RFB NO. 321010

CONSTRUCTION DOCUMENTS
PROJECT MANUAL

DANE COUNTY DEPARTMENT OF PUBLIC WORKS,
HIGHWAY AND TRANSPORTATION

PUBLIC WORKS ENGINEERING DIVISION
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

REQUEST FOR BIDS NO. 321010
SMO HVAC REPLACEMENT
SOUTH MADISON HUMAN SERVICES
2306 S. PARK ST
MADISON, WISCONSIN

Due Date / Time: **TUESDAY, July 20th, 2021 / 2:00 P.M.**

Location: **PUBLIC WORKS OFFICE**

Performance / Payment Bond: **100% OF CONTRACT AMOUNT**

Bid Deposit: **5% OF BID AMOUNT**

FOR INFORMATION ON THIS REQUEST FOR BIDS, PLEASE CONTACT:

Todd Draper, PROJECT MANAGER
TELEPHONE NO.: 608/267-0119
FAX NO.: 608/267-1533
E-MAIL: draper@COUNTYOFDANE.COM

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INVITATION TO BID

LEGAL NOTICE

Dane County Dept. of Public Works, Hwy & Transp, 1919 Alliant Energy Center Way, Madison, WI 53713, will receive sealed Bids until:

2:00 P.M., TUESDAY, JULY 20TH, 2021

RFB NO. 321010

SMO HVAC REPLACEMENT

SOUTH MADISON HUMAN SERVICES

2306 S. PARK ST, MADISON, WI

Dane County is inviting Bids for construction services to replace existing HVAC rooftop units at South Madison Human Services. Only firms with capabilities, experience & expertise with similar projects should obtain this Request for Bids (RFB) document & submit Bids.

RFB document may be obtained after **2:00 p.m. on June 15th, 202**1 by downloading it from bids-pwht.countyofdane.com. Please call Todd Draper, Project Mgr., at 608/267-0119, or our office at 608/266-4018, for any questions or additional information.

All Bidders must be qualified as a Best Value Contractor before Bid Due Date / Time. Complete Pre-qualification Application for Contractors at publicworks.countyofdane.com/bvc or obtain one by calling 608/267-0119.

A pre-bid, facility tour will be held on Monday, June 28th at 11:00 am at South Madison Human Services, 2306 S. Park St, Madison. Bidders are strongly encouraged to attend this tour. See RFB for mandatory disease transmission prevention practices.

PUBLISH: JUNE 15TH & JUNE 22ND, 2021 - WISCONSIN STATE JOURNAL

JUNE 14TH & JUNE 21ST, 2021 - THE DAILY REPORTER

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INSTRUCTIONS TO BIDDERS

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1. GENERAL

A. Before submitting Bid, bidder shall thoroughly examine all Construction Documents. Successful Bidder shall be required to provide all the Work that is shown on Drawings, set forth in Specifications, or reasonably implied as necessary to complete Contract for this project.

B. Pre-bid meeting is scheduled on Monday, June 28th at 11 a.m. at South Madison Human Services,2306 S. Park, Madison, starting out front. Attendance by all bidders is optional, however bidders and subcontractors are strongly encouraged to attend.

C. Safe distancing & face masks are required for all tour attendees. Tours will be limited to 10 people; please limit number of attending staff & subcontractors. If there are more than 10 people, group will be split & there will be two or more tours. Allow sufficient time if you do not make it in to first tour group. Do not visit the site if you are or have recently been ill.

D. Failure to visit site or failure to examine any and all Construction Documents will in no way relieve successful Bidder from necessity of furnishing any necessary materials or equipment, or performing any work, that may be required to complete the Work in accordance with Drawings and Specifications. Neglect of above requirements will not be accepted as reason for delay in the Work or additional compensation.

2. DRAWINGS AND SPECIFICATIONS

A. Drawings and Specifications that form part of this Contract, as stated in Article 1 of General Conditions of Contact, are enumerated in Document Index of these Construction Documents.

B. Complete sets of Drawings and Specifications for all trades will be available to all Bidders, irrespective of category of work to be bid on, in order that all Bidders may be familiar with work of other trades as they affect their bid.

3. INTERPRETATION

A. No verbal explanation or instructions will be given in regard to meaning of Drawings or Specifications before Bid Due Date. Bidders shall bring inadequacies, omissions or conflicts to Owner or Architect / Engineer's attention at least ten (10) calendar days before Bid Due Date. Prompt clarification will be available to all bidders by Addendum.

B. Failure to so request clarification or interpretation of Drawings and Specifications will not relieve successful Bidder of responsibility. Signing of Contract will be considered as implicitly denoting that Contractor has thorough understanding of scope of the Work and comprehension of Construction Documents.

C. Owner or Engineer will not be responsible for verbal instructions.

4. QUALIFICATIONS OF BIDDER (CONTRACTOR AND SUBCONTRACTOR)

A. Before award of Contract can be approved, Owner shall be satisfied that Bidder involved meets following requirements:

1. Has completed at least one (1) project of at least fifty percent (50%) of size or value of Division of work being bid and type of work completed is similar to that being bid. If greater magnitude of experience is deemed necessary, other than size or value of work, such requirements will be described in appropriate section of Specifications.

2. Maintains permanent place of business.

3. Can be bonded for terms of proposed Contract.

4. Contractor and subcontractors shall meet all applicable Best Value Contractor requirements.

    a. Completed contracts in accordance with drawings and specifications.
    b. Diligently pursued execution of work and completed contracts according to established time schedule unless Owner grants extensions.
    c. Fulfilled guarantee requirements of construction documents.
    d. Is not presently on ineligible list maintained by County's Department of Administration for noncompliance with equal employment opportunities and affirmative action requirements.
    e. Authorized to conduct business in Wisconsin. By submitting Bid, bidder warrants that it has: complied with all necessary requirements to do business in State of Wisconsin; that persons executing contract on its behalf are authorized to do so; and, if corporation, that name and address of bidder's registered agent are as set forth in Contract. Bidder shall notify Owner immediately, in writing, of any change in its registered agent, their address, and bidder's legal status. For partnership, term "registered agent" shall mean general partner.

B. County's Public Works, Project Manager will make such investigations as are deemed necessary to determine ability of bidder to perform the Work, and bidder shall furnish to County's Public Works, Project Manager or designee all such information and data for this purpose as County's Public Works Project Manager may request. Owner reserves right to reject Bid if evidence submitted by, or investigation of, bidder fails to satisfy Owner that bidder is responsible and qualified to carry out obligations of Contract and to complete the Work contemplated therein.

5. BID GUARANTEE

A. Bank certified check, cashier's check or Bid Bond, payable to County in amount not less than five percent (5%) of maximum bid, shall accompany each Bid as guarantee that if Bid is accepted, Bidder will execute and return proposed Contract and Performance and Payment Bonds within ten (10) business days after being notified of acceptance of Bid. Company issuing bonds must be licensed to do business in Wisconsin.

B. Any bid, which is not accompanied by bid guarantee, will be considered "No Bid" and will not be read at Bid Due Date.

C. If successful Bidder so delivers Contract, Certificate of Insurance, and Performance and Payment Bonds, check will be returned to Bidder. In case Bidder fails to deliver such Contract, insurance, and bond, amount of bid guarantee will be forfeited to County as liquidated damages.

D. All checks tendered as bid guarantee, except those of three (3) lowest qualified, responsible bidders, will be returned to their makers within three (3) business days after Bid Due Date. All such retained checks will be returned immediately upon signing of Contract and Performance and Payment Bonds by successful Bidder.

6. WITHDRAWAL OF BIDS

A. Bids may be withdrawn by written request received from bidder or authorized representative thereof prior to time fixed for Bid Due Date, without prejudice to right of bidder to file new Bid. Withdrawn Bids will be returned unopened. Negligence on part of bidder in preparing their Bid confers no right for withdrawal of Bid after it has been opened.

B. No Bid may be withdrawn for period of sixty (60) calendar days after Bid Due Date.

C. If Bid contains error, omission or mistake, bidder may limit liability to amount of bidder's guarantee by giving written Notice of Intent not to execute Contract to Owner within seventy-two (72) hours of Bid Due Date.

7. CONTRACT FORM

A. Sample copy of contract that successful Bidder will be required to enter into is included in these Construction Documents and bidders are required to familiarize themselves with all conditions contained therein.

8. CONTRACT INTERESTS BY COUNTY PUBLIC OFFICIALS

A. In accordance with Wisconsin Statute 946.13, county official may not bid for or enter into any contract involving receipts or disbursements of more than $15,000.00 in a year, in which they have private pecuniary interest, direct or indirect if at same time they are authorized to

take official action with respect to making of this Contract. Any contract entered into in violation of this Statute is void and County incurs no liability thereon. This subsection does not affect application and enforcement of Wisconsin Statute 946.13 by state prosecutors in criminal courts of this state.

