BID DOCUMENTS

MOUNT VERNON CSD

Bid #2024/25-06
VARIOUS HVAC REPAIR & MAINTENANCE SERVICES

WESTCHESTER COUNTY
MT. VERNON, NY 10552

BIDS DUE: August 14, 2024 @ 10:00 AM

MOUNT VERNON CITY SCHOOL DISTRICT
165 North Columbus Avenue
Mount Vernon, New York 10553

NOTICE TO BIDDERS

The Board of Education of the Mount Vernon City School District, Mount Vernon, New York, popularly known as the Mount Vernon City School District, in accordance with Section 103 of Article 5-A of the General Municipal Law, hereby invites the submission of sealed bids from reputable and qualified contractors for the provision of labor and materials for the following contracts with the School District:

BID # 2024/25-06 Various HVAC Repair and Maintenance Services

Bids Due August 14, 2024 at 10:00 AM Local Time

Bids for the Contracts will be received until the above stated hour of prevailing time and date at the Office of the District Clerk at the Mount Vernon City School District Administration Building located at 165 North Columbus Avenue, Mount Vernon, New York 10553, at which time and place all bids will be publicly opened and read aloud. The bid opening will take place at the Mount Vernon City School District Administration Building. Specifications and bid forms may be obtained in the Purchasing Office located at 165 North Columbus Avenue, Mount Vernon, New York beginning on July 19, 2024 Monday through Friday, excluding holidays from 10:00 a.m. to 3:00 p.m.

Bids must be presented on the standard proposal form in the manner designated therein and as required by the Specifications. All bids must be enclosed in sealed envelopes, which are clearly marked on the outside:

BID # 2024/25-06 Various HVAC Repair and Maintenance Services

Bids shall remain firm for a period of forty-five (45) days following the date of the bid opening. No phone, fax or email bids will be accepted. The School District is not responsible for delays occasioned by any delivery service, the internal mail delivery system of the School District or any other means of delivery employed by the Bidder.

The Board of Education reserves the right to waive any informalities in or to reject any or all bids, or to accept that bid which, in the Board of Education's judgment, is in the best interest of the School District.

The successful Bidder shall be required to comply with the provisions of the New York State Prevailing Wage Laws.

Additional information can be obtained at www.labor.state.ny.us/workprotection/publicwork. Please note that certified payroll records must be submitted with all invoices. Invoices will not be processed if certified payroll records are not supplied with the invoice.

Bidders shall be required to furnish, at their own expense, a bid bond or certified check in the amount of ten percent (10%) of the bid amount together with the bid. Proof of the ability to furnish a performance bond in the amount of 100% of the bid shall be submitted with the bid.

BOARD OF EDUCATION
MOUNT VERNON CITY SCHOOL DISTRICT
165 North Columbus Avenue
Mount Vernon, New York 10553

INSTRUCTIONS TO BIDDERS

1. Bidders are invited to bid on the work described in the Bid Documents. The bid must be on the Bid Proposal Form included in these Bid Documents and must be made in accordance with these instructions. Bidders must be thoroughly familiar with the work to be performed.

2. Carefully inspect all general and special provisions in the bid documents.

3. Complete all forms. Be sure to sign in ink in all required places.

4. One (1) original and two (2) copies of the Bid proposal must be submitted.

5. All materials submitted to the District pursuant to this bid shall become the property of the District and will not be returned to the bidder. The bidder is responsible for making its own copies of any or all parts of this document for its file.

6. Bid proposals must be presented in a sealed envelope addressed to:

Mount Vernon City School District
Purchasing Department
165 North Columbus Avenue
Mount Vernon, New York 10553

BID # 2024/25-06 Various HVAC Repair and Maintenance Services

Bids will be received until 10:00 A.M., prevailing time on August 14, 2024 at the Purchasing Office, 165 North Columbus Avenue, Mount Vernon, New York 10553 by the Purchasing Agent. The bid opening will occur immediately thereafter. There will be no discussion of the proposals at the time of the bid opening. Bids shall be submitted in a sealed envelope. The Bid number shall be clearly written on the front of the envelope. Bidder's bid security shall be placed in a separate sealed envelope inside the bid envelope.

7. All questions, requests for clarification or information about the bid specifications or any question related to the bid must be submitted in writing no later than close of business on August 6, 2024. All questions or requests for clarification or information should be submitted to:

Hillary Thompson- Purchasing Agent
Mount Vernon City School District
165 North Columbus Avenue
Mount Vernon, New York 10553

Written questions may be submitted by fax or e-mail. Fax number is (914) 665-3395 Email is hthompson@mtvernoncsd.org and mraimondi@mtvernoncsd.org. It is the vendor's responsibility to verify that the question(s) submitted have been received by the question deadline.

8. **No interpretation of the meaning of the specification or other Contract document will be made to any bidder orally.** Notice of any and all interpretations and any supplemental instructions will be sent to all bidders of record by the District or its designee in the form of addenda to the specifications. All addenda so issued will be sent by certified mail, return receipt requested, or by fax with receipt acknowledged and shall become a part of the Contract documents. Failure of any bidder to receive any such addendum or interpretation shall not relieve any bidder from any obligations under his/her bid submitted.

9. No proposal will be considered unless it is received and in hand on the specified date and at the specified time and address at which proposals are to be opened. Any bidder submitting proposals by mail or private delivery service must assume the risk of any delay in the mail or handling of bids by employees of the U.S. Postal Service, private delivery service or the District. All proposals received after the designated date and time will be refused and returned unopened.

10. The submission of a bid will be construed to mean that the bidder is fully informed as to the extent and character of the work, supplies, materials, or equipment required and a representation that the bidder can furnish the work, supplies, materials, or equipment satisfactorily in complete compliance with the specifications.

11. Any seeming inconsistency between provisions of the bid specifications or contract, or upon any point requiring explanation, must be inquired about by the bidder in writing, as least forty-eight (48) hours prior to the time and date set forth for the opening of the proposals. Any bidder shall be precluded from asserting any inconsistency after said time.

12. Any bidder submitting proposals by mail or private delivery service must assume the risk of any delay in the mail or handling of bids by employees of the U.S. Postal Service, private delivery service or the District. All proposals received after the designated date and time will be refused and returned unopened.

13. Bids shall remain open for a period of forty-five (45) days following the date of the bid opening. Bidders agree that the prices submitted will remain firm for an additional forty-five (45) days thereafter, unless the District receives written notice to the contrary.

15. The Board of Education reserves the right to reject any and all bids and to waive any informalities in any bid. The District reserves the right to make an award on an item by item, group of items, or total award basis whichever is in the best interest of the District.

16. As required by the specifications, bidders must use the attached bid proposal form indicating the cost of providing labor and materials necessary to provide the various HVAC Repair & Maintenance Services needed pursuant to this contract. Proposals submitted on any form other than the bid form are not acceptable and will be rejected. Illegible or vague bids will be rejected. All signatures must be written. Facsimile, printed, or typewritten signatures are not acceptable.

17. All bidders shall insert their bid price in the appropriate place on the bid proposal sheet next to any items they wish to bid on. The price inserted must be net and must include all labor, delivery and freight charges.

18. Where so indicated by the makeup of the Bid Form, sums shall be expressed in both words and figures and in case of discrepancy between the two, the written amount will govern. If the Bidder is not submitting a bid for all of the services requested in this bid as reflected on the Bid Form and these Bid Documents, the Bidder shall so indicate the same on the bid proposal form by writing "No Bid" for the service, work or item that is not being bid. Failure to complete the Bid Form in its entirety may result in the bid being deemed not responsive.

19. If two (2) or more bidders submit identical bids as to price, the decision of the Board to award a Contract to one (1) such bidder shall be final. No proposal shall be considered nor will any contract be awarded to any bidder in arrears to the District upon any debt or contract or who is a defaulter as surety or otherwise upon any obligation to the District, or who is deemed irresponsible or unreliable by the District.

20. A bidder shall not make any stipulations on the Bid Form or qualify its bid in any way. No bid will be considered which purports to qualify, limit, amend or omit any requirement of the Bidding Documents. No alteration, erasure or addition is to be made to the typewritten matter. Any deviations from the conditions and specifications will constitute sufficient grounds for rejection of the bid. No oral, telegraphic or telephonic proposals or modifications will be considered. The School District shall have the right to reject bids that contain conditions, omissions, exceptions or modifications.

21. A bid shall include the legal name of bidder and a statement whether the bidder is a sole proprietor, a partnership, a corporation or any other legal entity, and shall be signed by the person or persons legally authorized to bind the bidder to a contract. All required signatures shall be handwritten in ink with the full name of the person executing same. Initials, stamps, photocopies or other copies or company names may not be used in lieu of any required signature. A bid by a corporation shall also give the state of incorporation and have the corporate seal affixed on the signature pages of each Form of Proposal. A bid by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the bidder.

22. Sales to school districts are not affected by any fair trade agreements. (General Business Law).

23. No charge will be allowed for Federal, State or municipal sales and excise taxes since the District is **EXEMPT** from such taxes. The price bid shall be net and shall not include the amount of any tax. The successful bidder shall be fully responsible for any and all applicable taxes for the work and/or services performed under the contract.

24. **BID SECURITY:** All bids shall be accompanied by bid security in the form of a Certified Check, Cashier's Check or Bid Bond in the amount of 10% of the total bid amount. The bid security shall be made payable to Mount Vernon City School District and its return shall be conditioned upon the successful bidder entering into a contract with the District within ten (10) calendar days following written Notice of Award. Any bid which is not accompanied by a bid security shall be considered non-responsive and ineligible for award. In the event the successful bidder fails or refuses to enter into contract with the District within the time stated, the bid security submitted with the bid will be forfeited as liquidated damages because of such failure or default. The bid security will be returned after the opening of bids to all except the three lowest bidders and the remaining guarantees shall be returned to these bidders after the contract with the successful bidder has been fully executed.

25. **PROPRIETARY INFORMATION:** All information included in any bid proposal becomes public information including any and all information that is proprietary in nature. The District shall be held harmless from any claims arising from the release of proprietary information.

26. **BROCHURES:** Bids shall include adequate brochures, latest printed specifications and advertising literature, describing the products offered in such fashion as to permit ready comparison with our specifications on any item-by-item basis where applicable. Web site information may be included for specific products or services being offered.

27. Any and all agreements required to perform this contract must be submitted as part of bidder's proposal. Any agreements are subject to modification by District counsel and approval by the Board of Education. No agreements will be executed if their terms contradict the terms and conditions of this bid.

28. Where articles or items of equipment, supplies or materials are designated as manufactured by a specific manufacturer, or where catalog numbers are used, it is understood that the article, as specified, represents an accepted standard. It is not the intention of the district to limit competition thereby. If the item bid on is not the product specified, but a substitute, or "equal," the item shall be clearly described in the space provided, as the brand, packing, etc. with the catalog number of the vendor bidding. Additionally, bidder shall submit, with the bid, a picture and the manufacturer's specifications. Otherwise, the bid will be construed as submitted on the identical item as specified.

29. **SUBSTITUTIONS OR EQUIVALENTS:** If bidders make substitutions of any kind, type, brand, or manufacturer of material other than those named in the Specifications, the bidder shall identify the material or equipment the substitution is being made for; the kind, type, brand, or manufacturer of material or equipment of the substitution; written documentation evidencing that the substituted material or equipment meets or exceeds the specifications for materials and/or equipment set forth in the bid specifications. Such documentation shall include, but not be

limited to, a full explanation of the proposed substitution, together with a submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, significant qualities of proposed substitution and other like information necessary for a complete evaluation of the substitution. Additionally, the bidder shall provide a demonstration of any substitutions for the District's evaluation. All such material shall be provided to the District at the bidder's sole expense. The bidder's written explanation shall also include a list of reasons the substitution is advantageous and necessary, including the benefits to the District in the event the substitution is accepted. Additionally, the bidder shall submit to the District information describing in specific detail how the proposed substituted product differs from the quality and performance required by the base specifications, and such other information as may be required by the District. Bidders shall provide information, including a list of changes or modifications needed to other items of the contract that will be necessary to accommodate proposed substitution. By making such request or proposal for a substitution in conformance with procedures established herein, the bidder represents that a representative of it has personally investigated the proposed substitute product and has determined that it is equal to or superior in all respects to that specified; represents that the warranty for the substitution will be the same, or greater than, that applicable to the specified product.

30. It is the bidder's responsibility to familiarize themselves with the actual work and the locations where such work is to be performed prior to bidding. Submission of a bid shall constitute acknowledgement that the bidder has satisfied this requirement. Failure to do so will not relieve the bidder from any requirements and/or obligations incurred as a result of his/her bid.

31. PREVAILING WAGE: New York State law requires the payment of prevailing wages for the work to be performed hereunder. The successful contractor must comply with all New York State Labor Laws, including but not limited to, prevailing wage rate requirements. The prevailing wage rate schedule for the work described and required herein is attached hereto. The bidders shall be responsible for paying the prevailing wage rate applicable for the work described in these bid documents for the time period associated with the contract term in accordance with the prevailing wage rate schedules issued by the New York State Department of Labor for said time period.

32. As per Article 8 and 9 of the New York State Labor Laws, wages paid for the performance of this contract shall not be less than those listed as minimum by the New York State Commissioner of Labor for the occupants listed. As per Article 8, Section 220, New York State Labor Law, every bidder and sub-bidder shall submit to the Department of Jurisdiction (Mount Vernon City School District), within thirty (30) days after issuance of its first payroll, and every thirty (30) days thereafter, a transcript of the original payroll record, as provided by Article 8, subscribed and affirmed as true under penalties of perjury. The Mount Vernon City School District shall be required to receive and maintain such payroll records.

34. The District will endeavor to make an award within forty-five (45) days of the date of the bid opening and all bids shall remain firm during that time frame. The District further reserves the right to make an award following this period to any bidder who has not provided written notice to the District that its bid has been withdrawn in accordance with section 103 of the General Municipal Law.

35. Award will be made to the bidder, as will best promote the public interest, taking into consideration factors including but not limited to the reliability of the bidder.

36. The Board of Education shall award a contract to the bidder submitting the lowest bid for provision of the services requested herein, as is in the best interest of the District.

37. The District reserves the right to reject all bids; to reject any bid in whole or in part; to waive technical defects, qualifications, irregularities, and omissions if in its judgment the best interests of the District will be served; and to reject bids.

38. The placing in the mail of a notice of award to the successful bidder, to the address given in the bid, will be considered sufficient notice of acceptance of the bid.

39. The awarded vendor must comply with all New York State Labor Laws.

40. Each and every provision of law and clause required by law to be inserted herein and the Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through a mistake or otherwise, any such provision is not inserted or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

CONDITIONS OF THE CONTRACT

1. Each and every provision of the Instructions to Bidders is incorporated by reference herein as if fully restated herein.

2. The contract shall commence upon award and remain in effect through **June 30, 2025**, unless earlier terminated as provided for herein. The Board of Education reserves the right to renew this agreement for additional one year periods not to exceed two (2) years upon the same terms and conditions. The prices contained in the successful bidder's bid shall prevail and remain in effect for the entire term of the contract or any renewal period, unless lower prices are offered to other clients in similar circumstances. In the event that the successful bidder offers lower pricing to other clients in similar circumstances, the successful bidder shall provide the lower prices to the District.

3. Bidders shall have been engaged in the business of monitoring, repair and maintenance as described in the specifications for the different systems ("hereinafter referred to as "Services"). Bidders shall provide the District with documentation evidencing the following: (1) successful performance of **Services** in a school district's facilities; (2) resources (i.e., sufficient financial support, equipment and organization) available internally to provide **Services** within mandated time frames; and (3) an established satisfactory record of performance for a period of three (3) years or more. Bids that fail to include this information may be rejected. Bidder may be required to furnish a description of its experience with contracts of comparative size, complexity, and cost, together with documentary evidence showing that said contracts were completed to the Owner's satisfaction and were completed in a timely fashion.

4. The successful bidder shall not assign or subcontract any part of this contract to a subcontractor without the prior written approval of the District.

5. Bidders' offices must be staffed by competent company representatives who can be contacted twenty-four (24) hours a day and are authorized to handle any and all matters pertaining to the contract resulting from this bid solicitation.

6. **CONTRACT AWARD: AWARD WILL BE MADE TO THE BIDDER WHOSE BID PROPOSAL RESULTS IN THE LOWEST COST FOR THE SERVICES. THE SCHOOL DISTRICT RESERVES THE RIGHT TO MAKE AN AWARD ON AN ITEM BY ITEM, GROUP OF ITEMS, BY ADDING ONE BASE BID TO OTHER BASE BID(S), OR TOTAL AWARD BASIS FOR ALL SERVICE, WHICHEVER IS IN THE BEST INTEREST OF THE DISTRICT.**

7. It is mutually agreed that no contract becomes binding until the necessary funds have been approved for the school year(s) during which the contract is in effect and contract or contracts have been approved by the Board of Education.

8. It is the intent of the District to award this Contract to the lowest responsible bidder, who in meeting all specifications as outlined in the bid package and any addenda, provides the requested services at the lowest cost to the District. Awards will be made to the lowest responsible bidder as will best promote the public interest taking into consideration the reliability of the bidder, the quality of the materials, equipment or supplies to be furnished, their conformity with the specifications, the purposes for which required, and the terms of delivery.

9. The bid specifications including the Notice to Bidders, Instructions to Bidders, Non-Collusive Bidding Certificate, Sexual Harassment Prevention Certificate, General Conditions, Bid Specifications, the successful bidder's bid response and the Mount Vernon City School District Purchase Order shall form the agreement between the successful bidder and the District. Accordingly, the documents specified above shall constitute a binding contract. This contract shall be non-exclusive.

10. **LIQUIDATED DAMAGES**: In addition to the remedies set forth elsewhere in the contract documents:

a. If the successful bidder fails to deliver the commodities requested and/or fails to perform the services specified in this contract and/or fails to meet the criteria of the specifications, the successful bidder shall, in place of actual damages, pay to the District liquidated damages of $500.00 per calendar day for each day that the supplies, equipment or services are not performed.

b. If the District terminates this contract in whole or in part, for bidder's failure to deliver or perform as required by this contract, the successful bidder shall be liable for liquidated damages accruing until the District reasonably obtains delivery or performance of the commodity and services.

c. The successful bidder will not be charged with liquidated damages when there is a delay in delivery or performance that is beyond the control and without the fault or negligence of the successful bidder. The District shall have the sole discretion to determine whether the delay in delivery or performance is excusable.

11. **TERMINATION**

a. **For cause.**

i. The District may, by written notice of default to the successful bidder, terminate this contract in whole or in part, effective **immediately**, if the successful bidder:

1. fails to deliver the commodities and/or perform the services specified in the contract and/or meet the criteria of the specifications;

2. fails to make progress, so as to endanger performance of this contract;

3. fails to cure a mechanical, technical or service failure within twenty-four (24) hours of notification of such failure; or

4. fails to perform any of the other provisions of this contract.

ii. The District's right to terminate this contract under subdivisions (a)(i)(2) and (a)(i)(4) of this clause, may be exercised if the successful bidder does not cure such failure within three (3) days after receipt of the notice from the District specifying the failure. The District's right to terminate this contract under subdivisions (a)(i)(1) and (a)(i)(3) of this clause shall not be subject to the within notice provisions. In the event that the District

exercises its right to terminate the contract under (a)(i)(1) or (a)(i)(3) such termination shall be effective immediately.

iii. If the District terminates this contract in whole or in part, it may acquire, under the terms and in the manner the District considers appropriate, commodities or services similar to those terminated, and the successful bidder will be liable to the District for the costs of those supplies or services. However, the successful bidder shall continue the portion of work not terminated.

iv. The rights and remedies of the District in this clause are in addition to any other rights and remedies provided by law and/or equity and/or under this contract.

1. Cancellation of a contract for any reason may result in removal of the successful bidder's name from mailing list for future proposals for an indeterminate period.

2. It is mutually understood and agreed that the successful bidder shall not assign, transfer, convey, sublet or otherwise dispose of the contract or his right, title, or interest therein, or his power to execute such contract, to any other person, company, or corporation, without the previous written consent of the District.

12. **INDEMNIFICATION**: The successful bidder shall indemnify and save the District harmless from any and all claims, liabilities, losses and causes of action which may arise as a result of the successful bidder's performance or failure to perform its contractual obligations as outlined in these Bid specifications. The successful bidder shall pay all claims and losses of any nature whatsoever in connection therewith, and shall defend all suits in the name of the District when applicable, and shall pay all costs and judgments, which may issue thereon. The successful bidder agrees to protect, defend, indemnify and hold harmless the District and its officers and employees from any and all claims and damages of every kind and nature made, rendered or incurred by or on behalf of every person or corporation whatsoever, including the parties hereto and their employees that may arise, occur, or grow out of any acts, actions, omissions, work or other activity done by the successful bidder, its employees, subcontractors or any independent contractor working under the direction of either the successful bidder or any approved subcontractor in the performance of this contract. The awarded bidder will be required to issue a certificate of insurance naming the Mount Vernon City School District as additional insured with the appropriate coverage as specified in the enclosed Certificate of Liability Insurance form.

13. **INSURANCE**: Insurance coverage as required by the District shall be provided by an insurance company licensed as an "admitted carrier" by the New York State Insurance Department. Thirty (30) days' notice of cancellation, non-renewal or reduction of coverage is required. The insuring company shall not be released from liability or obligation for its failure to notify the Mount Vernon City School District. The insurance coverage shall protect the successful bidder and the School District from claims for which the successful bidder may be liable. A copy of the successful bidder's insurance certificate naming the District as an additional insured shall be furnished to the School District upon award of the contract. The Contractor's insurance shall be considered primary and non-contributory.

14. **PERFORMANCE SECURITY:** The successful bidder to whom an award is made shall duly execute and deliver a Performance Bond to the District in an amount of 100% of the bid amount for the contract term and any renewal term. The bond shall be delivered to the District's Business Office within ten (10) calendar days after a written Notice of Award is given to the successful bidder. If the successful bidder fails to deliver the bond within this specified time frame, including any extensions which may be granted by the District, the District shall declare the successful bidder in default of the contractual terms and conditions and the successful bidder shall forfeit its Bid Bond. In lieu of a Performance Bond, the District will accept a cash bond in the form of a certified cashier's check made payable to the Mount Vernon City School District.

15. **GUARANTEES:** The successful bidder guarantees its products will be suitable for the purpose intended and will replace any equipment or part which becomes defective during the guarantee period as a result of any defect in the product supplied by the successful bidder. In addition, the successful bidder understands and agrees that it will be responsible for any damage caused to the School District's buildings or equipment by it or its employees, agents, subcontractors or assigns while performing services hereunder.

16. **DELIVERY:** No items are to be shipped or delivered until receipt of an official purchase order from the District. The successful bidder shall be responsible for delivery of items in good condition at point of destination. They shall file with the carrier all claims for imperfections, and other losses, which will be deducted from invoices.

