered Equipment, or (ii) reperformance of the defective portion of the Work

(c) SIEMENS shall not be required to repair or replace more than the component(s) of the Equipment actually found to be defective. SIEMENS' warranty liability shall not exceed the purchase price of such component(s) Repaired or replaced Equipment will be warranted hereunder only for the remaining portion of the original warranty period.

6.3 THE EXPRESS LIMITED WARRANTIES PROVIDED ABOVE ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, STATUTORY, EXPRESS, OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED. SIEMENS MAKES NO WARRANTY, EXPRESS OR IMPLIED, THAT ANY EQUIPMENT PROVIDED HEREUNDER WILL PREVENT ANY LOSS, OR WILL IN ALL CASES PROVIDE THE PROTECTION FOR WHICH IT IS INSTALLED OR INTENDED. THE LIMITED EXPRESS WARRANTIES AND REPRESENTATIONS SET FORTH IN THIS AGREEMENT MAY ONLY BE MODIFIED OR SUPPLEMENTED IN A WRITING SIGNED BY A DULY AUTHORIZED CORPORATE OFFICER OF SIEMENS.

6.4 SIEMENS shall maintain the following insurance while performing the Work:

Workers' Compensation	Statutory
Employers' Liability	\$1,000,000 each accident

Commercial General Liability \$1,000,000 per occurrence and

\$5,000,000 in the aggregate

Automobile Liability \$1,000,000 per occurrence/aggregate

6.5 Risk of loss of materials and Equipment furnished by SIEMENS shall pass to Customer upon delivery to Customer's premises, and Customer shall be responsible for protecting and insuring them against theft and damage.

6.6 ANYTHING HEREIN NOTWITHSTANDING, IN NO EVENT SHALL SIEMENS BE RESPONSIBLE UNDER THIS AGREEMENT FOR INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOSS OF USE AND/OR LOST BUSINESS OPPORTUNITIES, WHETHER ARISING IN WARRANTY, LATE OR NON-DELIVERY OF ANY WORK, TORT, CONTRACT OR STRICT LIABILITY, AND REGARDLESS OF WHETHER CUSTOMER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND, IN ANY EVENT, SIEMENS' AGGREGATE LIABILITY FOR ANY AND ALL CLAIMS, LOSSES OR EXPENSES (INCLUDING ATTORNEYS FEES) ARISING OUT OF THIS AGREEMENT, OR OUT OF ANY WORK FURNISHED UNDER THIS AGREEMENT, WHETHER BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, AGENCY, WARRANTY, TRESPASS, INDEMNITY OR ANY OTHER THEORY OF LIABILITY, SHALL BE LIMITED TO THE LESSER OF \$1,000,000 OR THE TOTAL COMPENSATION RECEIVED BY SIEMENS FROM CUSTOMER UNDER THIS AGREEMENT. SIEMENS reserves the right to control the defense and settlement of any claim for which SIEMENS has an obligation to indemnify hereunder. The parties acknowledge that the price which SIEMENS has agreed to perform its Work and obligations under this Agreement is calculated based upon the foregoing limitations of liability, and that SIEMENS has expressly relied on, and would not have entered into this Agreement but for such limitations of liability.

6.7 It is understood and agreed by and between the parties that SIEMENS is not an insurer and this Agreement is not intended to be an insurance policy or a substitute for an insurance policy. Insurance, if any, shall be obtained by Customer. Fees are based solely upon the value of the Work, and are unrelated to the value of Customer's property or the property of others on Customer's premises.

Article 7: Hazardous Materials Provisions

7.1 The Work does not include directly or indirectly performing or arranging for the detection, monitoring, handling, storage, removal, transportation, disposal or treatment of Oil or Hazardous Materials. Except as disclosed pursuant to Section 7.3, Customer represents that there is no asbestos or any other hazardous or toxic materials, as defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, the regulations promulgated thereunder, and other applicable federal, state or local law ("Hazardous Materials"), present at Customer's locations where Work is performed. SIEMENS will notify Customer immediately if it discovers or suspects the presence of any Hazardous Material. All Work has been priced and agreed to by SIEMENS in reliance on Customer's representations as set forth in this Section 7.1. The presence of Hazardous Materials constitutes a change in the Proposed Solution equivalent to a change order whose terms must be agreed to by SIEMENS before its obligations hereunder will continue.

7.2 Customer shall be solely responsible for testing, abating, encapsulating, removing, remedying or neutralizing such Hazardous Materials, and for the costs thereof. Even if an appropriate change order has been entered into pursuant to Section 7.1 above, SIEMENS will continue to have the right to stop the Work until the job site is free from Hazardous Materials. In such event, SIEMENS will receive an equitable extension of time to complete its Work, and compensation for delays caused by Hazardous Materials remediation. In no event shall SIEMENS be required or construed to take title, ownership or responsibility for such Oil or Hazardous Materials. Customer shall sign any required waste manifests in conformance with all government regulations, listing Customer as the generator of the waste.

7.3 Customer warrants that, prior to the execution of the Agreement, it has notified SIEMENS in writing of any and all Hazardous Materials present, potentially present or likely to become present at Customer's locations and has provided a copy of any jobsite safety policies, including but not limited to lock-out and tag procedures, laboratory procedures, chemical hygiene plan, material safety data sheets or other items covered or required to be disclosed or maintained by federal, state, or local laws, regulations or ordinances.

7.4 For separate consideration of \$10 and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, Customer shall indemnify, defend and hold SIEMENS harmless from and against any damages, losses, costs, liabilities or expenses (including attorneys' fees) arising out of any Oil or Hazardous Materials or from Customer's breach of, or failure to perform its obligations under, Sections 7.1, 7.2 or 7.3.

Article 8: Import / Export Indemnity

8.1 Customer acknowledges that SIEMENS is required to comply with applicable export laws and regulations relating to the sale, exportation, transfer, assignment, disposal and usage of the Work or Equipment or Services provided under the Contract, including any export license requirements. Customer agrees that such Work or Equipment or Services shall not at any time directly or indirectly be used, exported, sold, transferred, assigned or otherwise disposed of in a manner which will result in non-compliance with such applicable export laws and regulations. It shall be a condition of the continuing performance by SIEMENS of its obligations hereunder that compliance with such export laws and regulations be maintained at all times. CUSTOMER AGREES TO INDEMNIFY AND HOLD SIEMENS HARMLESS FROM ANY AND ALL COSTS, LIABILITIES, PENALTIES, SANCTIONS AND FINES RELATED TO NON-COMPLIANCE WITH APPLICABLE EXPORT LAWS AND REGULATIONS

SECTION 232010 - PIPING SYSTEMS AND ACCESSORIES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 SUBMITTALS

- A. None required.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe and fittings shall be new, marked with manufacturer's name and comply with applicable ASTM and ANSI Standards.
- B. All adhesives, sealants, primers and paint used for piping in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits called for in the current version of U.S. Green Building Council LEED Credits EQ 4.1 and EQ 4.2.

2.2 STEEL PIPING AND FITTINGS

- A. Pipe: ASTM A53, Schedule 40 weight; black or galvanized finish as called for; ends chamfered for welding or roll grooved for grooved mechanical; connections.
- B. Fittings: Same material and pressure class as adjoining pipe.
 - 1. Welded Fittings: Factory forged, seamless construction, butt weld type, chamfered ends. Where branch connections are two or more sizes smaller than main size, use of "Weldolets", "Thredolets", or "Sokolets" are acceptable. Mitered elbows, "shaped" nipples, and job-fabricated reductions are not acceptable unless specifically required. Socket weld type, 2000 psi wp, where required.
 - 2. Threaded Fittings: Cast or malleable iron, black or galvanized, as required; drainage type where called for. Street type 45° and 90° elbows are not acceptable.
- C. Flanges, Unions and Couplings:
 - 1. Threaded Connections:
 - a. Flanges: Cast iron companion type; for sizes 2-1/2 in. and larger.
 - b. Unions: Malleable iron, bronze to iron seat, 300 lb. wwp; for sizes 2 in. and smaller.

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- c. Couplings: Malleable iron, 150 or 300 lb. wwp, based on system pressure. Steel thread protectors are not acceptable as couplings.
- 2. Welded Connections:
 - a. Flanges: Welding neck type.
 - b. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents and working temperatures and pressures. ASME B16.21, nonmetallic, flat, asbestos free, 1/8 in. maximum thickness unless thickness or specific material is indicated.
 - c. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- 3. Grooved Mechanical Connections:
 - a. Couplings: Ductile iron, ASTM A536, with painted coating, designed for rolled grooved piping, hot dipped galvanized finish were called for.
 - b. Gaskets:
 - 1) Grade "E" EPDM synthetic rubber, -30°F to 230°F temperature range, suitable for water service.
 - 2) Grade "EHP" EPDM synthetic rubber, -30°F to 250°F temperature range, suitable for water service.
 - 3) Gasket lubricant furnished by coupling manufacturer.
 - c. Bolts and Nuts: Head treated, hex head carbon steel (ASTM A183 and A449) cadmium plated or zinc electroplated.
 - d. Fittings: Elbows, tees, laterals, reducers, adapters as required. Same construction as couplings. The use of mechanical tees is permitted only when a branch size is two or more sizes smaller than the main size. Reducing couplings, strapless mechanical tees and segment-welded elbows are not acceptable.
 - e. Design Equipment: Victaulic rigid system, 10 and 12 in. or 8 in. and down Quick Vic couplings.
 - f. Victaulic AGS Piping System 14 in. through 24 in.: Rigid Style W07 with Grade "E" FlushSeal gasket.
 - g. Victaulic AGS Piping System 14 in. through 24 in.: Flexible Style W77 with Grade "E" FlushSeal gasket.
 - h. Make: Victaulic, Anvil, Tyco/Grinnell.
- D. Gauge and Instrument Connections: Nipples and plugs for adapting gauges and instruments to piping system shall be IPS brass.

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E. Base Elbows:

1. Cast iron or steel type, flange connections; Crane 500 or equivalent. Made from welding elbows, with welded pipe support and steel base. Reducing elbows where necessary.

ELBOW SIZE	SUPPORT SIZE	BASE PLATE
2 in. to 3 in.	1-1/4 in.	6 in. x 6 in. x 1/4 in.
4 in. to 6 in.	2-1/2 in.	8 in. x 8 in. x 1/4 in.
8 in. and larger	6 in.	14 in. x 14 in. x 5/16 in.

2. Anchor bolt holes in each corner of base for securely bolting to floor or concrete base; minimum 3/4 in. bolts.

2.3 DIELECTRIC PIPE FITTINGS

- A. Description: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.
- B. Unions: Factory fabricated, for 250 psi minimum working pressure at 180°F, threaded or solder ends, insulating material suitable for system fluid, pressure and temperature.
- C. Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system fluid pressures and temperatures with flange insulation kits and bolt sleeves.
- D. Waterway Fittings: 300 psi maximum working pressure at 230°F, male threaded or grooved ends, electroplated ductile iron or steel body with LTHS high temperature polyolefin polymer liner.
- E. Make: EPCO, Capitol Manufacturing, Watts, Victaulic, or approved equal.

2.4 HANGERS, INSERTS, AND SUPPORTS

- A. Hangers, Inserts, Clamps: B-Line, Grinnell, Michigan Hanger, PHD Manufacturing.
- B. Hangers:
 1. Adjustable, wrought malleable iron or steel with electroplated zinc or cadmium finish. Copper plated or PVC coated where in contact with copper piping. Hot-dipped galvanized finish for exterior locations.
 2. Adjustable ring type where piping is installed directly on hanger for piping 3 in. and smaller.
 3. Adjustable steel clevis type for 4 in, and larger, and where insulation passes through hanger.
 4. Hangers sized to permit passage of insulation through the hanger for chilled water.

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5. Nuts, washers and rods with electroplated zinc or cadmium finish. Hot-dipped galvanized finish for exterior locations.

C. Hanger Shields:

1. Pre-Insulated Type:

- a. Insulated pipes shall be protected at point of support by a 360° insert of high density, 100 psi waterproof calcium silicate, encased in a 360° sheet metal shield. Insulation insert to be same thickness as adjoining pipe insulation and extend 1 in. beyond sheet metal shield.

2. Field-Insulated Type:

- a. #18 USSG, galvanized steel shields, minimum 120° arc. Provide temporary blocking between pipe and hanger to maintain proper spacing for insulation.

3. Shield Sizing:

PIPE SIZE	SHIELD LENGTH	MINIMUM GAUGE
1/2 in. to 3-1/2 in.	12 in.	18
4 in.	12 in.	16
5 in. and 6 in.	12 in.	14
8 in. to 14 in.	24 in.	12
16 in. to 24 in.	24 in.	10

4. Hanger shield gauges listed are for use with band type hangers only. For point loading (roller support), increase shield thickness by one gauge, and length by 50%.

D. Spacing Schedule:

PIPE SIZE	STEEL	COPPER	CPVC PLASTIC	ROD SIZE
3/4 to 1 in.	8 ft.	6 ft.	3 ft.	3/8 in.
1-1/4 to 2 in.	10 ft.	6 ft.	3 ft.	3/8 in.
2-1/2 to 4 in.	12 ft.	10 ft.	4 ft.	1/2 in.
5 and 6 in.	12 ft.	10 ft.	4 ft.	5/8 in.
8 in.	12 ft.	10 ft.	4 ft.	3/4 in.

- E. Inserts: Carbon steel body and square insert nut, galvanized finish, maximum loading 1,300 lbs., for 3/8 in. to 3/4 in. rod sizes, reinforcing rods on both sides, MSS-SP-69 Type 19 or approved equal.

F. Beam Attachments:

1. C-Clamp, locknut, electroplated finish, UL listed, FM approved, for pipe sizes 2 in. and smaller.

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2. Center load style with clamp attachments that engage both edges of beam, electroplated finish, UL listed, FM approved, for pipe sizes larger than 2 in., refer to "Supports" for additional requirements.

G. Supports:

1. Provide intermediate structural steel members where required for hanger attachment. Members shall span across bar joists at panel points of joists. Secure member to structure. Select size of members based on a minimum factor of safety of four.
2. For Weights Under 1000 lbs.: Insert, "U" shaped channel, beam clamps or other structurally reviewed support. The factor of safety shall be at least four. Follow manufacturer's recommendations.
3. For Weights Above 1000 lbs.: Drill through floor slabs and provide flush plate welded to top of rod or provide additional inserts and hangers to reduce load per hanger below 1000 lbs.
4. For Metal Decks: Drill hole through for hanger rods and embed a welded plate in concrete or use devices designed for this application, with a safety factor of four.
5. Make: Hilti, ITW Ramset, Phillips "Red Head", or approved equal.

H. Trapeze Hangers:

1. For use on 1-1/2 in. and smaller piping only.
2. Hangers shall be supported with rod sized with a safety factor of four.
3. May be manufactured type "U" shaped channel, or suitable angle iron or channel. Round off all sharp edges.
4. Securely fasten piping to trapeze with "U" bolt or straps, dissimilar metals shall not touch, use isolation gaskets.
5. Make: B-Line, Kindorf, Unistrut, or approved equal.

2.5 PIPING ACCESSORIES

- A. Escutcheon Plates: Steel or cast brass polished chrome, split hinge type with setscrew, high plates where required for extended sleeves.
- B. Pipe Guides: Cylindrical steel guide sleeve, proper length for travel, integral bottom base anchor, top half removable. Split steel spider to bolt to pipe, copper plated spider for copper pipe. Insulated style where pipe is required to be insulated. Make: Tri-State Industries, or equal.
- C. Anchors: Same material as pipe. Make: Pipe Shields Model C1000 or C2000, Keflex, Flexonics, or field constructed. Provide detailed fabrication drawings for all field constructed anchors.