9. EMERGING SMALL BUSINESS PROVISIONS

A. **Emerging Small Business Definition.** For purposes of this section, ESB is defined as:

1. Independent business concern that has been in business minimum of one year;

2. Business located in State of Wisconsin;

3. Business comprised of less than twenty-five (25) employees;

4. Business must not have gross sales in excess of three million dollars ($3,000,000.00) over past three years; and

5. Business does not have history of failing to complete projects.

B. **Emerging Small Business (ESB) Involvement.** Bidder shall make good faith effort to award minimum of ten percent (10%) of the Work to ESBs. Bidder shall submit report to Dane County Contract Compliance Specialist within ten (10) business days of Bid Due Date demonstrating such efforts. Good faith efforts means significant contact with ESBs for purposes of soliciting bids from them. Failure to make or demonstrate good faith efforts will be grounds for disqualification.

C. **Emerging Small Business Report.** Emerging Small Business Enterprise Report is to be submitted by Bidder in separate envelope marked "Emerging Small Business Report". This report is due by 2:00 p.m. following specified ten (10) business days after Bid Due Date. Bidder who fails to submit Emerging Small Business Report shall be deemed not responsive.

D. **ESB Goal.** Goal of this project is ten percent (10%) ESB participation. ESB utilizations are shown as percentage of total Bid. If Bidder meets or exceeds specified goal, Bidder is only required to submit Form A - Certification, and Form B - Involvement. Goal shall be met if Bidder qualifies as ESB.

E. **Report Contents.** Following award of Contract, Bidder shall submit copies of executed contracts for all Emerging Small Businesses. Emerging Small Business Report shall consist of these:

1. Form A - Certification;

2. Form B - Involvement;

3. Form C - Contacts;

4. Form D - Certification Statement (if appropriate); and

5. Supportive documentation (i.e., copies of correspondence, telephone logs, copies of advertisements).

F. **ESB Listing.** Bidders may solicit bids from *Dane County Targeted Business Directory* by going to this website. Do not click as a link; copy & paste address into a web browser.
https://equity.countyofdane.com/documents/PDFs/Targeted-Business-Directory.xlsx

G. **DBE Listing.** Bidders may also solicit bids from *State of Wisconsin DOT Disadvantaged Business Enterprise Unified Certification Program (DBE / UCP) Directory* by going to this website. These are not only transportation-related designers & contractors. Do not click as a link; copy & paste address into a web browser.

https://wisconsindot.gov/Documents/doing-bus/civil-rights/dbe/dbe-ucp-directory.xlsx

H. **ESB Certification.** All contractors, subcontractors and suppliers seeking ESB certification must complete and submit Emerging Small Business Report to Dane County Contract Compliance Program.

I. **Certification Statement.** If ESB firm has not been certified by County as ESB prior to submittal of this Bid, ESB Report cannot be used to fulfill ESB goal for this project unless firm provides "Form D - Certification Statement". Certification statement must be completed and signed by ESB firm.

J. **Questions.** Questions concerning Emerging Small Business provisions shall be directed to:

OEI@countyofdane.com
or
Dane County Contract Compliance Specialist
City-County Building, Room 356
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703
608/266-4192

K. **Substituting ESBs.** In event of any significant changes in subcontract arrangements or if need arises to substitute ESBs, Bidder shall report such proposed changes to Contract Compliance Specialist to making any official changes and request authorization to substitute ESB firm. Bidder further agrees to make every possible effort to replace ESB firm with another qualified ESB firm.

L. **Good Faith Efforts.** Good faith efforts can be demonstrated by meeting all of these obligations:

1. Selecting portions of the Work to be performed by ESBs in order to increase likelihood of meeting ESB goal including, where appropriate, breaking down Contract into smaller units to facilitate ESB participation.

2. Advertising in general circulation, trade associations and women / minority focus media concerning subcontracting opportunities.

3. Providing written notices to reasonable number of specific ESBs that their interest in Contract was being solicited in sufficient time to allow ESBs to participate effectively.

4. Following up on initial solicitations of interest by contacting ESBs within five (5) business days prior to Bid Due Date to determine with certainty whether ESB were interested, to allow ESBs to prepare bids.

5. Providing interested ESB with adequate information about Drawings, Specifications and requirements of Contract.

6. Using services of available minority, women and small business organizations and other organizations that provide assistance in recruitment of MBEs / WBEs / ESBs.

7. Negotiating in good faith with interested ESBs, not rejecting ESBs as unqualified without sound reason based on thorough investigation of their capabilities.

8. Submitting required project reports and accompanying documents to County's Contract Compliance Specialist within twenty-four (24) hours after Bid Due Date.

M. **Appeals Disqualification of Bid.** Bidder who is disqualified may appeal to Public Works & Transportation Committee and Equal Opportunity Commission.

10. METHOD OF AWARD - RESERVATIONS

A. Following will be basis of award of Contract, providing cost does not exceed amount of funds then estimated by County as available to finance Contract(s):

1. Lowest dollar amount submitted by qualified responsible bidder on Base Bid for all work comprising project, combined with such additive Owner accepted alternates.

2. Owner reserves right to reject all bids or any bid, to waive any informality in any bid, and to accept any bid that will best serve interests of County.

3. Unit Prices and Informational Bids will not be considered in establishing low bidder.

11. SECURITY FOR PERFORMANCE AND PAYMENTS

A. Simultaneous with delivery of signed Contract, Bidder shall be required to furnish Performance and Payment Bonds as specified in Article 29 of General Conditions of Contract, "Contract Security". Surety Company shall be licensed to do business in Wisconsin. Performance and Payment Bonds must be dated same date or subsequent to date of Contract. Performance and Payment Bonds must emulate information in Sample Performance and Payment Bonds in Construction Documents.

B. Provide certified copy of power of attorney from Surety Company showing that agent who signs Bond has power of attorney to sign for Surety Company. Secretary or Assistant Secretary of company must sign this certification, not attorney-in-fact. Certification must bear same or later date as Bond. Power of Attorney must emulate model power of attorney information detailed in Sample Performance and Payment Bonds.

C. If Bidder is partnership or joint venture, State certified list, providing names of individuals constituting partnership or joint venture must be furnished. Contract itself may be signed by one partner of partnership, or one partner of each firm comprising joint venture, but Performance and Payment Bonds must be signed by all partners.

D. If Bidder is corporation, it is necessary that current certified copy of resolution or other official act of directors of corporation be submitted showing that person who signs Contract is authorized to sign contracts for corporation. It is also necessary that corporate seal be affixed to resolution, contract, and performance and payment bonds. If your corporation has no seal, it is required that above documents include statement or notation to effect that corporation has no seal.

12. TAXES

A. Wisconsin Statute 77.54 (9m) allows building materials that become part of local unit government facilities to be exempt from sales & use tax. Vendors & materials suppliers may not charge Bidders sales & use tax on these purchases. This does not include highways,

streets or roads. Any other Sales, Consumer, Use & other similar taxes or fees required by law shall be included in Bid.

B. In accordance with Wisconsin Statute 71.80(16)(a),successful nonresident bidder, whether incorporated or not, and not otherwise regularly engaged in business in this state, shall file surety bond with State of Wisconsin Department of Revenue payable to Department of Revenue, to guarantee payment of income taxes, required unemployment compensation contributions, sales and use taxes and income taxes withheld from wages of employees, together with any penalties and interest thereon. Amount of bond shall be three percent (3%) of Contract or subcontract price on all contracts of $50,000 or more.

13. SUBMISSION OF BIDS

A. All Bids shall be submitted on standard Bid Form bound herein and only Bids that are made on this Bid Form will be considered. Entire Bid Form and other supporting documents, if any, shall be removed or copied from Construction Documents, filled out, and submitted in manner specified hereinafter. Submit completed Bid Bond with Bid as well.

B. No bids for any subdivision or any sub-classification of the Work, except as indicated, will be accepted. Any conditional Bid, amendment to Bid Form or appended item thereto, or inclusion of any correspondence, written or printed matter, or details of any nature other than that specifically called for, which would alter any essential provision of Construction Documents, or require consideration of unsolicited material or data in determining award of Contract, will disqualify Bid. Telecommunication alterations to Bid will not be accepted.

C. Bidders must submit single Bid for all the Work.

D. Bid amounts shall be inserted in words and in figures in spaces provided on Bid Form; in case of conflict, written word amounts will govern.