17. All deliveries shall be accompanied by delivery tickets. Every ticket shall be presented to the head custodian in the building where the materials, equipment or supplies is delivered and initialed with a copy to the Purchasing Department. Each delivery ticket must contain the following information for each item delivered: (1) Contract Number and/or Purchase Order Number; (2) Description of Delivered Product; (3) Quantity; and (4) Name of Successful Bidder. Failure to comply with this condition shall be considered sufficient reason for refusal to accept the delivery. Any and all costs associated with the delivery and/or return of the equipment shall be at the sole responsibility of the vendor. The head custodian's initials shall not act as an approval or acknowledgement of the adequacy of the contractor's performance or a bar to any claim that the School District may have against the successful bidder.

18. It is the Contractor's responsibility prior to submitting a bid and delivery, to survey and review the particular delivery or location of the work to insure that it can make the delivery or perform the work as required. Should the proposed delivery or installation location not meet established criteria, the Contractor and the District will attempt to locate an alternate, mutually agreeable location.

19. **REPRESENTATIONS:** The successful bidder warrants that it is duly licensed and authorized to perform and provide the Boiler services, as described herein. The successful bidder further warrants that it will provide the District with licensed and qualified individuals to perform the work contemplated by this agreement.

20. The successful bidder and all its employees shall possess and maintain in full force current licenses and permits as are required by law in connection with the services required herein. The successful bidder shall comply with all laws, rules, regulations and ordinances applicable to the services to be provided hereunder.

21. All work performed shall be performed in accordance with applicable law and best industry practice. The successful bidder shall furnish each individual providing services hereunder with a photo identification badge to be worn at all times when the individual is on-site providing services to the District. It is understood and agreed that while on the District's property, the successful bidder, its employees and/or agents shall obey all of the District's rules and regulations and must follow all reasonable directives of the District's administrators and employees.

22. The successful bidder(s) shall be responsible for all personnel in his employ. At no time shall any employees create a nuisance, interfere with District students and/or employees or destroy school property. The successful bidder's employees shall not enter unauthorized areas. The District reserves the right to remove and/or request the removal of any employee of the Contractor with or without cause.

23. In compliance with the Board of Education's approved Drug Free Workplace Policy and Code of Conduct on School Policy, the successful bidder shall be aware that the possession, use, transmittal, manufacture, purchase or sale of illegal drugs, controlled substances, drug paraphernalia, designer drugs, alcoholic beverages or the use of tobacco products in any place or vehicle under school jurisdiction is strictly prohibited. All successful bidders shall ensure that its employees understand and comply with said policy and requirements.

24. The successful Bidder(s) shall repair or replace, to the satisfaction of the School District, any and all damage done to buildings, grounds and containers as a result of his negligence or as a result arising from an accident involving its employees and/or vehicles.

25. The successful bidder understands and agrees that it will comply with all applicable New York State Labor Laws including the payment of prevailing wage rates and the submission of certified payroll as provided for in the New York State Labor Law, section 220 et. seq. No payments will be made if certified payroll has not been submitted to the School District.

26. As per Article 8 and 9 of the New York State Labor Laws, wages paid for the performance of this contract shall not be less than those listed as minimum by the New York State Commissioner of Labor for the occupants listed. As per Article 8, Section 220, New York State Labor Law, every bidder and sub-bidder shall submit to the Department of Jurisdiction (Mount Vernon City School District), within thirty (30) days after issuance of its first payroll, and every thirty (30) days thereafter, a transcript of the original payroll record, as provided by Article 8, subscribed and affirmed as true under penalties of perjury. The Mount Vernon City School District shall be required to receive and maintain such payroll records.

27. The successful bidder will adhere to all applicable health and safety laws, rules and regulations including the Occupational Safety and Health Administration ("OSHA") Rules and Regulations. In the event that hazardous material or any hazardous condition is discovered, the successful bidder shall notify the District, and have the right to suspend all work until such hazards are removed or corrected. In the event that the hazardous material was introduced or the hazardous condition was caused by the successful bidder, its agents or employees, the successful bidder agrees to pay the cost of the removal, remediation, or correction.

28. The successful bidder shall comply with the "State Occupational Safety and Health Act" (SOSHA) and the "Toxic Substances Act" (Right to Know Act) with respect to all operations or activities on any of the properties owned or leased by the School District. Chapter 551 of the Laws of 1980 defined **TOXIC SUBSTANCE** as "any substance listed in the latest edition of the National Institute for Occupational and Health's REGISTRY OF TOXIC EFFECTS OF ❑ CHEMICAL SUBSTANCES, or has yielded positive evidence of acute or chronic health hazards in human, animal or other biological testing." Such information is required to be on file with each employer. Article 28, Section 875 subdivision 4, required that "any manufacturer, importer, procedure, or formulator of any toxic substance shipped, transported or sole for any use within the state must provide upon request certain information." In order for us to have this information on file, bidders are required to submit one form OSHA-20, for each product included in the bid to which this law will apply.

29. The successful bidder and all of its subcontractors shall comply with all pertinent provisions of Federal and State law against discrimination in employment practices.

30. The successful bidder shall comply with all laws, rules, regulations and ordinances of the State of New York, County of Westchester, and all local laws, with special attention to New York Labor Laws, Environmental Conservation laws and all applicable town/village/city codes together with any rules and/or regulations promulgated thereunder.

31. If any person when called to testify before a Grand Jury, Head of a State Department, Temporary Commission or other State Agency, the Organized Crime Task Force in the Department of Law, Head of a Municipal Department, or other Municipal Agency which is empowered to compel attendance of witnesses and examine them under oath to testify in an investigation concerning any transaction or contract had with the State of New York, or any political subdivision thereof, a public authority, or with any public department, agency or office of the State or political subdivision thereof, refuses to answer any relevant question concerning such transaction or contract even though offered appropriate immunity, then any such person or firm, partnership or corporation of which he or she is a member, partner, director or officer shall be disqualified for a period of five (5) years after such refusal from submitting bids to, receiving awards from, or entering into any contracts with the District or any department or agency or official thereof. Further, on the same grounds this agreement may be terminated by the District without the District incurring any penalty or damages by virtue of such cancellation or termination.

32. It is mutually understood and agreed that the successful bidder shall not assign, transfer, convey, sublet, or otherwise dispose of the Contract or its right, title, or interest herein, or its power to execute such Contract, or any part thereof to any person, company or corporation, without the previous written consent of the District.

BIDDER'S QUALIFICATIONS

A Statement of Qualifications of Bidders giving evidence of sufficient facilities equipment, experience and financial capability to insure completion of the work must be completed by all prospective bidders, and must be sworn to and submitted with each bid. No bid shall be considered unless the bidder meets all of the following requirements, unless otherwise accepted as set forth herein, namely the bidder:

a. Shall have been in the business of providing the services specified for a minimum of ten (10) years.
b. Shall have knowledge of all types of equipment included in the contract for which the firm is bidding.
c. Mount Vernon Fire Department License to install and service refrigerating systems.
d. Universal Refrigerant license.
e. Asbestos Awareness training certificate.
f. Confined space awareness certificate.
g. Lead Awareness certificate.
h. Must have experience and be able to service and repair industrial chillers and absorbers.
i. Must have experience and be able to service and repair cooling towers as well as test and treat to Department of Health Guidelines.

In addition, all bidders must:

a. possess and maintain the necessary licenses and certifications for the work to be performed.
b. maintain a full-time staff, capable of performing the work described in the contract; and,
c. have at least ten (10) years experience in the service for which the bid is being submitted

Provide a Vendor profile, which includes, but is not limited to, the following:

- Provide a brief description and history of your company.
- Indicate the number of years the company has been in business.
- Indicate the size of your company and number of service contracts.
- Discuss the ownership and organizational structure of your company and its support staff with an organizational chart for the team that would be assigned to the account.
- Provide information to demonstrate that your firm has the ability to provide the Boiler Services required by the District.
- Discuss your firm's experience and qualifications on similar projects.
- Provide a minimum of five (5) major account references from present customers, including company name, contact name, position or title, telephone number, fax number and/or email address. Emphasize accounts comparable in size and scope to the District.
- Provide proof of your company's financial viability. A Dunn and Bradstreet profile will suffice.

Bidders must provide evidence of compliance with all of the foregoing at the time of bid submission.

The School District may make such investigation into the bidder's qualifications as it deems necessary to determine the responsibility of any bidder or to determine the ability of any bidder to perform the work. Such investigation shall include a review of the Bidder Qualification Statement and such additional information as the School District may require. When requested by the School District, bidders shall furnish all information and data required by the School District within the time and in the form and manner requested by the School District. Upon the School District's request, the lowest monetary bidder shall furnish, within three (3) working days after the bid opening, four (4) copies of the following information in writing:

a. evidence of the bidder's financial responsibility, including a certified financial statement prepared by a certified public accountant; and
b. the insurance certificates required by the Bid Documents.

To the fullest extent permitted by law, the School District reserves the right to reject any bid if the evidence required and/or requested by the School District is not submitted or fails to satisfy the School District that the bidder is responsible, able and qualified to carry out the obligations of the Contract or to complete the Work as contemplated.

Rejection of Bids. The District reserves the right to reject any bid if the evidence submitted in the qualification statement or as determined by investigation of the bidder indicates, in the judgment of the District, that the bidder is not qualified to carry out the obligations of the contract and/or to perform the work described therein.

TECHNICAL SPECIFICATIONS FOR

MAINTENANCE OF HVAC EQUIPMENT

HVAC equipment maintenance and repair work as contemplated herein shall include but not be limited to maintenance and repair of boiler, chillers, pool HVAC units, AHU's and RTU's and associated mechanical equipment as more fully described in these specifications. Such maintenance and repair services will be required at all of the District's locations as listed herein:

Nellie Thornton High
Lincoln School
Nelson Mandela School
Cecil Parker School
Hamilton School
Traphagen School
Edward Williams School
Grimes School
Graham School
Columbus School
BOE Education Center
MV Steam Academy
Benjamin Turner Middle School
Rebecca Turner School
Pennington School
Holmes School
Mount Vernon High School

BASE BID #A - HVAC Repair & Maintenance Services

HVAC Equipment Maintenance and Repair Services shall include but not be limited to:

a. Prepare written reports documenting all maintenance and repair activities. A written summary of work performed will be provided at least monthly or more often, as requested by the District.

b. Provide all services indicated in the attached Operations and Maintenance Manuals for each type of equipment with the frequency recommended for each type of equipment

c. Provide all manufacturer recommended periodic maintenance services. All labor and materials necessary to complete the services must be furnished by the successful bidder as part of the contract.

d. Provide 500 hours of labor to do repair work separate and apart from manufacturer recommended periodic maintenance. The unit cost per hour of labor will be included on the bid form. The cost of the service will be adjusted up or down based upon the unit cost of labor provided on the bid form.

e. Replace or repair all defective or faulty parts with manufacturer-approved replacement parts.

f. Complete pre-approved manufacturer's maintenance log sheet(s).

g. For boilers and related equipment
(Log books provided by the District are located in each boiler room and require entry on each and every service call):

1) List, test and record operation of all safety limit controls including, pressure and temperature limits, combustion and ignition failures, low water cut-off and ON-Off-Standby or Off Line controls.
    A. Check low water cut-off by blowing down boilers, not blowing down water column
2) Check and record operation of all safety relief valves and replace all defective valves.

3) On steam boiler systems, record water level and operating pressure.
4) Record all inlet/outlet temperatures and pressures, including gas/oil flow rates.
5) Record expansion tank level and correct if necessary.
6) Inspect fan and outside air dampers for proper operation. Replace draft dampers and draft controls as necessary.
7) Record flue gas temperature and percentage of oxygen at 50% and 100% loads.

h. The contractor will have personnel available upon 2 hours' notice regardless of season to provide service when deemed needed by the District. The cost of the repair will be billed against the 500 labor hour price provided on the bid form.

BASE BID #B - HVAC Controls (BMS) Monitoring and Maintenance Services

All HVAC equipment in the District is controlled by a Honeywell open platform Direct Digital Control system. All equipment as-builts, O&M manuals and drawings are provided to the bidders for their review and use as separate documents. Equipment service manuals for each school covered by this contract are available to view, upon request to the District's Purchasing Agent. Requests may be made to the Purchasing Agent or Director of Facilities via email or fax.

HVAC Controls (BMS) Monitoring and Maintenance Services shall include but not be limited to the following:

a. Prepare written reports documenting all activities. A written summary of work will be provided monthly or more often as requested by the district.

   1. The BMS contractor must be certified to work on Honeywell controls. The other two contractors do not have to be Honeywell certified but must be knowledgeable of how to maintain all the HVAC equipment.

b. A summary of all the equipment controlled and the sequence of operation for all equipment is attached.

c. The Contractor will provide continuous monitoring of the BMS system and report problems to designated personnel within one hour of problems being identified.

   1. If the Central Station is notified of a problem, they would have a list of people to contact to get the system fixed. This is someone in a central station similar to a fire alarm company constantly monitoring the BMS system. Sending an email or receiving an email is not sufficient. The response would depend on the problem. If a boiler is down, they need to talk with a maintenance employee. The response for different conditions will be detailed with the District.

d. The contractor will test all freeze stats annually.

e. The contractor will perform all periodic maintenance on BMS equipment as recommended by Honeywell, as manufacturer, including but not limited to;

   1. Provide all maintenance that is part of the Honeywell maintenance requirements for the equipment. This includes annual testing of all freeze stats and checking all controls annually.
   2. Materials that would normally be replaced as part of normal maintenance should be included in the bid price.
   3. Replacement of parts not part of normal maintenance would be extra.

f. The contractor will provide an on-site service technician at the district for a period of 26 weeks with the technician on site 8 hours per day Monday through Friday. The technician will assist District personnel in operating the HVAC systems. On-site hours to be determined by the District.

   1. Provide on-site full time (40 + hours/ per week) maintenance person for 26 weeks per year. The person will be located in the district. The person will do any maintenance

required that can be done during normal work hours and work on anything related to controls and checking the HVAC equipment required by the District.

2. The onsite technician will do testing as requested by the district while on site. The technician will check especially for frozen conditions and HVAC equipment problems.
3. The person on site is there to assist the District as the District requires.
4. The time would be spent checking all HVAC equipment controls and assisting the district as requested by the District within work hours.
5. This would also possibly include checking equipment when the BMS says there is a problem before calling for a service vendor.

g. The contractor will have personnel available with 2 hours' notice regardless of season to provide service when deemed needed by the District. The cost of the service will be billed against the 200 hour labor price provided on the bid form.

1. The contractor will have a central station monitoring station. If the BMS system detects a fault or trouble or concern, the central station will notify the district. The district will provide a list of individuals to contact.
2. All materials and parts that are required to complete the standard maintenance for all HVAC equipment included in the agreement is part of the contract and part of the bid. If a part is required that is not part of normal maintenance that would be an extra cost.

BASE BID #C - Maintenance of Liebert HVAC Equipment

The district has three Liebert units for temperature and humidity control of the main server spaces in the administration building.

Maintenance of Liebert HVAC Equipment shall include but not be limited to:

a. Prepare written reports documenting all activities. A written summary of work will be provided monthly or more often as requested by the district.
b. The contractor will provide all periodic maintenance for Liebert's and related equipment as recommended by the manufacturer.
c. The contractor will have personnel available for an 8 hour response time if a problem occurs with any of the units.
d. The periodic maintenance is part of the bid. Response and repairs will be an extra cost and billed on a time and materials basis.
e. Cut sheet for Liebert units are included in separate folders
f. If the space is too dry, the units have the capability to add humidity and the opposite is also true.

REPORTING

The successful Bidders shall provide a written and/or verbal report when necessary indicating recommendations for repairs or replacement parts when a questionable condition is discovered. Report shall address safety, reliability, and usability concerns of the equipment part of each contract.

CONFINED SPACE ENTRY

OSHA 29 CFR Part 1910 rulings and regulations regarding Confined Space Entry shall be followed when the boiler cleaning work involves entering a boiler or other confined space. Boiler furnace tubes, fireboxes, and watersides are considered to be a confined space as defined by OSHA. Personnel performing confined space entry shall have received training and adhere to a Confined Space Entry Program developed by the successful Bidder A copy of the Confined Space Entry Program as required by OSHA shall be made available on request. The successful Bidder shall provide all necessary equipment for confined space entry procedures including calibrated air monitors, forced air blowers, ropes and harnesses, Confined Space Entry Permits, Pre-Entry Checklists, and other related equipment. Evidence of proper confined space entry equipment, confined space program, and training certificates shall be provided on request.

LOCKOUT TAGOUT

OSHA 29 CFR Part 1910 rulings and regulations regarding Lockout Tagout of equipment during the cleaning process shall be followed. Personnel performing lockout tagout shall have received proper training and adhere to a Lockout Tagout Program. The necessary equipment for lockout tagout procedures including locks, tags, chains, and other related equipment, shall be provided by the successful Bidder. Evidence of lockout tagout equipment shall be provided on request.

SITE CONDITION

The successful Bidder shall leave the job site free of soot, waste, and debris generated from the work. All waste materials including hazardous waste shall be disposed of by the Contractor in accordance with applicable laws, rules and regulations. The successful bidder shall defend and indemnify the District against any claims and fines arising from improper waste disposal. Job site shall be left in the same condition as was present prior to work.

INSURANCE REQUIREMENTS

I. Notwithstanding any terms, conditions or provisions, in any other writing between the parties, the contractor hereby agrees to effectuate the naming of the district as an additional insured on the contractor's insurance policies, with the exception of workers' compensation and N.Y. State disability insurance.

II. The policy naming the district as an additional insured shall:

- Be an insurance policy from an A.M. Best rated "secured" or better insurer, authorized to conduct business in New York State. A New York licensed insurer is preferred. The decision to accept specific insurers lies exclusively with the district.
- State that the organization's coverage shall be primary and non-contributory coverage for the district, its Board, employees and volunteers.
- The district shall be listed as an additional insured by using endorsement CG 2010 11 85 or
- equivalent. Examples of equivalent ISO additional insured endorsements include using both CG 2033 1001 and CG 2037 1001 together. A completed copy of the endorsement must be attached to

the certificate of insurance.

- The certificate of insurance must describe the specific services provided by the contractor (e.g., roofing, carpentry, and plumbing) that are covered by the commercial general liability policy and the umbrella policy.

- At the District's request, the contractor shall provide a copy of the declaration page of the liability and umbrella policies with a list of endorsements and forms. If so requested, the contractor will provide a copy of the policy endorsements and forms.

III. The contractor agrees to indemnify the district for any applicable deductibles and self-insured retentions.

IV. Required Insurance:

- **Commercial General Liability Insurance**
  $1,000,000 per occurrence/ $2,000,000 general and products/completed operations aggregates. The general aggregate shall apply on a per-project basis.
- **Automobile Liability**
  $1,000,000 combined single limit for owned, hired and borrowed and non-owned motor vehicles.
- **Workers' Compensation, Employers Liability and NYS Disability Insurance** Statutory Workers' Compensation, Employers' Liability Insurance and NYS Disability Insurance for all employees. Proof of coverage must be on the approved specific form, as required by the New York State Workers' Compensation Board. ACORD certificates are not acceptable.
- **Owners Contractors Protective Insurance**
  (When required in the specifications)
  $1,000,000 per occurrence/$2,000,000 aggregate, with the district as the named insured.
- **Excess Insurance**
  $2,000,000 each Occurrence and Aggregate depending on the type and size of the project. Excess coverage shall be on a follow-form basis.
- **Bid, Performance and Labor & Material Bonds**
- If required, these bonds shall be provided by a New York State admitted Surety Company, in good standing.
- **Builders Risk Insurance or Installation Floater**
- Builders Risk coverage can be provided by NYSIR, or required of the contractors. Installation floaters are provided by the contractor(s).

V. Contractor acknowledges that failure to obtain such insurance on behalf of the district constitutes a material breach of contract and subjects it to liability for damages, indemnification and all other legal remedies available to the district. The contractor is to provide the district with a certificate of insurance, evidencing the above requirements have been met, prior to the commencement of work or use of facilities.

VI. The insurance producer must indicate whether or not they are an agent for the companies providing the coverage.

MOUNT VERNON CITY SCHOOL DISTRICT
165 NORTH COLUMBUS AVENUE
MOUNT VERNON, NEW YORK 10553

Bid Proposal Form
BASE BID #A
HVAC Repair & Maintenance Services

Company: _____

Bidder Signature: _____

Printed Name: _____

Bidder Address: _____

Award will be made to the bidder whose bid proposal results in the lowest cost for the services. The school district reserves the right to make an award on an item by item, group of items, by adding one base bid to other base bid(s), or total award basis for all service, whichever is in the best interest of the District. This contract shall be utilized on an as-needed basis. Quantities for the commodity set forth herein are estimates only. The District makes no guarantees as to the amount of work or materials that will be undertaken or purchased under this agreement. Estimated quantities shall be used for purposes of calculating the bid amounts.

Sums on the bid form must be expressed in both words and numbers and in case of discrepancy between the two, the written amount will govern.

PART 1: MAINTENANCE FOR HVAC Equipment DISTRICT-WIDE:

a. Total Cost for Labor and Materials Necessary to Provide Manufacturer Recommended Annual Service for the HVAC equipment identified in the attached documents. This bid includes all required materials and supplies.

_____

_____ ($ _____) DOLLARS

b. Cost for 500 hours of labor for repairs done. This is beyond the manufacturers recommended maintenance.

_____

($_____) DOLLARS

c. Total Bid – Add Items a&b.

_____

($_____) DOLLARS

d. Mark-up % for parts & materials for 500 hours of labor from line (b)
(%_____)

PART 2: UNIT PRICES BELOW WILL NOT BE USED FOR PURPOSES OF BID AWARD.

a. Hourly Rate for Repairs ($_____)

MOUNT VERNON CITY SCHOOL DISTRICT
165 NORTH COLUMBUS AVENUE
MOUNT VERNON, NEW YORK 10553

Bid Proposal Form
BASE BID #B
HVAC Controls Monitoring and Maintenance Services

Company: _____

Bidder Signature: _____

Printed Name:_____

Bidder Address: _____

Award will be made to the bidder whose bid proposal results in the lowest cost for the services. The school district reserves the right to make an award on an item by item, group of items, by adding one base bid to other base bid(s), or total award basis for all service, whichever is in the best interest of the district. This contract shall be utilized on an as-needed basis. Quantities for the commodity set forth herein are estimates only. The District makes no guarantees as to the amount of work or materials that will be undertaken or purchased under this agreement. Estimated quantities shall be used for purposes of calculating the bid amounts.

Sums on the bid form must be expressed in both words and numbers and in case of discrepancy between the two, the written amount will govern.

PART 1: MAINTENANCE FOR HVAC Equipment DISTRICT-WIDE:

a. Total Cost for Labor and Materials Necessary to provide services related to the BMS system for the District as delineated in the specifications. This bid includes all required materials and supplies.