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- D. Pipe Roll Stand: Cast iron roll stand. Make: Advanced Thermal Systems, Carpenter and Patterson, ITT Grinnell, Pipe Shields.
- E. Flexible Expansion Loops: Same materials as pipe.
 - 1. Loop travel to be ± 4 in. for all pipe sizes. Loops shall impart no thrust loads on anchors. Loops shall consist of two (2) flexible sections of hose and stainless steel braid, two (2) 90° elbows, and a 180° return bend. Provide "nested" construction of loops when installed in multiples. Provide a Clevis type pipe hanger within four pipe diameters on each side of the loop. Support loops per manufacturer's recommendations.
 - 2. Loops shall be at 0 in. deflection at time of installation based upon 50°F ambient temperature. If the installation temperature is to be below 50°F, it is the Contractor's responsibility to review the installation with the Engineer before proceeding.
 - 3. Make: Metraflex Co., or equal.

2.6 SEALING ELEMENTS

- A. Expanding neoprene link type, watertight seal consisting of interlocking links with zinc plated bolts.
 - 1. Make: Thunderline "Link-Seal" Series 200, 300 or 400, Pyropac, Calipco.
- B. Waterproof Type:
 - 1. Exterior Walls, Below Grade, Above Floor: Synthetic rubber material with zinc plated bolts. Make: "Link-Seal" Series 200, 300 or 400, Pyropac, Calipco.

2.7 PIPING MATERIALS AND SCHEDULE

- A. See Exhibit "A", "Schedule of Piping Materials" at end of this Section for (HVAC) piping.

PART 3 - EXECUTION

3.1 EQUIPMENT AND SYSTEMS

- A. Equipment and systems in accordance with laws, codes, and provisions of each applicable section of these specifications. Accurately establish grade and elevation of piping before setting sleeves. Install piping without springing or forcing (except where specifically called for), making proper allowance for expansion and anchoring. Arrange piping at equipment with necessary offsets, union, flanges, and valves, to allow for easy part removal and maintenance. Offset piping and change elevation as required to coordinate with other work. Avoid contact with other mechanical or electrical systems. Provide adequate means of draining and venting units, risers, circuits and systems. Conceal piping unless otherwise called for. Copper tubing shall be cut with a wheeled tubing cutter or other approved copper tubing cutter tool. The tubing must be cut square to permit proper joining with the fittings. Ream pipes after cutting and clean before

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- B. Provide reducers at all control valves, where control valve is smaller than pipeline size. Reducers for steam control valves shall be eccentric type. Provide unions at each side of every control valve and reducers directly adjacent to the unions.
- C. Provide reducers at all balance valves, where balance valve is smaller than pipeline size.

3.2 PIPING OVER ELECTRICAL EQUIPMENT

- A. Contractor shall route piping to avoid installation directly over electric equipment (within 18" horizontally), including, but not limited to panels, transformers, disconnects, starters and fused switches. In the event it cannot be avoided, the Contractor shall notify the Engineer in writing and provide a sheetmetal drip shield under the pipe which extends 3'0" beyond the electrical equipment.

3.3 WATER SYSTEMS

- A. Top connection for upfeed, bottom or side connection for downfeed. Grade off level; up in direction of flow and down toward drain.

3.4 HANGERS, INSERTS AND SUPPORTS

- A. Piping shall not be supported by wires, band iron, chains, or from other piping, not by vertical expansion bolts. Support each pipe with individual hangers from concrete inserts, welded supports, or beam clamps of proper configuration and loading design requirements for each location. Trapeze hangers are acceptable for racking of multiple pipes of 1-1/2 in. or less in size. Follow manufacturer's safe loading recommendations. Suspend with rods of sufficient length for swing and of size as called for, using four nuts per rod. Provide additional rustproofed structural steel members, where required for proper support. Provide oversized hangers where insulation/supports must pass between pipe and hanger. Hangers, when attached to joists, shall only be placed at the top or bottom chord panel point. Only concentric type hangers are permissible on piping larger than 2-1/2 in., "C" types are permitted for piping 2-1/2 in. and smaller. Provide riser clamps for each riser at each floor.

3.5 PIPE CONNECTIONS

- A. Solder Connections: Nonacid flux and clean off excess flux and solder.
- B. Press Connections: Copper press fittings shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

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- C. Brazed Connections: Make joints with silver brazing alloy in accordance with manufacturer's instructions. Remove working parts of valves before applying heat. "Walseal" fittings may be used; if sufficient alloy is showing, face braze such joints.
- D. Threaded Connections: Clean out tapering threads, made up with pipe dope; screwed until tight connection. Pipe dope must be specific for each application.
- E. Flanged Joints: Select appropriate gasket material, size, type and thickness for service applications. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- F. Dielectric Pipe Fittings: Provide dielectric unions at ALL equipment connections where dissimilar metals meet. In addition, provide dielectric unions in all open type piping systems (condensing water, domestic water, etc.) where dissimilar metals are to be joined. Dielectric unions are not required in typical closed systems such as heating water, chilled water, heat pump loop, etc. except for the equipment connections.
- G. Grooved Mechanical Joints: Pipe to be prepared in accordance with the latest Victaulic Grooving Specification (ref. Victaulic PB137), using Victaulic Vic-Easy Grooving tools. Pipe shall be checked to be sure it is free of indentations, projections; weld seams or roll marks on the exterior of the pipe over the entire gasket seating area. Pipe ends are to be square cut. Victaulic lubricant shall be applied to gasket and/or pipe ends and housing interiors to eliminate pinching the gasket. All grooved couplings, and fittings, valves and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components. A factory-trained field representative (direct employee) of the mechanical joint manufacture shall provide on-site training for contractor's field personnel in the proper use of grooving tools and installation of grooved piping products. Provide a field report verifying that factory trained representative has provided on-site training and that Contractor has coupled recommended installation procedures. Factory-trained representative shall periodically review the product installation. Contractor shall remove and replace any improperly installed products.

3.6 WELDING

- A. Welding shall be performed in compliance with the welding procedure specifications prepared by the National Certified Pipe Welding Bureau. Welded pipe fabricated by certified welder. Contractor shall submit proof of current certification of each welder if requested by Owner. Use full-length pipe where possible; minimum distance between welds, 18 in. on straight runs. Welds must be at least full thickness of pipe inside smooth and remove cutting beads, slag and excess material at joints; chamfer ends. Minimum gap 1/8 in., maximum 1/4 in., for butt welds. Overlaps on position and bench welds to be not less than 3/4 in. One internal pass and one external pass minimum required on slip-on flanges. Do not apply heat to rectify distorted pipe due to concentrated welding; replace distorted pipe. When welding galvanized pipe, apply cold galvanizing on joint after welding.

3.7 HANGER SHIELDS

- A. Provide at hangers for chilled water piping. Pre-insulated type or field-insulated type at Contractor's option.

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3.8 ANCHORS

- A. Provide piping system anchors where shown on the plans, and as recommended by the expansion joint/loop manufacturer. Where an anchor is shown at a change in piping direction, it shall fully control movement in both directions. In lieu of a single anchor fabricated for two directional control, two (2) individual anchors may be provided. Provide detailed fabrication drawings for all field-fabricated anchors.
- B. Anchors shall be designed and located as to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stressing to connected equipment.

3.9 ALIGNMENT GUIDES

- A. Provide alignment guides to guide expansion and to avoid end-loading and torsional stress.
- B. Install two (2) or more guide(s) on each side of flexible expansion loop. Install guides nearest to expansion joint not more than four (4) pipe diameters from expansion joint.
- C. Attach guides to pipe and secure guides to building structure.

3.10 ESCUTCHEON PLATES

- A. Provide polished chrome escutcheon plates for exposed piping passing through floors, walls or ceilings, except in Boiler, Fan and Mechanical Rooms.

3.11 PIPE LINE SIZING

- A. Pipe sizes called for are to be maintained. Pipe sizing changes made only as reviewed by Owner's Representative. Where discrepancy in size occurs, the larger size shall be provided.

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EXHIBIT "A" - PIPING MATERIALS (HVAC)

(Notes are at end of Exhibit "A")

<u>SERVICE</u>	<u>PIPE MATERIALS</u>	<u>FITTINGS</u>	<u>CONNECTIONS</u>
Hot water heating	Schedule 40, black steel	Malleable iron and butt weld	Screwed 2 in. and smaller; Welded 2-1/2 in. and larger; (SEE NOTE 1)
Chilled water	Schedule 40, black steel	Butt weld and malleable iron	2-1/2 in. and larger welded or flanged; 2 in. and smaller screwed; (SEE NOTE 1)
Boiler feed and pumped condensate (50 psi and lower)	Schedule 40, black steel	Malleable iron	2-1/2 in. and larger welded or flanged; 2 in. and smaller screwed

END OF SECTION

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SECTION 232123 - PUMPS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide labor, materials, equipment and services as required, for the complete installation designed in Contract Documents.

1.2 SUBMITTALS TO THE ARCHITECT/ENGINEER

- A. Shop drawings and performance curves, on pumps and pump accessories clearly indicate which equipment is being submitted.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Pumps shall be non-overloading over their entire performance range with motors capable of running continuously without undue noise, heating, or sparking. Impellers statically and dynamically balanced. Mechanical seals for closed systems shall be constructed of carbon rings with ceramic mating seat up to 220°F. Packing type seals for open systems only. Materials suitable for water pressures, temperature and conditions for each application. Tapped discharges and suction connections for gauges vent and drain. With trimmed impeller if required to meet initial delivery requirements. Factory service engineer or machinist must check each pump alignment before pump is started. Include the cost of checking and start-up in pump quotation.

2.2 IN-LINE CENTRIFUGAL PUMPS

- A. Designed for continuous operation between 40° and 225°F. In-line, close-coupled, single stage, bronze fitted construction. All pump internals shall be capable of being serviced without disturbing piping connections. Replaceable shaft sleeves at the seal or packing. Enclosed type impeller, keyed to the shaft and secured by a locking capscrew. Factory guaranteed operating performance. Pumps used in a variable speed pumping system shall contain couplings suitable for very low and intermittent torque loads.
- B. Design Equipment: Taco, KV.
- C. Make: Armstrong, Bell & Gossett, Taco.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Adjust gpm of each pump to capacity called for on schedule, readjust during balancing. Install in-line pumps in locations shown, supported independently of piping using hangers on both pump flanges.

END OF SECTION

SECTION 233100 - SHEET METAL AND DUCTWORK ACCESSORIES CONSTRUCTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services required for the complete installation designed in Contract Documents.

1.2 QUALITY ASSURANCE

- A. Ductwork shall be fabricated and installed in compliance with latest edition of the following standards.
 - 1. SMACNA Duct Construction Standards - Metal and Flexible Ductwork.
 - 2. SMACNA Duct Liner Application Standard.
 - 3. NFPA Standards, Bulletin 90A, 96, 101.
 - 4. Plans and Specifications which exceed the requirements in any of the referenced standards.
- B. All sheet metal shall be fabricated and installed by an experienced Contractor specializing in this type of work.

1.3 SUBMITTALS

- A. Ductwork Shop Drawings.
- B. Duct Access Doors.
- C. Flexible Duct.
- D. Submit a complete shop standard manual including miscellaneous materials, and construction details for all shop fabricated materials including, but not limited to, volume dampers, turning valves, duct sealant, equipment flexible connections, access doors, flexible duct, acoustical duct lining, etc.

1.4 GENERAL

- A. All adhesives, sealants, primers and paint used for ductwork in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits called for in the current version of U.S. Green Building Council LEED Credits EQ 4.1 and EQ 4.2.

1.5 DUCTWORK CLASSIFICATION

- A. Duct systems are to be classified and constructed per the SMACNA Velocity-Pressure classification system as follows:
 - 1. All ductwork shall be constructed for a minimum pressure class of 2 in. w.g. (unless stated otherwise) for the following systems, as applicable:

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- a. Typical low pressure supply ductwork.
 - b. Typical return ductwork.
 - c. Typical low pressure exhaust ductwork.
2. Pressure classes above 3 in. w.g. shall be provided as follows, based upon the external static pressure as scheduled for each specific fan.

<u>Scheduled External Static Pressure</u>	<u>Pressure Class</u>
Over 3 in. up to 4 in. w.g.	4 in. w.g.
Over 4 in. up to 6 in. w.g.	6 in. w.g.
Over 6 in. up to 10 in. w.g.	10 in. w.g.

1.6 DUCTWORK SHOP DRAWINGS

- A. Prepare minimum 1/4 in. scale drawings:
 1. Constructed from actual field inspections and measurements so as to assure a complete job.
 2. Incorporate dimensions of actual equipment proposed for use on the project.
 3. Showing adequate sections, elevations, and plan views and indicating the bottom of ductwork elevations from the finished floor.
 4. Indicating all volume dampers, fire dampers, smoke dampers, damper access doors and other accessories required for a completed project.
- B. Call to the attention of the Engineers immediately, any major deviations from the Contract Drawings, which must be made. All deviations shall be documented in writing.
- C. Indicate roof, wall and floor opening dimensions and locations shown on shop drawings.
- D. Submit prints to each Contractor of the other trades for review for interference's and coordination with their work.

1.7 DAMPERS

- A. Provide volume dampers at all air outlets, diffusers, grilles and as noted on plans.

PART 2 - PRODUCTS

2.1 DUCTWORK MATERIALS

- A. Unless otherwise called for, provide materials in accordance with Exhibit I at the end of this section.

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2.2 SQUARE AND RECTANGULAR DUCTWORK

- A. Manufactured of galvanized steel, conforming to ASTM A653 and A924, or aluminum as noted. Gauges per SMACNA Duct Construction Standards.
- B. Transverse and longitudinal duct seams reinforcement shall conform to appropriate tables and figures per SMACNA Velocity-Pressure Classification for duct construction.
 - 1. Transverse joints shall be sealed with duct joint sealant. "Ductmate" or "Nexus" 4-bolt connection systems may be used in lieu of standard construction.
 - 2. Field assembled longitudinal seams shall be sealed with duct sealant. Factory or shop fabricated rolled or machine pressed longitudinal seams does not require sealant.
- C. Corner closures shall be required as described and illustrated by SMACNA Duct Construction Standards.
- D. Throat radius on all elbows shall not be less than the dimension of the duct plane of radius. Where this cannot be maintained, use shorter radius with internal guide vanes, or square elbow with turning vanes.
- E. Bracing and hanging of ductwork shall be per SMACNA Standards for size and system class of ductwork being used.
- F. Any transformations shall not reduce the ductwork cross-sectional area. Maximum angle in straight duct, 20° for diverging flow and 30° for contraction flow. Transformation from square to round or flat to oval seams welded or brazed.

2.3 DUCTWORK SEALING

- A. SMACNA Duct Sealing Classification shall be used for duct systems using the following criteria:
 - 1. Seal Class A shall be used for all transverse joints and longitudinal seams for duct Velocity-Pressure Classes above 2 in. w.g.
 - 2. Seal Class B shall be used for all transverse joints and field constructed longitudinal seams for duct Velocity-Pressure Classes 2 in. w.g. and below.
- B. Duct sealant for indoor applications shall be Hardcast Iron-Grip IG-601.
- C. Sealants and tapes shall be UL181A or UL181B listed.

2.4 TURNING VANES

- A. Provide in mitered elbows as shown on contract drawings. Vanes 36 in. or longer shall be double wall air foil type. All turning vanes shall be installed as per the latest SMACNA Standards. Turning vane size and spacing shall be as per SMACNA. Turning vane spacing greater than SMACNA Standards is not acceptable.

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2.5 DAMPERS IN DUCTWORK

- A. Blade Type Volume Dampers: Constructed per SMACNA, one gauge heavier than duct material, securely fastened to 3/8 in. sq., cold rolled steel operator rod. Provide multiblade dampers in ductwork above 12 inches in height. Where multiblade dampers are required. They shall be equal to Ruskin Model CD35. Provide quadrant locking handle on air volume dampers.
- B. Automatic Air Dampers: Furnished as part of "Control Systems" Section 230923 and installed by this Contractor.

2.6 FLEXIBLE CONNECTIONS TO FANS AND EQUIPMENT

- A. Materials for flexible connections shall be fire retardant, water and mildew resistant, and comply with UL Standard 214.
- B. All systems of heavy glass fabric, double neoprene coated, approximately 30 oz. per sq. yd. Ventfabrics Inc., "Ventglas".