E. Addenda issued after Bid Letting shall become part of Construction Documents. Bidders shall acknowledge receipt of such addenda in appropriate space provided on Bid Form. Bid may be rejected if receipt of any particular addendum applicable to award of Contract has not been acknowledged on Bid Form.

F. Bids shall be signed, placed in envelope, sealed and delivered before due time to place designated in Invitation to Bid, and identified with project name, bid number, location, category of work being bid upon, Bid Due Date, name and address of bidder.

G. Bidder shall be responsible for sealed Bid being delivered to place designated for Bid Due Date on or before date and time specified. Bids received after time of closing will be rejected and returned to bidder unopened.

H. Current conditions prevent public bid openings.

I. Bids dropped off at Public Works' physical address should be placed in the "Public Works Bids & Proposals" box inside the building's front vestibule.

J. Bid will be opened on listed due date & time & results should be available within 24 hours at bids-pwht.countyofdane.com.

K. Bid will be considered invalid and will be rejected if bidder has not signed it.

L. Faxed or emailed Bids will not be accepted.

M. Bidder's organization shall submit completed with Bid, Fair Labor Practices Certification form, included in these Construction Documents.

14. SUBCONTRACTOR LISTING

A. Bidders are required to submit Section 00 43 36, Proposed Subcontractors Form listing all subcontractors for this project including committed prices for each subcontractor. Project Manager must receive Form no later than when successful Bidder submits their signed Contract. Failure to submit may delay progress payments.

15. ALTERNATE BIDS

A. Bidder shall carefully read requests for Alternate Bids, and thoroughly examine Drawings and Specifications to determine extent various changes and conditions will affect Bid.

B. Space is provided in Bid Form for requested Alternate Bids. Failure to submit bid for any requested Alternate Bids may result in rejection of entire Bid.

C. Bidder shall state amount to be added / subtracted to Base Bid for providing alternates, including all incidentals, omissions, additions, and adjustments as may be necessary or required by such changes. If there is no difference in price, Bidder shall state, "No Change".

D. Descriptions of requested Alternate Bids are as set forth in Construction Documents.

16. INFORMATIONAL BIDS

A. Not Applicable.

17. UNIT PRICES

A. Not Applicable.

18. COMMENCEMENT AND COMPLETION

A. Successful Bidder shall commence work when schedule and weather permit, but no later than stated in Bid Form. Contractor shall pursue the Work regularly and continuously at reasonable rate to insure completion of the Work within time stated in Bid.

B. Should it be found impossible to complete the Work on or before time specified for completion, written request may be submitted for extension of time setting forth reasons believed to justify granting of such request. Refer to Article 20 of General Conditions of Contract, titled "Time for Completion".

19. WORK BY OWNER

A. Not Applicable.

20. SPECIAL HAZARDS COVERAGE

A. If hazardous materials abatement work is required by Construction Documents, successful Bidder shall provide necessary Pollution Insurance that specifically includes coverage for

hazardous materials abatement work as called for under “Insurance” in Supplementary Conditions.

FORM A

DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION

In accordance with General Conditions of Contract, submit this Emerging Small Business Report within ten (10) days after Bid Due Date.

PROJECT NAME: _____

_____

BID NO.: _____ BID DUE DATE: _____

BIDDER INFORMATION

COMPANY NAME: _____

ADDRESS: _____

_____

TELEPHONE NO.: _____

CONTACT PERSON: _____

EMAIL ADDRESS: _____

FORM B

DANE COUNTY
(Copy this Form as necessary to provide complete information)
EMERGING SMALL BUSINESS REPORT - INVOLVEMENT

COMPANY NAME: _____

PROJECT NAME: _____

BID NO.: _____ BID DUE DATE: _____

ESB NAME: _____

CONTACT PERSON: _____

ADDRESS: _____

_____

PHONE NO & EMAIL.: _____

_____

Indicate percentage of financial commitment to this ESB: _____% Amount: $_____

ESB NAME: _____

CONTACT PERSON: _____

ADDRESS: _____

_____

PHONE NO & EMAIL.: _____

_____

Indicate percentage of financial commitment to this ESB: _____% Amount: $_____

FORM C

DANE COUNTY
(Copy this Form as necessary to provide complete information)
EMERGING SMALL BUSINESS REPORT - CONTACTS

COMPANY NAME: _____

PROJECT NAME: _____

BID NO.: _____ BID DUE DATE: _____

	ESB FIRM NAME CONTACTED	DATE	PERSON CONTACTED	DID ESB BID?	ACC-EPT BID?	REASON FOR REJECTION
1)						
2)						
3)						
4)						
5)						
6)						
7)						
8)						

FORM D

DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION STATEMENT

I, _____ , _____ of
Name Title

_____ certify to best of my knowledge and
Company

belief that this business meets Emerging Small Business definition as indicated in Article 9 and that information contained in this Emerging Small Business Report is true and correct.

_____ _____
Bidder's Signature Date

Name of Bidding Firm: _____

SECTION 00 41 13

BID FORM

BID NO. 321010
PROJECT: SMO HVAC REPLACEMENT
SOUTH MADISON HUMAN SERVICES

TO: DANE COUNTY DEPARTMENT OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION PROJECT MANAGER
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

NOTE: WISCONSIN STATUTE 77.54 (9M) ALLOWS FOR NO SALES & USE TAX ON THE PURCHASE OF MATERIALS FOR COUNTY PUBLIC WORKS PROJECTS

BASE BID - LUMP SUM:
Dane County is inviting Bids for construction services to replace existing HVAC rooftop units at South Madison Human Services. The undersigned, having examined the site where the Work is to be executed and having become familiar with local conditions affecting the cost of the Work and having carefully examined the Drawings and Specifications, all other Construction Documents and Addenda thereto prepared by Dane County Department of Public Works, Highway & Transportation hereby agrees to provide all labor, materials, equipment and services necessary for the complete and satisfactory execution of the entire Work, as specified in the Construction Documents, for the Base Bid stipulated sum of:

_____ and __ /100 Dollars
Written Price

$_____
Numeric Price

The undersigned agrees to add the alternate(s) portion of the Work as described, for the following addition(s) to or subtraction(s) from the Base Bid, as stipulated below.

ALTERNATE BID 1 - LUMP SUM:
Replace two HVAC rooftop units (RTU's 5 and 15) at South Madison Human Services.

_____ and __ /100 Dollars
Written Price

$_____
Numeric Price (circle: Add or Deduct)

Receipt of the following addenda and inclusion of their provisions in this Bid is hereby acknowledged:

Addendum No(s). _____ through _____

Dated _____

Dane County Human Services must have substantial completion on this project by October 31st, 2021. Assuming this Work can be started by August 30th, 2021, what dates can you commence and complete this job?

Commencement Date: _____ Completion Date: _____
(final, not substantial)

I hereby certify that all statements herein are made on behalf of:

_____
(Name of Corporation, Partnership or Person submitting Bid)

Select one of the following:
1. A corporation organized and existing under the laws of the State of _____, or

2. A partnership consisting of _____, or

3. A person conducting business as _____;

Of the City, Village, or Town of _____ of the State of _____.

I have examined and carefully prepared this Bid from the associated Construction Documents and have checked the same in detail before submitting this Bid; that I have full authority to make such statements and submit this Bid in (its) (their) (my) behalf; and that the said statements are true and correct. In signing this Bid, we also certify that we have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a Bid; that this Bid has been independently arrived at without collusion with any other bidder, competitor, or potential competitor; that this Bid has not been knowingly disclosed prior to the Bids Due Date to another bidder or competitor; that the above statement is accurate under penalty of perjury.

The undersigned is qualified as a Best Value Contractor or has proven their exemption. Qualification or exemption shall be complete before Bid Due Date / Time.

The undersigned further agrees to honor the Base Bid and the Alternate Bid(s) for sixty (60) calendar days from date of Award of Contract.

SIGNATURE: _____
(Bid is invalid without signature)

Print Name: _____ Date: _____

Title: _____

Address: _____

Telephone No.: _____ Fax No.: _____

Email Address: _____

Contact Person: _____

END OF SECTION

THIS PAGE IS FOR BIDDERS' REFERENCE

DO NOT SUBMIT WITH BID FORM.