_____

_____ ($ _____) DOLLARS

b. Cost for 200 hours of labor for repairs done. This is beyond the services delineated as part of the bid package.

_____

($_____) DOLLARS

c. Total Bid – Add Items a&b.

_____

($_____) DOLLARS

d. Mark-up % for parts & materials for 200 hours of labor from line (b)
(%_____)

PART 2: UNIT PRICES BELOW WILL NOT BE USED FOR PURPOSES OF BID AWARD.

a. Hourly Rate for Repairs ($_____)

MOUNT VERNON CITY SCHOOL DISTRICT
165 NORTH COLUMBUS AVENUE
MOUNT VERNON, NEW YORK 10553

Bid Proposal Form
BASE BID #C
Maintenance of Liebert HVAC Equipment

Company: _____

Bidder Signature:_____

Printed Name: _____

Bidder Address: _____

_____

Award will be made to the bidder whose bid proposal results in the lowest cost for the services. The school district reserves the right to make an award on an item by item, group of items, by adding one base bid to other base bid(s), or total award basis for all service, whichever is in the best interest of the district. This contract shall be utilized on an as-needed basis. Quantities for the commodity set forth herein are estimates only. The District makes no guarantees as to the amount of work or materials that will be undertaken or purchased under this agreement. Estimated quantities shall be used for purposes of calculating the bid amounts.

Sums on the bid form must be expressed in both words and numbers and in case of discrepancy between the two, the written amount will govern.

PART 1: MAINTENANCE FOR HVAC Equipment DISTRICT-WIDE:

a. Total Cost for Labor and Materials Necessary to provide services related to the Liebert units for the District as delineated in the specifications. This bid includes all required materials and supplies.

_____

($_____) DOLLARS

MOUNT VERNON CITY SCHOOL DISTRICT
165 NORTH COLUMBUS AVENUE
MOUNT VERNON, NEW YORK 10553

Bid Proposal Form
BASE BID # D
Combined Base Bid

Company:_____

Bidder Signature: _____

Printed Name:_____

Bidder Address: _____

_____

Award will be made to the bidder whose bid proposal results in the lowest cost for the services. The school district reserves the right to make an award on an item by item, group of items, by adding one base bid to other base bid(s), or total award basis for all service, whichever is in the best interest of the district. This contract shall be utilized on an as-needed basis. Quantities for the commodity set forth herein are estimates only. The District makes no guarantees as to the amount of work or materials that will be undertaken or purchased under this agreement. Estimated quantities shall be used for purposes of calculating the bid amounts.

Sums on the bid form must be expressed in both words and numbers and in case of discrepancy between the two, the written amount will govern.

PART 1: MAINTENANCE FOR HVAC Equipment DISTRICT-WIDE:

a. Total Cost for Labor and Materials Necessary to provide labor and materials for all three base bids (Base Bid A, B & C) combined.

_____

($_____) DOLLARS

-FORM OF DISCLOSURE-
MOUNT VERNON CITY SCHOOL DISTRICT

THE UNDERSIGNED AFFIRMS THAT THE FOLLOWING CONSTITUTE ALL OFFICERS,

DIRECTORS, PARTNERS, OR CONTROLLING PRINCIPALS OF THE FIRM:

Name _____

---

1. Does any Mount Vernon City School District Board Member, administrator, or employee possess any financial interest, directly or indirectly, in the firm? _____ If yes, set forth the basis upon which a financial interest exists in the firm:

---

2. Has the firm or any of its officers, directors, partners, or controlling principals possessed any interest in transactions heretofore entered into with Mount Vernon City School District?_____ If yes, please describe transaction(s):

---

3. Does any direct relative of a member of the Board, administrators, or staff possess any financial interest, directly or indirectly, in the firm? (For purpose of this inquiry a direct relative is to be defined as a parent, spouse, child or sibling.)_____If yes, set forth below the Mount Vernon City School District Board Member, administrator, or staff member whose relation possesses an interest and the relationship:

THE UNDERSIGNED AFFIRMS THAT THE ABOVE STATEMENTS ARE TRUE AND UNDERSTANDS THAT ANY FALSE STATEMENT SHALL CONSTITUTE A VIOLATION OF THE PENAL CODE OR GENERAL MUNICIPAL LAW AS APPLICABLE.

Firm: _____

Signature:_____

Print Name: _____

Title: Date:

NON-COLLUSIVE FORM
BID PROPOSAL CERTIFICATIONS

Firm Name_____

Business Address _____

Telephone Number _____Date of Bid

I. General Bid Certification

The bidder certifies that he/she/it will furnish, at the prices quoted, the materials, equipment and/or services as proposed on this Bid.

II. Non-Collusive Bidding Certification

The following statement is made pursuant to Section 103-D of the General Municipal Law, as amended by Chapter 675 of the Laws of 1966, and Section 139-D of the State Finance Law, as amended by Chapter 675 of the Laws of 1966, and Section 2604 of the Public Authorities Law, as amended by Chapter 675 of the Laws of 1966.

By submission of this bid proposal, the bidder certifies that he/she is complying with Section 103-d of the General Municipal Law as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation, or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury:

Non-collusive bidding certification.

(a) 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:

l. 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;

2. Unless otherwise required by law, the prices which 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,

3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) 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 reasons therefore. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the

political subdivision, public department agency or official thereof to which the bid is made or his designee, determines that such disclosure was not made for the purpose 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 subparagraph one (a).

Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certifications referred to in subdivision I of this section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing, and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of corporation.

The bidder affirms the above statement as true under the penalties of perjury.

Signature of Bidder:

(Signature of bidder or authorized representative of a corporation)

Title:

Sworn to before me this_____ day of _____, 2

_____

CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

As a result of the Iran Divestment Act of 2012 (the "Act"), Chapter 1 of the 2012 Laws of New York, a new provision has been added to State Finance Law (SFL) § 165-a and New York General Municipal Law § 103-g, both effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law) (the "Prohibited Entities List"). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, each Bidder/Contractor, any person signing on behalf of any Bidder/Contractor and any assignee or subcontractor and, in the case of a joint bid, each party thereto, certifies, under penalty of perjury, that once the Prohibited Entities List is posted on the OGS website, that to the best of its knowledge and belief, that each Bidder/Contractor and any subcontractor or assignee is not identified on the Prohibited Entities List created pursuant to SFL § 165-a(3)(b).

Additionally, Bidder/Contractor is advised that once the Prohibited Entities List is posted on the OGS Website, any Bidder/Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to this solicitation must certify at the time the Contract is renewed, extended or assigned that it is not included on the Prohibited Entities List.

During the term of the Contract, should the School District receive information that a Bidder/Contractor is in violation of the above-referenced certification, the School District will offer the person or entity an opportunity to respond. If the person or entity fails to demonstrate that he/she/it has ceased engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then the School District shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages or declaring the Bidder/Contractor in default. The School District reserves the right to reject any bid or request for assignment for a Bidder/Contractor that appears on the Prohibited Entities List prior to the award of a contract and to pursue a responsibility review with respect to any Bidder/Contractor that is awarded a contract and subsequently appears on the Prohibited Entities List.

I,_____ , being duly sworn, deposes and says that he/she is the _____ of the _____Corporation and that neither the Bidder/ Contractor nor any proposed subcontractor is identified on the Prohibited Entities List.

_____
SIGNED

SWORN to before me this

_____ day of

20___

Notary Public: _____

DECLARATION OF BIDDER'S INABILITY TO PROVIDE CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

Bidders shall complete this form if they cannot certify that the bidder /contractor or any proposed subcontractor is not identified on the Prohibited Entities List. The District reserves the right to undertake any investigation into the information provided herein or to request additional information from the bidder.

Name of the Bidder:

Address of Bidder:

Has bidder been involved in investment activities in Iran? _____
Describe the type of activities including but not limited to the amounts and the nature of the investments (*e.g.* banking, energy, real estate) _____
_____
_____
_____

If so, when did the first investment activity occur? _____

Have the investment activities ended? _____

If so, what was the date of the last investment activity? _____

If not, have the investment activities increased or expanded since April 12, 2012? _____

Has the bidder adopted, publicized, or implemented a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran? _____

If so, provide the date of the adoption of the plan by the bidder and proof of the adopted resolution, if any and a copy of the formal plan. _____
_____

In detail, state the reasons why the bidder cannot provide the Certification of Compliance with the Iran Divestment Act below (additional pages may be attached):
_____
_____
_____
_____
_____
_____

I,_____being duly sworn, deposes and says that he/she is the _____of the _____ Corporation and the foregoing is true and accurate.

_____
SIGNED

SWORN to before me this

_____day of _____ 20

Notary Public:

THIS FORM MUST BE SIGNED AND NOTARIZED
*****SUBMIT WITH PROPOSAL*****

HOLD HARMLESS AGREEMENT

IT IS HEREBY AGREED AND UNDERSTOOD THAT THE BIDDER AGREES TO HOLD HARMLESS AND INDEMNIFY THE MOUNT VERNON CITY SCHOOL DISTRICT, ITS BOARD OF EDUCATION, ANY OFFICER, AGENT, SERVANT OR EMPLOYEE OF THE MOUNT VERNON CITY SCHOOL DISTRICT, FROM ANY LAWSUIT, ACTION, PROCEEDING, LIABILITY, JUDGMENT, CLAIM, OR DEMAND WHICH MAY ARISE OUT OF:

A. ANY INJURY TO PERSON OR PROPERTY SUSTAINED BY THE BIDDER, ITS AGENTS, SERVANTS OR EMPLOYEES OR ANY PERSON, FIRM, OR CORPORATION EMPLOYED DIRECTLY OR INDIRECTLY BY THEM UPON OR IN CONNECTION WITH THEIR PERFORMANCE UNDER THE CONTRACT HOWEVER CAUSED;

B. ANY INJURY TO PERSON OR PROPERTY SUSTAINED BY ANY PERSON, FIRM, OR CORPORATION, CAUSED BY ANY ACT, DEFAULT, ERROR, OR OMISSION OF THE CONTRACTOR, ITS AGENTS, SERVANTS, OR EMPLOYEES OR ANY PERSON, FIRM OR CORPORATION, DIRECTLY OR INDIRECTLY EMPLOYED BY THEM UPON OR IN CONNECTION WITH PERFORMANCE UNDER THE CONTRACT.

THE ASSUMPTION OR INDEMNITY, LIABILITY AND LOSS HEREUNDER SHALL SURVIVE CONTRACTOR'S COMPLETION OF SERVICE OR OTHER PERFORMANCE HEREUNDER AND ANY TERMINATION OF THIS CONTRACT.

THE CONTRACTOR AT ITS OWN EXPENSE AND RISK SHALL DEFEND ANY SUCH LEGAL PROCEEDINGS THAT MAY BE BROUGHT AGAINST THE MOUNT VERNON CITY SCHOOL DISTRICT, ITS BOARD OF EDUCATION, OR ANY OFFICER, AGENT, SERVANT, OR EMPLOYEE OF THE MOUNT VERNON CITY SCHOOL DISTRICT ON ANY CLAIM OR DEMAND, AND SHALL SATISFY ANY JUDGMENT THAT MAY BE RENDERED AGAINST THE MOUNT VERNON CITY SCHOOL DISTRICT, ITS BOARD OF EDUCATION, OR ANY OFFICER, AGENT, SERVANT, OR EMPLOYEE OF THE MOUNT VERNON CITY SCHOOL DISTRICT.

THIS INDEMNIFICATION, DEFENSE AND HOLD HARMLESS AGREEMENT SHALL APPLY TO ANY LAWSUIT, ACTION, PROCEEDING, LIABILITY, JUDGMENT, CLAIM OR DEMAND, OR WHATEVER NAME OR NATURE, NOTWITHSTANDING THAT CONTRACTOR MAY DEEM THE SAME TO BE FRIVOLOUS OR WITHOUT MERIT. IT IS INTENDED THAT THIS AGREEMENT BE INTERPRETED IN THE BROADEST MANNER POSSIBLE SO AS TO INSULATE ALL OF THE ENTITIES, PARTIES AND INDIVIDUALS NAMED ABOVE FROM ANY LIABILITY, COST OR JUDGMENT, MONETARY OR OTHERWISE, AS THE SAME MAY RELATE TO THE PERSONNEL AND SERVICES PROVIDED BY THE CONTRACTOR.

Subscribed and sworn to before me

this _____ day of _____ 20

_____
Notary Public of Commissioner of Deeds
Commission Expires _____

(Person, Firm or Corporation)

_____
(Authorized Signature)

BIDDER'S CERTIFICATION

The bidder certifies that he has familiarized himself with the specifications, has carefully read them, understands their contents and agrees to furnish the services as requested at the prices quoted herein.

Signature of the bidder:

Print Name: _____

Date:_____

Seal (if Corporation)

Sworn to before me this _____ day of _____ 20____

Notary Public of Commissioner of Deeds _____

Commissioner Expires _____

Sexual Harassment Prevention Certification Form

By submission of this proposal, the person signing on behalf of the proposer, certifies under penalty of perjury, that: the proposer has and has implemented a written policy addressing sexual harassment prevention in the workplace; the proposer provides annual sexual harassment prevention training to all of its employees; and that the principal(s) and all employees of the proposer have completed the sexual harassment prevention training in the last twelve (12) months. Such policy shall, at a minimum, meet the requirements of Section 201-g of the Labor Law.

Proposer Name: _____

Proposer Address: _____

Print Name and Title : _____

Signature:_____

Date:

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

_____
Notary Public

ATTACHMENT A

BID #A

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE (O&M)/SERVICE MANUALS (Provided under Separate Cover) FOR HVAC REPAIR & MAINTENANCE SERVICES CONTRACT

LIST OF EQUIPMENT

AND

MAINTENANCE SCOPE OF WORK

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

1.0 Boilers by School

Building	Make	Model	QTY	Input (MBH)	Fuel	Burner Make & Model
AB Davis (conversion to HW)	Smith Mills	6500A-S-16	2	9,805	NG/FO	Power Flame C5-GO-30B
Benjamin Turner (Longfellow MS)	Fulton	VTG 2000DF	2	2,000	NG/FO	Factory Mounted
BOE Education Center	Fulton	Endura 750	2	750	NG	Factory Mounted
Cecil Parker ES	Smith Cast	GO-28A-S-15	1	4,853	NG/FO	Power Flame C3-GO-25B
Cecil Parker ES	Fulton	Endura 2000	2	2,000	NG/LPG	Factory Mounted
Columbus ES	HB Smith	GO-28HE-S-13	2	3,978	NG/FO	Power Flame C3-GO-25
Edward Williams ES	HB Smith	GO-28HE-S-12	2	3,663	NG/FO	Power Flame C3-GO-25
Graham ES	HB Smith	GO-28HE-S-15	2	4,608	NG/FO	Power Flame C3-GO-25B
Grimes ES	Fulton	VTG 2000DF	2	2,000	NG/FO	Factory Mounted
Hamilton ES	HB Smith	GO-28HE-S-13	2	3,978	NG/FO	Power Flame C3-GO-25
Lincoln ES	Fulton	VTG 4000DF	2	4,000	NG/FO	Factory Mounted
Mount Vernon HS (Boilers)	Fulton	VTG 6000DF	3	6,000	NG/FO	Factory Mounted
Nellie A. Thornton HS	Fulton	VTG 4000DF	2	4,000	NG/FO	Factory Mounted
Nelson Mandela HS	HB Smith	GO-28HE-S-12	2	3,663	NG/FO	Power Flame C3-GO-25
Rebecca Turner ES (Longfellow ES)	Weil-McLain	Series 94 H-1494	2	4,691	NG/FO	Power Flame C4-GO-25
The Pennington ES	HB Smith	GO-28HE-S-13	2	3,978	NG/FO	Power Flame C3-GO-25
Traphagen ES	Fulton	VTG 2000DF	2	2,000	NG/LPG	Factory Mounted
William H. Holmes ES	HB Smith	GO-28HE-S-13	2	3,978	NG/FO	Power Flame C3-GO-25

2.0 Gas Boosters by School

Building	Pipe Size	Pressure
Mount Vernon HS	12 inch	Low
William H. Holmes ES	4 inch	Low
Lincoln ES	8 inch	Low
Rebecca Turner ES (Longfellow ES)	6 inch	Low
Nellie A. Thornton HS	6 inch	Low
BOE Education Center	4 inch	Low
Cecil Parker ES	2 inch	Low
Benjamin Turner (Longfellow MS)	2 inch	Low
The Pennington ES	6 inch	Low
Traphagen ES	3 & 6 inch	Low

3.0 Domestic Hot Water Equipment by School

Building	REPLACEMENT DWH EQUIPMENT				
	DHW Heater Make	DHW Heater Model	Qty	Fuel	Input (MBH)
AB Davis (Old Boiler Rm)	HTP Elite	EL-399	1	NG	399
AB Davis (Old Boiler Rm)	Patterson Kelly (KP)	PK-12S-2	1	Indirect	2500
Benjamin Turner (Longfellow MS)	Fulton	Pulse DHW	1	NG	1000
Grimes ES	Fulton	Pulse DHW	1	NG	1000
Hamilton ES	HTP Elite	EL-399	1	NG	399
Lincoln ES	HTP Elite	EL-399	1	NG	399
Traphagen ES	HTP Elite	EL-399	1	NG	399

4.0 Motor Upgrades and VFD Installation by School

EXISTING PUMP MOTORS						
Building	Equipment Description	Qty	Motor HP	Replace Motor	Replace Pump	Install VFD
Thornton HS	Hot Water Circulating Pumps	2	15.00	Y	N	Y

EXISTING AHU MOTORS					
Building	Equipment Description	Qty	Motor HP Supply/Return	Replace Motor	Install VFD
Mount Vernon HS	HV-5 Gymnasium	1	7.50 / 5.00	Y (ECM18)	
	HV-7 Boys Locker Room	1	5.00	Y	N
	HVAC-9 Community Room	1	3.00	Y	N
AB Davis MS	AHU-1 Gymnasium	1	10.00	Y (ECM18)	
Graham ES	Upper Gym	2	0.50	Y (ECM18)	N
	Lower Gym	2	0.75		N
Hamilton ES	Auditorium	1	5.00	Y (ECM18)	
	Gymnasium	1	5.00		
Holmes ES	Gymnasium	1	1.50	Y (ECM18)	N
	Auditorium	1	2.00	Y	N
Lincoln ES	AC-1, 2 Supply	2	40.00	Y	N
	AC-5 Supply	1	15.00 / 5.00	Y (ECM18)	
	HV-1 Gymnasium	1	15.00 / 5.00	Y (ECM18)	
	Auditorium	1	7.50 / 3.00	Y (ECM18)	N

EXISTING PUMP MOTORS						
Building	Equipment Description	Qty	Motor HP	Replace Motor	Replace Pump	Install VFD
Grimes ES	Hot Water Circulating Pumps	2	15.00	Y	N	Y
Mount Vernon HS	Hot Water Circulating Pump 3	1	3.00	Y	Y	N
Parker ES	Hot Water Circulating Pumps	2	7.50	Y	N	Y
Traphagen ES	SWR Circulating Pumps	2	7.50	Y	Y	Y
	HW Circulating Pumps	2	5.00	Y	Y	Y
Education Center	Dual Temp Circulating Pumps	2	3.00	Y	N	Y
	Condenser Water Pumps	2	5.00	Y	N	Y

4.0 Motor Upgrades and VFD Installation by School Con't

EXISTING AHU MOTORS					
Building	**Equipment Description**	**Qty**	**Motor HP Supply/Return**	**Replace Motor**	**Install VFD**
Pennington ES	AHU-1	1	7.50	Y	N
Traphagen ES	AS-1 Gymnasium	1	5.00	Y (ECM18)	
	AS-2 Locker Room	1	1.50	Y	N
	AC-3 Office	1	1.50	Y	N
	AC-1 General Supply	1	25.00	Y	N
Williams ES	Gymnasium / Cafeteria	1	5.00	Y (ECM18)	
	Auditorium	1	2.00	Y	N
	Classroom	1	5.00	Y	N
	Music Room	1	1.50	Y	N

5.0 Multi-Zone Unit to Unit Variable Air Volume Conversion by School

MULTI-ZONE UNITS							
Building	**Location**	**AHU #**	**Area Served**	**Supply Fan HP**	**Return Fan HP**	**VFD Qty.**	**No. of Zones**
Mount Vernon HS	Boiler Room	HVAC-12	Cafeteria	20	-	1	2
Mount Vernon HS	Boiler Room	HVAC-13	Dining Rooms	7.5	-	1	2
Education Center	Mechanical Room	HVAC-1	First Floor	7.5	-	1	4
Education Center	Mechanical Room	HVAC-3	Ground Floor	5	-	1	4

6.0 Chilled Water Plants by School

Building	**Proposed**				
	Equipment	**Make**	**Model**	**Nominal Capacity (Tons)**	**Type**
Lincoln ES	Chiller	Daikin	WMC250DC	250	Water Cooled
Education Center	Chiller	Daikin	WGZ080D	80	Water Cooled

7.0 De-Stratification Fans by School

NEW DESTRATIFICAN FANS			
Building	**Location**	**Make & Model**	**Fan Count**
Mount Vernon HS	Gymnasium	Leading Edge 5600-1LC	8
	Auxiliary Gymnasium	Leading Edge 5600-1LC	2
AB Davis MS	Gymnasium	Leading Edge 5600-1LC	4
Longfellow MS	Gymnasium	Leading Edge 5600-1LC	2
Graham ES	Gymnasium	Leading Edge 5600-1LC	2
Grimes ES	Gymnasium	Leading Edge 5600-1LC	2
Holmes ES	Gymnasium	Leading Edge 5600-1LC	2
Lincoln ES	Gymnasium	Leading Edge 5600-1LC	2
Longfellow ES	Gymnasium	Leading Edge 5600-1LC	2
	Cafeteria	Leading Edge 5600-1LC	2
Pennington ES	Gymnasium	Leading Edge 5600-1LC	2
Traphagen ES	Gymnasium	Leading Edge 5600-1LC	2

8.0 Unit Ventilators by School

Building	Proposed Unit Ventilators
Thornton HS	33 (Water)
Graham ES	44 (Steam)
Williams ES	1 (Steam)
Education Center	2 (Water)

9.0 Air Handling Units by School

Building	REPLACEMENT AHUS					
	Equipment	**Make**	**Model**	**QTY**	**Type**	**Capacity (CFM)**
Mount Vernon HS	HVAC-12	US Coil & Air	MZD-190-ICOH	1	Dual Temp	18,000
Mount Vernon HS	HVAC-13	US Coil & Air	MZD-140-ICOH	1	Dual Temp	12,360
Mount Vernon HS	HVAC-14	US Coil & Air	MZD-045-ICOH	1	Dual Temp	2,970
Mount Vernon HS	HVAC-15	US Coil & Air	MZD-280-ICOH	1	Dual Temp	24,000
Mount Vernon HS	HVAC-16	US Coil & Air	MZD-140-ICOH	1	Dual Temp	12,360
Mount Vernon HS	HVAC-17	US Coil & Air	MZD-060-ICOH	1	Dual Temp	5,580
Education Center	HVAC-1	US Coil & Air	MZD-130-ICOH	1	Dual Temp	11,000
Education Center	HVAC-2	US Coil & Air	MZD-050-ICOH	1	Dual Temp	3,440
Education Center	HVAC-3	US Coil & Air	MZD-085-ICOH	1	Dual Temp	7,295