2.7 ACCESS DOORS

- A. General:
 - 1. All access doors shall be continuous piano hinged type, unless noted otherwise.
 - 2. Non-hinged only allowed where clearance to ceiling does not allow a full 90° swing.
 - 3. Double panel insulated type when used in insulated duct.
 - 4. Single panel uninsulated type allowed in un-insulated duct.
 - 5. Pressure rated according to system in which being installed. Door-to-frame and frame-to-duct gasketing.
 - 6. Provide specified Seal Class A or B ductwork sealing around frame, and hand adjust the latch tension for proper seal, on all access doors other than sandwich panel (Ductmate) style.
 - 7. MINIMUM access door size for ducts 12 in. or less in depth is 12 in. x 8 in.
 - 8. MINIMUM access door size for ducts 12 in. to 18 in. in depth is 18 in. x 14 in.
 - 9. MINIMUM access door size for ducts more than 18 in. in depth is 24 in. x 18 in.
 - 10. In ducts which require multiple section fire dampers due to duct size, provide one access door for each fire damper section.
 - 11. Access doors for fire and smoke dampers shall be permanently labeled with 1/2 in. high lettering reading "SMOKE DAMPER" or "FIRE DAMPER".

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- B. Door Types:
 - 1. Low Pressure Systems (2 in. w.g. pressure class): National Controlled Air ADH-1, Ruskin ADH22, Vent Products 9701, Air Balance FSA-100, Safe Air SAH.
 - 2. Medium and High Pressure Systems (3 in. w.g. pressure class and higher):
 - a. Rectangular Duct: Ductmate DMAD, or equal.
 - b. Round Duct: Ductmate DMRAD, or equal. 8 in. x 4 in. for ducts 14 in. and less in diameter. Ductmate DMRAD - 16 in. x 12 in. for ducts more than 14 in. in diameter.
 - c. Furnish and install factory supplied protector molding on cut medal edge for all Ductmate access doors.

2.8 ACOUSTIC-THERMAL DUCT LINING IN DUCTWORK

- A. General: Comply with NFPA Standard 90 and NAIMA Standard AHC-101.
- B. Materials: ASTM C 1071, Type I. Acrylic coated glass fiber insulation coated with an anti-microbial EPA registered coating that seals the airstream surface fibers into a smooth, low-friction surface acoustic ductliner shall be of thickness shown in the table. Maximum "K" value to be 0.24 btu/in. /sq. ft. /degrees F. /hr. when tested in accordance to ASTM C518. Absolute roughness per foot not to exceed 0.004 ft. Acoustic duct liner to be suitable for use up to 6000 feet per minute air velocity and temperatures up to 250°F. The acoustic duct liner shall not contribute to the corrosion of steel, copper or aluminum. The liner shall not absorb greater than 0.5% moisture by volume when exposed to air of 120°F., 96% RH. Acoustic duct liner shall provide the minimum sound absorption coefficients shown below when tested per ASTM C423 and ASTM E795, Mounting Type A.

OCTAVE BAND FREQUENCIES HZ							
Thickness	125	250	500	1000	2000	4000	NRC
1-1/2 in.	.35	.51	.83	.93	.97	.96	.80
2 in.	.34	.64	.96	1.03	1.00	1.03	.90

- C. Thickness: Unless otherwise noted, all supply air ductwork indicated to be acoustically lined, shall have 1-1/2 in. thick liner with an R value of 6. Return or exhaust ductwork, if acoustically lined, shall be of a thickness specifically noted. Note that per the symbol list (L) equals 1-1/2 in. thick, and (2L) equals 2 in. thick.
- D. Fire Hazard Classification: Flame spread rating of not more than 25 without evidence of continued progressive combustion and a smoke developed rating of no higher than 50, when tested in accordance with ASTM E84 and UL 723.
- E. Liner Adhesive: Comply with NFPA Standard 90A, ASTM C919, and maximum VOC requirements of LEED EQ 4.1 and EQ 4.2.

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- F. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct. Provide fasteners that do not damage the liner when applied as recommended by the manufacturer, that do not cause leakage in the duct, and will indefinitely sustain a 50 pound tensile dead load test perpendicular to the duct wall.
 - 1. Fastener Pin Length: As required for thickness of insulation, and without projecting more than 1/8 inch into the airstream.
 - 2. Adhesive for Attachment of Mechanical Fasteners: Comply with the "Fire Hazard Classification" of duct liner system.
- G. Design Equipment: Knauf Duct Liner EM.
- H. Acceptable Makes: Knauf Duct Liner EM, Certaineed ToughGard R.
- I. For duct velocities above 4000 fpm, provide metal "build-outs" of proper height, welded to the ductwork for turning vanes and dampers.

PART 3 - EXECUTION

3.1 REQUIREMENTS

- A. Equipment and systems shall be installed in accordance with local and state codes and regulations having jurisdiction. Bracing and hanging of ductwork shall be per SMACNA - HVAC Duct Construction Standard.
- B. Install all ductwork concealed and tight to the structure above unless noted otherwise on shop drawings. Fabricate only after the approval of shop drawings, and in locations to avoid interferences. Ductwork installed without approved shop drawings, which requires removal/modification and/or reinstallation due to conflicts or improper installation shall be repaired at no cost to the Owner.
- C. Sizes given on contract drawings are inside dimensions. Keep openings continuously closed and sealed with protective plastic wrapping during construction to prevent entrance of dirt and debris.
- D. Extend access openings, damper rods and levers, to outside of external insulation make systems airtight.
- E. No piping, conduit or other obstruction to airflow is permitted in ductwork.
- F. Provide necessary openings, hanger inserts, framing, chases, and recesses, not provided by other trades.
- G. Exposed exhaust or return registers and grilles shall be flush with face of duct; exposed supply registers and grilles shall be mounted outside airstream with 45° shoe-tap extension collars.

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- H. Provide 14 gauge sleeves for ducts passing through Mechanical Room floors. Set sleeves 4 in. above finished floor in Mechanical Rooms, seal watertight to floor.
- I. Where a return or exhaust duct is shown to be left open ended, provide hardware mesh screen at opening.
- J. Do not utilize flexible ductwork or connection in any way to connect variable or constant volume boxes to ductwork.

3.2 FLEXIBLE CONNECTIONS

- A. Provide flexible connections for the intake and discharge connections of duct connected to fans and air handling equipment.
- B. Round connections are to be made with adhesive and metal drawbands with ends tightly bolted.
- C. Rectangular connections shall be made with material securely held in grooved seam between flanges. Attach with adhesive and mechanical fasteners on 6 in. centers.
- D. Connections shall be made with a minimum of 2 in. space between duct and equipment collars, installed in line, and with 1 in. excess material folded so as not to interfere with airflow through connection.
- E. Mechanically fastened and sealed, with specified duct sealant, at duct and equipment connections.

3.3 FLEXIBLE DUCT CONNECTORS

- A. This applies to flexible connections between diffusers and ductwork only, as defined by the Mechanical Code of New York State.
- B. Joints made with Minnesota 3M adhesive applied to duct end or collar.
- C. Duct slid on depth of collar and 2 in. on duct end and secured with stainless steel worm-drive hose clamp.
- D. For round to oval connections, provide round-oval flexible adapter.
- E. Maximum length 48 in.
- F. Maximum on 90° angle bend from ductwork to outlet.

3.4 TURNING VANES

- A. Install only in square elbows of equal dimensions.
- B. Install as per latest SMACNA Standards.
- C. Secure vane runners to duct with spot welding, riveting or sheet metal screws.

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- D. When installing in ductwork with internal insulation.
 - 1. Install runners in ductwork inside insulation and bolt through insulation and duct sides, welding bolts to insure rigid installation. Provide build-outs for duct Velocity-Pressure classes above 2 in. w.g.

3.5 CLEANING DUCTWORK AFTER INSTALLATION

- A. Clean rubbish and dirt from system before fans are turned on.
- B. Keep openings continuously closed during this construction period.
- C. Pay damages resulting from dirt blown on painted or other finished surfaces.
- D. Repair or replace damaged fan wheels, dampers, or other system parts damaged as a result of dirt.
- E. Clean system as many times as required until the entire system is dirt free.

3.6 TEST OF DUCTWORK

- A. Ductwork not required to be tested for leakage, shall be checked and guaranteed to meet the standards of the specified SMACNA Duct Sealing Classifications. Air balancing and testing shall be used to determine satisfactory operation of duct systems. Balancing reports indicating excessive leakage amounts shall be required to rebuild, repair or seal ductwork having excessive leakage.

3.7 DAMPERS AND AIR CONTROL DEVICES

- A. Provide dampers necessary to permit proper balancing of air quantities. Comply with code requirements for smoke and fire control. Prevent introduction of uncontrolled outside air into building through roof and wall openings.
- B. When dampers are installed in acoustically lined ductwork, install with insulated "build-outs" per SMACNA.
- C. Install all dampers furnished as part of "Control Systems" Section.

3.8 ACCESS DOORS

- A. Provide for access to upstream side of duct mounted reheat coils, dampers, damper motors, fire dampers, smoke dampers, smoke detectors, control devices, fan bearings, and equipment requiring periodic inspection or service. Provide labels for fire and smoke dampers as called for in Part 2 - Products.

3.9 DUCT SUPPORTS

- A. Provide per SMACNA, same material as duct. Hanger bands to extend down sides and turn under bottom 2 in. Minimum two metal screws per hanger. Angle iron on larger duct spaced per building structural system but not greater than 8 ft. Provide extra support angles as required.

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3.10 ACOUSTIC-THERMAL DUCT LINING

- A. Where called for, increase metal duct dimensions to accommodate lining. Adhere lining to interior side of duct; minimum 90% coverage of Benjamin Foster 85-20 fire retardant adhesive, UL approved. Stapling method of attaching will not be permitted. Mechanical fasteners shall not pierce the sheet metal. Installing fasteners with spacing as per SMACNA Standards. Multiple layers of liner to achieve indicated thickness is prohibited.
- B. Abutting edges of acoustic linings shall be sealed with a fire resistant neoprene coating, and exposed edges of acoustic linings shall be installed with sheet metal nosing to prevent erosion.
- C. Lining shall not impart odor to the air, delaminate or be loosened by the airstream under normal operating conditions. Lining which is damaged during fabrication or shipment shall not be installed.

3.11 DUCTWORK AT HUMIDIFIERS

- A. Provide type 304 stainless steel duct with solder duct seams and joints watertight within 5 ft. of humidifier. Pitch duct and provide 1-1/4 in. capped drain connection at low point.
- B. Where humidifiers are installed in ducts 8 in. and less in depth, increase duct size and provide expanded section in accordance with manufacturer's recommendations.

3.12 DUCT SEALING

- A. Preparation:
 - 1. Clean surfaces of dirt, oil, grease and loose of foreign matter that could impair adhesion, using soap and water or solvent.
 - 2. Allow surfaces to dry completely before proceeding.
- B. Installation of Sealant System:
 - 1. Apply sealant system to duct joints, fasteners, and seams in accordance with manufacturer's instructions.
 - 2. Apply sealant by brush, putty knife or caulk gun, to full coverage. Remove excess adhesive immediately.
 - 3. Completely seal duct joint, fasteners and seams without voids, to a minimum 20 mil thick wet film.
 - 4. Apply and store at ambient temperature of 35°F to 110°F.
- C. Field Quality Control:
 - 1. Allow duct sealant system to cure a minimum of 72 hours before operating the system.

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2. Do not apply external duct insulation or coatings until the joints have been inspected by the Owner's Representative.

EXHIBIT I - DUCTWORK MATERIALS

(Notes are at the end of Exhibit "I")

<u>SERVICE</u>	<u>MATERIAL</u>	<u>SPECIAL REQUIREMENTS</u>
Supply downstream of humidifier	Stainless steel Type 304	Joints and features as called for SEE NOTE 1
Supply, return	Lock forming quality, galvanized steel ASTM A653 and A924	

END OF SECTION

PURCHASE COLLEGE - Music Building Humidification

SECTION 238216 - COILS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 SUBMITTALS

- A. Submit shop drawing on coils

1.3 GENERAL REQUIREMENTS

- A. Provide coils of proper size and rows to fit intended use and capacity as scheduled and specified. Location as shown on Plans. Designed for 125 psi. Same end or opposite end connections as required to fit installation shown on Plans. Vertical mounted coils shall have bottom drain headers. Duct mounted coils shall be equipped with flanges. Tag each coil at factory giving number and location. Coils completely drainable with auxiliary drain headers, if necessary. Minimum 1/2 in. drain and vent connections. Aluminum fins shall be a minimum of .0075 in. thick unless otherwise noted. Coils shall have brazed return "U" bends; bent tubes are not acceptable. Performance certified in accordance with ARI Standard 410.

PART 2 - PRODUCTS

2.1 REHEAT COILS

- A. Tubing shall be .025 in. thick copper and shall have a minimum outside diameter of 5/8 in. Fins shall be of aluminum and wound on tubing individually. Steel headers and galvanized steel casings. Coils shall be tested by subjecting each coil to a minimum air pressure of 250 psig with the coil submerged in water.
- B. Design Equipment: Trane.
- C. Make: Aerofin, Carrier, McQuay, Trane, Heatcraft, Marlo

2.2 HOT WATER HEATING COIL

- A. Non-ferrous heating coils, 125 psi working pressure, designed to relieve expansion and contraction strains. Minimum 16 gauge galvanized casing, non-ferrous or cast iron headers, .035 in. thick copper tubes with .035 in. thick "U" bends, aluminum fins, for coils. Coils tested at 300 psig then leak tested at 200 psig with air pressure under water. Hot water heating coils, serpentine type, number rows and arrangement as called for; same end connections with vent chamber on return end and completely drainable.
- B. Design Equipment: Trane.
- C. Make: Aerofin, Carrier, McQuay, Trane, Heatcraft, Marlo.

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2.3 CHILLED WATER COOLING COIL

- A. Copper tubes not less than .035 in. tube wall with .035 in. thick "U" bends; non-ferrous or cast iron headers. Aluminum fins, helically wound, or plate type with expanded tube. Completely drainable and able to be vented. Provide intermediate headers on each row at pipe connection end such that each row is independently able to be drained and vented. Circuited so as to keep head loss through coil not greater than called for. Minimum 16 gauge galvanized steel casings. Fin spacing to meet conditions called for. Coils bottom supply, counterflow heat transfer.
- B. Design Equipment: Trane.
- C. Make: Aerofin, Carrier, McQuay, Trane, Heatcraft, Stellmack, Marlo.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements. Provide supporting ironwork and sheet metal safing to assure proper installation without any bypass air around coil.
- B. Provide a stainless steel drip pan under each cooling coil section extended a minimum of 12 in. beyond downstream side of coil. Provide with 1-1/4 in. tapped drain connection pipe to nearest floor drain.
- C. Provide ample space during installation to allow for the removal of the coil. Provide all necessary unions, isolation valves, flexible connectors and accessories to allow for the removal and service of the coil.
- D. Provide an access door upstream of all coils for inspection. Access door shall be minimum 16 x 12.

END OF SECTION

PURCHASE COLLEGE - Music Building Humidification

SECTION 238413 - HUMIDIFIERS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide all labor, materials, equipment and services as required for the complete installation as designed in Contract Documents.

1.2 SUBMITTALS

- A. Humidifier and accessories.
- B. Absorption distance calculations.

PART 2 - PRODUCTS

2.1 STEAM DISPERSION ELEMENT

- A. Each panel shall consist of a steam supply and condensate header/separator, and a closely spaced steam dispersion tube(s) necessary to achieve the required steam capacity and absorption distance and non wetting of downstream ductwork and components.
- B. Each tube shall be fitted with steam discharge orifices in the tube wall centered on the diametric centerline. Each orifice shall be sized for its required steam capacity and to ensure even distribution across the face of the duct area.
- C. Each packaged humidifier panel assembly to tubes and headers shall be contained with a galvanized metal casing to allow for duct mounting or to facilitate the stacking of and/or the end-to-end mounting of multiple panels in ducts or air handler casings.
- D. All tubes and headers shall be of 304 stainless steel and the joints shall be heli-arc welded. Tubes shall be joined to headers with slip couplers containing O-rings or welded to the header.
- E. Spare O-Rings and replaceable orifice inserts shall be supplied in the proper quantity for regular three (3) year maintenance requirements.
- F. Absorption distance calculations shall be provided with the submittal package for the specific application conditions.
- G. Pressured dispersion elements shall be provided with a control valve and accessories from the manufacturer per Article 2.5.
- H. Design Equipment: Dri-Steem Ultra-srob.
- I. Make: Dristeem or approved equal.