BID CHECK LIST:
These items **must** be included with Bid:
☐ Bid Form ☐ Bid Bond ☐ Fair Labor Practices Certification
☐ Waste Management Plan

DANE COUNTY BEST VALUE CONTRACTING QUALIFICATION

General Contractors & all Subcontractors must be qualified as a Best Value Contractor with the Dane County Public Works Engineering Division. Qualification & listing is not permanent & must be renewed every 24 months. Complete a *Best Value Contracting Application* online at:
pwht.countyofdane.com/bvc_application.aspx

DANE COUNTY VENDOR REGISTRATION PROGRAM

All bidders are strongly encouraged to be a registered vendor with Dane County. Registering allows vendors an opportunity to receive notifications for RFBs & RFPs issued by the County and provides the County with up-to-date company contact information. Complete a new form or renewal online at:
danepurchasing.com/Account/Login?

SECTION 00 43 36

PROPOSED SUBCONTRACTORS FORM

General Contractor Name: _____ Bid No: _____

Instructions:
1. Complete all information in table below.
2. Include this Form with signed Construction Contract (Section 00 52 96).
3. General contractors & subcontractors must be qualified & registered as Best Value Contractor (Dane County Ordinances, Chapter 40.07). General contractors must be qualified & registered before bids are due. Subcontractors must be qualified & registered 10 working days before performing any work related to Construction Contract. No contractor can perform work without being qualified & registered.
4. Sample Best Value Contracting Application is included in this RFB package for informational purposes; fill out form online (publicworks.countyofdane.com/bvc).

SUBCONTRACTOR NAME	ADDRESS & PHONE NO.	DIVISION OF WORK	$$ AMOUNT OF CONTRACT

Check box if there is another form page attached to include additional subcontractors. ☐

The undersigned, for and on behalf of the General Contractor named herein, certifies the information on this Form is accurate.

_____ _____
Officer or Authorized Agent Signature Date

_____
Printed or Typed Name and Title

SUBCONTRACTOR NAME	ADDRESS & PHONE NO.	DIVISION OF WORK	$$ AMOUNT OF CONTRACT

END OF SECTION

COUNTY OF DANE

PUBLIC WORKS CONSTRUCTION CONTRACT

Contract No. _____ Bid No. 321010

Authority: 2020 RES -_____

THIS CONTRACT, made and entered into as of the date by which authorized representatives of both parties have affixed their signatures, by and between the County of Dane (hereafter referred to as "COUNTY") and _____ (hereafter, "CONTRACTOR"), and

W I T N E S S E T H :

WHEREAS, COUNTY, whose address is c/o Deputy Public Works Director, 1919 Alliant Energy Center Way, Madison, WI 53713, desires to have CONTRACTOR install SMO HVAC Replacement at South Madison Human Services("the Project"); and

WHEREAS, CONTRACTOR, whose address is _____ _____ is able and willing to construct the Project, in accordance with the Construction Documents;

NOW, THEREFORE, in consideration of the above premises and the mutual covenants of the parties hereinafter set forth, the receipt and sufficiency of which is acknowledged by each party for itself, COUNTY and CONTRACTOR do agree as follows:

1. CONTRACTOR agrees to construct, for the price of $_____ the Project and at the CONTRACTOR'S own proper cost and expense to furnish all materials, supplies, machinery, equipment, tools, superintendence labor, insurance, and other accessories and services necessary to complete the Project in accordance with the conditions and prices stated in the Bid Form, Quote, General Conditions of Contract, the drawings which include all maps, plats, plans, and other drawings and printed or written explanatory matter thereof, and the specifications therefore as prepared by _____ (hereinafter referred to as "the Architect / Engineer"), and as enumerated in the Project Manual Table of Contents, all of which are made a part hereof and collectively evidence and constitute the Contract.

2. COUNTY agrees to pay the CONTRACTOR in current funds for the performance of the Contract subject to additions and deductions, as provided in the General Conditions of Contract, and to make payments on account thereof as provided in Article entitled, "Payments to Contractor" of the General Conditions of Contract.

3. During the term of this Contract, CONTRACTOR agrees to take affirmative action to ensure equal employment opportunities. The CONTRACTOR agrees in accordance with Wisconsin Statute 111.321 and Chapter 19 of the Dane County Code of Ordinances not to discriminate on the basis of age, race, ethnicity, religion, color, gender, disability, marital status, sexual orientation, national origin, cultural differences, ancestry, physical appearance, arrest record or conviction record, military participation or membership in the national guard, state defense force or any other reserve component of the military forces of the United States, or political beliefs.

Such equal opportunity shall include, but not be limited to, the following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation. CONTRACTOR agrees to post in conspicuous places, available to all employees and applicants for employment, notices setting forth the provisions of this paragraph.

4. CONTRACTOR shall file an Affirmative Action Plan with the Dane County Contract Compliance Specialist in accord with Chapter 19 of the Dane County Code of Ordinances. CONTRACTOR must file such plan within fifteen (15) business days of the effective date of this Contract. During the term of this Contract CONTRACTOR shall also provide copies of all announcements of employment opportunities to COUNTY'S Office of Equity & Inclusion, and shall report annually the number of persons, by race, ethnicity, gender, and disability status, which apply for employment and, similarly classified, the number hired and number rejected.

5. During the term of this Contract, all solicitations for employment placed on CONTRACTOR'S behalf shall include a statement to the effect that CONTRACTOR is an "Equal Opportunity Employer".

6. CONTRACTOR agrees to furnish all information and reports required by COUNTY'S Contract Compliance Specialist as the same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and the provisions of this Contract.

7. This Contract is intended to be a Contract solely between the parties hereto and for their benefit only. No part of this Contract shall be construed to add to, supplement, amend, abridge or repeal existing rights, benefits or privileges of any third party or parties including, but not limited to, employees of either of the parties.

8. The entire agreement of the parties is contained herein and this Contract supersedes any and all oral agreements and negotiations between the parties relating to the subject matter hereof. The parties expressly agree that the express terms of this Contract shall not be amended in any fashion except in writing, executed by both parties.

9. CONTRACTOR must be qualified as a Best Value Contractor or have proven their exemption with Dane County Public Works Engineering Division before Bid Due Date / Time. All contractors and subcontractors must be qualified as a Best Value Contractor or have proven their exemption to perform any work under this Contract.

IN WITNESS WHEREOF, COUNTY and CONTRACTOR, by their respective authorized agents, have caused this Contract and its Schedules to be executed, effective as of the date by which all parties hereto have affixed their respective signatures, as indicated below.

* * * * * * *

FOR CONTRACTOR:

Signature Date

Printed or Typed Name and Title

Signature Date

Printed or Typed Name and Title

NOTE: If CONTRACTOR is a corporation, Secretary should attest. In accordance with IRS Regulations, unincorporated entities are required to provide either their Social Security or Employer Number in order to receive payment for services rendered.

* * * * * * *

This Contract is not valid or effectual for any purpose until approved by the appropriate authority designated below, and no work is authorized until the CONTRACTOR has been given notice to proceed by COUNTY'S Deputy Public Works Director.

FOR COUNTY:

Joseph T. Parisi, County Executive Date

Scott McDonell, County Clerk Date

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)

BOND AMOUNT:

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

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

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

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

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

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

Signed and sealed this day of

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

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

Init.
/

AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)

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

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

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

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 16

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

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

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

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

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

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

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

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

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

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

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

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

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

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

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

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

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

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

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

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

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

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

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

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

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

§ 14 Definitions

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

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

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

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

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

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

§ 16 Modifications to this bond are as follows:

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

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

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 18

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

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

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

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

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

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

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

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

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

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

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

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

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

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

.2 have sent a Claim to the Surety (at the address described in Section 13).

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

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

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

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

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

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

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

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

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

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

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

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

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

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

§ 16 Definitions

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

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

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

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

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

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

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

§ 18 Modifications to this bond are as follows:

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

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

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

SECTION 00 72 12

GENERAL CONDITIONS OF CONTRACT

TABLE OF CONTENTS

1. CONSTRUCTION DOCUMENTS

A. Construction Documents, listed in Table of Contents of this Specification volume shall form part of this Contract and provisions of Construction Documents shall be as binding upon parties as if they were fully set forth in Contract itself.

B. These shall also be considered as part of Construction Documents: Addenda, including additions and modifications incorporated in such addenda before execution of Contract; requests for information; construction bulletins; change orders; and written interpretations by Architect / Engineer or Public Works Project Manager that are made after execution of Contract.

C. Construction Documents are complementary, and what is required by one shall be as binding as if required by all. Intent of Construction Documents is to include all labor, materials and equipment necessary for proper execution of the Work.