9.0 Air Handling Units by School Con't

Building	EXISTING AHUS				
	Equipment	Serves	HP	QTY	Type
Mount Vernon HS	HV-2	SE Exercise Room	3	1	Heating
	HV-3	Field Practice Room	5	1	Heating
	HV-4	NE Exercise Room	3	1	Heating
	HV-5	Girls Gymnasium	7.5	1	Heating
	HV-7	Boys Locker Room	5	1	Heating
	HV-8	Girls Locker Room	-	1	Heating
	HVAC-9	Community Room	3	1	Dual Temp
Nelson Mandela HS	SF-1	Whole Building	20	1	Dual Duct
AB Davis MS	AHU-4,6	Kitchen, Music	2	2	-
Graham ES	HV-1	Gymnasiums	1/2	1	Ceiling Mounted
	HV-2	Gymnasiums	1/2	1	Ceiling Mounted
	HV-3	Gymnasiums	3/4	1	Ceiling Mounted
	HV-4	Gymnasiums	3/4	1	Ceiling Mounted
Hamilton ES	AHU	Auditorium	5	1	Auditorium unit in basement
	AHU	Classrooms	15	1	Classroom unit in basement
	AHU	Gymnasium	5	1	Gym unit is ceiling mounted above stage
Holmes ES	AHU	Classroom	7.5	1	Classroom unit in basement.
	AHU	Auditorium	10	1	Unit in mech. rm. near stage
	AHU	Gymnasium	5	1	Unit in mech. rm. near stage
Lincoln ES	AC-1	Classrooms	40	1	Heating and Cooling
	AC-2	Classrooms	40	1	
	AC-4	Classrooms	50	1	
	AC-5	Cafeteria	15	1	
	HV-1	Gymnasium	15	1	Heating
	RTU	Auditorium	7.5	1	Heating
Pennington ES	AHU	Classrooms	7.5	1	Heating
	AHU	Classrooms	7.5	1	Heating
Traphagen ES	AC-1	General Supply	25	1	Heating and Cooling
	AC-2	Auditorium	7.5	1	
	AC-3	Office	1.5	1	
	AS-1	Gymnasium	5	1	Heating
	AS-2	Locker Room	1.5	1	Heating
Williams ES	AHU	Gymnasium / Cafeteria	5	1	-
	AHU	Auditorium	2	1	-
	AHU	Classroom	1.5	1	-

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

Building	EXISTING AHUS				
	Equipment	Serves	HP	QTY	Type
	AHU	Music	1.5	1	-
	AHU	Kitchen Make Up	1.5	1	Direct Fired

10.0 Walk-In Freezer/Cooler by school

WALK-IN FREEZER/COOLER CONTROLS					
Building	Walk-In Coolers	Walk-In Freezers	Compressor Capacity		Air Cooled/Water Cooled
			Cooler kW	Freezer kW	
Mount Vernon HS	1	1	1.01	3.69	Air Cooled
Thornton HS	1	1	1.01	1.90	Air Cooled
Longfellow MS	1	1	1.02	1.90	Air Cooled
Graham ES	1	-	0.98	-	Air Cooled
Grimes ES	1	1	1.24	1.90	Air Cooled
Hamilton ES	1	1	1.24	2.65	Air Cooled
Holmes ES	1	1	1.00	2.74	Air Cooled
Longfellow ES	1	1	1.24	1.90	Air Cooled
Parker ES	1	1	1.16	2.66	Air Cooled
Pennington ES	1	1	1.18	1.94	Air Cooled
Williams ES	1	1	1.11	2.02	Air Cooled

11.0 Kitchen Hood

Building	No. of Hoods	Exhaust Fan HP
Mount Vernon HS	2	2

	SCHOOL				
EQUIPMENT	AB Davis	Graham	Mandela	Pennington	Thornton
Aldes CW2000-10000 *IOM			X		
Aldes CW3000i-e			X		
Aldes CW6500i-e	X				
Aldes CW8000i-e	X				
Aldes H/E1100 Air Exchanger			X		
Aldes LW3000i *SM			X		
AnnexAir AHU *IOM			X		
AnnexAir Energy Recovery Wheel *IOM			X		
AnnexAir Warranty			X		
Beacon/Morris BCUH-16 Cabinet Heater					X
Beacon/Morris CBS-RC-11 Cabinet Heater	X	X		X	
Beacon/Morris CBS-RW-11 Cabinet Heater				X	
Beacon/Morris CUH-6 Cabinet Heater			X		
Carrier 38-40MAQ Split System *SM	X	X		X	
Carrier 38AUZD/E Condensing Unit *IM	X				
Carrier 38MBRQ-48				X	
Carrier 38MGR-04SM Heat Pump *SM	X			X	
Carrier 39SH-5PD				X	
Carrier 40MAQB-12 Warranty				X	
Carrier 40MBCQ -09 *OM				X	
Carrier 40MBCQ-03 *IM	X				
Carrier 40MBCQ-03 *SM	X				
Carrier 40MBQD Split Unit Warranty	X				
Carrier 50HC-13				X	
Carrier AHU 39SH-3SI *IM	X			X	
Carrier DP172 Condensing Unit Warranty	X				
Carrier Heat Pump System *OM-25-3	X				
DCA Dehumidifier *OM	X				
DCA Dehumidifier Warranty	X				
Greenheck Model CUE & CUBE Upblast Fan *IOM				X	X
Greenheck Model CW & CWB Sidewall Exhaust *IOM					X
Greenheck Model G & GB Downblast Exhaust	X		X	X	
			X		

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

Greenheck Model QEI & QEID Mixed	X

	SCHOOL				
EQUIPMENT - Continued	**AB Davis**	**Graham**	**Mandela**	**Pennington**	**Thornton**
Greenheck Model SP & CSP Exhaust Fans *OMM		X	X	X	X
Greenheck Model SQ & BSQ Inline	X		X		X
Lochinvar Models 751-6001 Boiler *SM				X	
Lochinvar Warranty				X	
MagicAire Warranty					X
Mitsubishi PFFY Series AHU *TSM					X
Mitsubishi PKA-A-HA7 Heat Pump *OM					X
Mitsubishi PKFY Series AHU *TSM					X
Mitsubishi PLAA-12EA7 *SM					X
Mitsubishi PUMY P36-48 *TSM					X
Mitsubishi PUZ-PUY *SM					X
QMark AWH4000 *IOM			X		
QMark MUH *IOM			X		
Runtal *IOM					X
Sterling HS Unit Heaters			X		
Temspec VER 1800 *OMM	X				
Toshiba MMU-AP0121 *SM		X			
Toshiba/Carrier MMD-AP0364 *SM				X	
Toshiba/Carrier MMK-AP0071 *IM		X			
Toshiba/Carrier MMU-AP0072 *SM		X	X		
Toshiba/Carrier MMY-MAP0964 *EDB				X	
Toshiba/Carrier MMY-MAP1206 *SM			X		
Toshiba/Carrier RAV-SP240AT2-UL *IM			X		
Toshiba/Carrier RAV-SP240KRT-UL Indoor *IM			X		
Toshiba/Carrier RBM-Y *SM			X		
Trane BCHD AHU					X
Trane TWE*IOM					X
Trane YHC090A *UM					X
Trane YHC102 RT A/C *IOM					X
Trane YS150-300 RT A/C *IOM					X
Trane YSC060 Packaged Gas/Electric *IOM					X
Xylem Series 80 Pump	X		X		
Xylem Series e-1510 Pump *IM			X	X	

*SEE ABBREVIATIONS BELOW

EDB= Engineering Data Bulletin
IM= Installation Manual
IOM= Installation, Operating and Maintenance Manual
OM= Operating Manual
OMM= Operating and Maintenance Manual
SM= Service Manual
TSM= Technical Service Manual
UM= User Manual

13.0 Additional Equipment Schedules

A.B. DAVIS SCHOOL

SCHEDULE OF CABINET HEATERS

MARK	TYPE UNIT	MODEL Nº ①	CAPACITY DATA BTU/HR	CFM	GPM	PD.FT.	MOTOR WATTS	MOTOR RPM	ELECTRIC SERVICE	REMARKS
CH A	RECESSED CLG. MTD.	RC 1120 02	20.6	335	2.0	.25	1/15	1050	120/1/60	REFER TO 2 3 4 5 6

SCHEDULE OF DUCTLESS HEAT PUMP MULTI-SPLIT SYSTEMS

INDOOR AIR HANDLER INFORMATION												OUTDOOR CONDENSING UNIT INFORMATION								
GENERAL DATA			SUPPLY FAN DATA			COOLING COIL DATA ②			HEATING			GENERAL INFO.	COMPRESSOR DATA		CONDENSER FAN DATA		ELECTRICAL INFORMATION				REMARKS
MARK	SERVICE	MODEL No. ①	HIGH CFM	MOTOR (WATTS)	ELECTRIC SERVICE	TOTAL CAP. BTU/HR	SENSIBLE CAP. BTU/HR	ENT. AIR TEMP. DB/WB	TOTAL CAP. BTU/HR	ENT. AIR TEMP.	MARK	MODEL No. ①	QTY.	CAPACITY (MBH)	QTY.	MOTOR OUTPUT (W)	V/PH/HZ	MCA	MOCP	EER	
AC 1	WORK ROOM G-41	40MBC009	360	46	208/1/60	9,000	6,700	80 / 67	8,000	70	HP 1	38MGRQ18B	1	18,000	1	60	208/3/60	18	25	12.5	REFER TO 2 3 4 5 6
AC 2	WORK ROOM G-40	40MBC012	400			12,000	8,900		10,700												

SCHEDULE OF ROOFTOP HEATING, VENTILATING & AIR CONDITIONING UNITS

AIR HANDLING UNIT

GENERAL DATA						SUPPLY FAN DATA						COOLING COIL DATA ③						HEATING COIL DATA ④					FILTER DATA		
MARK	SERVICE	LOCATION	MIN/MAX O.A. CFM	MODEL No. ①	OCCUPANCY CAPACITY (PEOPLE)	CFM	TOTAL S.P. IN WG	FAN RPM	FAN OUTLET VELOCITY F.P.M.	MOTOR HP	ELECTRIC SERVICE	TOTAL CAP. BTU/HR	No. OF ROWS	FACE AREA ft²	FACE VEL. F.P.M.	ENT. AIR TEMP. DB/WB	LVG. AIR TEMP. DB/WB	TOTAL CAP. BTU/HR	MIN. COIL FACE AREA ft²	ENT. AIR TEMP.	LVG. AIR TEMP.	G.P.M.	No.	SIZE	TYPE
AHU 1	LIBRARY/MEDIA G-39	ROOF	500 / 3000	39SR07B	27	3000	1.0	950	1260	3.0	208/3/60	90,000	6	6.0	500	81.7 / 70.3	54.1 / 53.5	HC 1-1	SEE DUCT MOUNTED HOT WATER HEATING COIL SCHEDULE				2	16X32	MERV 7

SCHEDULE OF EXHAUST FANS

MARK	SERVICE	LOCATION	MODEL #①	CFM	EXT. S.P. IN H_2O	RPM	HP / AMP	ELECTRIC SERVICE	SIZE (IN)	WEIGHT (LBS.)
EF 1	LIBRARY/MEDIA G-39	ROOF	G-183-VG/5	500/3000	0.5	1100	3/4 / –	208/3/60	–	120

SCHEDULE OF EXHAUST FANS

MARK	SERVICE	LOCATION	MODEL #①	CFM	EXT. S.P. IN H_2O	RPM	HP / AMP	ELECTRIC SERVICE	SIZE (IN)	WEIGHT (LBS.)
EF 1	ROBOTICS ROOM B10	CEILING	SQ-120	1000	0.5	1100	1/4 / –	120/1/60	–	70

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

A.B. DAVIS SCHOOL – Con't

SCHEDULE OF OUTDOOR CONDENSING UNITS (AL

GENERAL DATA				CAPACITY	PHYSICAL DATA				ELECTRICAL SUPPLY			
MARK	SERVICE	LOCATION	MODEL No. (1)	COOLING (MBH)	UNIT WEIGHT (POUNDS)	L	W	H	SERVICE	MCA	EER	
CU 1	LIBRARY/MEDIA G-39	ROOF	38AUZD08	90.0	360	59"	46"	42"	460/3/60	20	11.2	

SCHEDULE OF ROOM DEHUMIDIFIER

MARK	ROOM SERVED	MODEL NO. (1)	MOISTURE REMOVAL (PTS/HR)	BLOWER C.F.M.	ELECT. REQMENTS			REMARKS
					AMP.	KW	VOLTAGE	
DH 1	ELECTRICAL ROOM	DCA 2000T	25.0	2000	25.8	5.07	208/3/60	REFER TO (2)(3)(4)(5)

Schedule of Outdoor Energy Recovery Units

MARK	SERVICE	LOCATION	MODEL No. (2)	AIRFLOW CONDITIONS					SUPPLY FAN			EXHAUST FAN			HEAT EXCHANGER WHEEL			
				O.A. CFM	E.A. CFM	R.A. CFM	S.A.ESP. IN. WC	R.A.ESP. IN. WC	TYPE	CFM	HP	TYPE	CFM	HP	SUMMER L.A.T. DB °F	SUMMER L.A.T. WB °F	WINTER L.A.T. DB °F	WINTER L.A.T. WB °F
ERU 1	ORIGINAL BLDG. SOUTH	ROOF	CW6500e	5650	6020	0	1.0	0.75	CENTR.	5650	7.5	CENTR.	6020	7.5	80	67.1	51.7	41.6
ERU 2	ORIGINAL BLDG. NORTH	↓	CW8000e	7320	7640	0	↓	↓	↓	7320	↓	↓	7640	10.0	↓	↓	↓	↓

HEATING COIL DATA (6)				FILTERS	ELECTRICAL DATA			DIMENSIONS			WEIGHT LBS
TOTAL CAP. BTU/HR	MIN. COIL FACE AREA ft²	ENT. AIR TEMP.	LVG. AIR TEMP.	INTAKE RETURN	VOLTAGE	MCA	MOP	L	W	H	
SEE HC 1-1	–	–	–	MERV 10	480/3/60	23.5	25	132	70	80	3,600
SEE HC 1-2	–	–	–	↓	↓	30.9	35	141	78	96	3,800

SCHEDULE OF PUMPS

MARK	SERVICE	LOCATION	MODEL NO	GPM	HEAD FT. H_2O	RPM	MOTOR HP	ELECTRIC V/PH/HZ
HWP 1	ERU-1 WATER COIL	BOILER RM	SERIES e-80 1.5x1.5x7C	35	45	1750	1.5	208/3/60
HWP 2	ERU-2 WATER COIL	BOILER RM	SERIES e-80 1.5x1.5x7C	35	45	1750	1.5	208/3/60

SCHEDULE OF UNIT VENTILATORS

MARK	SERVICE	MODEL No. (1)	CFM	MIN. O.A. CFM	HEATING DATA (2)		COOLING DATA (9)		FILTER TYPE	INDOOR MOTOR HP	ELECTRICAL DATA	DIMENSIONS L" x D" x H"	WEIGHT (LBS.)
					CAPACITY MBH	GPM	TOTAL CAPACITY MBH	SENSIBLE CAPACITY MBH					
UV A	GROUND FLOOR	VER 1800	1500	600	50.0	5.0	48.0	35.8	THROWAWAY	1/3	208/1/60	30"x28"x110"	300

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

A.B. DAVIS SCHOOL – Con't

SCHEDULE OF INDOOR DUCTLESS AIR HANDLING UNITS

GENERAL DATA				CAPACITY		PHYSICAL DATA				ELECTRICAL DATA		
MARK	SERVICE	MODEL No. (1)	MOUNTING LOCATION	COOLING (MBH)	CFM	UNIT WEIGHT (POUNDS)	L	W	H	SERVICE	MCA	REMARKS
AC 1	THIRD FLOOR TEACHER'S LOUNGE	40MBCQ18	CEILING	18.0	420	44	36	24	10	208/1/60	1.0	REFER TO (2)(3)(5)(6)(7)
AC 2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
AC 3	FIRST FLOOR CAMERAS/SECURITY 102A	40MBQB09C	↓	9.0	260	30	22	22	10	↓	↓	REFER TO (2)(3)(5)(6)(7)(8)

SCHEDULE OF OUTDOOR HEAT PUMP UNITS

GENERAL DATA			CAPACITY		PHYSICAL DATA				ELECTRICAL SUPPLY		
MARK	SERVICE	MODEL No. (1)	COOLING (MBH)	HEATING (MBH)	UNIT WEIGHT (POUNDS)	L	W	H	SERVICE	MCA	EER
HP 1	THIRD FLOOR TEACHER'S LOUNGE	38MGRQ36B	36.0	23.2	150	41"	17"	52"	208/1/60	30.0	13.5
HP 2	BASEMENT ROBOTICS CLASSROOM B10	25HCB6	60.0	44.4	150	45"	45"	48"	↓	50.0	17.5
HP 3	FIRST FLOOR CAMERAS/SECURITY 102A	38MAQB09	9.0	10.0	85	32"	12"	22"	↓	15.0	13.5

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

GRAHAM SCHOOL

SCHEDULE OF DUCTLESS SPLIT SYSTEM AND VRF AIR CONDITIONING UNITS

INDOOR UNIT INFORMATION											OUTDOOR CONDENSING UNIT INFORMATION								
GENERAL DATA		MODEL No. ①	SUPPLY FAN DATA			TOTAL CAPACITY	DIMENSION/WEIGHT				GENERAL INFO.		COMPRESSOR DATA						
MARK	SERVICE		CFM HIGH	UNIT MCA	ELECTRIC SERVICE	COOLING/HEATING KBTU/HR	W (IN.)	D (IN.)	H (IN.)	LBS	MARK	MODEL No. ①	QTY.	MCA	MOCP	ELECTRIC SERVICE	UNIT DIMENSIONS (IN)	UNIT WEIGHT (LBS)	REMARKS
HP A	SEE PLANS	MMK-AP0123H2	350	0.3	208/1/60	12.0/13.5	41.3	9	12.6	50	CU 1	MAP0964FTUL	1	50	60	208/3/60	48Wx31Lx73H	900	REFER TO ②③④⑤⑥
HP B	SEE PLANS	MMK-AP0073H2	340	0.3	208/1/60	7.5/8.5	41.3	9	12.6	50									
HP C	SEE PLANS	MMU-AP0121MH2	330	0.5	208/1/60	12.0/13.5	22.6	22.6	10.6	50									
FS A	SEE PLANS	RBM-Y0383FUL	–	0.5	208/1/60	–	9.8	6.3	7.5	15									REFER TO ②⑤
HP E	IT ROOM	40MAQB18B-3	650	0.5	208/1/60	18,400/18,700	40	13	9	40	CU 2	38MAQB18R-3	1	18.0	25.0	208/1/60	34Lx15Wx22H	150	REFER TO ②③④⑤⑥⑦

SCHEDULE OF CABINET HEATER

MARK	TYPE UNIT	MODEL N.º ①	CAPACITY DATA ③				MOTOR WATTS	MOTOR RPM	ELECTRIC SERVICE	REMARKS
			BTU/HR	CFM	LB/HR	P.D.FT.				
CH A	RECESSED CEILING	RC1210-04	17,300	430	17.3	.06	1/6 HP	1050	115/1/60	REFER TO ②③④⑤⑥

NOTES

① AS MANUFACTURED BY "STERLING".
② INSTALL PER MANUFACTURER'S RECOMMENDATIONS
③ CAPACITIES BASED ON HIGH SPEED FAN SETTING, 2PSIG STEAM
④ PROVIDE THROWAWAY FILTERS.
⑤ PROVIDE FACTORY DISCONNECT SWITCH
⑥ PROVIDE WITH RECESSED CEILING TRIM, MOUNTING HARDWARE RETURN AIR TEMP.SENSOR AND INTEGRAL MOUNTED CONTROLS. DIMENSIONS:47"X30"X9.5"/WEIGHT:150LBS

SCHEDULE OF FANS

MARK	SERVICE	LOCATION	TYPE	MODEL No. ①	CFM	TOT. S.P. IN H_2O	FAN RPM / HP(W	ELECTRIC SERVICE	REMARKS
EF 1	TOILET RM	CEILING	DIRECT	CSP-A390	300	.75	821 / (150)	120/1/60	REFER TO ②④⑤
EF 2	TOILET RM	CEILING	BELT	SP-B200	75	1.0	821 / (180)	120/1/60	REFER TO ②④⑤
EF 3	MER	CEILING	DIRECT	CSP-B200	40	.5	821 / (50)	120/1/60	REFER TO ②③⑤

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

MANDELA SCHOOL

SCHEDULE OF PUMPS

MARK	SERVICE	LOCATION	MODEL No. ①	GPM	HEAD FT.H_2O	RPM	MOTOR HP	ELECTRIC SERVICE	REMARKS
HWP 1	PRIMARY LOOP	BOILER ROOM	SERIES E-80 5x5x7B	300	30	1770	5.0	208/3/60	REFER TO ②③⑤
HWP 2	PRIMARY LOOP	BOILER ROOM	SERIES E-80 5x5x7B	300	30	1770	5.0	208/3/60	REFER TO ②③⑤
HWP 3	SECONDARY LOOP	BOILER ROOM	SERIES E-1510 3 BD	300	75	1800	15.0	208/3/60	REFER TO ②③④
HWP 4	SECONDARY STAND-BY	BOILER ROOM	SERIES E-1510 3 BD	300	75	1800	15.0	208/3/60	REFER TO ②③④

SCHEDULE OF UNIT HEATERS

MARK	MODEL No. ①	CAPACITY DATA				MOTOR WATTS	ELECTRIC SERVICE	PHYSICAL DATA	
		BTU/HR	EWT °F	LWT °F	GPM(KW)			LxWxH	WEIGHT (LBS)
UH A	HS-36	20,100 ①	180	160	3	25	120/1/60	15"x10"x18"	40
UH B	HS-60	37,300 ①	180	160	5	50	120/1/60	17"x11"x20"	50
UH C	MUH0321	7,500 ⑮	–	–	(2.2KW)	50	208/1/60	14"x8"x16"	30