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2.2 HUMIDIFIER (ELECTRIC TYPE)

A. General:

1. Provide electric immersion element humidifier with steam distributor steam dispersion assembly as specified in Article 2.1.

B. Steam Generation System:

1. Humidifier shall incorporate a modulated control system to monitor and optimize the contained water conductivity, fill and drain rate to maximize life and minimize energy. The control system shall compensate for varying entering water conditions.
2. Heating elements shall be of Incoloy sheathed cartridge resistive type elements. Tubular elements are not allowed.
3. Provide fill cup with 1 in. air gap on the fill side to prevent back siphoning and integral air gap on the drain side to comply with local codes.

C. Controls/Electrical:

1. Provide modulating control (0% to 100% R.H. range) with sensor mounted in room. Steam output shall vary to meet sensor requirements.
2. Provide stainless steel Teflon coated probes for liquid level control with tap water.
3. Provide self-diagnostic controls circuitry capable of monitoring abnormal conditions and preventing unsafe operation upon failure of the drain and fill system or over current condition of the unit. Upon these failures the heating elements shall shut down and alarm indication shall be shown on the display.
4. The humidifier shall have a built-in Triac contactor to modulate the power to the elements to meet space humidity requirements.
5. The drain cycle shall be field modifiable and the fill valve shall temper the drain water. If tempering is not available an external temp-r-drain condensate cooler shall be provided.
6. Internal fusing on the primary voltage lines shall protect the unit.
7. The unit shall be protected thermal safety switch that senses temperature within the heating element to prevent overheating.
8. Humidifier shall include a factory mounted and wired control panel with indications for power, steam generation, and diagnostic evaluations. The panel shall have electrical terminals for controlling stat, high limit stat, airflow proving, and alarm devices.
9. The humidifier shall be listed by UL and/or certified by CSA.

PURCHASE COLLEGE - Music Building Humidification

- D. Cabinet:
 - 1. Humidifier Cabinet shall have key lockable access on both the plumbing and electrical doors. Cabinet shall be constructed of 18 gauge steel with enamel finish.
 - 2. Provide a water softening system or ionically charge beds within the humidifier to decrease maintainability of the equipment when tap water is being utilized. A spare set of bed or heating elements shall be supplied with each unit.
- E. Optional Accessories:
 - 1. Condensate or drain water sump pump, for use when drains below the humidifier are not available. Suitable for hot water sized for 30 ft. head pressure.
- F. Design Equipment: Dri-Steem XT.
- G. Make: Armstrong, Dristeem, Hermidifier.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.
- B. Provide reducing valve with shut off valve and gauge to limit water supply pressure to 35 psi.
- C. Install duct mounted humidistat, and high limit controller cold snap offset temperature sensor, and air flow switch. Wire it to humidifier as recommended by manufacturer.
- D. Extend drain line to nearest floor drain.
- E. Provide piping accessories and valving as per the detail.
- F. Piping between steam generator and steam dispersion assembly to be rigid hard copper and insulated. Provide a union or unions as required to disconnect piping and remove the top cover of the steam generator.

END OF SECTION

SECTION 260501 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The drawings are diagrammatic, unless detailed dimensioned drawings are included, and show only approximate locations of equipment, fixtures, panelboards, conduits, and wiring devices. Exact locations are subject to the approval of the Owner's Representative. The general run of electrical feeders, branch circuits, and conduits, indicated on the drawings, is not intended to be the exact routing. Exact routings of conduit shall suit the job conditions.
- B. Circuit designations, in the form of "Home Runs" on branches, indicate the designation of the branch circuit, the size and the quantity of branch circuit conductors, and the panel board or interconnection box from which the branch circuit is served.
- C. Make measurements at the site and in the building during construction for all systems installed as the work progresses in such a manner that the equipment, piping, vents, ducts, conduit, and boxes will fit in the space available. Maintain headroom and if in unfinished areas, be as neatly installed, as obscure and "out-of-the-way" as physically possible. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and /or furnish other equipment as required for ample maintenance space.
- D. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.

1.2 QUALITY ASSURANCE

- A. Electric equipment shall be installed in a neat and workmanlike manner. All methods of construction, details of workmanship, that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative.
- B. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions, etc., correspond to the nomenclature dictated by those manufacturers. Where "or equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.

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1.3 SUBMITTALS

- A. Submit the following equipment, materials and products, including all fittings and accessories:
 - 1. Conduit
 - 2. Expansion Fittings
 - 3. Wireway and Wire Trough
 - 4. Conductors
 - 5. Cables
 - 6. Cable Termination and Splice Kits
 - 7. Wiring Devices
 - 8. Flashing, Sealing, Firestopping Materials
 - 9. Salvageable Materials

1.4 SALVAGEABLE MATERIALS

- A. Salvageable materials will be reviewed and identified by the Owner. Instruction shall be given to the Contractor whether the Owner will remove salvageable materials, or whether Contractor is to remove and deliver salvageable materials to a designated site.
- B. Items normally accepted as salvage by the Owner:
 - 1. All three phase circuit breaker panelboards and covers
 - 2. Circuit breakers
 - 3. Disconnects (100 AMP and up)
 - 4. Motors above 1/2 HP and up
 - 5. Environmental and automation control equipment

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Conduit, Raceway and Tubing:
 - 1. Rigid Metal Conduit shall be hot-dipped galvanized or electro-galvanized steel, UL listed "rigid metal conduit."
 - a. Acceptable Manufacturers:
 - 1) Republic Conduit
 - 2) Allied Tube and Conduit
 - 3) Wheatland Tube Company
 - 4) Approved equivalent
 - 2. Intermediate Metal Conduit shall be hot-dipped galvanized or electro-galvanized steel; UL listed "intermediate metal conduit."

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- a. Acceptable Manufacturers:
 - 1) Republic Conduit
 - 2) Allied Tube and Conduit
 - 3) Wheatland Tube Company
 - 4) Approved equivalent

3. Electrical Metallic Tubing shall be electro-galvanized steel; UL listed "electrical metallic tubing."
 - a. Acceptable Manufacturers:
 - 1) Republic Conduit
 - 2) Allied Tube and Conduit
 - 3) Wheatland Tube Company
 - 4) Approved equivalent

4. Flexible Metal Conduit shall be constructed one continuous length of electro-galvanized, spirally wound steel strip with interlocking convolutions and interior surfaces free from burrs and sharp edges. Shall be UL listed "flexible metal conduit" or "liquidtight flexible metal conduit" as required.
 - a. Acceptable Manufacturers:
 - 1) Republic Conduit
 - 2) Allied Tube and Conduit
 - 3) Wheatland Tube Company
 - 4) American Flexible Conduit Company

5. Electrical Non-Metallic Tubing (ENT) is designed to replace EMT, flexible metal conduit or other raceway or cable systems, for installation in accordance with Article 362 of the National Electrical Code, other applicable sections of the Code, and local codes.
 - a. Any ENT used shall meet the requirements of NEMA TC-13 and shall be listed by Underwriters Laboratories, Inc., as suitable for its intended purpose.
 - b. ENT shall be recognized by a CABO National Evaluation Report for use in one (1) hour and two (2) hour rated construction.
 - c. Penetration of fire rated walls, floors or ceilings shall use classified Through-Penetration Firestop Systems described in the current Underwriters Laboratories Building Materials Directory.
 - d. Fittings and outlet boxes shall be designed for use with ENT and listed by Underwriters Laboratories. All fittings, boxes, and accessories shall be from one manufacturer.
 - e. Only cement recommended specifically for use with the brand of ENT used shall be used.

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f. Unless indicated differently on drawings, ENT systems shall be color coded BLUE for branch and feeder circuit wiring, YELLOW for communications, and RED for fire alarm and emergency systems.

g. Acceptable Manufacturers:

- 1) Carlon
- 2) Approved equal

B. Conduit Fittings:

1. Fittings for rigid metal conduit shall be fully threaded and shall be of the same material as the respective raceway system. Connectors shall also have insulated throat up to and including 1 in. size. For sizes 1-1/4 in. and larger, provide plastic insulating bushing. Die-cast, pressure cast fittings shall not be used. Fittings for rigid non-metallic conduit shall be solvent cemented in accordance with the manufacturer's instructions.

a. Acceptable Manufacturers:

- 1) O.Z. Gedney
- 2) Steel City
- 3) Thomas & Betts
- 4) Crouse-Hinds
- 5) Carlon

2. Expansion Fittings shall be watertight, combination expansion and deflection type designed to compensate for movement in any direction. Fittings shall have flexible copper braid bonding jumpers, neoprene sleeve and stainless steel bands, use aluminum body fittings for rigid aluminum conduit.

a. Acceptable Manufacturers:

- 1) Crouse-Hinds, Type "DX"
- 2) O.Z./Gedney, Type "DX"
- 3) Approved equivalent

C. Wireway and Wire Trough:

1. Wireway and Wire Trough shall be hinged cover type wireway with provisions for full lay-in along the entire length of run. Wireway shall be steel, enclosed with gray enamel finish. Provide JIC sectional NEMA dust resistant, oil tight type where subjected to moisture, in Pump Rooms, Mechanical, Electric and Fan Rooms, exterior walls, Wood Shop, and Maintenance Shop, and similar locations. Size to meet NEC fill requirements or larger as noted on Contract Documents. Provide knockouts along runs. Recess in wall where required for flush mounted equipment. Provide all elbows, tees, pullboxes, fittings, hangers, reducers, supports, supports, etc., to meet installation requirements.

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- a. Acceptable Manufacturers:
 - 1) Square D "Square Duct"
 - 2) General Electric
 - 3) Hoffman
 - 4) Meco

D. Conductors and Cables:

- 1. Conductors shall be insulated for 600 volts, unless otherwise noted, and shall be standard AWG and kcmil sizes. Conductors shall be 98 percent copper, thermal plastic or cross-linked polymer insulated, heat and moisture resistant. Conductor sizes No. 18 AWG and smaller shall be a solid single strand; No. 16 AWG and larger shall be multiple stranded. Minimum conductor size shall be #12 AWG except smaller sizes may be used for communications and special systems. Conductor sizes shall be as called for. Conductors shall be labeled with UL seal and be marked with the manufacturer's name, wire size and insulation type. Insulation for all 600 volt conductors shall be Type THHN/THWN or Type XHHW, unless otherwise noted. Luminaire fixture wire shall conform to the latest Underwriters Laboratories requirements. Flexible cords and cables for general portable use shall be Type "SO" or "SJO." Cables for special use shall be of the type specified for the application.

- a. Color Coding:
 - 1) All circuits shall be color coded according to the following schedule.

	Three Phase 120/208V 240V	Three Phase 277/480V	Single Phase 120/240V
Ground	Green	Green	Green
Neutral	White	Gray	White
A or L1	Black	Brown	Black
B or L2	Red	Orange	Red
C or L3	Blue	Yellow	---

- b. Acceptable Manufacturers:
 - 1) General Cable
 - 2) Prysmian
 - 3) South Wire
 - 4) Okonite
 - 5) Senator

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E. Boxes:

1. Outlet boxes and covers shall be galvanized steel, not less than 1-1/2 in. deep, 4 in. square or octagonal, with knockouts. Outlet boxes exposed to moisture, exterior, wet or damp locations shall be cadmium cast alloy complete with threaded hubs and gasketed screw fastened covers. Minimum box size shall be as indicated in Article 314 of the National Electrical Code for the conductors and devices installed. Boxes shall be approved for the environmental condition where they will be installed.

a. Acceptable Manufacturers:

- 1) Steel City
- 2) Raco
- 3) Appleton
- 4) Crouse Hinds

2. Pull and junction boxes shall be constructed of not less than 14 gauge galvanized steel with trim for flush or surface mounting in accordance with the location to be installed. Provide screw-on type covers. Boxes installed in damp or wet locations shall be of raintight construction with gasketed cover and threaded conduit hubs. In no case shall boxes be sized smaller than as indicated in Article 314 of the National Electrical Code for conduit and conductor sizes installed. Boxes shall be approved for the environmental condition of the location where they will be installed.

a. Acceptable Manufacturers:

- 1) Hoffman
- 2) Keystone
- 3) Approved equivalent

F. Wiring Devices:

1. Wiring Devices (toggle switches, key switches, receptacles, dimmers, and occupancy sensors) shall be specification grade as a minimum. Switch handle and receptacle shall be as directed by the Owner's Representative. Provide device cover plates of satin finish type 302 stainless steel in finished areas and Yorkville "Invisoplage" for round or octagonal boxes only in unfinished areas. Provide neoprene gasketed cast aluminum box with raintight cover for switches and receptacles designated "WP".

a. Although only one manufacturers model number has been noted in each device description, acceptable manufacturers are:

- 1) Pass and Seymour
- 2) Hubbell
- 3) Arrow Hart
- 4) Leviton

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2. Toggle Switches:
 - a. UL verified to meet latest Federal Specification WS-896, NEMA WD-1 and UL Test 20.
 - b. 20 ampere, 1-pole, 120/277 volt: P&S 20AC1.
 3. Receptacles:
 - a. Back and side wiring options which accept No. 14 to No. 10 AWG solid and stranded conductors. One (1) piece plated steel or brass mounting strap. Bronze contacts. Meet requirements of Federal Specification W-C-596 and UL 496.
 - b. NEMA 5-20R, 20 ampere, 125 volt, duplex receptacle: P&S 5362, Hubbell HBL5352, Leviton 5362.
- G. Flashing, Sealing, Fire-stopping:
1. Fire-Stopping for Openings Through Fire and Smoke Rated Wall and Floor Assemblies:
 - a. Provide materials and products listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems". The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.
 - b. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for drywall construction.
 - c. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.
 - d. The methods used shall incorporate qualities, which permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.
 2. Acceptable Manufacturers:
 - a. Dow Corning Fire-Stop System Foams and Sealants
 - b. Nelson Electric Fire-Stop System Putty, CLK and WRP
 - c. S-100 FS500/600, Thomas & Betts
 - d. Carborundum Fyre Putty
 - e. 3-M Fire Products

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Unless otherwise noted, wiring for all systems indicated in the contract documents shall consist of insulated conductors installed in raceways. Raceways shall be continuous from outlet box to outlet box and from outlet box to cabinet, junction or pull box. Secure and bond raceways to all boxes and cabinets so that each system of raceways is electrically continuous throughout. Unless otherwise indicated on the drawings, install all wiring in the following raceway system:
1. Wiring Above 600 Volts in Indoor Dry Locations or Outdoors, Above Grade Locations: Rigid metal conduit or aluminum conduit.
 2. Wiring Above 600 Volts, Below Grade: Intermediate metal conduit.
 3. Wiring 600 Volts or Less in Dry Locations: Electrical metallic tubing.
 4. Wiring 600 Volts or Less in Outdoors, Above Grade Locations: Rigid metal conduit.
 5. Flexible metal conduit shall be used for final connection to all motors, final connection to rotating or vibrating equipment, final connections to dry type transformers and final connections to recessed lighting fixtures. Liquidtight flexible conduit shall be used in all wet or damp locations. Maximum length of flexible conduit shall be 36 in., except that from outlet boxes to lighting fixture maximum length shall be 6 ft. Provide green insulated equipment grounding conductor in all flexible metal conduit.
- B. Raceways:
1. Sized as indicated on the drawings. Where sizes are not indicated, raceways shall be sized as required by the National Electrical Code in accordance with the quantity, size, and type of the insulation conductors to be installed. Raceways shall be minimum 1/2 in. trade size for branch circuit wiring and minimum 3/4 in. trade size for all telephone intercommunications, instrumentation, fire alarm, television and computer systems and for all branch circuit "Home Runs" to panelboards.
 2. Installed to provide adequate grounding between all outlets and the established electrical system ground.
 3. Cut square, free of burrs due to field cutting or manufacture, and bushed where necessary.
 4. Installed with exterior surfaces not less than 6 in. from any surface with normal operating temperature of 200°F or higher.
 5. Plugged at the ends of each roughed-in raceway with an approved cap or disc to prevent the entrance of foreign materials during construction.