2. DEFINITIONS

A. These terms as used in this Contract are respectively defined as follows:
   1. All uses of term "County" in Construction Documents shall mean Dane County.
   2. All uses of term "Department" in Construction Documents shall mean Department of Public Works, Highway & Transportation,, which is a unit of Dane County government. Department is County agency overseeing Contract with Contractor.
   3. Public Works Project Manager is appointed by and responsible to Department. Public Works Project Manager has authority to act on behalf of Department and will sign change orders, payment requests and other administrative matters related to projects.
   4. Public Works Project Manager is responsible for supervision, administration and management of field operations involved in construction phase of this Work.
   5. Term "Work" includes all labor, equipment and materials necessary to produce project required by Construction Documents.
   6. Term "Substantial Completion" is date when project or specified area of project is certified by Architect / Engineer that construction is sufficiently completed, in accordance with Construction Documents, and as modified by any subsequent changes agreed to by parties, so that County may occupy project or specified area of project for use for which it was intended subject to permit approval for occupancy.
   7. Contractor is person, firm, or corporation with whom County makes Contract. Though multiple contracts may be involved, Construction Documents treat them throughout as if each were of singular number.

3. ADDITIONAL INSTRUCTIONS AND DRAWINGS

A. Contractor may be furnished additional instructions and detail drawings as necessary to carry out the Work included in Contract. Additional drawings and instructions thus supplied to Contractor will coordinate with Construction Documents and will be so prepared that they can be reasonably interpreted as part thereof. Contractor shall carry out the Work in accordance with additional detail drawings and instructions.

4. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Unless otherwise specified, Contractor shall submit three (3) copies of all Shop Drawings for each submission, until receiving final approval. After final approval, provide five (5) additional copies for distribution and such other copies as may be required.

B. Contractor shall submit, on an on-going basis and as directed, Product Data such as brochures that shall contain catalog cuts and specifications of all furnished mechanical and electrical equipment. After Architect / Engineer's approval, one (1) copy shall remain in Architect / Engineer's file, one (1) kept at Department's office and one (1) kept at job site by Contractor for reference purposes.

C. Samples shall consist of physical examples furnished by Contractor in sufficient size and quantity to illustrate materials, equipment or workmanship, and to establish standards to compare the Work.
   1. Submit Samples in sufficient quantity (minimum of two (2)) to permit Architect / Engineer to make all necessary tests and of adequate size showing quality, type, color range, finish, and texture. Label each Sample stating material, type, color, thickness, size, project name, and Contractor's name.
   2. Submit transmittal letter requesting approval, and prepay transportation charges to Architect / Engineer's office on samples forwarded.
   3. Materials installed shall match approved Samples.

D. Contractor shall review Shop Drawings and place their dated stamp thereon to evidence their review and approval and shall submit with reasonable promptness and in orderly sequence to cause no delay in the Work or in work of any other contractor. At time of submission, Contractor shall inform Architect / Engineer in writing of any deviation in Shop Drawings or Samples from requirements of Construction Documents. Architect / Engineer will not consider partial lists.

E. Architect / Engineer will review and approve or reject Shop Drawings with reasonable promptness to cause no delay. Architect / Engineer's approval shall not relieve Contractor from responsibility for errors or omissions in Shop Drawings.

F. Contractor shall not commence any work requiring Shop Drawing, Product Data or Sample submission until Architect / Engineer has approved submission. All such work shall be in accordance with approved Shop Drawings, Product Data and Samples.

G. Contractor shall keep on site of the Work, approved or conformed copy of Shop Drawings and shall at all times give Department access thereto.

H. By stamping and submitting Shop Drawings, Product Data and Samples, Contractor thereby represents that he or she has or will determine and verify all field measurements, field construction criteria, materials, catalog numbers, and similar data and that he or she has checked and coordinated each Shop Drawing, Product Data and Sample with requirements of the Work and of Construction Documents. Architect / Engineer shall return without examination, Shop Drawings, Product Data and Samples not so noted.

I. All Shop Drawings from any one Contractor should be numbered consecutively and on cover sheet shall bear name and location of project, name of Contractor, date of submittal and date of each correction or revision and associated Specification section and page number.

5. CUTTING AND PATCHING

A. Contractor shall be responsible for all cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

B. Contractor shall not damage or endanger portion of the Work or fully or partially completed construction of County or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. Contractor shall not cut or otherwise alter such construction by County or separate contractor except with written consent of County and of such separate contractor; such consent shall not be unreasonably withheld. Contractor shall not withhold unreasonably from County or separate contractor, Contractor's consent to cutting or otherwise altering the Work.

6. CLEANING UP

A. Contractor shall keep premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under Contract. Contractor shall remove from and about the Work waste materials, rubbish, Contractor's tools, construction equipment, machinery, and surplus materials at completion of the Work. Contractor shall maintain streets and sidewalks around the Work site in clean condition. Contractor shall remove all spillage and prevent tracking of spillage arising from performance of the Work, into, out of, and within the Work site. Contractor shall establish regular maintenance program of sweeping, vacuuming and / or hosing to minimize accumulation of dirt and dust upon such areas.

B. If Contractor fails to clean up as directed in Construction Documents, County may do so and shall charge Contractor cost thereof.

C. Contractor shall be responsible for broken windows and glass, and at completion of the Work shall replace such damaged or broken windows and glass. After replacing damaged or broken windows and glass, Contractor shall remove all labels, wash and polish both sides of all windows and glass.

D. In addition to general cleaning (sweeping, vacuuming and / or hosing, as is appropriate to work surface), Contractor shall perform following final cleaning for all trades at completion of the Work:
   1. Remove temporary protections;
   2. Remove marks, stains, fingerprints and other soil or dirt from painted, decorated and finished woodwork and wall surfaces;
   3. Remove spots, plaster, soil and paint from ceramic tile, marble and other finished materials, and wash or wipe clean;
   4. Clean fixtures, cabinet work and equipment, removing stains, paint, dirt and dust, and leave same in undamaged, new condition;
   5. Clean aluminum in accordance with recommendations of manufacturer; and
   6. Clean resilient floors thoroughly with well-rinsed mop containing only enough moisture to clean off any surface dirt or dust and buff dry by machine to bring surfaces to sheen.

7. USE OF SITE

A. Contractor shall provide County and Architect / Engineer access to the Work under all circumstances.

B. Contractor shall confine operations at site to areas permitted by County, law, ordinance, permits and Construction Documents and shall not unreasonably encumber site with materials

or equipment. Contractor shall assure free, convenient, unencumbered, direct and safe access to all properties adjacent to the Work for County, its employees, invitees and guests.

8. MATERIALS AND WORKMANSHIP

A. Contractor shall perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, necessary to complete the Work required by this Contract, within time specified, in accordance with provisions of Construction Documents.

B. All equipment and materials incorporated in the Work covered by this Contract are to be new; use recycled and / or recovered materials to extent that such use is technically and economically feasible. Recovered materials are products recovered from solid waste in form identical to original form for use that is same as, or similar to original use. Recycled materials are products manufactured from solid waste.

C. If requested, Contractor shall furnish satisfactory evidence as to kind and quality of construction materials proposed or used. Contractor shall furnish to Architect / Engineer, for approval, manufacturer name and model, performance capacities and other pertinent information of machinery, mechanical, electrical or other types of equipment, which Contractor plans to install.

D. If not otherwise provided, materials and labor called for in this Contract shall be provided and performed in accordance with established practice and standards recognized by Architects, Engineers, Department, and construction industry.

E. Reference to "Standard" specifications of any association or manufacturer, or codes of County authorities, intends most recent printed edition or catalog in effect on date that corresponds with date of Construction Documents.

F. Whenever reference is made in Specifications that work shall be "performed", "applied", in accordance with "manufacturer's directions or instructions", Contractor to whom those instructions are directed shall furnish three (3) printed copies of such instructions to Architect / Engineer before execution of the Work.

9. CONTRACTOR'S TITLE TO MATERIALS

A. Contractor or any subcontractor shall not purchase materials or supplies for the Work subject to any chattel mortgage or under conditional sale contract or other agreement by which seller retains interest. Contractor warrants that all materials and supplies used in the Work are free from all liens, claims or encumbrances and Contractor has good title to them.

10. "OR EQUAL" CLAUSE

A. Whenever equipment or materials are identified on Drawings or in Specifications by reference to manufacturer's or vendor's name, trade name, catalog number, and other identifying information, it is intended to establish standards; and any equipment or material of other manufacturers and vendors which will perform adequately duties imposed by general design will be considered equally accepted provided equipment or material so proposed is, in opinion of Architect / Engineer, of equal substance and function. Architect / Engineer and Department shall provide written approval before Contractor may purchase or install it.