SCHEDULE OF CABINET HEATERS

MARK	TYPE UNIT	MODEL No.	CAPACITY DATA ②				KW	MOTOR WATTS	ELECTRIC SERVICE	REMARKS
			BTU/HR	CFM	GPM	PD.FT.				
CH A	RECESSED WALL MTD.	RW1120-02 ①	25,800	230	3.0	2.9	–	70	120/1/60	REFER TO ②③④⑤⑥
CH B	CEILING MTD.	RC1200-02 ①	25,800	230	3.0	2.9	–	70	120/1/60	REFER TO ②③④⑤⑥
CH C	WALL MTD.	AWM4408F ⑫	13,650	100	–	–	4.0	–	208/1/60	REFER TO ②⑤⑦
CH D	WALL MTD.	RW1080-02 ①	25,800	230	3.0	2.9	–	70	120/1/60	REFER TO ②③④⑤⑥

Schedule of Energy Recovery Units

SCHEDULE OF ENERGY RECOVE

GENERAL DATA					SUPPLY FAN DATA						RETURN-EXH. FAN DATA						ELECTRICAL DATA			
MARK	SERVICE	LOCATION	OA	MODEL No.	MODEL	CFM	MOTOR HP	RPM	T.S.P. IN WC	VFD	MODEL	CFM	MOTOR HP	RPM	T.S.P. IN WC	VFD	FLA	MCA	MOP	ELECTRICAL SERVICE
ERU 1	CLASSROOMS	LOWER LEVEL MER	4090	⑦ ERV-I-04-EW	PLENUM	4090	5.0	1800	4.0	YES	PLENUM	2500	3.0	1800	3.4	YES	24	27	40	208/3/60
ERU 2	CLASSROOMS	LOWER LEVEL MER	4560	⑦ ERV-I-04-EW	PLENUM	4560	5.0	1800	4.0	YES	PLENUM	3560	3.0	1800	3.4	YES	24	27	40	208/3/60
ERU 3	ART ROOM	1ST FLOOR MER CLG.	605	⑫ E1100L-RI-EC	BACKWARD	605	0.5	1800	1.0	YES	BACKWARD	605	0.5	1800	1.0	YES	–	6	15	208/1/60
ERU 4	CLASSROOMS	2ND FLOOR MER	5375	⑦ ERV-I-04-EW	PLENUM	5375	7.5	1800	4.0	YES	PLENUM	4230	5.0	1800	3.4	YES	36	41	60	208/3/60
ERU 5	SCIENCE RM	ROOF	500	⑫ LW1500e	FOWARD	500	0.75	1800	1.5	YES	FOWARD	500	0.75	1800	1.5	YES	11	12	15	208/3/60
ERU 6	CLASSROOMS	ROOF	2370	⑫ CW3000e	BACKWARD	2370	2.0	1800	1.5	YES	BACKWARD	1895	2.0	1800	1.5	YES	18	20	25	208/3/60
ERU 7	GYM	ROOF	3540	⑫ CW3000e	BACKWARD	3540	5.0	1800	1.0	YES	BACKWARD	3540	5.0	1800	1.0	YES	24	27	40	208/3/60
ERU 8	CLASSROOMS	ROOF	1350	⑫ CW1500e	BACKWARD	1360	1.5	1800	1.5	YES	BACKWARD	910	1.5	1800	1.5	YES	12	14	20	208/3/60

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

MANDELA SCHOOL – Con't

Schedule of Energy Recovery Units – continued

ERY UNITS

HEAT EXCHANGER					HW COIL DATA ③								PRE/FINAL FILTER	PHYSICAL DATA			
MODEL	SUMMER E.A.T. DB °F	SUMMER E.A.T. WB °F	WINTER E.A.T. DB °F	WINTER E.A.T. WB °F	MARK	ROWS	CFM	CAP. MBH	ENT. AIR TEMP.	LVG. AIR TEMP.	GPM	PD.FT.	TYPE	L (in.)	W (in.)	H (in.)	WEIGHT (LBS)
ENTHALPY WHEEL	86	71	32	30	–	2	4090	200	40	90	20	–	2"/4"	132	68	75	4250
ENTHALPY WHEEL	83	70	42	37	–	2	4560	220	40	90	22	–	2"/4"	132	68	75	4250
PLATE EXCHANGER	82	69	55	44	HC 5–1	2	420	25	40	90	3	–	2"/2"	48	42	24	250
ENTHALPY WHEEL	81	69	50	42	–	2	5375	265	40	90	27	–	2"/4"	132	68	75	4250
ENTHALPY WHEEL	80	67	57	47	HC 5–1	2	500	30	40	90	3	–	2"/2"	60	47	47	1000
ENTHALPY WHEEL	81	68	55	46	HC 6–1 HC 6–2	2	1240/1130	68/62	40	90	7/7	–	2"/2"	92	53	63	1500
ENTHALPY WHEEL	82	68	52	44	HC 7–1	2	3540	195	40	90	20	–	2"/2"	92	53	63	1500
ENTHALPY WHEEL	85	70	40	35	HC 8–1 HC 8–2	2	450/900	25/50	40	90	3/5	–	2"/2"	60	47	47	1000

Schedule of VRF Heat-Pump System

SCHEDULE OF VRF HEA

INDOOR UNIT INFORMATION											
GENERAL DATA		MODEL No. ①	OA CFM MINIMUM	SUPPLY FAN DATA			TOTAL CAPACITY	DIMENSION/WEIGHT			
MARK	SERVICE			CFM HIGH	UNIT MCA	ELECTRIC SERVICE	COOLING/HEATING kBTU/HR	W (IN.)	L (IN.)	H (IN.)	LBS
HP A	SEE PLANS	MMU–AP0181MH2	0	450	1.0	208/1/60	15.0/17.0	22.6	22.6	10.6	40
HP B	SEE PLANS	MMU–AP0091MH2	25	330	1.0	208/1/60	9.5/10.5	22.6	22.6	10.6	40
HP C	SEE PLANS	MMU–AP0071MH2	25	320	1.0	208/1/60	7.5/8.5	22.6	22.6	10.6	40
HP D	SEE PLANS	RAV–SP24KRT	0	560	1.0	208/1/60	25.0/26.0	12.6	41.3	9.0	60
FC A	SEE PLANS	RBM–Y0383FUL	–	–	1.0	208/1/60	–	9.8	6.3	7.5	15
FC B	SEE PLANS	RBM–Y0613FUL	–	–	1.0	208/1/60	–	42	22.4	8.5	120

AT–PUMP SYSTEM

OUTDOOR CONDENSING UNIT INFORMATION								
GENERAL INFO.		COMPRESSOR DATA				UNIT DIMENSIONS (IN)	UNIT WEIGHT (LBS)	REMARKS
MARK	MODEL No. ①	QTY.	MCA	MOCP	ELECTRIC SERVICE			
CU 1	MAP1206FT9P	1	45.4	50	208/3/60	63Wx31Lx73H	900	REFER TO ②③④⑤⑥
CU 2	RAV–SP240AT2	1	24	40	208/1/60	31Wx12Lx22H	125	②③④⑥⑦⑧

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

PENNINGTON SCHOOL

SCHEDULE OF PUMPS

MARK	SERVICE	LOCATION	MODEL N° ①	GPM	HEAD FT.H$_2$O	RPM	MOTOR HP	ELECTRIC SERVICE
HWP 1	ADDITION	EXISTING BOILER ROOM	2 EB	153	97	1750	7-1/2	208/1/60
HWP 2	ADDITION	↓	↓	↓	↓	↓	↓	↓

SCHEDULE OF CABINET HEATERS

MARK	TYPE UNIT	MODEL N° ①	CAPACITY DATA ②				MOTOR HP	MOTOR RPM	ELECTRIC SERVICE
			BTU/HR	CFM	GPM	P.D.F.T.			
CH A	RECESSED WALL MTD.	RW 1120 02	16,400	230	.5	.06	1/15	1050	115/1/60
CH B	SURFACE WALL MTD.	RC-1200-02	↓	230	↓	↓	1/15	1050	115/1/60
CH B	RECESSED CEILING	RC-1190-02	22,600	230	–	–	1/15	1050	115/1/60

Schedule of Energy Recovery Units

SCHEDULE OF ENERGY RECOVERY UNIT

MARK	SERVICE	LOCATION	OUTSIDE AIR CFM	MODEL No. ①	SUPPLY FAN DATA				RETURN-EXH. FAN DATA				ELECTRICAL DATA		
					MODEL	CFM	MOTOR HP	EXT. S.P. IN WG	MODEL	CFM	MOTOR HP	EXT. S.P. IN WG	FLA	MCA	ELECTRICAL SERVICE
ERU 1	CLASSROOMS	ROOF	6400	ERP-05	PLUG	6400	10	2"	PLUG	6817	7.5	4"	63	67	460/3/60
ERU 2	MEDIA CENTER	↓	1600	ERP-02	PLUG	1600	2	0.75"	PLUG	1788	2	2.4"	26	30	460/3/60
ERU 3	MAIN OFFICE	CEILING	200	ERVXX LNB1200	–	200	1/4	.4	–	200	1/4	.4	–	–	120/1/60

	HEAT EXCHANGER					COOLING COIL DATA							PRE-FILTER DATA	ERU DIMENSIONS			
	MODEL	WINTER L.A.T.		SUMMER L.A.T.		TYPE	E.A.T. °F		L.A.T. °F		SENSIBLE MBH	TOTAL MBH	TYPE	L (in.)	W (in.)	H (in.)	WEIGHT (LBS)
		DB °F	WB °F	DB °F	WB °F		DB °F	WB °F	DB °F	WB °F							
0	ENTHALPY WHEEL	55.2	43.1	80.7	69.1	DX	80.4	69.1	55	54	176	306	(2) MERV8	240	93	80	10,000
0	ENTHALPY WHEEL	57.0	44.9	79.5	68.0	DX	79.5	68.0	55	54	43	70	(2) MERV8	186	72	64	5,300
	–	–	–	–	–	–	–	–	–	–	–	–	(2) MERV8	39	17	17	100

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

PENNINGTON SCHOOL – Con't

Schedule of Energy Recovery Units - Continued

SCHEDULE OF PACKAGED ROOFTOP U

GENERAL DATA				FAN DATA					COOLING COIL DATA			
MARK	SERVICE	MODEL No. ①	OAI CFM MAX./MIN.	CFM	EXT. S.P. IN H_2O	FAN RPM	MOTOR BHP	ELECTRIC SERVICE	TOTAL CAP. BTU/HR	SENSIBLE CAP. BTU/HR	ENT. AIR TEMP. D.B. / W.B.	LVG. AIR TEMP. D.B. / W.B.
RTU 1	CAFETERIA	50HC-D28	7200 / 2800	7200	1.0	866	3.0	460/3/60	376,000	244,000	78/65	52/52
RTU 2	MEDIA CENTER	50HC-A05	1600 / 0	1600	0.5	953	0.65	460/3/60	50,560	38,090	80/67	58/57

OF PACKAGED ROOFTOP UNITS

COOLING COIL DATA				COMPRESSOR DATA				FILTER DATA			PHYSICAL DATA	
TOTAL CAP. BTU/HR	SENSIBLE CAP. BTU/HR	ENT. AIR TEMP. D.B. / W.B.	LVG. AIR TEMP. D.B. / W.B.	QTY.	R.L.A. (EACH)	L.R.A. (EACH)	ELECTRIC SERVICE	QTY.	SIZE (IN.)	TYPE	WEIGHT (LBS.)	LxWxH (IN.)
376,000	244,000	78/65	52/52	2	18.6	125	208/3/60	2	16x25x2	PLEATED	4181	18'x7'x5'
50,560	38,090	80/67	58/57	1	6.2	41	208/3/60	4	16x16x2	THROWAWAY	790	6'x4'x3'

SCHEDULE OF EXHAUST FANS

MARK	SERVICE	LOCATION	TYPE	MODEL No. ①	CFM	TOT. S.P. IN H_2O	HP / RPM	ELECTRIC SERVICE	REMARKS
EF 1	KITCHEN HOOD	ROOF	ROOF UPBLAST	CUBE-131	1800	.75	1/2 / 1640	120/1/60	REFER TO ②④⑦
EF 2	TRANSFORMER CLOSET	CEILING	CABINET	CSP-B200	180	.5	145 WATTS	120/1/60	REFER TO ②③⑤⑨
EF 3	TOILETS	ROOF	ROOF DN BLAST	GB-141	1050	.75	1/3 / 1650	120/1/60	REFER TO ②④⑤⑦
EF 4	TOILETS	CEILING	CABINET	CSP-B200	180	.5	145 WATTS	120/1/60	REFER TO ②③⑤⑧
EF 5	TOILETS	CEILING	CABINET	↓	180	.5	145 WATTS	120/1/60	↓
EF 6	ATTIC VENTILATION	ROOF	ROOF UPBLAST	G-1/60	130	.2	1/60 HP	120/1/60	REFER TO ①②③⑤⑦

SCHEDULE OF SPLIT SYSTEM VRF AIR CONDITIONING UNITS

INDOOR AIR HANDLER INFORMATION								OUTDOOR CONDENSING UNIT INFORMATION					
GENERAL DATA		SUPPLY FAN DATA			COOLING COIL DATA ③			HEATING	GENERAL INFO.			ELECTRICAL INFORMATION	
MARK	MODEL No. ①	HIGH CFM	MOTOR (WATTS)	ELECTRIC SERVICE	TOTAL CAP. BTU/HR	SENSIBLE CAP. BTU/HR	ENT. AIR TEMP. DB/WB	TOTAL CAP. BTU/HR	MARK	SERVICE	MODEL No. ①	V/PH/HZ	TOTAL MCA (AMPS)	TOTAL MOCP (AMPS)
AC 1	MMD-AP036 4H2UL	926	260	208/1/60	36,000	26,280	80 / 67	513	CU 1A	ADDITION CLASSROOMS	MMY-MAP1686 HT9UL	460/3/60	31	35
AC 2	NOT USED								CU 1B	ADDITION CLASSROOMS	MMY-MAP1686 HT9UL	460/3/60	31	35
AC 3	MMD-AP096 4H2UL	2473	370	208/1/60	96,000	62,740	80 / 67		CU 1C	ADDITION CLASSROOMS	MMY-MAP1206 HT9UL	460/3/60	23	25

SCHEDULE OF BOILERS

MARK	LOCATION	MODEL No. ①	INPUT (MBH)	OUTPUT (MBH)	FUEL	ELECTRIC SERVICE	WEIGHT	REMARKS
B 1	BOILER ROOM	FBN-1251	1250	1203	GAS	120/1/60	1975	REFER TO ②③
B 2	↓	↓	↓	↓	↓	↓	↓	↓

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

PENNINGTON SCHOOL – Con't

SCHEDULE OF INDOOR DUCTLESS MULTI–SPLIT UNITS

GENERAL DATA				CAPACITY		PHYSICAL DATA				ELECTRICAL DATA		
MARK	SERVICE	MODEL No. (1)	MOUNTING LOCATION	COOLING/HEATING (KBTU/HR)	CFM	UNIT WEIGHT (POUNDS)	D	W	H	SERVICE	MCA	REMARKS
AC A	MAIN OFFICE	40MBCQ09–3	CEILING	9.0/9.5	380	35.0	22.5	22.5	10.2	208/1/60	0.2	REFER TO (2)(3)(4)(5)(6)(7)
AC B	MAIN OFFICE	40MBCQ12–3	CEILING	12.0/12.5	400	↓	↓	↓	↓	↓	↓	↓
AC C	MAIN OFFICE	38MAQB12–3	CEILING	11.0/12.0	400	39	25	27.6	8.3	208/1/60	0.2	REFER TO (2)(3)(4)(5)(6)

SCHEDULE OF OUTDOOR CONDENSING UNITS

			CAPACITY		PHYSICAL DATA				ELECTRICAL SUPPLY			
MARK	SERVICE	MODEL (1) No.	COOLING (MBH)	HEATING (MBH)	UNIT WEIGHT (POUNDS)	D	W	H	SERVICE	MCA	MOCP	REMARKS
CU C	MAIN OFFICE	38MGRQ48D–3	48.0	48.0	224	15.0	41.0	52.5	208/1/60	35.0	50.0	REFER TO (2)(3)(4)(5)(6)(7)

SCHEDULE OF FAN COIL UNITS

MARK	MODEL No. (1)	CFM	MIN. O.A. CFM	COOLING DATA			HEATING DATA (2)			FILTER TYPE	MOTOR H.P.	ELEC. SERV.
				TOTAL CAPACITY MBH	SENSIBLE CAPACITY MBH	ROWS	CAPACITY MBH	ROWS	HOT WATER GPM			
FC C	39S–03	1200	400	40.3	29.6	6	97,000	3	10	PLEATED MERV 7	3/4	208/3/60

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

THORNTON SCHOOL

FAN SCHEDULE

UNIT No.	LOCATION	SERVICE	FAN TYPE	PERFORMANCE DATA				MOTOR DATA						MANUF.	MODEL #
				CFM	TOTAL SP (IN. W.G.)	RPM	BHP	DRIVE TYPE	MHP	STARTER TYPE	ELECTRICAL DATA VOLTS	PHASE	HZ		
SAF-1	EXPANDED LOBBY LL-44	OUTSIDE AIR SUPPLY	INLINE	2125	1.50	1725	0.91	DIRECT	2.0	VFD	208	1	60	GREENHECK	SQ-160-VG
SAF-2	STORAGE LL-23E	OUTSIDE AIR SUPPLY	INLINE	50	0.25	950	0.02	DIRECT	–	TT	115	1	60	GREENHECK	SQ-160-VG
EF-1	GREEN RM. TLT.	TOILET EXH	INLINE	75	0.88	1050	0.02	DIRECT	–	TT	115	1	60	GREENHECK	CSP-A290
TX-1	ROOF	PUBLIC BATHROOMS	UPBLAST	2400	1.5	1725	1.00	DIRECT	2.0	TT	208	1	60	GREENHECK	CUE-161-VG
TX-2	BOYS LOCKER	BOYS LOCKER	INLINE	845	0.45	1095	0.55	DIRECT	–	TT	115	1	60	GREENHECK	CSP-A1050
TX-3	LL TOILET	TOILET EXH	INLINE	50	0.88	900	0.05	DIRECT	–	TT	115	1	60	GREENHECK	CSP-A200
TX-4	COURTYARD	GIRLS LOCKER	SIDEWALL	935	0.60	1725	0.22	DIRECT	0.25	TT	115	1	60	GREENHECK	CW-099-VG
RAF-1	PAPER LL-41	RELIEF AIR	INLINE	6400	1.00	1005.5	1.49	DIRECT	1.5	VFD	208	3	60	GREENHECK	QEI-22-I

SPLIT AIR COOLED CONDITIONING UNIT SCHEDULE – AIR HAN

AIR HANDLING UNIT No.	LOCATION	SERVICE	CONDENSING UNIT PARING	TOTAL COOLING (MBH)	SENSIBLE COOLING (MBH)	EVAPORATOR COIL CONDITIONS CFM SA/OA	ENT. AIR DB/WB (°F)	LVG. AIR DB/WB (°F)
AHU-1	EXPANDED LOBBY MECH RM.	EXPANDED LOBBY	ACCU-1	249	168	6400/2125	82/70	58/55
ACU-2	3-14	IT ROOM	ACCU-4	18	13	320	–	–
ACU-3	DIMMER RACK	DIMMER RACK	ACCU-5	30	21	775	–	–
ACU-4	DIMMER ROOM	DIMMER ROOM	ACCU-6	24	18	775	–	–
ACU-5	ART DIRECTOR OFFICE BALCONY	ART DIRECTOR OFFICE BALCONY	ACCU-7	18	13	490/40	79/68	55/54
ACU-7	LL-59	JANITORS CLOSET	ACCU-9	18	13	320	–	–
ACU-A	VARIOUS	LL-23E/F	ACCU-2	12	11	390/30	79/68	53/52
ACU-B	VARIOUS	IT ROOMS	ACCU-3	18	13	320	–	–

AIR HANDLING UNITS

R (°F)	LVG. AIR DB/WB (°F)	EXT. SP (IN. W.G.)	MOTOR HP	VOLTS	PHASE	HZ	AHU MCA	AHU MOCP	AHU OPER. WEIGHT (LBS)	LENGTH (FT-IN)	WIDTH (FT-IN)	HEIGHT (FT-IN)	MANUF.	MODEL #
)	58/55	1.9	4.7	208	3	60	17.5	30	891	92	31	72	TRANE	TWE240
	–	FREE DISCHARGE	30 WATTS	208	1	60	1.0	15	29	10	36	12	MITSUBISHI	PKA-A18HA7
	–	FREE DISCHARGE	56 WATTS	208	1	60	1.0	15	46	46	12	14	MITSUBISHI	PKA-A30KA7
	–	FREE DISCHARGE	56 WATTS	208	1	60	1.0	15	46	46	12	14	MITSUBISHI	PKA-A24KA7
)	55/54	0.2	90 WATTS	208	1	60	0.5	15	84	56	9	25	MITSUBISHI	PFFY-P18NEMU
	–	FREE DISCHARGE	30 WATTS	208	1	60	1.0	15	29	10	36	12	MITSUBISHI	PKA-A18HA7
)	53/52	FREE DISCHARGE	50 WATTS	208	1	60	1.0	15	46	35	36	15	MITSUBISHI	PLA-A12EA7
	–	FREE DISCHARGE	30 WATTS	208	1	60	0.4	15	29	10	36	12	MITSUBISHI	PKFY-P18NHMU

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

THORNTON SCHOOL – Con't

AIR COOLED CONDENSING UNIT SCHEDULE

UNIT No.	LOCATION	ACU SERVED	COOLING DESIGN AMBIENT TEMP (°F)	REFRIG. TYPE	NOMINAL COOLING CAPACITY (TONS)	EER	UNIT ELECTRICAL DATA					
							VOLTS	PHASE	HZ	MCA	MOCP	KW INPUT COOLING
ACCU-1	ROOF	AHU-1	95	R-410A	20.7	12.1	208	3	60	98	125	20.50
ACCU-2	ON GRADE	(2)ACU-A	95	R-410A	2.0	14.3	208	1	60	19	30	1.67
ACCU-3	ROOF	(3)ACU-B	95	R-410A	5.0	12.5	208	1	60	36	50	4.68
ACCU-4	ROOF	ACU-2	95	R-410A	1.5	9.9	208	1	60	11	30	1.82
ACCU-5	ROOF	ACU-3	95	R-410A	2.5	9.5	208	1	60	19	30	3.15
ACCU-6	ROOF	ACU-4	95	R-410A	2.0	12.2	208	1	60	19	30	1.96
ACCU-7	ROOF	ACU-5	95	R-410A	3.0	14.2	208	1	60	31	50	2.45
ACCU-9	ROOF	ACU-7	95	R-410A	1.5	9.9	208	1	60	11	30	1.82