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6. Concealed throughout except where exposure is permitted by the Owner's Representative. All exposed raceways shall be painted to match existing adjacent surface finish as directed by the Architect.
7. Installed parallel or perpendicular to floors, walls and ceilings where exposed wiring is permitted.
8. Installed with a minimum of bends and offsets. All bends shall be made without kinking or destroying the cross section contour of the raceway. Factory made bends are acceptable and should be considered for raceways larger than 2".
9. Installed with UL approved rain-tight and concrete-tight couplings and connectors.
10. Firmly fastened within 3 ft. of each outlet box, junction box, cabinet or fitting. Raceways shall not be attached to or supported by wooden plug anchors or supported from mechanical work such as ductwork, piping, etc.
11. Installed with a #14 AWG fish wire in all telephone, intercommunication, "Spare" or "Empty" conduit runs to facilitate future installation of conductors.
12. Installed with expansion fittings at all building expansion joints such that no undue stress is placed on any electrical raceway due to the proper functioning of expansion joints.
13. Arranged in a neat manner for access and allow for access to work installed by other trades.
14. Raceways installed in concrete slabs shall be located so as not to affect structural integrity of slab, and such that conduit shall have a minimum of one inch of concrete cover on all sides. Obtain approval from the Owner's Representative prior to installing conduit larger than 1 in. trade size in concrete slabs. Raceways in slabs shall be for floor box use only.
15. Raceways installed below ground floor slab shall be encased in concrete with 3 in. minimum coverage on all sides. Where possible, install conduit directly below slab with concrete envelope poured monolithic with slab. Where this is not possible, support raceways and envelop maximum 5 ft. - 0 in. on centers from underside of structural slab by means of galvanized pipe hangers. Pipe hangers shall be coated with asphalt mastic. Installation shall maintain integrity of waterproofing membrane.
16. If it is necessary to burn holes through webs of beams or girders, call such points to the attention of the Owner's Representative and receive written approval both as to location and size of hole before proceeding with work. All holes shall be burned no larger than absolutely necessary.
17. Become familiar with the general construction of the building and place sleeves, inserts, etc., as required. All penetrations through existing floors shall be core drilled and sleeved.

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18. Wherever a cluster of four (4) or more raceways rise out of floor exposed, provide neatly formed 6 in. high concrete envelop, with chamfered edges, around raceways.
19. All raceways shall be supported adequately by malleable iron pipe clamps or other approved methods. In exterior or wet locations, supports shall allow not less than 1/4 in. air space between raceway and wall. Firmly fasten raceway within 3 ft. of each outlet box, junction box, cabinet or fitting. The following table lists maximum spacing between conditions, strength of supporting members, etc.
20. Furnish and install such supports at no additional cost to owner.

Conduit Trade Size	Type of Run	Horizontal Spacing in Feet	Vertical Spacing in Feet
1/2 in., 3/4 in.	Concealed	7	10
1 in., 1-1/4 in.	Concealed	8	10
1-1/2 in. and larger	Concealed	10	10
1/2 in., 3/4 in.	Exposed	5	7
1 in., 1-1/4 in.	Exposed	7	8
1-1/2 in. and larger	Exposed	10	10

21. Where raceways puncture roof, install pitch pockets as required in order that the roof warranty is maintained. Coordinate with representative of roofing material manufacturer.
22. At each flush mounted panelboard, terminal cabinet, control cabinet, etc., provide four (4) spare 3/4 in. raceways from panelboard, etc., to an area above the nearest accessible ceiling space. Make 90° turn above the ceiling, arranged for further continuation of raceway, and cap.
23. Provide a bushing at each conduit termination unless fitting at box where conduit terminates has hubs designed in such a manner to afford equivalent protection to conductors. Provide grounding type insulated bushings on all conduit sizes 1-1/4 in. trade size and larger, and on all feeder raceways regardless of size. Provide standard bushings for conduits 1 in. and smaller unless otherwise stated.

C. Wiring Methods:

1. Conductors shall not be installed until raceway system, including all outlets, cabinets, bushings and fittings, is completed. Verify that all work of other trades which may cause conductor damage is completed. Use only U.L. approved cable lubricants when necessary. Do not use mechanical means to pull conductors No. 8 or smaller.
2. In general, conductors shall be the same size from the last protective device to the load.

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3. All wiring systems shall be properly grounded and continuously polarized throughout, following the color-coding specified. Connect branch circuit wiring at panelboards, as required, in order to provide a "balanced" three-phase load on feeders.
4. Provide insulated green ground conductor and white (gray for 277 volt) insulated neutral conductor in each branch circuit.
5. All feeder connections shall be made to bus and other equipment using solderless, pressure type terminal lugs.
6. For splices and taps, No. 10 AWG and smaller, use solderless "twist on" connectors having spiral steel spring and insulated with a vinyl cap and skirt.
7. For splices and taps, No. 8 and larger, use solderless "Split Bolt" type connectors or compression fittings.
8. Use cast connections for ground conductors.
9. Make all splices and connections in accessible boxes and cabinets only.
10. Cover uninsulated splices, joints, and free ends of conductor with rubber and friction tape of PVC electrical tape. Plastic insulating caps may serve as insulation. Heat shrink sleeves shall be acceptable for crimp type splices.
11. On termination at branch circuit outlets, leave a minimum of 8 in. free conductor for installation of devices and fixtures.
12. Feeder conductors shall be continuous from point of origin to load termination without splice. If this is not practical, contact the Owner's Representative and receive written approval for splicing prior to installation of feeder(s). Where feeder conductors pass through junction and pull boxes, bind and lace conductors of each feeder together. For parallel sets of conductors, match lengths of conductors as near equal as possible.
13. Branch circuit conductors installed in panelboards, and control conductors installed in control cabinets and panels shall be neatly bound together using "Ty-Raps" or equivalent.
14. Provide conduit seals and explosion proof devices as indicated on the plans and as dictated by the National Electrical Code for all hazardous locations indicated on the drawings.
15. Lighting fixtures, detectors, etc., in mechanical equipment, boiler and pump rooms shall be installed with exposed wiring after equipment, ductwork, piping, etc., are in place. In general, lighting shall be as located on the drawings; where conflicts exist, locate lights for best distribution.

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16. The following should be permitted to be installed in cable tray systems only under the conditions described in their respective National Electrical Code articles:
 - a. Intermediate metal conduit (Article 345).
 - b. Rigid metal conduit (Article 346).
 - c. Electrical metallic tubing (Article 348).
 - d. Flexible metallic tubing (Article 350).
 - e. Flexible metal conduit (350).
 - f. Liquidtight flexible metal conduit and liquidtight flexible nonmetallic conduit (Article 351).

D. Outlet Boxes:

1. Consider location of outlets shown on drawings as approximate only. Study architectural, process piping, mechanical, plumbing, structural, roughing-in, etc., drawings and note surrounding areas in which each outlet is to be located. Locate outlet so that when fixtures, motors, cabinets, equipment, etc., are placed in position, outlet will serve its desired purpose. Where conflicts are noted between drawings, contact Owner's Representative for decision prior to installation. Comply with Article 370 of National Electrical Code relative to position of outlet boxes in finished ceilings and walls.
2. Prior to installation, relocate any outlet location a distance of five feet in any direction from location indicated on drawings if so directed by the Owner's Representative. Prior to completion of wall construction, adjust vertical height of any outlet from height indicated if so directed by Owner's Representative. The above modifications shall be made at no additional cost to the Owner.
3. Where outlets at different mounting heights are indicated on drawings adjacent to each other (due to lack of physical space to show symbol on drawings), install outlets on a common vertical line.
4. Where switch outlets are shown adjacent to strike side of door, locate edge of outlet box approximately 3 in. from door frame.
5. Outlet boxes in separate rooms shall not be installed "back-to-back" without the approval of the Owner's Representative.
6. Outlet boxes shall be sized to accommodate the wiring device(s) to be installed.
7. Outlet boxes installed in plaster, gypsum board or wood paneled walls shall be installed with raised plaster covers or raised tile covers.

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8. Outlet boxes installed in tile, brick or concrete block walls shall be installed with extra-deep type raised tile covers or shall be 3-1/2 in. deep boxes with square corners and dimensions to accommodate conductors installed.
 9. Surface ceiling mounted outlet boxes shall be minimum 4 in. square, 1-1/2 in. deep, galvanized sheet metal.
 10. Surface wall mounted outlet boxes shall be cast type boxes having threaded or compression type threadless hubs. Exterior boxes shall be cast type with threaded hubs and gasketed cover plates secured by non-ferrous screws.
 11. Floor outlet boxes shall be installed flush with finished floor, adjust level and tile as required. Where finished floor is terrazzo, provide boxes specifically designed for installation in terrazzo. Where floors are to receive carpet, provide floor outlet with carpet flange.
 12. Install a device cover plate over each and every outlet indicated on drawings. Do not install plates until painting, cleaning and finishing of surfaces surrounding the outlet are complete. Install single one-piece multi-gang covers over multi-gang devices.
- E. Receptacles:
1. Provide 20 ampere 125 volt, duplex receptacles unless noted otherwise on the Drawings.
- F. Junction and Pull Boxes:
1. Install junction and pull boxes in readily accessible locations. Access to boxes shall not be blocked by equipment, piping, ducts and the like. Provide all necessary junction or pull boxes required due to field conditions and size as require by the National Electrical Code.
- G. Equipment Mounting Heights:
1. Unless otherwise noted, mount devices and equipment at heights measured from finished floor to device/equipment centerline as follows:
 - a. Toggle switches Above ceiling.
 - b. Receptacle Above ceiling
 - c. Distribution panelboards, to top of backbox 72 in.
 - d. Terminal cabinets, control cabinets, to top of backbox 72 in.
 - e. Disconnect switches, ASD, motor starters 48 in.

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2. Where structural or other interferences prevent compliance with mounting heights listed above, consult Owner's Representative for approval to change location before installation.

H. Hangers and Supports:

1. Provide steel angles, channels and other materials necessary for the proper support and erection of motor starters, distribution panelboards, large disconnect switches, large circuit breakers, pendant mounted lighting fixtures, etc.
2. Panelboards, disconnect switches, circuit breakers, cabinets, large pull boxes, cable support boxes and starters shall be secured to ceiling and floor slab and not supported from conduits. Small panelboards, etc., as approved by Owner's Representative, may be supported on walls. Racks for support of conduits and heavy electrical equipment shall be secured to building construction by substantial structural supports.

I. Identification:

1. Provide engraved lamicoid identification nameplates on main switchboard, main service disconnects and on all panelboards using designation shown in panelboard schedule. Include voltage, phase, equipment served, voltage source to panel or equipment.
2. Provide engraved lamicoid identification nameplates for each circuit breaker in the main distribution panel listing the panelboard or equipment connected to each device.
3. Provide engraved lamicoid identification nameplates on all items of equipment including individual circuit breaker enclosures and disconnect switches, listing the equipment connected to the particular device provided under Specification Section 262000, including, but not limited to: starters, disconnect switches, variable speed drives, circuit breakers, etc. Include voltage, phase, equipment served, voltage source to panel or equipment.
4. Provide complete type written directory for each panelboard listing room number, function, etc, for each circuit breaker. Provide type written updated panelboard directories for existing panelboards affected by this work.
5. Nameplates shall be engraved black, with white core, with Helvetica medium 3/16 in. lettering. 1/8 in. lettering is acceptable where space of 3/16 in. is not available.
6. Identify junction and pullboxes for particular service such as power, lighting, fire alarm, telephone, interphone, public address, nurse call, etc. using stencil lettering on cover.
7. Using dymo tape label all receptacle and switch coverplates, power poles, etc. listing panel designation and circuit number. Dymo tape shall be attached to outside of receptacle or switch coverplates.

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J. Spare Parts:

1. Deliver to Owner and obtain receipt for spare parts including key switches, fuses, etc.

3.2 TESTS

- A. Branch circuits shall be tested during installation for continuity and identification and shall pass operational tests to determine that all circuits perform the function for which they are designed. For all feeder wiring rated 600 volts or less, provide 1,000 volt "Megger" insulation test prior to energizing feeders. Use a 1,000-volt motor driven megger for all tests. Test voltage shall be applied until readings reach a constant value, and until three (3) equal readings, each one (1) minute apart, are obtained. Minimum megger reading shall be 45 megohms for feeder conductors. Document test results and submit for approval prior to energizing conductors.

END OF SECTION

SECTION 262000 - ELECTRIC DISTRIBUTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide a complete distribution system as indicated on the Contract Documents and as specified herein.

1.2 QUALITY ASSURANCE

- A. All methods of construction, details of workmanship, that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions, etc., correspond to the nomenclature dictated by those manufacturers. Where "or equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.
- B. Installation shall be in accordance with NFPA-70 (National Electrical Code), National Electrical Safety Code (NESC), state codes, local codes, and requirements of authority having jurisdiction.
- C. Equipment shall be designed, manufactured, assembled, and tested in accordance with the latest revisions of applicable published ANSI, NEMA, UL and IEEE Standards.

1.3 SUBMITTALS

- A. Submit the following equipment, materials, products, etc.:
 - 1. Switchboard, including the following:
 - a. Manufacturer and equipment type.
 - b. Standard catalog information sheet.
 - c. Detailed shop drawings indicating plan, elevation, end and isometric views.
 - d. Single-line diagram.
 - e. Complete Bill of Materials.
 - 2. Distribution switchboard.
 - 3. Distribution and branch circuit panelboards.
 - 4. Over-Current Device Information

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5. Enclosed circuit breakers.
6. Motor starters, contactors and relays.
7. Disconnect switches.
8. Adjustable Speed Drives.
9. Submit documentation of all grounding tests.
10. Surge Protective Devices.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Distribution Switchboard:

1. Provide distribution switchboard as specified and scheduled herein and shown on the associated drawings. The switchboard shall meet Underwriter's Laboratories enclosure requirements and be furnished with an Underwriter's Laboratory label for service entrance equipment.
2. The switchboard shall be dead front with front accessibility only required. The switchboard framework shall consist of steel channels welded or bolted to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting. The framework is to be formed, code gauge steel, rigidly welded and bolted together to support all cover plates, bussing and component devices during shipment and installation. Each switchboard section shall have an open bottom and an individual removable top plate for installation and termination of conduit. Top and bottom conduit areas are to be clearly shown and dimensioned on the shop drawings. The wireway front covers are to be hinged to permit access to the branch circuit breaker load side terminals without removing the covers. All front plates used for mounting meters, selector switches or other front mounted devices shall be hinged with all wiring installed and laced with flexibility at the hinged side. All closure plates shall be screw removable and small enough for easy handling by one man. The paint finish shall be grey ANSI Standard No., 61 enamel over a rust-inhibiting phosphate primer.
3. The switchboard bussing shall be plated copper and of sufficient cross-sectional area to continuously conduct rated full load current with a maximum average temperature rise of 50°C above an ambient temperature of 25°C. Provide grounding bus. The main horizontal or through-bus shall be rated as indicated on the drawings. The bus bars shall be rigidly braced to comply with the withstand rating of the switchboard. The main horizontal bus bars between sections shall be located at the back of the switchboard to permit a maximum of available conduit area. The end section shall have bus bar provisions for the addition of a future section. The provisions shall include the bus bars installed and extended to the extreme side of the section and fabricated in such a fashion that the addition of a future section would require only the installation of a single splice bus connection per phase and neutral. The horizontal main bus bar supports,

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connections, and joints shall be bolted with carriage bolts and Belleville washers. The vertical bus shall be the same rating as the horizontal bus.