B. Equipment or materials of manufacturers, other than those named, may be used only upon following conditions:
   1. That, in opinion of Architect / Engineer and Department, proposed material or equipment item is fully equal or superior (in design, materials, construction, workmanship, performance, finish, etc.) to named item. No compromise in quality level, however small, is acceptable.
   2. That, in substituting materials or equipment, Contractor assumes responsibility for any changes in system or for modifications required in adjacent or related work to accommodate such substitution despite Architect / Engineer's and Department's approval, and all costs growing out of approval of "or equal" items shall be responsibility of Contractor. No extra costs resulting from such approval shall become responsibility of Department, Architect / Engineer or any other separate Contractor.
   3. It shall be understood that use of materials or equipment other than those specified, or approved equal by Architect / Engineer and Department, shall constitute violation of Contract, and that Architect / Engineer and Department shall have right to require removal of such materials or equipment and their replacement with specified materials or equipment at Contractor's expense.
   4. Product and manufacturer named first in Specifications or on information shown on Drawings is basis of selection of manufactured items and equipment, particularly mechanical equipment. In using other than first named products or manufacturers, including those specified as additionally approved or acceptable, Contractor assumes responsibility for any changes in system and for modifications in any work required to accommodate them. Architect / Engineer's approval of such additionally acceptable products or manufacturers, either in Specifications or in Addendum, does not relieve Contractor from obligation to coordinate such optional products with other Contractors, whose work may be affected by them, and to pay all additional costs resulting from their inclusion into the Work. Contractor's liability shall include payment of Architect / Engineer's fees for any additional services made necessary by or directly connected to such product changes. No extra costs resulting from such changes shall become responsibility of Department, Architect / Engineer or any other separate Contractor.

C. No request for approval of "or equal" materials will be entertained except from Contractor. Identify any request for substitution as substitution on Contractor's letter of transmittal and give reasons for substitution. Department may in its sole discretion allow substitutions of materials.

11. PATENTS AND ROYALTIES

A. If Contractor uses any design, device or material covered by letters, patent or copyright, it is mutually agreed and understood, that, without exception, contract prices shall include all royalties or costs arising from use of such design, device or materials, in any way involved in the Work.

B. Contractor shall indemnify and save harmless County from any and all claims for infringement by reason of use of such patent or copyright in connection with the Work agreed to be performed under this Contract, and shall indemnify County for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during prosecution of the Work or after completion of the Work.

12. SURVEYS, PERMITS, REGULATIONS AND TAXES

A. Department will furnish to Contractor all site, topography and property surveys necessary for execution of the Work.

B. Contractor shall procure all permits, licenses and approvals necessary for execution of this Contract.

C. Contractor shall give all notices and comply with all State of Wisconsin, Federal and local laws, codes, rules and regulations relating to performance of the Work, protection of adjacent property, and maintenance of passageways, guard fences or other protective facilities.

D. Contractor does not need to pay State and local sales & use taxes on building materials that become part of local unit government facilities. See Wisconsin Statute 77.54 (9m). This does not include materials for highways, streets or roads. Contractor shall pay any other Sales, Consumer, Use & other similar taxes or fees required by law.

E. Contractor shall promptly notify Architect / Engineer of any variances of Drawings or Specifications with that of any State of Wisconsin, federal or local law, code, rule or regulation. Upon such notification, Architect / Engineer will require correction of variance to comply with applicable law, code, rule or regulation at no additional cost to Contractor.

F. Work under this Contract shall comply with all applicable State of Wisconsin, Federal and local laws, codes and regulations.

G. Contractor shall pay charges for water, sewer and other utility connections made by municipalities where required by Specifications.

13. CONTRACTOR'S OBLIGATIONS AND SUPERINTENDENCE

A. Contractor shall provide and pay for all materials, labor, tools, equipment, transportation and superintendence necessary to execute, complete and deliver the Work within specified time. Contractor agrees to secure at their own expense all personnel necessary to carry out the Work. Such personnel shall not be deemed County employees nor shall they have or be deemed to have any direct contractual relationship with County.

B. Performance of any work necessary after regular working hours, on Sundays or Legal Holidays shall be without additional expense to County. Performance of any work at site at other than normal working hours must be coordinated with Public Works Project Manager.

C. Contractor shall furnish, erect, maintain and remove such temporary works as may be required.

D. Contractor shall observe, comply with, and be subject to all terms, conditions, requirements and limitations of Construction Documents.

E. At the Work site, Contractor shall give personal superintendence to the Work or shall employ construction superintendent or foreman, experienced in character of work covered by Contract, who shall have full authority to act for Contractor. Understand that such superintendent or foreman shall be acceptable to Architect / Engineer and Department.

F. Remove from project or take other corrective action upon notice from Architect / Engineer or Department for Contractor's employees whose work is considered by Architect / Engineer or Department to be unsatisfactory, careless, incompetent, unskilled or otherwise objectionable.

G. Contractor and subcontractors shall be required to conform to Labor Laws of State of Wisconsin and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable to the Work.

H. Presence and observation of the Work by Architect / Engineer or Public Works Project Manager shall not relieve Contractor of any obligations.

14. WEATHER CONDITIONS

A. In event of temporary suspension of work, or during inclement weather, or whenever Architect / Engineer shall direct, Contractor shall, and shall cause subcontractors to protect carefully all work and materials against damage or injury from weather. If, in opinion of Architect / Engineer or Department, any work or materials that have been damaged or injured due to failure on part of Contractor or any subcontractors so to protect the Work, such materials shall be removed and replaced at expense of Contractor.

15. PROTECTION OF WORK AND PROPERTY

A. Contractor shall at all times safely guard County's property from injury or loss in connection with this Contract. Contractor shall at all times safely guard and protect the Work, and adjacent property, from damage. Contractor shall replace or make good any such damage, loss or injury unless such is caused directly by errors contained in Contract, or by County, or County's duly authorized representative.

B. Contractor may act diligently, without previous instructions from Architect / Engineer and / or Department, in emergency that threatens loss or injury of property, or safety of life. Contractor shall notify Architect / Engineer and / or Department immediately thereafter. Promptly submit any claim for compensation by Contractor due to such extra work to Architect / Engineer and / or Department for approval as provided for in Article 18 herein.

16. INSPECTION AND TESTING OF MATERIALS

A. Authorized representatives and agents of County government shall have access at all times to the Work wherever it is in preparation or progress and Contractor shall provide facilities for such access and for inspection.

B. Should it be considered necessary or advisable at any time before final acceptance of the Work to make examination of work already completed, by removing or tearing out same, Contractor shall upon request, promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any aspect, due to fault of Contractor or subcontractors thereof, Contractor shall assume all expenses of such examination and of satisfactory reconstruction. Contractor will be reimbursed for such examination and replacement in accordance with Article 18 - A.3., of these General Conditions of Contract if such work is found to meet requirements of Contract.

C. If Specifications, Architect / Engineer's, or Public Works Project Manager's instructions require any work to be specially tested or approved, Contractor shall give Architect / Engineer and Public Works Project Manager timely notice of its readiness for testing or inspection. Test all materials and equipment requiring testing in accordance with accepted or specified standards, as applicable. Architect / Engineer shall recommend laboratory or inspection agency and Department will select and pay for all initial laboratory inspection

services. Should retesting be required, due to failure of initial testing, cost of such retesting shall be borne by Contractor.

D. Cost of any testing performed by manufacturers or Contractor for substantiating acceptability of proposed substitution of materials and equipment, or necessary conformance testing in conjunction with manufacturing processes or factory assemblage, shall be borne by Contractor or manufacturer responsible.

17. REPORTS, RECORDS AND DATA

A. Contractor shall submit to Architect / Engineer and Public Works Project Manager such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, invoices, records and other data as either may request concerning work performed or to be performed under this Contract.

18. CHANGES IN THE WORK

A. Make no changes, except in cases of emergency, in the Work covered by approved Construction Documents without having prior written approval of Department. Charges or credits for the Work covered by approved change shall be determined by one of these methods:
   1. Unit bid prices previously approved.
   2. Agreed lump sum based on actual cost of:
      a) Labor, including foremen, and all fringe benefits that are associated with their wages.
      b) Materials entering permanently into the Work.
      c) Ownership or rental cost of construction tools and equipment during time of use on extra work.
      d) Power and consumable supplies for operation of power equipment.
      e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
      f) Social Security and old age and unemployment contributions.
      g) Add to cost under (2), fixed fee to be agreed upon, but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force. Fee shall be compensation to cover cost of supervision, overhead, bond, profit and any other general expense.
      h) On that portion of the Work under (2) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit and any other general expense.
      i) Department may require correct amount of costs with supporting vouchers; Contractor shall keep and present in such form as directed.
   3. Cost-plus work, with not-to-exceed dollar limit, based on actual cost of:
      a) Labor, including foremen, and all fringe benefits that are associated with their wages.
      b) Materials entering permanently into the Work.
      c) Ownership or rental cost of construction tools and equipment during time of use on extra work. Rental cost cannot exceed fifty percent (50%) replacement value of rented equipment.
      d) Power and consumable supplies for operation of power equipment.
      e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
      f) Social Security and old age and unemployment contributions.
      g) To cost under (3), there shall be added fixed fee to be agreed upon but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force.