SOUND PRESSURE LEVEL AT 3' (DBA)	UNIT DIMENSIONS			PIPE SIZES		OPERATING WT. (LBS)	MANUF.	MODEL #
	WIDTH (IN)	DEPTH (IN)	HEIGHT (IN)	REFRIG. SUCTION (IN)	REFRIG. LIQUID (IN)			
89	94	44	45	5/8	3/8	904	TRANE	TTA240
47	38	13	38	5/8	3/8	153	MITSUBISHI	PUZ-A24NHA7
59	42	14	53	3/4	3/8	306	MITSUBISHI	PUMY-P60NKMU1
46	32	13	24	1/2	1/4	99	MITSUBISHI	PUY-A18NKA7
48	38	13	38	5/8	3/8	163	MITSUBISHI	PUY-A30NHA7
48	38	13	38	5/8	3/8	151	MITSUBISHI	PUY-A24NHA7
53	42	13	53	5/8	3/8	269	MITSUBISHI	PUMY-P36NKMU1
46	32	13	24	1/2	1/4	99	MITSUBISHI	PUY-A18NKA7

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

THORNTON SCHOOL – Con't

ROOFTOP AIR CONDITIONING UNIT SCHEDULE – AIR COOLED

				SUPPLY FAN DATA					
UNIT No.	LOCATION	SERVICE	AMBIENT TEMP. (°F)	CFM	EXT. SP (IN. W.G.)	RPM	BHP	MOTOR TYPE	DRIVE TYPE
RTU–1	ROOF	DANCE STUDIO	95	3200	1.50	725	1.96	–	BELT
RTU–2	ROOF	EXPERIMENTAL THEATER	95	5200	1.50	775	3.66	–	BELT
RTU–3	ROOF	SCENE SHOP	95	1450	0.20	1050	0.75	–	DIRECT
RTU–4	ROOF	ART ROOM	95	2600	1.70	1075	0.87	–	BELT
RTU–5	ROOF	LIBRARY	95	2720	1.50	1530	2.56	–	DIRECT
HV–1	LL–18	LL–18	–	1800	0.44	700	0.50	–	DIRECT

)

SPILL FAN DATA						DX DATA			
CFM	EXT. SP (IN. W.G.)	RPM	BHP	MOTOR HP	DRIVE TYPE	REFRIGERANT	SUCTION TEMP. (°F)	TOTAL (MBH)	SENSIBLE (MBH)
1380	–	–	–	–	–	R410–A	–	170	95
1345	–	–	–	–	–	R410–A	–	235	148
210	–	–	–	–	–	R410–A	–	41	29
420	–	1075	–	0.9	–	R410–A	–	87	65
415	–	–	–	–	–	R410–A	–	94	71
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ILE)	COOLING DATA									
	AIR DATA									
	CFM	O.A. CFM	R.A. CFM	MAX. FACE VEL. (FPM)	MAX. AIR P.D. (IN W.G.)	MAX. FPI	No. OF ROWS	EAT °F DB/WB	LAT °F DB/WB	FACE VELOCITY (FPM)
	3200	1450	1750	–	–	–	–	82/71	55/53	–
	5200	3090	3785	–	–	–	–	79/68	53/52	–
	1560	220	1340	–	–	24	2	77/67	60/58	–
	2600	525	2260	–	–	23	1	80/67	57/55	–
	2700	480	1945	–	–	–	–	79/66	58/56	–
	N/A	640	1160	N/A	N/A	N/A	N/A	N/A	N/A	N/A

HEATING DATA													
GAS DATA									HOT WATER DATA				
INPUT MBH	OUTPUT MBH	INLET PRESS. (WG)	EAT (°F)	LAT (°F)	MAX. FPI	No. OF ROWS	FACE VELOCITY (FPM)	MAXIMUM AIR P.D. (IN W.G.)	GPM	EWT (°F)	LWT (°F)	PRESS. DIFF. (FT)	OUTPUT MBH
350	283	2.5	35	80	–	–	–	–	N/A	N/A	N/A	N/A	N/A
350	283	2.5	44	80	–	–	–	–	N/A	N/A	N/A	N/A	N/A
60	48	5.0	48	77	–	–	–	–	N/A	N/A	N/A	N/A	N/A
120	96	5.0	43	99	–	–	–	–	N/A	N/A	N/A	N/A	N/A
150	120	5.0	43	98	–	–	–	–	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	45	95	12	2	463	0.27	9.7	180	160	1.8	97.3

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

THORNTON SCHOOL – Con't

ROOFTOP AIR CONDITIONING UNIT SCHEDULE – AIR COOLED – CONT'D

	FILTER DATA			CONDENSING UNIT DATA								
		SP (IN W.G.)		COMPRESSOR								
UNIT No.	FILTER TYPE	INITIAL	FINAL	STARTER TYPE	QUANTITY	KW INPUT	No. OF STEPS	ELECTRICAL DATA VOLTS	PHASE	HZ	LRA	FLA
RTU-1	MERV 13	–	–	–	2	12.16	–	208	3	60	–	–
RTU-2	MERV 13	–	–	–	2	17.09	–	208	3	60	–	–
RTU-3	MERV 13	–	–	–	1	3.40	–	208	1	60	109	–
RTU-4	MERV 13	–	–	–	1	6.89	–	208	3	60	164	–
RTU-5	MERV 13	–	–	–	2	6.59	–	208	3	60	110	–
HV-1	MERV 13	–	–	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTES:

AIR COOLED – CONT'D

CONDENSING UNIT DATA									
OR					AIR-COOLED CONDENSER				EER FULL LOAD
ELECTRICAL DATA					CONDENSER FANS			AIRFLOW CFM (EACH)	
TS	PHASE	HZ	LRA	FLA	No. OF FANS	TYPE	HP		
08	3	60	–	–	2	PROP	–	–	12.0
08	3	60	–	–	2	PROP	–	–	11.0
08	1	60	109	–	1	PROP	4.0	3400	12.0
08	3	60	164	–	1	PROP	0.7	–	11.0
08	3	60	110	–	1	PROP	–	–	12.5
/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

UNIT ELECTRICAL DATA					UNIT DIMENSIONS					
VOLTS	PHASE	HZ	MCA	KW INPUT	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	OPERATING WT. (LBS)	MANUF.	MODEL #
208	3	60	68.0	14.52	121	84	64	2176	TRANE	YHD180
208	3	60	99.0	21.55	121	84	64	2211	TRANE	YHD240
208	1	60	28.5	3.40	45	59	36	452	TRANE	4YCC4042
208	1	60	44.0	7.48	84	51	41	767	TRANE	YSC090
208	3	60	42.0	9.20	54	89	47	1035	TRANE	YHC102
208	1	60	5.3	–	42	40	22	129	TRANE	BCHD054

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

THORNTON SCHOOL – Con't

MAKEUP AIR UNIT

				SUPPLY FAN DATA					
UNIT No.	LOCATION	SERVICE	AMBIENT TEMP. (°F)	CFM	EXT. SP (IN. W.G.)	RPM	BHP	MOTOR TYPE	DRIVE TYPE
MAU–1	ROOF	SUPPLY	0	2145	0.9	1101	0.90	ODP	BELT
MAU–2	ROOF	SUPPLY	0	1535	1.25	1424	0.82	ODP	BELT

HEATING DATA								
GAS DATA								
INPUT MBH	OUTPUT MBH	INLET PRESS. (WG)	TOTAL MBH	EAT (°F)	LAT (°F)	MAX. FPI	No. OF ROWS	MAXIMUM AIR P.D. (IN W.G.)
225	180	6	180	0	77.7	–	–	0.255
150	120	6	120	0	72.4	–	–	0.369

FILTER DATA	UNIT DIMENSIONS					
FILTER TYPE	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	OPERATING WT. (LBS)	MANUF.	MODEL #
2" MERV8	102	53	36	911	GREENHECK	IG–110–H20
2" MERV8	99	44	36	771	GREENHECK	IG–109–H10

CABINET UNIT HEATER SCHEDULE

								HOT WATER			
UNIT No.	LOCATION	SERVICE	TYPE	HEATING CAPACITY (MBH)	EAT DB (°F)	LAT DB (°F)	CFM	GPM	EWT (°F)	LWT (°F)	PRESS. DIFF. (FT)
CUH–1	STAIRS	STAIRS	HORIZONTAL	8	60	89.5	250	0.8	180.0	160.0	0.06

ELECTRICAL DATA							
KW	No. OF STAGES	FLA	MOTOR (WATTS)	VOLTS	PHASE	HZ	MANUF. MODEL #
–	1	0.8	50	115	1	60	STERLING RW–1120–02

LIST OF EQUIPMENT & OPERATIONS AND MAINTENANCE FOR HVAC REPAIR & MAINTENANCE SERVICES

THORNTON SCHOOL – Con't

UNIT VENTILATOR SCHEDULE

		CONFIGURATION				SUPPLY FAN DATA							
UNIT No.	LOCATION	TYPE	SUPPLY OUTLET	RETURN INLET	OUTSIDE AIR INLET	FAN SPEED SETTING	SUPPLY CFM	MIN. O.A. CFM	ESP (IN. W.G.)	DRIVE TYPE	MOTOR QTY.	MOTOR HP	FAN QTY.
UV–1	VARIOUS	VERTICAL NON–DUCTED	TOP	FRONT BOTTOM	BACK DUCTED	HIGH	1000	345	0.25	DIRECT	1	1/5	3
UV–2	VARIOUS	VERTICAL NON–DUCTED	TOP	FRONT BOTTOM	BACK DUCTED	HIGH	750	240	0.25	DIRECT	1	1/5	2

ELECTRICAL DATA						COIL DATA 2–PIPE HEATING								
										HEATING DATA				
VOLTS	PHASE	HZ	FLA	MCA	MOCP	ROWS	GPM	FLUID	PD (FT. H_2O)	CAPACITY (MBH)	EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)
120	1	60	3.7	4.6	15	2	4	WATER	1.5	50.0	46	92	180	160
120	1	60	3.7	4.6	15	2	4	WATER	1.2	38.0	53	99	180	160

	UNIT DIMENSIONS						
FILTER TYPE	WIDTH (IN)	DEPTH (IN)	HEIGHT (IN)	O.A.I. LOUVER WxH (IN)	WEIGHT (LBS)	MANUF.	MODEL #
MERV 8	74*	16–5/8"	30	48x5	470	MAGIC AIRE	MAUVF3
MERV 8	62*	16–5/8"	30	36x5	390	MAGIC AIRE	MAUVF2

ATTACHMENT B

BID #B

BMS OPERATIONS AND MAINTENANCE (O&M) FOR HVAC CONTROLS MONITORING AND MAINTENANCE SERVICES CONTRACT

LIST OF EQUIPMENT
AND
MAINTENANCE SCOPE OF WORK

BID #B

BMS OPERATIONS AND MAINTENACE FOR HVAC CONTROLS (BMS) MONITORING AND MAINTENANCE SERVICES

1. 0 BMS & Controls

BMS Upgrades

Buildings		
Mount Vernon HS	Nelson Mandela HS	Thornton HS
AB Davis MS	Longfellow MS	Columbus ES

Buildings		
Graham ES	Grimes ES	Hamilton ES
Holmes ES	Lincoln ES	Longfellow ES
Parker ES	Pennington ES	Traphagen ES
Williams ES	Education Center	Mount Vernon Bus Garage

2.0 Demand Control Ventilation (DCV Upgrades)

Building	PROPOSED DCV UPGRADES				
	Equipment	Serves	Supply Fan HP	Return Fan HP	VFD Qty.
Mount Vernon HS	HV-5	Gymnasium	7.50	5.00	2
	HVAC-12	Cafeteria	20.00	-	1
	HVAC-13	Dining Room	7.50	-	1
	HVAC-14	Little Theater	3.00	0.50	-
	HVAC-15	Auditorium	20.00	5.00	2
AB Davis MS	AHU-1	Gymnasium	10.00	-	1
	AHU-5	Auditorium	5.00	-	-
Graham ES	H&V	Upper Gymnasium	0.50	-	-
	H&V	Upper Gymnasium	0.50	-	-
	H&V	Lower Gymnasium	0.75	-	-
	H&V	Lower Gymnasium	0.75	-	-
	RTU	Auditorium	1.50	-	-
	RTU	Auditorium	1.50	-	-
Hamilton ES	AHU-1	Gymnasium	5.00	-	1
	AHU-2	Auditorium	5.00	-	1
	RTU	Cafeteria	5.00	-	-
	RTU	Cafeteria	5.00	-	-
Holmes ES	AHU	Gymnasium	1.50	-	-
Lincoln ES	HV-1	Gymnasium	15.00	5.00	2
	RTU	Auditorium	7.50	3.00	-
	AC-5	Cafeteria	15.00	5.00	2
Longfellow ES	RTU	Gymnasium	2.00	-	-
	RTU	Gymnasium	2.00	-	-
	RTU	Auditorium	7.50	5.00	-
Pennington ES	AHU	Auditorium	3.00	-	-
Traphagen ES	AS-1	Gymnasium	5.00	-	1
Williams ES	AHU	Gymnasium and Cafeteria	5.00	-	1
Education Center	HVAC-2	Board Room	3.00	-	-

ATTACHMENT C

BID #C

OPERATIONS AND MAINTENANCE (O&M) OF LIEBERT HVAC EQUIPMENT

LIST OF EQUIPMENT
AND
MAINTENANCE SCOPE OF WORK

Lieberts Mini-Mate2

System Testing

Environmental-control Function Tests

The performance of all control circuits can be tested by changing the setpoints, which actuates each of the main functions.

Cooling Test

To test the cooling function, set the setpoint to a temperature of 10°F(5°C) below room temperature. A call for cooling should register and prompt the equipment to begin cooling cycle. (Disregard any temperature alarms). Upon completion of testing, return to the desired temperature.

Heating Test

Test reheat by setting the setpoint to 10°F(5°C) above room temperature. A call for heating should register and prompt the equipment to begin heating cycle. (Disregard any temperature alarms). Upon completion of testing, return the setpoint to the desired temperature.

Humidification Test

To check humidification, set the humidity setpoint at 10% RH above the room humidity reading. After a short delay, the canister will fill with water and steam will be produced. Upon completion of testing, return the humidity setpoint to the desired humidity.

Dehumidification Test

Test dehumidification by setting the humidity setpoint 10% below room relative humidity. The compressor should turn on. Upon completion of testing, return the humidity setpoint to the desired humidity.

Smoke Sensor Test

The smoke sensor is located in the unit, and the power supply for the smoke sensor is located in the electric panel. It constantly samples return air through a tube. No adjustments are required.

Remote Shutdown Test

A connection point is provided for remote shutdown devices supplied by the customer. This terminal strip is on the printed circuit board. (Terminals TB1-4 and TB1-5 are fitted with a jumper when no remote shutdown device is installed).

Filter Maintenance

Experience shows that filters are usually the most neglected item in an environmental control system. In order to maintain efficient operation, they should be checked monthly and changed as required.

NOTE: Always turn power off before removing filters.

Filters can be replaced by opening the hinged door on the return air filter box. Replace filters are commercially available in several efficiencies, contact your Vertiv representative for appropriate filter sizes.

Electrical Panel Maintenance

Inspect the electrical panel on a semi-annual basis for any loose electrical connections.

Belt-drive Blower Package Maintenance

Inspect the blower package monthly including: motor mounts, belts, fan bearings and impellers.

Fan Impeller and Motor bearing Maintenance

Inspect fan impellers thoroughly and remove any debris. Check to see if the impellers are tightly mounted on the fan shaft and that they do not rub against the fan housing during rotation. Although the unit's motor bearings are permanently sealed and self-liberating, inspect them monthly for signs of wear.

Air Distribution Inspection

Because all unit models are designed for constant volume air delivery, any unusual restrictions within the air circuit must be avoided. Note that high-efficiency filters can be reduce air performance and evaporator capacity.

Motor Replacement

If the evaporator motor needs to be replaced, first remove the air distribution plate on the bottom of the unit. Removing the mounting screws, allows the entire blower wheel and motor to be lifted out.

Removing the Blower from the Evaporator

You many need to remove the blower for servicing/replacement or to access the bearings for service.

NOTICE

> Risk of refrigerant and water/glycol piping damage. Can cause leaks that result in equipment and building damage and loss of cooling.
>
> Use caution and do not contact piping when removing the blower motor and blower sled.

To remove the belt-drive blower:

1. Prepare the main center section of the 3-piece electrical panel, by marking and disconnecting all power and control wiring entering the panel.
2. Remove the main center section of the panel by removing screws from top and bottom sections
3. Remove the blower motor from the blower sled.
4. Remove the 4 bolts holding the blower sled to the base isolators.
5. Slide the blower/sled assembly forward and rotate 90 degrees.
6. Slide the blower/sled assembly from unit after ensuring that the refrigerant and water piping are protected from damage.
7. Reinstall by reversing this procedure.

Electric Reheat Maintenance

Reheat element sheets and fins are manufactured with stainless steel. Regular inspections are necessary to assure proper cleanliness of the reheating element. If inspection reveals corrosion particles on the reheating element or adjoining surfaces (including ducts and plenums), preform appropriate cleaning. Periodic replacement of the reheating element may be necessary to meet specific application requirements.

Refrigeration System Maintenance

Inspect the components of the refrigeration system monthly for proper function and signs of wear. Because evidence of malfunction is typically present before component failure, periodic inspections are major factor in the prevention of most system failures. Refrigerant lines must be properly supported and not allowed to vibrate against ceilings, floors, or unit frame, inspect all refrigerant lines every 6 months for signs of wear and proper support. Inspect the capillary and equalizer lines from the expansion valve.

Refrigeration Suction pressure

Suction pressure will vary with load conditions. Suction pressure normally ranges from 58 psi to 75 psi (405kPa to 517kPa).

Refrigeration Discharge Pressure

The discharge pressure will vary greatly with load and ambient conditions, see Table 10.12. the high-pressure switch shuts down the compressor at its cut-out setting.

Table 10.1 Typical Discharge Pressures

System Design	Discharge Pressure, psig (kPa)
Air-Cooled	200-300 (1380-2070)
Water-Cooled 65 to 85°F water (18 to 29.4°C)	200-250 (1380-1725)
Glycol-Cooled	250-350 (1725-2415)
High-Pressure Cut-Out	400 (2760)

Thermostatic Expansion Valve (TXV) Maintenance

The TXV performs one function: it keeps the evaporator supplied with enough refrigerant to satisfy load conditions. It does not affect compressor operation.

Proper valve operation can be determined by measuring superheat. The correct superheat setting is between 10 and 15°F (5.6 and 8.3°C). If too little refrigerant is being fed to the evaporator, the superheat will be high. If too much refrigerant is being supplied, the superheat will be low.

Air-Cooled Condensing Unit Maintenance

Restricted airflow will reduce operating efficiency and could result in high compressor-head pressure and loss of cooling.

- Clear coil surface of all debris that will inhibit airflow
- Check for bent or damaged coil fins and correct
- Do not permit snow to accumulate around or under outdoor unit
- Periodically consider commercial cleaning of coil surface
- Inspect fans, motors and controls for proper support
- Inspect all refrigerant lines for signs of oil leaks
- Check contactors for pitting. Replace if pitted.

Hot Gas Bypass Operation and Maintenance

When applying hot-gas bypass with split system condensing units, bypassing discharge gas to the compressor suction line offers more flexibility than conventional hot-gas bypass to the evaporator unit.

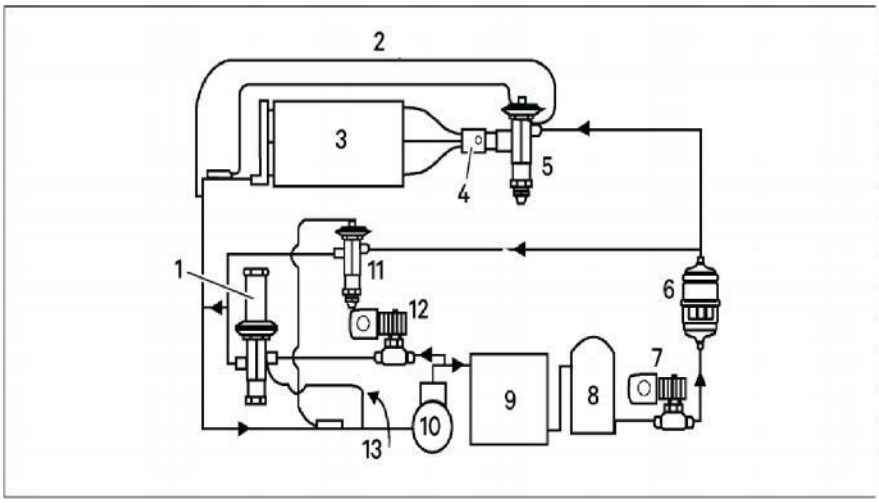
The hot-gas bypass valve is installed between the compressor discharge piping and suction piping, bypassing the condenser and evaporator coils. The discharge gas mixes with the suction gas, raising the

suction temperature and pressure and decreasing the mass flow through the evaporator. The higher suction temperatures could cause compressor overheating, therefore a separate, liquid-quenching valve is provided to mix refrigerant from the system liquid line with the discharge gas before mixing with the suction gas entering the compressor.

During normal operation, when the evaporator is under full load, the hot-gas bypass equalizer pressure will remain high enough to keep the valve port closed. If the evaporator load decreases, the evaporator temperature and pressure will drop. When the suction pressure reduces below the hot-gas-bypass valve setting the hot-gas-bypass valve opens diverting some of the refrigerant flow back to the compressor suction. The liquid-quenching valve bulb senses this increased superheat and opens, allowing liquid refrigerant to mix with the discharge gas, de-superheating it.

Proper mixing of the three refrigerant paths ensures stable operation and system performance. The liquid-quenching valve bulb must be located downstream of all these connectors to control superheat at the compressor inlet. Superheat settings for the liquid-quenching valve are chosen to maintain consistency with the system expansion valve. During hot-gas bypass operation, higher superheats, 50 to 60°F (28 to 33°C), may be observed at the compressor. The liquid- quenching valve is internally equalized and superheat is not adjustable.

Figure 10.1 Hot-gas bypass components and flow



Item	Description
1	Discharge bypass valve
2	External equalizer
3	Evaporator
4	Distributor
5	TEV
6	Catch-all
7	Solenoid valve
8	Receiver
9	Condenser coil
10	Compressor
11	De-superheating TEV
12	Hot-gas solenoid valve
13	External equalizers

Coaxial Condenser Maintenance (Water/Glycol-cooled Condensers Only)

Each water or glycol-cooled module has a coaxial condenser consisting of an exterior steel tube and an interior copper tube. Clean the screen on the field-installed Y-strainer (if installed). If the water supply is clean, coaxial condensers do not normally require maintenance or replacement. If your system begins to operate at high head pressure with reduced capacity and all other causes have been eliminated, the condenser may be obstructed or fouled and should be cleaned or replaced.

Regulating Valve Maintenance (Water/Glycol-cooled Condensers Only)

The water- regulating valve automatically regulates the amount of fluid necessary to remove the heat from the refrigeration system, permitting more fluid to flow when load conditions are high and less fluid to flow when load conditions are low. The valve consists of a brass body, balance spring, valve seat, valve disc holders, capillary tube to discharge pressure and adjusting screw.