4. Each switchboard, as a complete unit, shall be given a single withstand short circuit current rating by the manufacturer. The withstand short circuit current rating shall certify that all equipment is capable of withstanding the stresses of a fault equal to the interrupting capacity rating of the smallest overcurrent protective device contained therein. Such rating shall be established by actual tests by the manufacturer on equipment constructed similarly to the subject switchboard. This test data shall be available and shall be furnished to the Architect/Engineer with the shop drawings submittal.
 5. Main disconnect device shall be a molded case circuit breaker totally front accessible and front connectable.
 6. Distribution molded case circuit breakers shall be group mounted and shall be totally front accessible and front connectable. The circuit breakers shall be mounted in the switchboard to permit installation, maintenance and testing without reaching over any line side bussing. The circuit breakers shall be removable without disturbing either the line side or load side cable terminations and all line and load side connections are to be individual to each circuit breaker. No common mounting brackets or electrical bus connectors will be acceptable. Line side circuit breaker connections shall be bolt-on type. Provide an externally operable mechanical means to trip the circuit breaker, enabling maintenance personnel to verify the ability of the circuit breaker trip mechanism to operate as well as exercise the breaker latch and operating mechanisms. Each type of circuit breaker assembly shall have undergone and passed heat tests according to UL test procedures and be UL Listed.
 7. Ratings shall be as indicated in the Contract Documents. Circuit breakers within the switchboard shall be fully rated for the scheduled interrupting rating. Reducing breaker ratings on the basis of "series rating" is not acceptable.
 8. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:
 - a. Square D "QED Power-Style".
 - b. Eaton Corporation "Pow-R-Line".
 - c. General Electric "AV-Line".
 - d. Siemens "SB Series".
- B. Distribution Panelboards (Nominal 600 Volt):
1. Provide distribution panelboards as indicated in the "Panelboard Schedule" and as located on the drawings. Panelboards shall be equipped with quick make/quick break thermal magnetic, molded case circuit breakers as scheduled.
 2. Panelboard bussing and lugs shall be copper. Provide grounding bus in each panelboard, securely bonded to the box. Panelboard bus structure, main lugs, and main breaker shall have current ratings as indicated. Such ratings shall be

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established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 50°C rise above ambient.

3. Circuit breakers shall be equipped with individually insulated, braced and protected connectors. Large permanent, individual circuit numbers shall be affixed to each breaker in a uniform position. Tripped indication shall be clearly shown by the breaker handle taking a position between "ON" and "OFF". Provisions for additional breakers shall be such that no additional connectors will be required to add breakers.
4. Each panelboard, as a complete unit shall have a short circuit rating equal to or greater than the rating shown on the Panelboard Schedule. All panelboards shall be fully rated. "Series Ratings" are NOT acceptable. The use of series rating of panelboards for short circuit rating is not acceptable.
5. Panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL Standard 50 for cabinets. The size of wiring gutters shall be in accordance with UL Standard 67. Cabinets shall be equipped with locks and all locks shall be keyed alike. End walls shall be removable. Fronts shall be of code gauge, full-finished steel with rust-inhibiting primer and baked enamel finish.
6. The panelboard interior assembly shall be dead front with panelboard front removed. Panelboard front shall be door in door construction with full length piano-hinge. Main lugs or main breakers shall be barriered on five (5) sides. The end of the bus structure opposite the mains shall be barriered.
7. Panelboards shall be UL listed for use intended.
8. Ratings shall be as indicated in the contract documents.
9. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:
 - a. Square D "I-Line".
 - b. Eaton Corporation "PRL3".
 - c. General Electric "CCB".
 - d. Siemens.

C. Branch Circuit Panelboards (480Y/277 volt):

1. Provide branch circuit panelboard as indicated in the "Panelboard Schedule" and as located on the drawings. Panelboards shall be equipped with quick make/quick break thermal-magnetic, molded case circuit breakers as scheduled.
2. Panelboard bussing and lugs shall be copper. Provide grounding bus in each panelboard, securely bonded to the box. Panelboard bus structure and main lugs or main circuit breaker shall have current ratings as indicated. Such ratings shall be established by heat rise tests, conducted in accordance with UL Standard 67.

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3. Provisions for additional circuit breakers shall be such that field addition of connectors or mounting hardware will not be required to add circuit breakers to the panelboard. Bus connections shall be bolt-on.
4. Each panelboard, as a complete unit, shall have a short circuit current rating equal to or greater than the rating shown on the Panelboard Schedule or on the plans. All panelboards shall be fully rated. "Series Ratings" are NOT acceptable. Reducing breaker ratings on the basis of series rating is not acceptable.
5. The panelboard bus assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be specified in UL Standard 50 cabinets. Wiring gutter space shall be in accordance with UL Standard 67 for panelboards. Each front shall include a door and have a flush, stainless steel, cylinder type lock with catch and spring-loaded door pull. All panelboard locks shall be keyed alike. Doors shall be mounted by completely concealed steel hinges. A circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door. Fronts shall be of code gauge, full-finished steel with rust inhibiting iron phosphate sealer and baked enamel finish. Minimum box width shall be 20 in.
6. Ratings shall be as indicted on the Panelboard Schedule.
7. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - a. 480Y/277 Volt:
 - 1) Square D "NF".
 - 2) Eaton Corporation "PRL2".
 - 3) General Electric "AE".
 - 4) Siemens.

D. Circuit Breakers:

1. Circuit breakers below 400 amp frame shall be molded case with inverse time and instantaneous tripping functions, unless indicated otherwise in contract documents.
2. Circuit breakers 400 amp frame and above shall be equipped with adjustable solid state trip units with ground fault, short time, short time delay, long time, long time delay, front adjustable, programmable with handheld unit and instantaneous trip functions as indicated.
3. Branch circuit breakers shall be quick-make, quick-break, thermal-magnetic and trip indicating, and multipole breakers shall have common trip. Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" at 120V ac or 277 V ac and carry the SWD marking.
4. Ratings shall be as indicated in the Contract Documents.

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5. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:
 - a. Square D Micrologic trip unit.
 - b. Eaton Corporation Optim 550 trip units for circuit breakers 400 - 1600 amp frame or RMS 610 trip units for 2000 amp frame to 6000 amp frame
 - c. General Electric Spectra RMS or MicroVersa trip unit.
 - d. Siemens Sentron Sensitrip III trip unit.

6. Enclosed circuit breakers shall be molded case, thermal-magnetic type, ratings as noted, with overcenter, trip-free, toggle-type operating mechanism, quick make/quick break action and positive handle indication. Multiple pole breakers shall be common trip type. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. Provide provisions for padlocking in the "off" position. Breakers shall be calibrated for operation in an ambient temperature of 40°C and shall be suitable for mounting and operating in any position. Breakers shall have removable lugs, UL listed for copper and aluminum conductors. Breakers shall be installed in NEMA 1 general purpose, surface enclosures, unless otherwise noted.
 - a. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - 1) Square D
 - 2) Cutler Hammer
 - 3) General Electric
 - 4) Siemens

- E. Motor Starters:
 1. Provide motor starters, disconnect switches, etc. as listed on the Electric Equipment and Control Schedule on the drawings.
 2. Starters, contactors and controllers shall comply with NEMA standards having general purpose NEMA 1 or 1B enclosure unless otherwise called for. Starters shall be minimum NEMA size 0 with solid state overloads in each phase sized per NEC, motor full load amperage, service factor, and motor operating conditions.
 3. Pad lock arrangements shall be provided to lock the disconnect device in the "off" position. Magnetic starters shall be provided with a control power transformer with 120V secondary and primary and secondary fusing and be sized to accept the loads imposed there on. Starters shall have LED type pilot lights. Each starter subject to electrical interlock and/or automatic control shall have necessary auxiliary contacts.
 4. Auxiliary Devices: Provide pushbutton stations, pilot lights, devices, relays, transformers, selector switches, electric thermostats, auxiliary starter contacts as required for functions called for. Provide separate relay for each speed to operate electric dampers or other devices as required for multispeed motor circuit.

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5. Manual Motor Starter:
 - a. Provide all starters with thermal overload(s); and pilot light(s) and handle lock-out provisions. Gang starter with selector switch for multispeed applications. Provide single or 2-pole as required:
 - 1) 120 volt, single-pole, surface mounted: Square-D FG-5P and handle guard.
 - 2) 240 volt, two-pole, surface mounted: Square-D FG-6P and handle guard.
 6. Manual Motor Starter - Speed Controller: Shall be similar to "Manual Motor Starter", above, except two-gang with motor speed control sized to handle motor indicated, with positive full on and full off bypass of speed control unit.
 7. Combination Magnetic Starter: Shall be similar to "Magnetic Starter", above, except shall include disconnect switch thermal magnetic circuit breaker connected ahead of starter. The disconnect handle shall be in control of the disconnect device with the door open or closed. Disconnect handle shall be clearly marked as to whether the disconnect device is "on" or "off".
 8. Packaged Control Unit: Shall be furnished and mounted by others, and installed and connected by Electrical Contractor. Generally consists of one or more starters, disconnect switches and additional control devices prewired.
 9. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:
 - a. Square-D
 - b. Cutler Hammer
 - c. General Electric
 - d. Allen-Bradley
 - e. Siemens
- F. Disconnect Switches:
1. Shall be heavy-duty type three-pole, with "Quick Make/Quick Break" operating handle mechanically interlocked with the cover, horsepower and voltage rated to match equipment served. Where indicated switches shall be provided with dual-element, time delay, rejection type fuses. Switches shall be installed in NEMA 1, General Purpose Surface Enclosures, unless otherwise noted. Provide provisions for padlocking in the "off" position. Provide neutral bar in single phase or three phase, four wire circuits, and ground bar in all switches. Provide auxiliary contacts where called for.
 2. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - a. Square-D.
 - b. Cutler Hammer.

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- c. General Electric.
 - d. Siemens.
- G. Fuses:
 - 1. All fuses rated 600 volts and below shall be rejection type dual-element, time-delay type. Provide two (2) complete sets of fuses for all fusible disconnect switches. Deliver spare fuses to the Owner and obtain receipt.
 - 2. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - a. Fuses 600 Amperes and Below: Bussman Type FRS-R (600 volts), Bussman Type FRN-R (300 volts) or equivalent.
 - b. Fuses Rated Above 600 Amperes: Bussman Type KRP-C or equivalent.

2.2 SHORT CIRCUIT LEVELS AND COORDINATION STUDY

- A. The Contractor shall adjust and program all overcurrent devices. The Engineer will provide the settings/ratings of the fuses, relays and circuit breaker trip units to the Contractor.
- B. The Contractor shall submit a product information for each overcurrent device including the following:
 - 1. Device name (load served), manufacturer, model number/type, trip unit model number, time current curve (TCC) with TCC number, and available settings and parameters.
 - 2. Overcurrent device instantaneous selectivity tables.
 - 3. Feeder length and size.
- C. Arc Flash stickers will be provided by Engineer; Contractor shall apply stickers to devices as required.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All equipment shall be grounded per the NEC.
- B. Electrical distribution equipment shall have lugs/terminations suitable for the indicated conductor size. Where conductors have been oversized for voltage drop and where approved by the Engineer it shall be allowed to reduce the conductor size using hydraulically crimped splice in a box next to the distribution equipment to allow for standard lug termination.
- C. Distribution switchboards, motor control centers and floor mounted dry-type transformers shall be mounted on 4 in. high concrete pads which shall extend 3 in. on all sides. Securely bolt the unit to the pads for proper horizontal and vertical alignment.

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D. Adjustable Speed Drives:

1. Set in place controllers on 4 in. high concrete base, on wall or freestanding steel frame as required. Completely erect and assemble, including shipping splits and make respective connections from terminal or terminal strips to any miscellaneous control devices.
2. Provide respective line side power supply connections to load side power terminals. Adjust unit controls in accordance with manufacturer's instructions.
3. Adjust unit controls in accordance with manufacturer's instructions.
4. A factory-trained manufacturer's service representative shall provide complete start-up services at the site during construction plus a separate (after startup on a 100% correctly operating drive) 4 hour training session for the Owner. Coordinate start-up and controls with Division 23 Contractor.
5. Equipment manufacturer to provide a one (1) year full parts and labor warranty from date of start-up and Owner acceptance.

E. Identification:

1. Identify all items of equipment as described in Section 260501-3.1, Identification.

3.2 ELECTRICAL LOAD TEST

A. Conduct a load test prior to request for final payment and comply with the following:

1. Energize maximum normal light and power load for a period of two hours when scheduled.
2. Record voltage at service and at each panel.
3. Measure current in each phase of all feeders.
4. Adjust transformer taps as directed by engineer after review of report.
5. Provide and install all necessary metering equipment.
6. Owner's Representative or Site Representative shall witness the test.
7. Before final acceptance specified test shall be completed to the satisfaction of the Owner's Representative who shall be sole judge of the acceptability of such tests and who may direct the performance of such additional tests as deemed necessary in order to determine the acceptability of the systems, equipment, material and workmanship. Additional tests required by the Owner's Representative shall be provided at no additional cost. Protective equipment shall be actuated in a manner that clearly demonstrated their workability and operation.

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3.3 SPARE PARTS

- A. Deliver loose equipment to the Owner and obtain receipt for fuses, keys to panelboards, etc.

END OF SECTION

SECTION 283103 - FIRE ALARM SYSTEM - EXISTING HARDWIRED SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide labor, materials, equipment and services to perform operations required for the expansion of the existing fire alarm system and related Work required in these Contract Documents.

1.2 QUALITY ASSURANCE

- A. All methods of construction, details of workmanship that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions, etc. correspond to the nomenclature dictated by those manufacturers. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.
- B. Installation shall be accordance with NFPA-70 (National Electrical Code), state codes, local codes, and requirements of authority having jurisdiction.
- C. Equipment shall be designed, manufactured, assembled, and tested in accordance with the latest revisions of applicable published ANSI, NEMA, UL and IEEE Standards.
- D. Contractor shall be a licensed fire alarm installer in the State of New York.
- E. Items specified shall match the existing fire alarm system to maintain one fire alarm system in the facility. No other makes of duct smoke detectors will be allowed other than recommended by existing fire alarm control panel manufacturer.

1.3 GENERAL DESCRIPTION

- A. The existing fire alarm panel shall have its capabilities to include additional duct smoke detectors.
- B. The following work is proposed:
 - 1. Provide duct smoke detectors Provide the additional modules required to the existing fire alarm control panel as required.
- C. Before any work is accomplished on the existing system, a thorough testing shall be done on the system to conform to NFPA 72. A test report shall be completed and submitted to the engineers for review. Once the preliminary testing is found to be acceptable, work can proceed on the existing system. An additional test will be performed after the work is complete.

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1.4 SUBMITTALS

- A. Complete equipment list including quantities. Catalog descriptive literature for all equipment. Typical Terminal Wiring Diagram of device. Submittals that fail to comply with the requirements described will be rejected.

PART 2 - PRODUCTS

2.1 MODIFICATIONS TO THE EXISTING FIRE ALARM CONTROL PANEL

- A. Provide the necessary initiation modules for the additional devices required. Each individual function shall be provided by solid state plug-in panels or modules. Removal of any plug-in module shall cause a trouble signal to sound. End of line resistors shall be located in the Fire Alarm Control Panel. All detector initiation zone modules shall use a second alarm verification technique prior to initiating an alarm condition. The first alarm shall activate a pre-alarm window and cause a trouble indication. Only a second alarm during the alarm verification window shall cause the system to alarm. Provide supplementary control modules as required and shown by riser diagram for control of magnetic door holders, duct smoke dampers, fan shutdown.
- B. Provide separate visible and audible alarm, trouble and supervisory indication for each of the following circuits:

2.2 VENTILATION FAN SHUTDOWN CONTROL

- A. Provide additional normally closed relays, wiring and connection into the fan motor control circuits ahead of all automatic devices for the additional fans added as a part of this contract. Sequence fan shutdown for every air distribution system over 2000 CFM. Provide drill bypass feature, locate switch on Fire Alarm Control Panel and label "DRILL-FAN SHUTDOWN BYPASS." Buzzer shall sound continuously while in bypass mode. Provide fan reset feature, locate switch on Fire Alarm Control Panel and label "FAN RESET."