Fee shall be compensation to cover cost of supervision, overhead, bond, profit, and any other general expense.

h) On that portion of the Work under (3) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit, and any other general expense.

i) Contractor shall keep and present, in such form as directed, correct amount of cost together with such supporting vouchers as may be required by Department.

B. If Contractor claims that by any instructions given by Architect / Engineer, Department, by drawings or otherwise, regarding performance of the Work or furnishing of material under Contract, involves extra cost, Contractor shall give Department written notice of cost thereof within two (2) weeks after receipt of such instructions and in any event before proceeding to execute work, unless delay in executing work would endanger life or property.

C. No claim for extra work or cost shall be allowed unless it was done in pursuance of written Change Order from Architect / Engineer and approved by Department, as previously mentioned, and claim presented with payment request submitted after changed or extra work is completed.

D. Negotiation of cost for change in the Work shall not be cause for Contractor to delay prosecution of the Work if Contractor has been authorized in writing by Public Works Project Manager to proceed.

19. EXTRAS

A. Without invalidating Contract, Department may order extra work or make changes by altering, adding to or deducting from the Work, contract sum being adjusted in accordance with Article 18 herein.

20. TIME FOR COMPLETION

A. Contractor agrees that the Work shall be prosecuted regularly and diligently and complete the Work as stated in Construction Documents.

21. CORRECTION OF WORK

A. All work, all materials whether incorporated in the Work or not, and all processes of manufacture shall at all times and places be subject to inspection of Architect / Engineer and Public Works Project Manager who shall be judge of quality and suitability of the Work, materials, and processes of manufacture for purposes for which they are used. Should they fail to meet Architect / Engineer's and Public Works Project Manager's approval they shall be reconstructed, made good, replaced or corrected, by Contractor at Contractor's expense. Immediately remove all rejected material from site.

B. If Contractor defaults or neglects to carry out the Work in accordance with Construction Documents or fails to perform any provision of Contract, Department may, after ten (10) business days' written notice to Contractor and without prejudice to any other remedy County may have, make good such deficiencies. In such case, appropriate Change Order shall be issued deducting from Contractor's payments then or thereafter, cost of correcting such deficiencies, including cost of Architect / Engineer's additional services made necessary by such default, neglect or failure.

22. SUBSURFACE CONDITIONS FOUND DIFFERENT

A. If Contractor encounters subsurface or latent conditions at site materially differing from those shown on Drawings or indicated in Specifications, Contractor shall immediately give notice to Architect / Engineer and Public Works Project Manager of such conditions before they are disturbed. Architect / Engineer will thereupon promptly investigate conditions, and if Architect / Engineer finds that they materially differ from those shown on Drawings or indicated in Specifications, Architect / Engineer will at once make such changes as necessary, any increase or decrease of cost resulting from such changes to be adjusted in manner provided in above Article 18 entitled "Changes in the Work".

23. RIGHT OF DEPARTMENT TO TERMINATE CONTRACT

A. In event that any provisions of this Contract are violated by Contractor or by any subcontractors, County may serve written notice upon Contractor and Surety of its intention to terminate Contract, such notice to contain reasons for such intention to terminate Contract, and unless within ten (10) business days after serving of such notice upon Contractor, such violation or delay shall cease and satisfactory arrangement or correction be made, Contract shall, upon expiration of said ten (10) business days, cease and terminate.

B. In event of any such termination, County shall immediately serve notice thereof upon Surety and Contractor, and Surety shall have right to take over and perform Contract subject to County's approval; provided, however, that if Surety does not commence performance thereof within ten (10) business days from date of mailing to such Surety of notice of termination, County may take over the Work and prosecute same to completion by contract, or by force account, at expense of Contractor; Contractor and Surety shall be liable to County for any excess cost occasioned County thereby, and in such event County may take possession of and utilize in completing the Work, such materials and equipment as may be on the Work site and therefore necessary.

24. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

A. Contractor shall be responsible for Construction Schedule and coordination. Immediately after execution and delivery of Contract and before making first payment, Contractor shall notify all subcontractors to furnish all required information to develop Construction Schedule. Contractor and all subcontractors associated with the Work shall furnish following information from each Division of Specifications:
   1. List of construction activities;
   2. Start, finish and time required for completion of each activity;
   3. Sequential relationships between activities;
   4. Identify all long lead-time items, key events, meetings or activities such as required submittals, fabrication and delivery, procurement of materials, installation and testing;
   5. Weekly definition of extent of work and areas of activity for each trade or Subcontract; and
   6. Other information as determined by Public Works Project Manager.

B. In addition to above requested items, Contractor shall request delivery dates for all County-furnished equipment, materials or labor. This shall include any work handled by Department under separate contracts such as asbestos abatement, air and water balancing, etc. Indicate on Construction Schedule these associated delivery and installation dates.

C. Progress Reporting:

1. Contractor shall update and publish Construction Schedule on monthly basis. Revisions to Schedule shall be by Contractor and made in same detail as original Schedule and accompanied by explanation of reasons for revision; and shall be subject to approval by Department.
2. Failure of Contractor to keep Schedule in updated format shall result in County hiring firm specializing in construction schedule development and deducting those costs associated with updating process from payments due Contractor.
3. Contractor shall submit show actual percentage of each activity completed, estimated future progress, and anticipated completion time.

D. Responsibility for timely completion requires:
   1. Contractor and subcontractors understand that performance of each is interdependent upon performance of others.
   2. Whenever it becomes apparent from current schedule, that phasing or progress completion dates will not be met, Contractor must take some or all following actions at no additional cost to County:
      a) Increase construction labor in such quantities and crafts as will eliminate backlog of work.
      b) Increase number of working hours per shift, shifts per working day, working days per week, amount of construction equipment, or any combination of foregoing to eliminate backlog of work.
      c) Reschedule work (yet remain in conformance with Drawings and Specifications).
   3. Prior to proceeding with any of above actions, Contractor shall notify Public Works Project Manager.

E. Maintain current Construction Schedule at all times. Revise Construction Schedule in same detail as original and accompany with explanation of reasons for revision. Schedule shall be subject to approval by Architect / Engineer and Public Works Project Manager.

25. PAYMENTS TO CONTRACTOR

A. Contractor shall provide:
   1. Detailed estimate giving complete breakdown of contract price by Specification Division; and
   2. Periodic itemized estimates of work done for purpose of making partial payments thereon.

B. Submit these estimates for approval first to Architect / Engineer, then to Public Works Project Manager. Costs employed in making up any of these schedules are for determining basis of partial payments and not considered as fixing basis for additions to or deductions from Contract price.

C. County will make partial payments to Contractor for value, proportionate to amount of Contract, of all labor and material incorporated in the Work during preceding calendar month upon receipt of Application and Certificate for Payment form from Architect / Engineer and approval of Department.

D. Contractor shall submit for approval first to Architect / Engineer, and then to Public Works Project Manager all Application and Certificate for Payment forms. If requested, Application and Certificate for Payment shall be supported by such additional evidence as may be required, showing Contractor's right to payment claimed.

E. Application and Certificate for Payment for preparatory work and materials delivered and suitably stored at site to be incorporated into the Work at some future period, will be given due consideration. Requesting payment for materials stored off site, may be rejected, however, if deemed essential for reasons of job progress, protection, or other sufficient cause, requests will be considered, conditional upon submission by Contractor of bills of sale, photographs and such other procedures as will adequately protect County's interest such as storage in bonded warehouse with adequate coverage. If there is any error in payment, Contractor is obligated to notify Department immediately, but no longer than ten (10) business days from receipt of payment.

F. Payments by County will be due within forty-five (45) business days after receipt by Department of Application and Certificate for Payment.

G. County will retain five percent (5%) of each Application and Certificate for Payment until final completion and acceptance of all the Work covered by Contract. However, anytime after fifty percent (50%) of the Work has been furnished and installed at site, County will make remaining payments in full if Architect / Engineer and Public Works Project Manager find that progress of the Work corresponds with Construction Schedule. If Architect / Engineer and Public Works Project Manager find that progress of the Work does not correspond with Construction Schedule, County may retain up to ten percent (10%) of each Application and Certificate for Payment for the Work completed.