The water regulating valve begins opening at 180 psig (1240kPag) and is fully opened at 240 psig (1655 kPag). The valve is factory-set and should not need adjustment. There is significant difference in the way standard pressure and high-pressure valves are adjusted. Consult Vertiv technical Support.

Glycol Solution Maintenance

It is difficult to establish a specific schedule of inhibitor maintenance because the rate of inhibitor depletion depends upon local water conditions. Analysis of water samples at the time of installation and through a maintenance program should help to establish a pattern of depletion. A visual inspection of the solution and filter residue is often helpful in judging whether active corrosion is occurring.

The complexity of water/glycol solution condition problems and the variations of required treatment programs make it extremely important to obtain the advice of a competent and experienced water-treatment specialist and follow a regularly-scheduled coolant-fluid system-maintenance program. It is important to note that improper use of water treatment chemicals can cause problems more serious than using none. Consult the glycol manufacturer for testing and maintenance of inhibitors. Do not mix products from different manufactures.

Compressor Maintenance

Periodic maintenance inspections that identify abnormal operation can be a major factor in reducing maintenance cost. It is easier and more cost-effective to implement the necessary preventative steps that ensure proper system operation, rather than ignore the problem until it results in compressor failure and costly replacement. When troubleshooting a compressor problem, check all electrical components for proper operation:

- Check all fuses and circuit breakers
- Check pressure switch operation
- If a compressor failure has occurred, determine whether its cause is an electrical or mechanical problem.

Steam-generating Humidifier Maintenance

The humidifier drains and refills to maintain a current setpoint and alert the operator when the humidifier canister needs to be replaced.

After an extended period of operation, in accordance with life-expectancy information, the cylinder is completely used as indicated by the amber high-water sensor light illuminated on the cabinet. When this condition is reached, a new replacement cylinder must be installed.

NOTE: The amber high-water sensor light may come on during the initial start-up, but this instance does not indicate that the cylinder should be replaced.

Preventative Maintenance Checklist

Evaporator/Filters

1. Check/replace filters
2. Wipe section clean
3. Clean coil
4. Clean condensate pan

5. Clean trap in condensate drain
6. Drain connection/lines open, leak free and in good condition
7. Check/test filter clog switch operation (if equipped)
8. Check/test condensate drain pan float switch operation (if equipped)

Blower Section

1. Blower wheels free of debris
2. Check motor mount
3. Motor amp draw
   L1 _____ L2 _____ L3
   (L1 and L2 on single-phase units)
   Compare to nameplate and amps

Reheat (if equipped)

1. Inspect elements and check for corrosion
2. Check/re-torque wire connections (inside reheat box)
3. Reheat amp draw
   L1 L2 _____ L3

Steam Generating Humidifier (if Equipped)

1. Check drain valve/drain lines/traps for clogs
2. Check water fill valve and all hoses for leaks
3. Check condition for steam hose
4. Check canister for mineral deposits
5. Check condition of the electrodes
6. Clean strainer
7. Replace humidifier bottle
8. Check operation of humidifier
9. Humidifier and draw
   L1 _____ L2 _____ L3 _____

Condensate Pump (if Equipped)

1. Check for debris
2. Check operation of float(s) (free movement)
3. Check/Clean discharge check valve
4. Check drain connection/lines for leaks

Overflow Drain pan (Duct Units - if equipped)

1. Drain connection and lines open and free of debris
2. Drain lines empties into a maintenance sink or condensate pump
3. Water detection device/system installed and monitored - check operation (if installed)

Electrical Panel

1. Check fuses

2. Check contactors for pitting (replace if pitted)
3. Check/re0torque wire connections

Controls

1. Check/verify control operation (Sequence)
2. Check/test changeover device(s) (if equipped)
3. Check/test water-detection device(s) (if equipped)

Refrigeration Piping

1. Check refringent lines (clamps secure/no rubbing/no leaks)
2. Check for moisture (sight glass)
3. Check for restriction temperature drop across filter drier

Compressor Section

1. Check oil level
2. Check for oil leaks
3. Check compressor mounts (springs/bushings)
4. Cap tubes (not rubbing)
5. Check/re-torque wire connections (inside compressor box)
6. Compressor operation (vibration/noise)
7. Check crank-case heater fuses/operation (if equipped)
8. Check for refrigerant leaks
9. Suction pressure_____
10. Discharge pressure _____
11. Superheat _____
12. High pressure cut out _____
13. Compressor amp draw _____

L1 _____L2 _____ L3____
(L1 and L2 on single-phase units)

Econ-O-Coil (if equipped)

1. Verify proper water/glycol maintenance/treatment is being performed
2. Verify that continuous water/glycol flow is maintained
3. Check for water/glycol leaks
4. Check valve operation

Air-Cooled Condensing Unit (if equipped)

1. Coil clean/free of debris
2. Motor mounts tight
3. Bearings in good condition
4. Refrigerant lines properly supported
5. Motor amp draw

L1 _____ L2 L3
(L1 and L2 on single-phase units)

Water/Glycol-cooled Condenser (if equipped)

1. Check water-regulating valve operation
2. Verify water flow/Continuous flow is maintained
3. Clean screen on Y strainer (if equipped)
4. Cap tubes (not rubbing)
5. Check for water/glycol leaks
6. Entering water temperature _____
7. Leaving water temperature _____

Daikin AHU Periodic

Maintenance

1. Check all moving parts for wear every six months.
2. Check bearing collar, sheave, and wheel hub setscrews, sheave capscrews, and bearing hold-down bolts for tightness every six months.
3. Annually check and snug all electrical connections. Inspect for signs of water damage such as corrosion and repair if necessary. Check ground conductor and connection integrity and correct if needed.

Ball Bearing Lubrication

⚠ CAUTION

Bearing overheating potential. Can damage the equipment. Do not over lubricate bearings. Use only a high grade mineral grease with a 200°F safe operating temperature. See below for specific recommended lubricants.

Motor Bearings

Supply and return fans Supply and return fan motors should have grease added after every 2000 hours of operation. Using the following procedure, re-lubricate the bearings while the motor is warm, but not running. Use one of the greases shown in Table 23.

1. Remove and clean upper and lower grease plugs.
2. Insert a grease fitting into the upper hole and add clean grease (Table 23) with a low-pressure gun.
3. Run the motor for five minutes before replacing the plugs.

NOTE: Direct-Drive Class II fans that are supplied with TECO motors have double shielded bearings on frame sizes 140T-280T. These bearings are pre-packed with a long-life grease and are not greaseable. Larger frame size TECO motors are greaseable and follow the same lubrication recommendations as all other motors.

Table 23: Recommended Lubricants and Amounts for Fan Motor Bearings

Manufacturers' Grease	NEMA Size	Amount to Add (oz.)
Texaco, Polystar or Polyrex EM (Exxon Mobile) or Rykon Premium #2 or Penzoil Pen 2 Lube	56 to 140	0.08
	140	0.15
	180	0.19
	210	0.30
	250	0.47
	280	0.61
	320	0.76
	360	0.81
	400	1.25
	440	2.12

Fan Shaft Bearings

⚠ CAUTION

For safety, stop rotating quipment. Add one half of the recommended amount shown in Figure 24. Start bearing, and run for a few minu Stop bearing and add the second half of the recommended amount. A temperature rise, sometimes 30°F (1°C after lubrication is normal. Bearing should operate at tempe ature less than 200°F (94°C) and should not exceed 225 (107°C) for intermittent operation. For a lubrication schedule, see Table 22. For applications that are not in the range of the table, contact Daikin.

⚠ CAUTION

Table 24, Table 25 and Table 26 state general lubrication recommendations based on our experience and are intended as suggested or starting points only. For best results, specific applications should be monitored regularly and lubrication intervals and amounts adjusted accordingly.

Any good quality lithium or lithium complex base grease, using mineral oil, conforming to NLGI grade 2 consistency, and an oil viscosity of 455-1135 SUS at 100°F (100-200 cSt at 40°C) may be used for re-lubrication.

Compatibility of grease is critical. Lubricatable bearings are supplied with grease fittings or zerks for ease of lubrication with hand or automatic grease guns. Always wipe the fitting and grease nozzle clean.

Table 24: Lubrication Intervals

Speed	Bearing Temperature	Cleanliness	Lubrication Intervals
(Use NLGI #2 Lithium or Lithium Complex Grease)			
100 RPM	Up to 120°F (50°C)	Clean	6 to 12 months
500 RPM	Up to 150°F (65°C)	Clean	2 to 6 months
1000 RPM	Up to 210°F (100°C)	Clean	2 weeks to 2 months
1500 RPM	Over 210°F (100°C) to 250°F (120°C)	Clean	Weekly
Above 1500 RPM	Up to 150°F (65°C)	Dirty/Wet	1 week to 1 month
Max Catalog Rating	Over 150°F (65°C) to 250°F (120°C)	Dirty/Wet	Daily to 2 weeks
	Above 250°F (120°C)		Contact Browning

Table 25: Recommended Lubricants for Fan Shaft Ball Bearings

Name	Temperature	Base	Thickener	NLGI Grade
Texaco, Premium RB	30° to 350°F (34° to 177°C)	Parafinic Mineral Oil	Lithium	2
Mobil, AW2	40° to 437°F (40° to 175°C)	Mineral Oil	Lithium	2
Mobil, SHC 100	68° to 356°F (50° to 180°C)	Synthetic	Lithium	2
Chevron, Altiplex Synthetic	60° to 450°F (51° to 232°C)	Synthetic	Lithium	2
Exxon, Ronex MP	40° to 300°F (40° to 149°C)	Mineral Oil	Lithium	2

Note:
Temperature ranges over 225°F are shown for lubricants only. High temperature applications are not suitable for standard air handler components.

Table 26: Recommended Fan Lubrication Grease Charge

Shaft Size in Inches (mm)	Weight in Ounces (grams)
1/2 to 3/4 (20)	0.03 (0.85)
7/8 to 1-3/16 (25-30)	0.10 (2.84)
1-1/4 to 1-1/2 (35-40)	0.15 (4.25)
1-11/16 to 1-15/16 (45-50)	0.20 (5.67)
2 to 2-7/16 (55-60)	0.30 (8.51)
2-1/2 to 2-15/16 (65-70)	0.50 (15.59)
3 to 3-7/16 (75-80)	0.85 (24.10)
3-1/2 to 4 (85-105)	1.50 (42.53)

Fan Drive Adjustments

⚠ WARNING

Before servicing fans, lock out and tag out all power to the unit. Fans or belts can cause severe personal injury or death.

⚠ WARNING

Do not open the hinged access door and screw-fastenerd access panels while the unit is operating. Moving parts and strong suction forces can cause severe personal injury or death.

Upon completion of the air balance, replace the variable pitched motor sheave with a properly sized, fixed sheave. A matching fixed sheave provides longer belt and bearing life and minimizes vibration. Initially, it is best to have a variable pitched motor sheave for the purpose of air balancing. Once the balance is achieved, fixed sheaves maintain balancing and alignment more effectively. Replace the adjustable sheaves with fixed sheaves.

With the electrical power disconnected, locked and tagged out, measure the diameter of the V-belt outer surface where it passes around the sheave (pitch diameter). Calculate fan speed from the motor nameplate rpm.

$$\text{Fan RPM} = \text{motor RPM} \times \frac{\text{Measured diameter at motor sheave}}{\text{Measured diameter at fan sheave}}$$

VM/VP Variable Pitch Key Type Sheaves

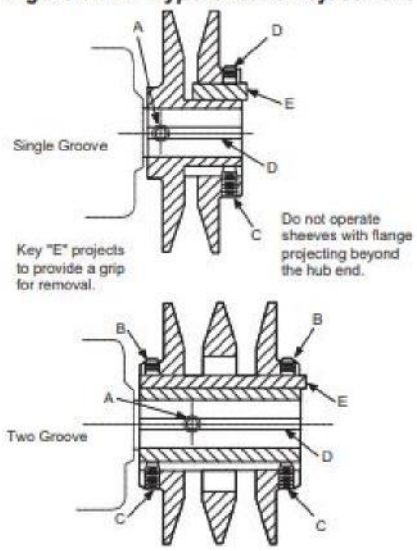
Mounting:

1. Mount all sheaves on the motor or driving shaft with the setscrews A toward the motor.
2. Verify that both driving and driven sheaves are in alignment and that shafts are parallel.
3. Fit internal key D between sheave and shaft and lock setscrew A securely in place.

Adjusting:

1. Loosen setscrews B and C in moving parts of sheave and pull out external key E. (This key projects a small amount to provide a grip for removing.)
2. To adjust sheave pitch diameter for desired speed, open moving parts by half or full turns from closed position. Do not open more than five full turns for A belts or six full turns for B belts.
3. Replace external key E and securely tighten setscrews B over key and setscrews C into keyway in fixed half of the sheave.
4. Put on belts and adjust tension. Do not force belts over grooves. See Fan Drive Belt on page 42.
5. Make future adjustments by loosening the belt tension and increasing or decreasing the pitch diameter of the sheave by half or full turns as required. Readjust belt tension before starting drive.
6. To provide the same pitch diameter, adjust both halves of the two-groove sheaves by the same number of turns from closed position.
7. Verify that all keys are in place and that all se screws are tight before starting drive. Check setscrews and belt tension after 24 hours service.

Figure 52: VP Type Sheave Adjustment



LVP Variable Speed Sheaves

Mounting:

1. Slide sheave on motor shaft so that the side of the sheave with setscrew **A** is next to the motor when setscrew **A** is in the hub or barrel of the sheave.
2. When setscrew **A** is at an angle in the center flange **B**, mount it away from the motor so that the outer locking ring and flange can be removed to get to the setscrew.
3. To remove the flange and locking ring:
    a. Loosen setscrews **D**.
    b. Loosen but do not remove capscrews **E**.
    c. Remove key **F**.
    d. Rotate the flange counterclockwise until it disengages the threads on the sheave barrel.

NOTE: This key projects a small amount to provide a grip for removing.

4. Verify that the driving and driven sheaves are in alignment and the shafts are parallel. When

aligning two groove sheaves, allow room between the sheave and motor to access capscrews **E**.

5. Insert key **C** between the sheave and the shaft and tighten setscrew **A** securely.
6. If flange and locking ring have been removed, when replacing them make sure that the inner and outer flanges are open from the closed position by the same amount as the other flange. Determine this by accurately measuring the top width of the grooves.
7. Insert key **F**.
8. Tighten setscrews **D** and capscrews **E**.
9. Put on belts and adjust belt tension. Do not force belts over grooves. See Fan Drive Belt.
10. Before starting the drive, ensure that all keys are in place and all setscrews and all capscrews are tight. Check and retighten all screws and retention belts after approximately 24 hours of service.

Adjusting:

1. Slack off belt tension if belts have been installed.
2. Loosen setscrews **D**.
3. Loosen but do not remove capscrews **E**.
4. Remove key **F**.

NOTE: This key projects a small amount providing a grip for removing.

5. Adjust pitch diameter by opening or closing the movable flanges by half or full turns.

NOTE: Two-groove sheaves are supplied with both grooves set at the same pitch diameter. To provide the same pitch diameter for satisfactory operation, move both movable flanges the same number of turns. Do not open sheaves more than five turns for **A** belts or six turns for **B** belts.

6. Replace key **F**.
7. Tighten setscrews **D** and capscrews **E**
8. If belts have been installed, readjust belt tension. If belts have not been installed, install them and adjust belt tension. Do not force belts over grooves. See Fan Drive Belt on page 42.
9. Before starting the drive, ensure that all keys are in place and all setscrews and all capscrews are tight. Check and retighten all screws and retention belts after approximately 24 hours of operation.
10. Replace variable speed sheaves for 15 hp motors and greater with a fixed pitch sheave after air balancing to maintain fan balance integrity. Fixed sheaves furnished by others.

MVP Variable Speed Sheaves

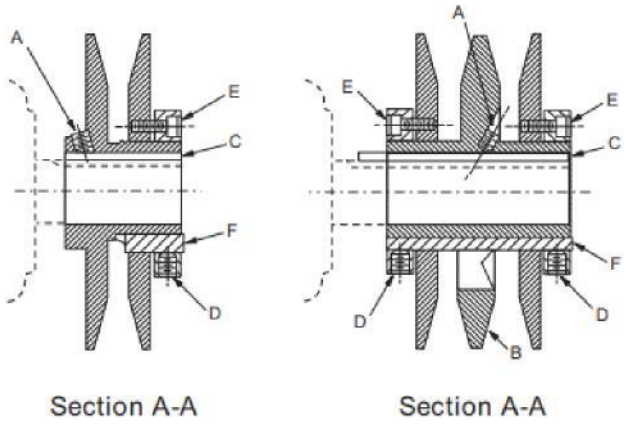
Mounting:

1. Verify both driving and driven sheaves are in alignment and the shafts are parallel. The centerline of the driving sheave must be in line with the centerline of the driven sheave (Figure 54).
2. Verify that all setscrews are torqued to the values shown in Table 27 before starting drive. Check setscrew torque and belt tension after 24 hours of service.

Adjusting:

1. Adjust motor base forward to release belt tension. Remove the belts for easier adjustment.
2. Loosen, but do not remove both of the locking setscrews **A** in the outer locking ring by using a hex key or torque wrench with a hex bit.
3. Adjust sheave to desired pitch diameter by turning the outer locking ring, using a spanner wrench or drift inserted into the three holes that are located 120° apart on the ring.

Figure 53: LVP Type Sheave Adjustment



4. Any pitch diameter can be obtained within the sheave range. One complete turn of the outer locking ring changes the pitch diameter 0.233".
5. Do not open sheaves more than the following
    a. Do not open **B** sheaves more than 4-3/4 turns for the **A** belts or 6 turns for the **B** belts.
    b. Do not open **C** sheaves more than 9-1/2 turns.
    c. Do not open **5V** sheaves more than 6 turns.
    d. Do not open **8V** sheaves more than 8 turns.
6. Tighten BOTH locking screws **A** in the outer locking ring before operating the drive. Use a torque wrench and tighten to the value shown in Table 27.
7. Replace belts and adjust the motor base to tension the belts properly. See Fan Drive Belt on page 42.
8. Do not loosen any screws other than the two locking screws **A** in the outer locking ring when adjusting the sheave pitch. Do not operate the drive until the locking screws have been set to the torque specifications.

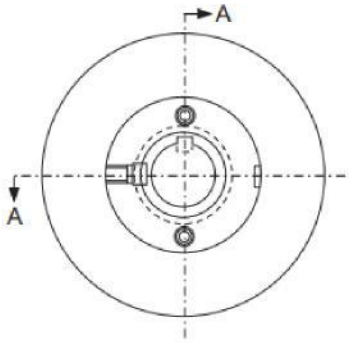
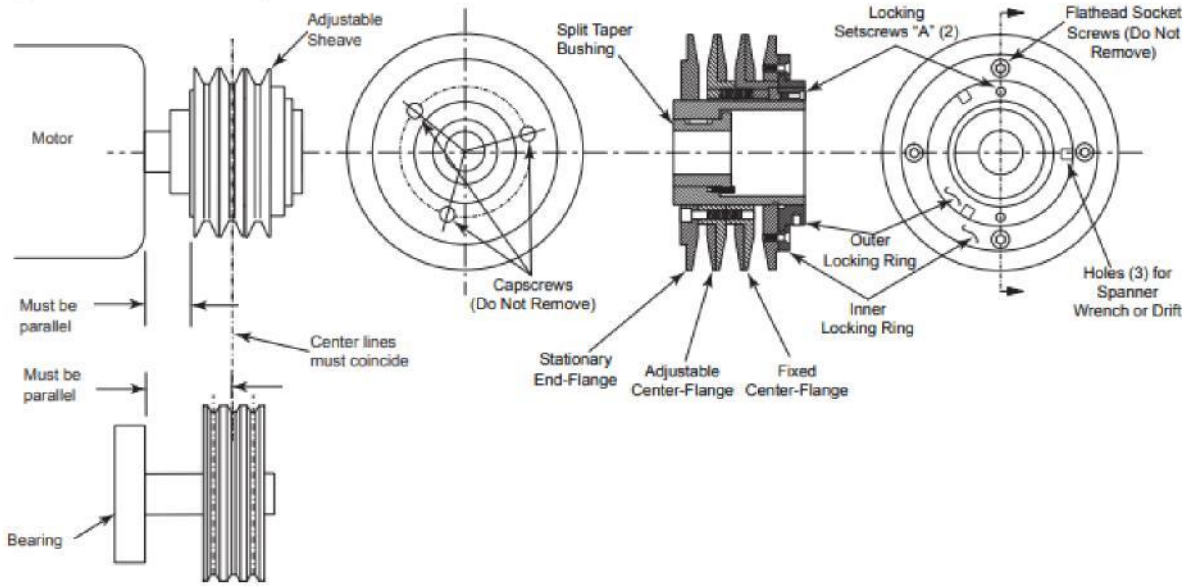


Table 27: Screw Torque Values

Nominal Screw Size (dia–thds/in)	Socket Head Cap Screws		Flat Head Socket Screws	Hollow Head Set Screws Only			
	Seating Torque		Seating Torque	Lengths Equal or Greater Than Dia.		For Lengths (L) Less Than Dia.	
				Seating Torque	Seating Torque	Length (L)	Seating Torque
	(in–lbs)	(in–lbs)	(in–lbs)	(in–lbs)	(in–lbs)	(in)	(in–lbs)
1/4–20NC	150	12.5	100	87	7.3	3/16	50
5/16–11NC	305	25.4	200	165	13.8	1/4	90
3/8–16NC	545	45.4	350	290	24.2	1/4, 5/16	150, 250
1/2–13NC	1300	108.3	N/A	620	51.7	N/A	N/A
5/8–11NC	N/A	N/A	N/A	1225	102.1	N/A	N/A

Figure 54: MVP Sheave Adjustment



Fan Drive Belt

General Rules of Tensioning

1. The ideal tension is the lowest tension at which the belt does not slip under peak load conditions.
2. Check tension frequently during the first 24 to 48 hours of operation.
3. Over tensioning shortens belt and bearing life.
4. Keep belts free from foreign material that can cause slippage.
5. Inspect V-drive on a periodic basis. Adjust tension if the belt is slipping. Do not apply belt dressing. This can damage the belt and cause early failure.

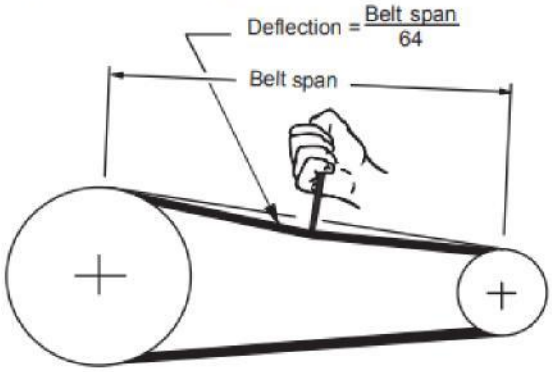
Tension Measurement Procedure

1. Measure the belt span (Figure 55).
2. Place belt tension checker squarely on one belt at the center of the belt span. Apply force to the checker, perpendicular to the belt span, until the belt deflection equals belt span distance divided by 64. Determine the force applied while in this position.
3. Compare this force to the values in Table 28.