2.3 DUCT-TYPE SMOKE DETECTOR

- A. Detectors shall operate on the "photoelectric" principle that shall be activated by the presence of combustion products. Upon activation, the detector shall operate its associated alarm circuit and illuminate the integral alarm indicator light. The alarm indicator light shall not extinguish until the Fire Alarm Control Panel has been reset. The detector shall contain a solid state LED and a high speed light sensing photodiode within the smoke sensing chamber. The photodiode shall accelerate the LED light burst rate when smoke enters the chamber. An alarm shall be activated when several consecutive pulses verify the existence of smoke. Reset shall be accomplished at the Fire Alarm Control Panel. Provide lock-in feature. Provide a calibrated test feature capable of simulating a maximum acceptable amount of smoke for alarm. Detectors shall operate from a nominal 10 to 30 volt DC power supply. Detectors shall be designed for twistlock mounting to a separate base assembly. Provide complete with sampling tubes. Size sampling tubes for 80% of the width of the duct. Locate in ductwork where shown on the Drawings. Provide auxiliary contacts as required for fan shutdown and smoke damper operation. Provide a remote indicating light directly below each duct detector and mount on the underside of the ceiling where the detector is concealed.

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- B. Design Equipment: Coordinate with mechanical equipment requirements.

PART 3 - EXECUTION

3.1 INSTALLATION, EQUIPMENT

- A. All installations shall be accompanied in a professional manner by qualified personnel regularly engaged in and experienced in this type of Work. All fire alarm installers shall possess a state license for installation of fire alarm systems where required. Install all wiring in accordance with manufacturer's recommendations. All wiring shall be copper and installed in EMT conduit in a separate and segregated system. Provide minimum #16 AWG for station circuits, minimum #14 AWG for signal and detector circuits and minimum #12 AWG for power supply circuits. Provide three 20 ampere, 120 volt circuits to the Fire Alarm Control Panel, one for power for the power extender, one for fan shutdown and one for door release.
- B. Provide all wiring to the smoke dampers installed by others. Wire to the damper junction box with flexible conduit and wire; provide box or boxes as required. Install according to N.E.C. Article 300-22. Smoke dampers shall operate only when its associated smoke duct detector is in alarm.
- C. All wiring shall conform to NEC Articles 725 and 760, and to NFPA-72, "National Fire Alarm Code". Detection and initiating equipment shall be listed by UL or approved by FM. Total assembly shall be secure, smooth contour and have no protrusions. Provide wire guards on detectors where called for. Where detectors are installed on wood or masonry surfaces, attach brackets directly to the surface with tamperproof fasteners. Where detectors are installed on suspended ceilings, provide additional supports in the ceiling, such as channel support system, angle iron or additional runner bars. Fasten the additional supports rigidly to the ceiling runner bars. Fasten the additional supports rigidly to the ceiling runner bar system. Attach bracket to the supports with tamperproof fasteners. Install metal spacers between the bracket and supports so that the ceiling tiles will not be a part of the support system.
- D. An auxiliary fire alarm relay used to control an emergency control device that provides any control functions described in this specification shall be located within three feet of the emergency control device.

3.2 TESTING AND INSTRUCTION

- A. Test and reprogram existing fire alarm system and guarantee for a period of one year after Owner's Representative written acceptance.
- B. Prior to request for final payment submit bound Operator Manuals as specified in other sections of these Specifications that shall include as a minimum:
 - 1. Bill of Material.
 - 2. Manufacturer's equipment description for each type of device and each Fire Alarm Control Panel initiation and control module type used.

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3. Record Drawings for fire alarm wiring diagrams showing typical connection diagrams of device. Record Drawings for fire alarm wiring diagram shall show all terminal connections at the Fire Alarm Control Panel.
4. Instruction report stating when instruction was given and who was in attendance, signed by the Owner's Representative.
5. Written test report from an authorized representative of the equipment manufacturer that device and overall system operation has been 100% tested and approved by the manufacturers.
6. Certificate of Completion as described in NFPA-72, Section 1-7.2.

END OF SECTION

HVAC Testing and Design
Purchase College – State University of New York
Purchase, Hamlet of the Town of Harrison
Westchester County

ASBESTOS SCREENING REPORT

May 2011

Prepared By:



**Engineering and
Land Surveying, P.C.**

1533 Crescent Road
Clifton Park, NY 12065

Prepared For:

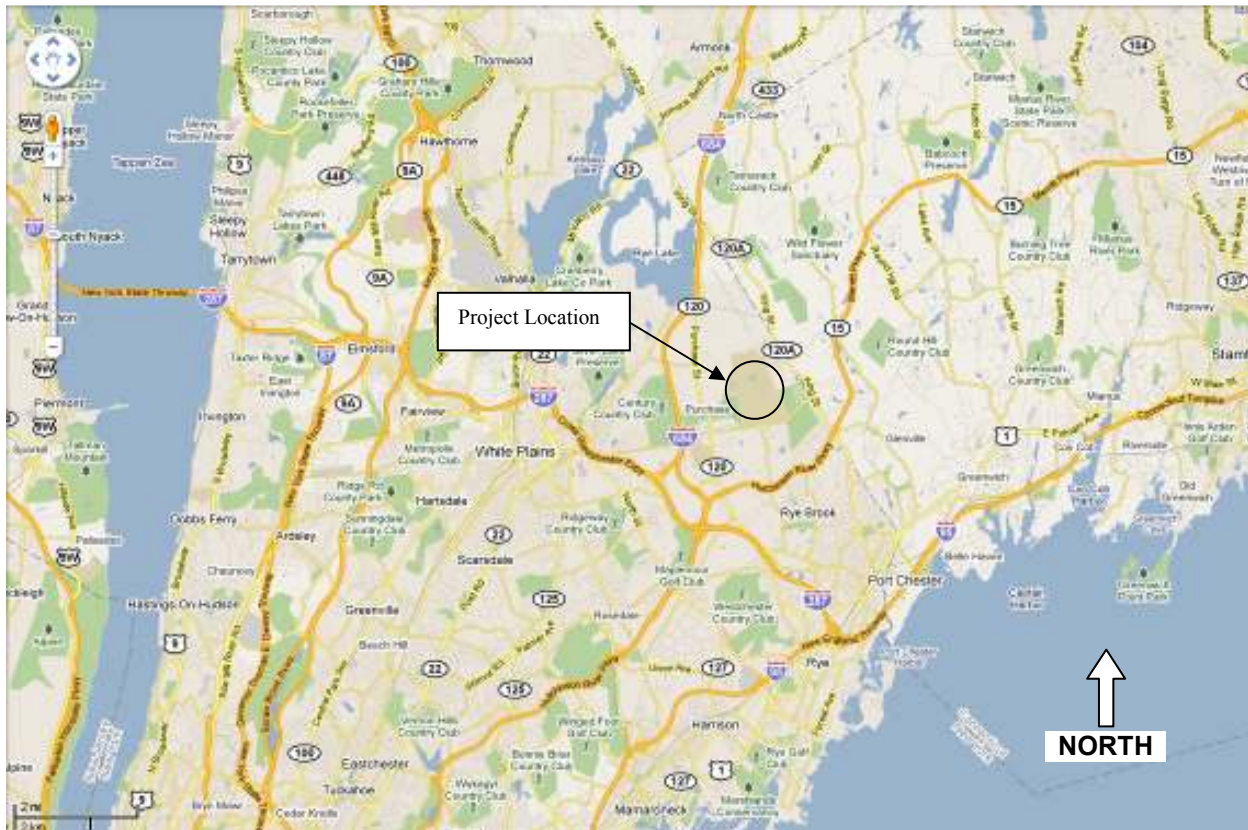
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&
Purchase College – State University of New York
735 Anderson Hill Road
Purchase, New York 10577

I. INTRODUCTION

M/E Engineering, PC (M/E) is currently testing the operation of existing Heating, Ventilating, and Air Conditioning (HVAC) units in various buildings located on the Purchase College campus (See figure 1). These HVAC units may require modifications as a result of the performance testing. MJ Engineering and Land Surveying, PC (MJ) was retained by M/E to survey the HVAC units in the Natural Sciences, Music and Social Sciences buildings on the Purchase College campus for suspected asbestos containing materials (ACM) that could be disturbed as a result of the proposed modifications.

The survey was performed by MJ, accompanied by M/E, on March 29, 2011. During the site visit, MJ performed visual observations of suspect ACM and collected 34 samples to determine whether asbestos was present.

II. ON-SITE SURVEY FOR ACM'S



Project Location Map

Figure 1

Asbestos Screening:

On March 29, 2011, Chad W Schneider, a certified New York State Department of Labor (NYSDOL) and United States Environmental Protection Agency (USEPA) Asbestos Inspector screened the existing HVAC units in the Natural Sciences, Music and Social Sciences buildings for suspected ACM.

MJ was shown the locations of the units to be tested by M/E personnel. During the on-site survey, the insulation and mastic utilized to attach the insulation inside the HVAC units were believed to be suspect ACM's. Photographs of this site are included in Appendix A.

The Natural Sciences building contained one HVAC unit that has the potential to be disturbed. The Music and Social Sciences buildings each contained three HVAC units that have the potential to be disturbed. Three samples of the suspected ACM were collected from each unit.

Sample numbers are as follows:

Building	Sample Numbers	
	Insulation	Mastic
Natural Sciences	NS-D#	NS-M#
Music	M-D#	M-M#
Social Sciences	SS-D#	SS-M#

The suspected ACM samples collected were then relinquished to the following New York State Department of Health (DOH) approved analytical laboratory for analysis:

EMSL ANALYTICAL, INC
307 WEST 38TH STREET
NEW YORK NY 10018

In order to qualify as an ACM in New York State, the material shall contain greater than 1% asbestos. All samples collected and analyzed were either negative for asbestos or contained less than 1% asbestos. The analytical results are included in Appendix B. Therefore, all samples were considered to not contain asbestos per the standards set forth by the NYSDOL.

Conclusions and Recommendations:

Based on the analytical results, the materials tested are not considered ACM.

APPENDIX A
PHOTOGRAPHS



Photo #1 – Typical HVAC unit



Photo #2 – Typical HVAC unit insulation



Photo #3 – Typical HVAC unit insulation and mastic (red)

APPENDIX B
ANALYTICAL RESULTS

1146 Central Ave, Albany New York 12205 Ph: 518 453-0146
Fax: 518 453-0175

**Alpine
Environmental
Services, Inc.**

Fax

To: Chad Schneider **From:** Alpine Lab

Fax: 371-0822 **Pages:** 9 (incl. cover)

Phone: **Date:** 4/6/2011

Re: **CC:**

Urgent **For Review** **Please Comment** **Please Reply** **Please Recycle**

• **Comments:** Enclosed you will find the results for SUNY Purchase.

Confidentiality Warning: This message is intended for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt for disclosure under applicable law. If the reader of this message is not the intended recipient or the employee or agent responsible for delivery of the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone and return the original message to us at the above address.

031109345

Alpine Environmental Services, Inc.
1146 Central Avenue
Albany, NY 12205

enst.ny.4-4-11

Phone: (518) 453-0146
Fax: (518) 453-0175
email: lab@alpineenv.com

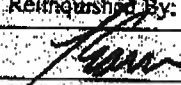
CHAIN OF CUSTODY

Client: Alpine Environmental Services, Inc. Project: SUNY Purchase
1146 Central Ave.
Albany, NY 12205 Project Number: 11-11125-A
Contact: Jeff Eames PCM Lab QA/OC Officer Sampled By: Client
Phone/Fax: (518) 453-0146/0175 Date / Time Collected: 3/29/11
Delivery Method: UPS FedEx USPS Tracking #: 794268013163

ALL NEGATIVE PLM NOB'S ARE TO IMMEDIATELY GO TO TEM AT 24HR TAT
Turnaround Time: Immediate 24HR 48HR 72HR Other: _____

Log No.	Sample No.	Sample Location	Sample Material	Analysis	Comments
	NS-D1	AC3 Supply	Insulation	NYS PLM	
	NS-D2	AC3 Return	Insulation	NYS PLM	
	NS-D3	Other Duct	Insulation	NYS PLM	
	NS-M1	AC3 Supply	Mastic	PLM/TEM	
	NS-M2	AC3 Return	Mastic	PLM/TEM	
	NS-M3	Other Duct	Mastic	PLM/TEM	
	M-D1	AC3 Z1 Supply	Insulation	NYS PLM	
	M-D2	AC3 Z2 Supply	Insulation	NYS PLM	
	M-D3	AC3 Z3 Supply	Insulation	NYS PLM	
	M-M1	AC3 Z1 Supply	Mastic	PLM/TEM	
	M-M2	AC3 Z2 Supply	Mastic	PLM/TEM	
	M-M3	AC3 Z3 Supply	Mastic	PLM/TEM	

Disposition of Samples: Accept _____ Reject _____ Comments: _____

Relinquished By: 	Received By: <u>S. V. S. W. N. E. Z</u>	Date: <u>4/5</u>	Time: <u>10:28 AM</u>
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031109345

Alpine Environmental Services, Inc.
 1146 Central Avenue
 Albany, NY 12205

encl ny 4-4-11

Phone: (518) 453-0146
 Fax: (518) 453-0175
 email: lab@alpineenv.com

CHAIN OF CUSTODY

Client: Alpine Environmental Services, Inc. Project: SUNY Purchase
1146 Central Ave.
Albany, NY 12205
 Contact: Jeff Eames PCM Lab OA/OC Officer Project Number: 11-11125-A
 Phone/Fax: (518) 453-0146/0175 Sampled By: Client
 Delivery Method: UPS FedEx USPS Date / Time Collected: 3/29/11
 Tracking #: 794268013163

ALL NEGATIVE PLM NOB'S ARE TO IMMEDIATELY GO TO TEM AT 24HR TAT
 Turnaround Time: Immediate 24HR 48HR 72HR Other: _____

Log No.	Sample No.	Sample Location	Sample Material	Analysis	Comments
	M-D4	AC3 Return	Insulation	NYS PLM	
	M-M4	AC3 Return	Mastic	PLM/TEM	
	M-D5	AC2 Return	Insulation	NYS PLM	
	M-D6	AC2 Supply	Insulation	NYS PLM	
	M-M5	AC2 Return	Mastic	PLM/TEM	
	M-M6	AC2 Supply	Mastic	PLM/TEM	
	M-D7	AC1 Supply	Insulation	NYS PLM	
	M-D8	AC1 Supply	Insulation	NYS PLM	
	M-D9	AC1 Return	Insulation	NYS PLM	
	M-M7	AC1 Supply	Mastic	PLM/TEM	
	M-M8	AC1 Supply	Mastic	PLM/TEM	
	M-M9	AC1 Return	Mastic	PLM/TEM	

Disposition of Samples: Accept _____ Reject _____ Comments: _____

Relinquished By: <u>[Signature]</u>	Received By: <u>S Vasquez</u>	Date: <u>4/5</u>	Time: <u>10:28 AM</u>
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031109345

Alpine Environmental Services, Inc.
 1146 Central Avenue
 Albany, NY 12205

emsl.ny 4-4-11

Phone: (518) 453-0146
 Fax: (518) 453-0175
 email: lab@alpineenv.com

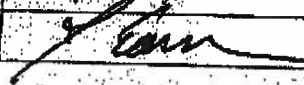
CHAIN OF CUSTODY

Client: Alpine Environmental Services, Inc. Project: SUNY Purchase
1146 Central Ave.
Albany, NY 12205
 Contact: Jeff Eames PCM Lab OA/OC Officer Project Number: 11-11125-A
 Phone/Fax: (518) 453-0146/0175 Sampled By: Client
 Delivery Method: UPS FedEx USPS Date / Time Collected: 3/29/11
 Tracking #: 794268013163

ALL NEGATIVE PLM NOB'S ARE TO IMMEDIATELY GO TO TEM AT 24HR TAT
 Turnaround Time: Immediate 24HR 48HR 72HR Other:

Log No.	Sample No.	Sample Location	Sample Material	Analysis	Comments
	SS-D1	AC2 Return	Insulation	NYS PLM	
	SS-D2	AC1 Supply	Insulation	NYS PLM	
	SS-D3	O/S AC2 & 3 Supply	Insulation	NYS PLM	
	SS-D4	AC3 Supply	Insulation	NYS PLM	
	SS-D5	AC3 Return	Insulation	NYS PLM	
	SS-M1	AC2 Return	Mastic	PLM/TEM	
	SS-M2	AC1 Supply	Mastic	PLM/TEM	
	SS-M3	O/S AC2 & 3 Supply	Mastic	PLM/TEM	
	SS-M4	AC3 Supply	Mastic	PLM/TEM	
	SS-M5	AC3 Return	Mastic	PLM/TEM	

Disposition of Samples: Accept _____ Reject _____ Comments: _____

Relinquished By: 	Received By: SYASLOWE	Date: 7/5	Time: 10:28 AM
---	--------------------------	--------------	-------------------

031109345



EMSL Analytical, Inc.
 307 West 38th Street, New York, NY 10018
 Phone: (212) 260-0058

Attn: **Alpine Environmental Services**
 1146 Central Ave
 Albany, NY 12205

Customer ID: ALP150
 Customer PO:
 Received: 04/05/11 10:28 AM
 EMSL Order: 031109345
 EMSL Proj:

Fax: (518) 453-0175
 Phone: (518) 453-0146
 Project: 11-11125-AJ SUNY PURCHASE

Test Report: Asbestos Analysis of Bulk Material

Sample Description	Test	Analyzed Date	Color	Fibrous	Non Asbestos	Non-Fibrous	Asbestos	Comments
NS-D1 031109345-0001	PLM NYS 198.1 Friable	4/5/2011	Black	85.00% Min. Wool		15%	None Detected	
AC3 SUPPLY/ INSULATION	PLM NYS 198.6 NOB							
NS-D2 031109345-0002	TEM NYS 198.4 NOB					N/A		Not Analyzed
AC3 RETURN/ INSULATION	PLM NYS 198.1 Friable	4/5/2011	Black	80.00% Min. Wool		20%	None Detected	Not Analyzed
NS-D3 031109345-0003	PLM NYS 198.6 NOB							
OTHER DUCT/ INSULATION	TEM NYS 198.4 NOB					N/A		Not Analyzed
NS-M1 031109345-0004	PLM NYS 198.1 Friable	4/5/2011	Black	80.00% Min. Wool		20%	None Detected	Not Analyzed
AC3 SUPPLY/ MASTIC	PLM NYS 198.4 NOB					N/A		Not Analyzed
NS-M2 031109345-0005	PLM NYS 198.1 Friable					N/A		Not Analyzed
AC3 RETURN/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Red /Black			N/A	Inconclusive: None Detected	Not Analyzed
NS-M3 031109345-0006	TEM NYS 198.4 NOB	4/8/2011	Red /Black			N/A		
OTHER DUCT/ MASTIC	PLM NYS 198.1 Friable							
M-D1 031109345-0007	PLM NYS 198.6 NOB	4/6/2011	Red /Black			N/A	Inconclusive: None Detected	Not Analyzed
AC3 Z1 SUPPLY/ INSULATION	TEM NYS 198.4 NOB	4/8/2011	Red /Black			N/A		
M-D2 031109345-0008	PLM NYS 198.1 Friable	4/5/2011	Grayish	<1% Glass 70.00% Min. Wool 5.00% Cellulose		25%	None Detected	Not Analyzed
AC3 Z2 SUPPLY/ INSULATION	PLM NYS 198.6 NOB							
	TEM NYS 198.4 NOB					N/A		
	PLM NYS 198.1 Friable	4/6/2011	Grayish	85.00% Min. Wool		15%	None Detected	Not Analyzed
	TEM NYS 198.6 NOB							
	PLM NYS 198.4 NOB					N/A		Not Analyzed
	TEM NYS 198.4 NOB					N/A		Not Analyzed

Initial Report From 04/06/2011 12:28:36

Test Report NY196WA-7.21.0 Printed: 4/6/2011 12:46:08 PM



EMSL Analytical, Inc.

307 West 38th Street, New York, NY 10018
Phone: (212) 290-9991

Attn: Alpine Environmental Services
1146 Central Ave
Albany, NY 12205

Customer ID: ALP150
Customer PO:
Received: 04/05/11 10:28 AM
EMSL Order: 031109345
EMSL Proj:

Fax: (518) 453-0175
Project: 11-11125-AJ SUNY PURCHASE
Phone: (518) 453-0148

Test Report: Asbestos Analysis of Bulk Material

Sample Description	Test	Analyzed Date	Color	Fibrous	Non Asbestos	Non-Fibrous	Asbestos	Comments
M-D3 031109345-0029	PLM NYS 198.1 Friable	4/5/2011	Grayish	85.00% Min. Wood		15%	None Detected	
AC3 Z3 SUPPLY/ INSULATION	PLM NYS 198.6 NOB					N/A		Not Analyzed
M-M1 031109345-0010	TEM NYS 198.4 NOB					N/A		Not Analyzed
AC3 Z1 SUPPLY/ MASTIC	PLM NYS 198.1 Friable					N/A		Not Analyzed
M-M2 031109345-0011	PLM NYS 198.5 NOB	4/6/2011	Red			N/A	Inconclusive: None Detected	
AC3 Z2 SUPPLY/ MASTIC	TEM NYS 198.4 NOB	4/8/2011	Red			N/A	None Detected	
M-M3 031109345-0012	PLM NYS 198.1 Friable					N/A		Not Analyzed
AC3 Z3 SUPPLY/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Red			N/A	Inconclusive: None Detected	
M-M4 031109345-0013	TEM NYS 198.4 NOB	4/6/2011	Red			N/A	None Detected	
AC3 RETURN/ INSULATION	PLM NYS 198.1 Friable					N/A		Not Analyzed
M-M5 031109345-0014	PLM NYS 198.1 Friable					N/A		Not Analyzed
AC3 RETURN/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Red /Black			N/A	Inconclusive: None Detected	
M-D5 031109345-0016	TEM NYS 198.4 NOB	4/8/2011	Red /Black			N/A	None Detected	
AC2 RETURN/ INSULATION	PLM NYS 198.1 Friable	4/5/2011	Grayish	75.00% Min. Wood		25%	None Detected	
M-D6 031109345-0016	PLM NYS 198.6 NOB					N/A		Not Analyzed
AC2 SUPPLY/ INSULATION	PLM NYS 198.1 Friable	4/5/2011	Black	75.00% Min. Wood		25%	None Detected	
M-M5 031109345-0017	PLM NYS 198.6 NOB					N/A		Not Analyzed
AC2 RETURN/ MASTIC	TEM NYS 198.4 NOB	4/8/2011	Red /Black			N/A	Inconclusive: None Detected	
Initial Report From 04/08/2011 12:28:36	PLM NYS 198.1 Friable					N/A	None Detected	

Test Report NY198w/A-7.21.0 Printed: 4/6/2011 12:46:08 PM



EMSL Analytical, Inc.

397 West 38th Street, New York, NY 10018
Phone: (212) 280-4061

Attn: Alpine Environmental Services
1146 Central Ave
Albany, NY 12205

Customer ID: ALP150
Customer PO:
Received: 04/05/11 10:28 AM
EMSL Order: 031109345
EMSL Proj:

Fax: (518) 453-0175
Phone: (518) 453-0146
Project: 11-1125-AJ SUNY PURCHASE

Test Report: Asbestos Analysis of Bulk Material

Sample Description	Test	Analyzed Date	Color	Fibrous	Non Asbestos	Non-Fibrous	Asbestos	Comments
M-M6 031109345-0018	PLM NYS 198.1 Friable							
AC2 SUPPLY/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Red /Black			N/A	Inconclusive: None Detected	Not Analyzed
	TEM NYS 198.4 NOB	4/6/2011	Red /Black			N/A	None Detected	
M-D7 031109345-0019	PLM NYS 198.1 Friable	4/5/2011	Black	70.00% Min. Wood		30%	None Detected	Not Analyzed
AC1 SUPPLY/ INSULATION	PLM NYS 198.6 NOB					N/A		
	TEM NYS 198.4 NOB					N/A		
M-D8 031109345-0020	PLM NYS 198.1 Friable	4/5/2011	Grayish	75.00% Min. Wood		25%	None Detected	Not Analyzed
AC1 SUPPLY/ INSULATION	PLM NYS 198.6 NOB					N/A		
	TEM NYS 198.4 NOB					N/A		
M-D9 031109345-0021	PLM NYS 198.1 Friable	4/5/2011	Black	75.00% Min. Wood		25%	None Detected	Not Analyzed
AC1 RETURN/ INSULATION	PLM NYS 198.6 NOB					N/A		
	TEM NYS 198.4 NOB					N/A		
M-M7 031109345-0022	PLM NYS 198.1 Friable							
AC1 SUPPLY/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Red /Black			N/A	Inconclusive: None Detected	Not Analyzed
	TEM NYS 198.4 NOB	4/6/2011	Red /Black			N/A	None Detected	
M-M8 031109345-0023	PLM NYS 198.1 Friable							
AC1 SUPPLY/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Red			N/A	Inconclusive: None Detected	Not Analyzed
	TEM NYS 198.4 NOB	4/6/2011	Red			N/A	None Detected	
M-M9 031109345-0024	PLM NYS 198.1 Friable							
AC1 RETURN/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Red /Black			N/A	Inconclusive: None Detected	Not Analyzed
	TEM NYS 198.4 NOB	4/6/2011	Red /Black			N/A	None Detected	
SS-D1								
031109345-0025	PLM NYS 198.1 Friable	4/5/2011	Yellow	85.00% Min. Wood		15%	Inconclusive: None Detected <1% Chrysotile	
	PLM NYS 198.6 NOB						<1% Total	
AC2 RETURN/ INSULATION	PLM NYS 198.6 NOB					N/A	None Detected	Not Analyzed
	TEM NYS 198.4 NOB					N/A		Not Analyzed



EMSL Analytical, Inc.

307 West 38th Street, New York, NY 10018
Phone: (212) 290-0051

Attn: Alpine Environmental Services
1146 Central Ave
Albany, NY 12205

Customer ID: ALP150
Customer PO:
Received: 04/05/11 10:28 AM
EMSL Order: 001109345
EMSL Proj:

Fax: (518) 453-0175
Phone: (518) 453-0146
Project: 11-11125-AJ SUNY PURCHASE

Test Report: Asbestos Analysis of Bulk Material

Sample Description	Test	Analyzed Date	Color	Fibrous	Non-Asbestos	Non-Fibrous	Asbestos	Comments
SS-D2 031109345-0026	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/5/2011	Black/Yellow	85.00% Min. Wool		15%	None Detected	
AC1 SUPPLY/ INSULATION						N/A		Not Analyzed
SS-D3 031109345-0027	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/5/2011	Black	85.00% Min. Wool		15%	None Detected	Not Analyzed
O/S AC2 & 3 SUPPLY/ INSULATION						N/A		Not Analyzed
SS-D4 031109345-0028	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/5/2011	Black	75.00% Min. Wool		25%	None Detected	Not Analyzed
AC3 SUPPLY/ INSULATION						N/A		Not Analyzed
SS-D5 031109345-0029	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/5/2011	Yellow	85.00% Min. Wool		15%	None Detected	Not Analyzed
AC3 RETURN/ INSULATION						N/A		Not Analyzed
SS-M1 031109345-0030	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/6/2011	Black	5.5% Glass		N/A	Inconclusive: None Detected	Not Analyzed
AC2 RETURN/ MASTIC						N/A		Not Analyzed
SS-M2 031109345-0031	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/6/2011	Black	4.5% Glass		N/A	Inconclusive: None Detected <1% Chrysotile <1% Total	Not Analyzed
AC2 SUPPLY/ MASTIC						N/A		Not Analyzed
SS-M3 031109345-0032	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/6/2011	Black	21.0% Glass		N/A	Inconclusive: None Detected <1% Chrysotile <1% Total	Not Analyzed
O/S AC2 & 3 SUPPLY/ MASTIC						N/A		Not Analyzed
SS-M4 031109345-0033	PLM NYS 198.1 Friable PLM NYS 198.6 NOB TEM NYS 198.4 NOB	4/6/2011	Black	17.3% Glass 2.5% Fibrous (other)		N/A	Inconclusive: None Detected <1% Chrysotile <1% Total	Not Analyzed
AC3 SUPPLY/ MASTIC						N/A		Not Analyzed

Initial Report From 04/06/2011 12:28:36

Test Report NY198W/A-7.21.0 Printed: 4/6/2011 12:48:08 PM



EMSL Analytical, Inc.

307 West 38th Street, New York, NY 10018
Phone: (212) 280-0051

Attn: Alpine Environmental Services
1146 Central Ave
Albany, NY 12205

Customer ID: ALP150
Customer PO: 04/05/11 10:28 AM
Received: 031109345
EMSL Order: 031109345
EMSL Proj:

Fax: (518) 453-0175
Project: 11-11125-AV SUNY PURCHASE
Phone: (518) 453-0146

Test Report: Asbestos Analysis of Bulk Material

Sample Description	Test	Analyzed Date	Color	Fibrous	Non Asbestos	Non-Fibrous	Asbestos	Comments
SS-M5 031109345-0034	PLM NYS 198.1 Friable							
AC3 RETURN/ MASTIC	PLM NYS 198.6 NOB	4/6/2011	Black	21.5% Glass		N/A	Inconclusive: None Detected	Not Analyzed
	TEM NYS 198.4 NOB	4/6/2011	Black			N/A	None Detected	

NOB = Non Friable Organically Bound
N/A = Not Applicable

Analyst(s)

Alicia Folger
Albert Grohmann
Henry Akintunde

James Hall, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. The above test report relates only to the items tested. This test report must not be used to claim product endorsement by NALAP or any agency of the U.S. Government. EMSL bears no responsibility for sample collection activities or analytical method limitations. The results in this report meet all requirements of the NELAP Standards unless otherwise noted. The laboratory is not responsible for the accuracy of results when requested to physically separate and analyze layered samples. PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB's. Quantitative TEM is currently the only method that can be used to determine if a NOB material can be considered or treated as non-asbestos containing. Samples analyzed by EMSL Analytical, Inc., New York, NY NYS ELAP 13508

Initial Report From 04/06/2011 12:28:36

Test Report NY198W/A-7.21.0 Printed: 4/6/2011 12:46:08 PM

THIS IS THE LAST PAGE OF THE REPORT.



STATE OF NEW YORK
OFFICE OF THE STATE COMPTROLLER

January 23, 2012

Nikolaus Lentner
PURCHASE
735 Anderson Hill Road
Purchase, NY 10577-1402

SUBJECT: Specific allowance for Siemens humidification/digital controls system
DETERMINATION: Approved
GROUND: Single Source
RESTRICTIONS:

Dear Mr. Lentner:

Your request for an exemption from giving notice in the New York State Contract Reporter for Specific allowance for Siemens humidification/digital controls system has been approved. This approval is for exemption only; it does not constitute the prior approval of OSC if required. For single or sole source exemptions, the reasonableness of cost must be included with the contract package.

In accordance with the statute, you are still required to publish a notice of either the letting or award of this proposed contract in the New York State Contract Reporter. The notice must state the reason for the exemption and be placed as soon as practicable. It will be your responsibility to maintain proof that this exemption was subsequently published in the newsletter.

A copy of this letter should accompany the transaction when submitted to our office for approval.

Sincerely,

A handwritten signature in black ink, appearing to read 'Brian Fuller', written over a faint, dotted-line signature.

Brian Fuller
Contract Management Specialist 3

cc: Nancy Fisher
Empire State Development