Table 28: Belt Deflection Force (per Browning Specifications)

Cross Section	Small Sheave Diameter (in)	Number of Belts (Deflection Force lbs)					
		1		2		3 +	
		Min	Max	Min	Max	Min	Max
A, AX	0.0 to 3.5	3.0	5.0	2.5	4.0	2.0	3.5
	3.6 to 4.4	3.5	5.0	3.0	4.5	2.0	4.0
	4.5 +	4.0	5.5	3.0	5.0	2.5	4.5
B, BX	0.0 to 5.4	5.5	8.0	4.5	7.0	3.5	5.5
	5.5 to 7.6	5.5	8.5	4.5	7.5	3.5	5.5
	7.7 +	6.5	9.0	5.0	8.0	4.0	6.5
5V, 5VX	0.0 to 8.5	7.0	11.0	5.5	9.0	4.0	7.0
	8.6 to 12.0	8.5	13.0	6.5	10.5	5.0	8.0
	12.1 +	10.0	15.0	7.5	11.5	5.5	9.0

Figure 55: Drive Belt Adjustment



⚠ WARNING

Moving belt and fan can cause severe personal injury or death.

During installation and filter maintenance:

- Verify that the belt and fan guards on plenum fan units are always in place.
- Lock and tag out fans to prevent accidental start up.
- Do not enter the filter compartment until the fan is completely stopped.
- Use approved equipment for reaching filters located above normal reach. Do not step on filter frames or unit components.
- Floor surfaces must be dry and free of oil or grease.

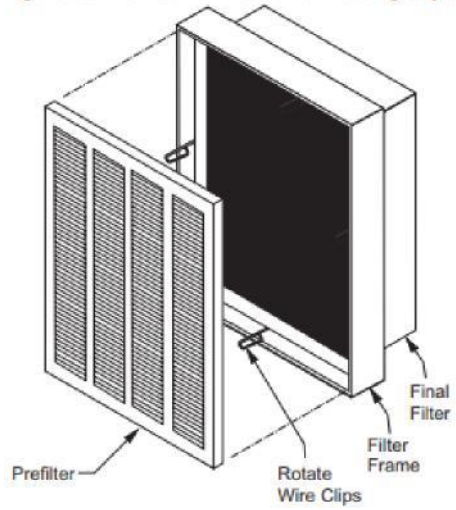
Filters

Front Load Filter Option

Front loaded filter options require that the filters be removed and replaced from inside the unit.

To remove filters, rotate the wire clips. This releases both the prefilter and the final filter. When installing clean filters, check to verify the filters are fully seated in the frame (Figure 56).

Figure 56: Frame and Filters with Holding Clips



Filter Gauges

Filter gauges indicate pressure drop for installed filters. If prefilters are present, the gauge will indicate the pressure drop for both pre- and final filters.

Table 29 shows the typical filter pressure drop for clean filters at rated air flow. The tables also show a final pressure drop for front loaded filters.

Where a single filter gauge is used, the prefilters can be removed to check the pressure drop of the final filters.

Figure 57: Filter Gauge

Table 29: Filter Pressure Drops

Bag filters—DriPak 2000				
Efficiency	45%	65%	85%	95%
Rated velocity (FPM)	625	500	500	500
Initial pressure drop	0.20–0.26	0.21–0.30	0.34–0.48	0.50–0.70
Initial pressure drop	1.0	1.0	1.0	1.0
Cartridge filters—Varicel II MH, 4.25" deep				
Efficiency	65%	85%	95%	
Rated velocity (FPM)	500	500	500	
Initial pressure drop	0.43	0.61	0.70	
Final pressure drop	1.5	1.5	1.5	
Cartridge filters—Varicel SH, 12" deep				
Efficiency	70%			
Rated velocity (FPM)	500			
Initial pressure drop	0.39			
Final pressure drop	1.2			
Pleated panel filters				
Type	Perfect pleat	AMAir 1300 4"		
Efficiency	30%	30%		
Rated Velocity (FPM)	500	625		
Initial Pressure Drop	0.36	0.36		
Final Pressure Drop	1.0	1.0		
5700 filters				
Efficiency	N/A			
Rated velocity (FPM)	500			
Initial pressure drop	0.25			
Final pressure drop	1.0			
Pleated 62 Plus filters				
Size	2"	4"		
Efficiency	70%	70%		
Initial pressure drop	0.42	0.37		
Final pressure drop	1.0	1.0		

Coils

⚠ CAUTION

Sharp fin edges are a potential injury hazard. Avoid contact with them.

1. To obtain maximum performance, the coil must be clean. Check once a year under normal operating conditions and, if dirty, brush or vacuum clean. Use a chemical coil cleaner on multiple row coils. Read and follow the chemical cleaner's instructions as some cleaners may contain harsh chemicals. Take care not to damage fins while cleaning. CAUTION—Fin edges are sharp.
2. Drain pans in any air conditioning unit may have some moisture. Algae, etc., can grow due to airborne spores and bacteria. Periodic cleaning is necessary to prevent this buildup from plugging the drain and causing the drain pan to overflow. Also, keep the drain pans clean to prevent the spread of disease. Cleaning should be performed by qualified personnel.

3. Dirt and lint can clog the condensate drain, especially with dirty filters. Inspect twice a year to help avoid overflow.

Winterizing Water Coils

⚠ WARNING

Mold can cause personal injury. Clean drain pan regularly so mold does not develop.

Coils can freeze due to air stratification or failure of outdoor air dampers and/or preheat controls. Drain all coils as thoroughly as possible and then treat in the following manner.

- Fill each coil independently with an antifreeze solution using a small circulating pump and again thoroughly drain.
- Check freezing point of antifreeze before proceeding to next coil. Due to a small amount of water always remaining in each coil, there is a diluting effect. The small amount of antifreeze solution remaining in the coil must always be sufficient enough to prevent freeze-up.

NOTE: Carefully read instructions for mixing antifreeze solution used. Some products have a higher freezing point in their natural state when mixed with water. Daikin is not responsible for the freezing of coils.

Removing and Replacing Components

⚠ WARNING

Before removing any component, lock out and tag out all power to the unit. Fans and belts can cause severe personal injury or death.

Removing a Side or Top Panel

1. Remove the flat head fasteners located along the sides of the panel.
2. Once all fasteners are removed, lift off the panel.

Removing a Frame Channel

Frame channels that run the length of the unit along the top can be removed to allow access to both the side and top of the unit.

1. First remove any adjoining side and top panel(s).
2. Once the side panel is off, remove the flat head fasteners in the corner of the frame channels.
3. Pull the frame channel out the side.
4. If any top panel fastens into the frame channel (when the frame channel is 24” or wider in direction of air flow), remove the fasteners in the top panel before pulling out the channel.

Removing the Fan Section

The fan shaft, motor, and any drive components can be removed and replaced through the access door opening. If required, the side panel can be removed for additional access.

If fan replacement is required, the entire fan assembly can be pulled out the side of the cabinet for housed fan assemblies. The fan assembly includes the fan housing, the bearing support, and the fan base.

1. Remove the side panels and any intermediate supports (follow instructions for side panel removal).
2. Once the panels and any intermediate supports are removed, disconnect the neoprene bulk head seal that is attached to the fan discharge.
3. Remove the four discharge angles that hold the neoprene canvas in place around the discharge opening.
4. Disconnect the fan sled from each of the corner mounts and pull the entire assembly out the side of the unit.
5. After the fan sled is out, loosen the fan bearings and pull out the shaft.
6. Disconnect the fan housing from the fan sled, and bearing support by removing the attaching bolts.
7. Replace the new fan, reconnect the shaft and bearings and put the fan assembly in the cabinet.
8. Replace panels and fasteners.

For plenum fan assemblies, the entire fan cabinet may need to be removed to replace the entire fan assembly depending on the length of the fan section. In some cases, the fan section is not long enough for the assembly to fit out the side of the cabinet. For those cases where it will fit, follow the above steps except the neoprene seal is a D-gasket on the inlet side that needs to be removed for plenum fans. Otherwise, the entire fan cabinet must be removed from the other sections and then the fan assembly can be removed out the discharge side of the cabinet.

Removing and Replacing the Coil

The coil can be removed by the side, top, or a combination of both. The size and configuration of the coil affects how the coil can be removed. Single banks of coil are fastened only on the connection side of the unit. Stacked and staggered coils are fastened on both ends of the coil. See the instructions below for details to remove each coil type.

Before removing the coil, disconnect all piping. The instructions below assume the coil is mounted in a sectionalized coil section where the frame channel can be removed without affecting other components. If the coil section is unitized with other components, removing the top frame channel requires removing additional panels.

Removing Single Coils

NOTE: Single coils are bolted to the unit on the connection end. The connection end is held in place with a clamp.

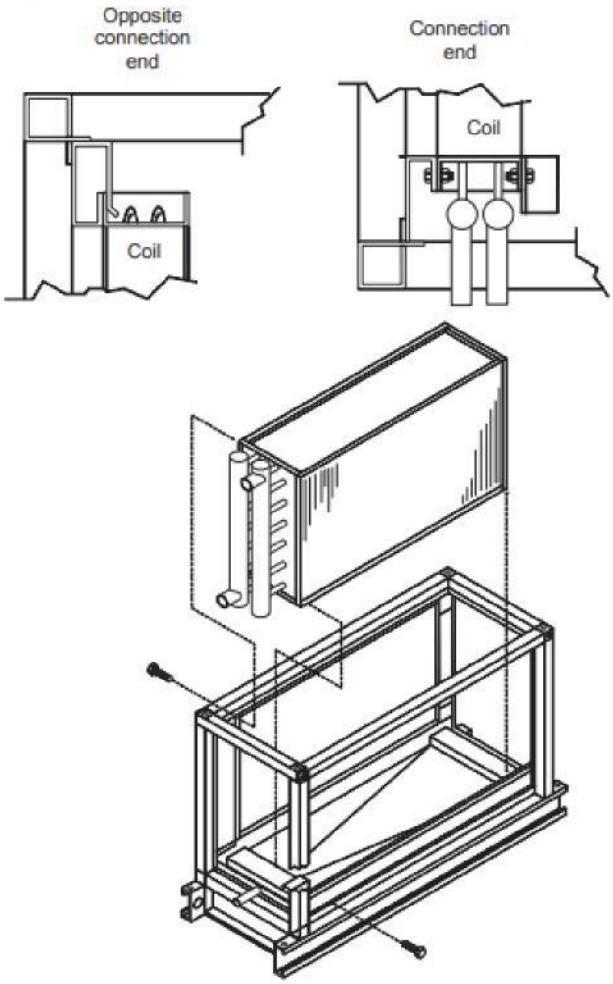
1. Disconnect all piping and remove the brass plugs for the vents and drains located in the connections.
2. Remove all screws and remove the access panel.
3. Remove the screws holding the coil in place.
4. Lift and pull the coil out the side.

Installing Single Coils

1. Slide the coil through the opening in the coil section onto the bottom coil rests.
2. To prevent any air bypass around the coil, place coils up against the coil bulkheads (refer to Figure 58).
3. Once the coil is in place, fasten the coil to the section.
4. Caulk the seams between the coil casings and bulkheads (refer to Figure 58).

5. If this is an additional coil being installed and not a replacement, locate the coil supply and return connections dimensionally. Carefully drill holes in the end panels of the unit.
6. Remove the brass plugs for the vents and drains on the connections.
7. Slip the panel over the connections.
8. Replace the brass plugs and panel fasteners.

Figure 58: Single Coil Removal



Removing Stacked Coils

NOTE: Top and bottom stacked coils are held together with steel plate and screws on one side and drain trough and screws on the other side. Remove the plate and trough before removing the coils. The coils cannot be removed attached together.

1. Disconnect all piping and remove the brass plugs for the vents and drains located in the connections.
2. Remove all screws and remove the access panel.
3. Remove the bolts holding the coil in place and then lift and pull out the coil from the side.
4. Remove the steel plate and the drain trough that hold the coils together.
5. Remove the bolts on both ends of the top coil holding it in place and then lift and slide the coil out.

6. Remove the bolts on both ends of the bottom coil holding it in place and then lift and slide the coil out.

Installing Stacked Coils

1. Slide the bottom coil through the opening in the coil section onto the bottom coil rests.
2. Place the coil up against the coil bulkheads to prevent any air bypass around the coil.
3. Once the coil is in place, bolt the coil to the section.
4. Caulk the mounting surface of the steel plate and install the plate on the coils.
5. Caulk the mounting surface of the drain trough and install the drain trough on the coils.
6. Caulk the seams between the coil casings and block offs.
7. Connect all piping and install the brass plugs for the vents and drains located in the connections.
8. Install the access panel.

Removing and Installing Staggered Coils

Staggered coils have two banks of coils positioned a few inches apart in the direction of airflow. Both coils are secured to the unit on the connection and opposite connection end of the unit.

1. Disconnect all piping and remove the brass plugs for the vents and drains located in the connections.
2. To access bolts holding the coils in place, remove the panels on both the connection and opposite connection end of the coil section.
3. Each coil is held in place with bolts located in the corners of the coil side plates. Remove the bolts and then lift and pull the coil out the side.
4. The bottom coil is fastened to the air block off plate. Remove the screws attaching this plate to the coil.
5. Once the fasteners holding the coil in place are removed, pull out the coil from either side of the unit.
6. Install the coils in reverse order of removal.

Greenheck Exhaust Fan

DANGER
Disconnect and secure to the "off" position all electrical power to the fan prior to inspection or servicing. Failure to comply with this safety precaution could result in serious injury or death.
DANGER
Pour écarter les risques de blessure grave ou de mort, débrancher et verrouiller l'alimentation électrique en position « Arrêt » avant tout contrôle ou entretien.
IMPORTANT
Uneven cleaning of the wheel will produce an out of balance condition that will cause vibration in the fan.
WARNING
This unit should be made non-functional when cleaning the wheel or housing (fuses removed, disconnect locked off).
AVERTISSEMENT
L'appareil doit être rendu non opérationnel lors du nettoyage de la turbine ou du caisson (fusibles retirés, sectionneur verrouillé).

Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and who are experienced with this type of equipment.

Motor maintenance is generally limited to cleaning and lubrication (where applicable). Cleaning should be limited to exterior surfaces only. Removing dust buildup on motor housing ensures proper motor cooling.

Greasing of motors is only intended when fittings are provided. Many fractional horsepower motors are permanently lubricated and should not be lubricated after installation. Motors supplied with grease fittings should be greased in accordance with manufacturers' recommendations. Where motor temperatures do not exceed 104°F (40°C), the grease should be replaced after 2,000 hours of running time as a general rule. Wheels require very little attention when moving clean air. Occasionally, oil and dust may accumulate causing imbalance. When this occurs, the wheel and housing should be cleaned to ensure smooth and safe operation.

All fasteners should be checked for tightness each time maintenance checks are performed prior to restarting unit.

A proper maintenance program will help these units deliver years of dependable service.

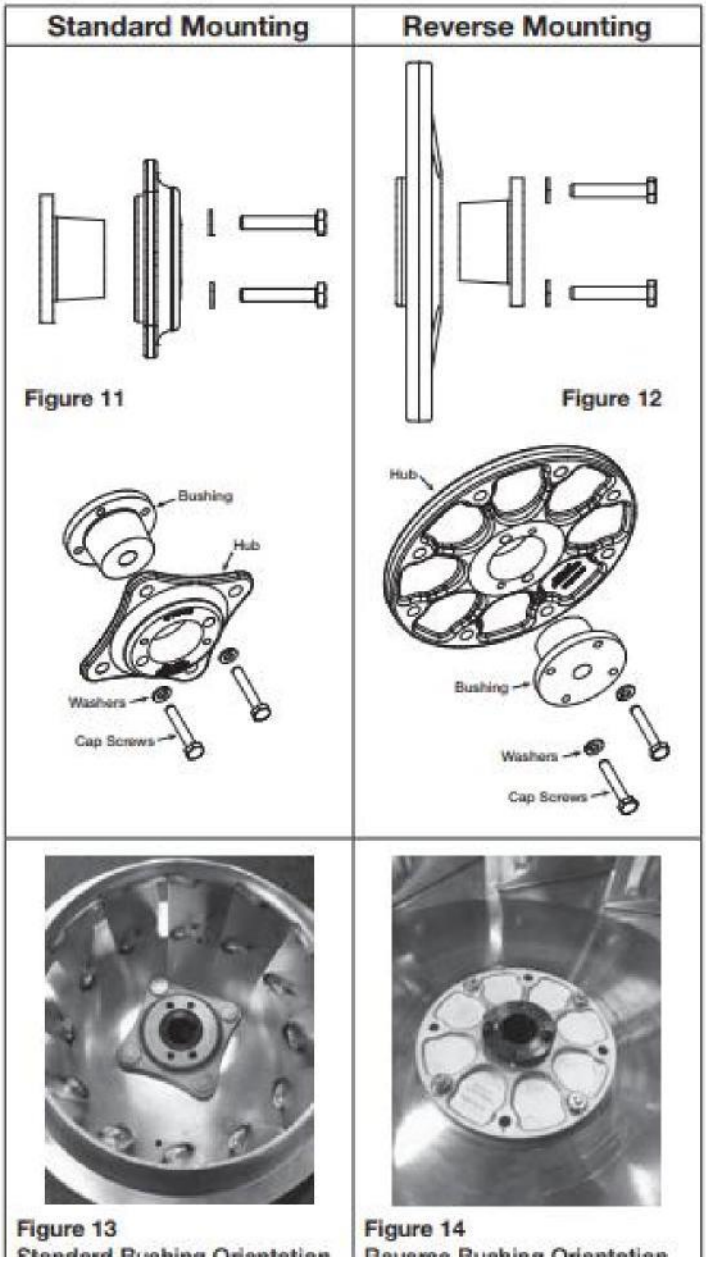
1. Belts tend to stretch after a period of time. They should be checked periodically for wear and tightness. When replacing belts, use the same type as supplied with the unit.
2. Matched belts should always be used on units with multi-groove pulleys.
3. For belt replacement, loosen the tensioning device enough to allow removal of the belt by hand. Do not force the belts on or off. This may cause cords to break, leading to premature failure.
4. Once installed, adjust belts as shown in "Pre-Starting Checks".
5. To ensure tightness, check pulley setscrews. Proper keys must be in keyways.
6. Fan RPM should not be readjusted. Only use pulleys of identical size and type when replacing pulleys.
7. Shaft bearings can be classified in two groups, relubricating and non-relubricating. All non-relubricating bearings on model CWB fans are factory lubricated and require no further lubrication under normal use; between -20° to 180°F (-29° to 82°C) in a relatively clean environment.
8. On CWB belt driven fans, the cast pillow block bearings are factory lubricated and are provided with external grease fittings. Annual lubrication is recommended, or more frequently if needed (see Table 2 on page 9). Do not over-grease. Use only one or two shots of lubricant with a hand gun. Maximum hand gun rating is 40 psi. Rotate bearings during lubrication where good safety practice permits. Caution should be employed to prevent over packing or contamination.
9. Units installed in hot, humid or dirty locations should be equipped with special bearings. These bearings will require frequent lubrication. Caution should be employed to prevent over packing or contamination.
10. Grease fittings should be wiped clean. The unit should be in operation while lubricating bearings. Extreme care should be used around moving parts.
11. Grease should be pumped in very slowly until a slight bead forms around the seal. A high grade lithium base grease should be used.
12. During the first few months of operation, check bearing set screws periodically to ensure tightness.
13. When installing fans for restaurant exhaust applications, follow NFPA 96 for cleaning fans.
14. Grease containers must be emptied at regular intervals to prevent overflow.
15. If unit is to be left idle for an extended period, remove belts and store in a cool, dry place to avoid premature belt failure.

Tapered Bushing Hub Installation and Removal

For wheel hubs and shaft pulleys utilizing a tapered bushing interface, follow this procedure for installation and removal. There are two possible set ups for the tapered bushing, both have the same procedure, but orientation of the hub varies.

Tapered Bushing Removal:

1. If present, loosen the setscrew holding the bushing and shaft key in place.
2. Loosen and remove the socket head cap screws which fasten the bushing to the hub as shown in the section views and examples of Figures 11-14.
3. Standard Mounting - Take the two socket head cap screws that were removed and install them into the visibly threaded holes on the wheel hub. Reverse Mounting - Install the two socket head cap screws into the visibly threaded holes of the bushing flange.
4. Once both socket head cap screws are installed, tighten them an eighth of a turn at a time, alternating between the two until the hub comes loose from the bushing.



Bushing Installation:

1. Clean all surfaces of hub and bushing to remove any oil or residue present and do not use any lubricant to install bushing into the hub. For both standard and reverse mounting styles, the socket head cap screws are adjustable from the inlet of the fan.
2. Standard Mounting: Slide the bushing and shaft key onto the fan shaft followed by the wheel and hub assembly. If present, use the keyway setscrew to hold the shaft key and bushing in place but DO NOT overtighten as this can damage the bushing. Align the unthreaded holes of the hub with the threaded holes of the tapered bushing. Reverse Mounting: Slide the wheel and hub assembly onto the fan shaft followed by the bushing and shaft key. If present, use the keyway setscrew to hold the shaft key and bushing in place but DO NOT overtighten as this can damage the bushing. Align the unthreaded holes of the tapered bushing with the threaded holes of the hub.
3. Install the two bushing socket head cap screws into the aligned holes by hand (or without excessive torque) until the heads of the socket head cap screws are seated against the mating surface.
4. Adjust the height of the wheel in the fan relative to the inlet venturi then tighten the two socket head cap screws an eighth turn at a time in an alternating fashion and to a torque of 10 ft-lbs.

Recommended Bearing Lubrication Frequency in Months

If unusual environment conditions exist, such as extreme temperature, moisture or contaminants, more frequent lubrication is required.

A good quality lithium base grease, conforming to NLGI Grade 2 consistency, such as those listed in Table 3.

Table 2: Suggested Fan Bearing Lubrication Intervals

Interval (months)	Type of Service
1 to 3	Heavy duty in dirty, dusty locations; high ambient temperatures; moisture laden atmosphere; vibration.
3 to 6	12 to 24 hours per day, heavy duty, or if moisture is present
6 to 12	8 to 16 hours per day in clean, relatively dry atmosphere
12 to 18	Infrequent operation or light duty in clean atmosphere

Table 3: Grease Manufacturers

Manufacturer	Grease (NLGI #2)
U.S. Electric Motors	Grease No. 83343
Chevron U.S.A. Inc	Chevron SRI Grease #2
Mobil Oil Corporation	Mobilith
	Mobil 532
Texaco, Inc.	Premium BRB #2
	Texaco Multifak #2
Amoco Oil Co.	Rykon Premium #2
Exxon	Unirex N2
Shell	B Shell Alvania #2