H. All material and work covered by partial payments made shall become sole property of County, but this provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made, or restoration of any damaged work, or as waiver of right of County to require fulfillment of all of terms of Contract.

I. County will make final payment within sixty (60) calendar days after final completion of the Work, and will constitute acceptance thereof.

J. County may make payment in full, including retained percentages and less authorized deductions, upon completion and acceptance of each Division where price is stated separately in Contract.

K. Every contractor engaged in performance of any contract for Department of Public Works, Highway & Transportation shall submit to this Department, as requested and with final application for payment for work under said contract, affidavit(s) as required to prove that all debts and claims against this Work are paid in full or otherwise satisfied, and give final evidence of release of all liens against the Work and County.

26. WITHHOLDING OF PAYMENTS

A. County, after having served written notice on said Contractor, may either pay directly any unpaid bills of which Department has written notice, or withhold from Contractor's unpaid compensation sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged; whereupon, payment to Contractor shall be resumed in accordance with terms of this Contract, but in no event shall these provisions be construed to impose any obligations upon County to either Contractor or Contractor's Surety.

B. In paying any unpaid bills of Contractor, County shall be deemed agent of Contractor, and any payment so made by County, shall be considered as payment made under Contract by

County to Contractor and County shall not be liable to Contractor for any such payment made in good faith.

C. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from all claims growing out of lawful demands of subcontractors, laborers, workers, mechanics, material men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in performance of this Contract.

D. At Department's request, Contractor shall furnish satisfactory evidence that all obligations of nature designated above have been paid, discharged or waived.

27. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

A. Making of final payment shall constitute waiver of all claims by County except those arising from:
   1. Unsettled lien;
   2. Faulty or defective work appearing after substantial completion;
   3. Failure of the Work to comply with requirements of Construction Documents; or
   4. Terms of any special guarantees required by Construction Documents.

B. Acceptance of final payment shall constitute waiver of all claims by Contractor.

28. PAYMENTS BY CONTRACTOR

A. Contractor shall pay following not later than fifth (5^{th}) business day following each payment received from County:
   1. All transportation and utility services rendered;
   2. All materials, tools, and other expendable equipment that have been delivered at site of the Work to extent of ninety percent (90%) of cost thereof, and balance of cost thereof when said balance is paid to Contractor; and
   3. Each subcontractor, respective amount allowed Contractor because of work performed by subcontractor to extent of subcontractor's interest therein.

29. CONTRACT SECURITY

A. Contractor shall furnish Performance and Payment Bonds in amount at least equal to one hundred percent (100%) of Contract price as security for faithful performance of this Contract and payment of all persons performing labor on project under this Contract and furnishing materials in connection with this Contract.

B. Sample Performance and Payment Bonds that Contractor will be required to execute is bound into these Construction Documents. Before construction Contract is consummated, completed Performance and Payment Bonds must be approved by Department.

30. ASSIGNMENTS

A. Contractor shall not assign whole or any part of this Contract or any moneys due or to become due hereunder without written consent of Department. In case Contractor assigns all or any part of any moneys due or to become due under this Contract, instrument of assignment shall contain clause substantially to effect that it is agreed that right of assignee in and to any moneys due or to become due to Contractor shall be subject to prior claims of all

persons, firms and corporations for services rendered or materials supplied for performance of the Work called for in this Contract.

31. MUTUAL RESPONSIBILITY OF CONTRACTORS

A. If, through acts of neglect on part of Contractor or any subcontractor shall suffer loss or damage on the Work, Contractor agrees to settle with such subcontractor by agreement or arbitration if such other subcontractor will so settle. If such subcontractor shall assert any claim against County on account of any damage alleged to have been sustained, Department shall notify Contractor, who shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives against any such claim.

32. SEPARATE CONTRACTS

A. Department may award other contracts for the Work and all Contractors shall fully cooperate with each other and carefully adjust their work to that provided under other contracts as may be directed by Department. No Contractor shall commit or permit any act that will interfere with performance of the Work by any other Contractor.

B. Contractor shall coordinate the Work with those of other Contractors. Cooperation will be required in arrangement for storage of materials and in detailed execution of the Work. Contractor, including subcontractors, shall keep informed of progress and detail work of others and shall notify Architect / Engineer or Department immediately of lack of progress or defective workmanship on part of others. Failure of Contractor to keep informed of the Work progressing on site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by Contractor of status of the Work as being satisfactory for proper coordination with Contractor's own work.

33. SUBCONTRACTS

A. Contractor may use services of specialty subcontractors on those parts of the Work that, under normal contracting practices, are performed by specialty subcontractors.

B. Contractor shall not award any work to any subcontractor without prior approval of Department. Qualifications of subcontractors shall be same as qualifications of Contractor. Request for subcontractor approval shall be submitted to Department fifteen (15) business days before start of subcontractor's work. If subcontractors are changed or added, Contractor shall notify Department in writing.

C. Contractor shall be as fully responsible to County for acts and omissions of subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for acts and omissions of persons directly employed by Contractor.

D. Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to Contractor by terms of General Conditions of Contract and other Construction Documents insofar as applicable to work of subcontractors and to give Contractor same power as regards terminating any subcontract that Department may exercise over Contractor under any provision of Construction Documents.

E. Nothing contained in this Contract shall create any contractual relation between any subcontractor and County.

F. Contractor shall insert in all subcontracts, Articles 26, 33, 43 and 45, respectively entitled: "Withholding of Payments", "Subcontracts", "Affirmative Action Provision and Minority / Women / Disadvantaged Business Enterprises", and "Minimum Wages", and shall further require all subcontractors to incorporate physically these same Articles in all subcontracts.

34. PROJECT MANAGER'S AUTHORITY

A. Public Works Project Manager shall:
   1. Administer and ensure compliance with Construction Documents;
   2. Provide responsible on-site observations of construction and have authority to request work and to stop work whenever necessary to insure proper enforcement of Construction Documents;
   3. Convene and chair project meetings and foreman's coordination meetings when necessary to coordinate resolution of conflicts between Contractors, Architects, Engineers, Consultants, and Department; and
   4. Check and inspect material, equipment and installation procedures of all trades for proper workmanship and for compliance with Drawings, Specifications and Shop Drawings, permit no material on project site that is not satisfactory and reject work not in compliance with Construction Documents.

35. CONSULTANT'S AUTHORITY

A. Architect / Engineer is retained by, and is responsible to Department acting for County.

B. Architect / Engineer shall determine amount, quality, acceptability, and fitness of several kinds of work and materials that are provided under this Contract and shall decide all questions that may arise in relation to said work and construction thereof.

C. Architect / Engineer shall decide meaning and intent of any portion of Specifications and of any Drawings where they may be found obscure or be in dispute.

D. Architect / Engineer shall provide responsible observation of construction. Architect / Engineer has authority to stop the Work whenever such stoppage may be necessary to insure proper execution of Construction Documents.

E. Architect / Engineer shall be interpreter of conditions of Construction Documents and judge of its performance.

F. Within reasonable time, Architect / Engineer shall make decisions on all matters relating to progress of the Work or interpretation of Construction Documents.

G. Architect / Engineer's decisions are subject to review by Public Works Project Manager.

36. STATED ALLOWANCES

A. Stated allowances enumerated in Instructions to Bidders shall cover net cost of materials or equipment, and all applicable taxes. Contractor's cost of delivery and unloading at site, handling costs on site, labor, installation costs, overhead, profit and any other incidental costs shall be included in Contractor's bid, but not as part of cash allowance.

B. Department will solicit at least two (2) bids on materials or equipment for which allowance is stated and select on basis of lowest qualified responsible bid. Contractor will then be instructed to purchase "Allowed Materials". If actual price for purchasing "Allowed Materials", including taxes, is more or less than "Cash Allowance", Contract price shall be adjusted accordingly. Adjustment in Contract price shall not contain any cost items excluded from cash allowance.

37. ESTIMATES OF QUANTITIES

A. Whenever estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of Construction Documents, they are given for use in comparing bids and right is especially reserved to increase or diminish them as they may be deemed reasonably necessary or desirable by Department to complete the Work included in this Contract, and cost for such increase or diminution shall be adjusted in manner provided for in General Conditions of Contract Article 18 entitled "Changes in the Work".

38. LANDS AND RIGHTS-OF-WAY

A. Prior to start of construction, County shall furnish all land and rights-of-way necessary for carrying out and completion of the Work to be performed under this Contract.

39. GENERAL GUARANTEE

A. Neither final certificate of payment nor any provision in Construction Documents nor partial or entire occupancy of premises by County shall constitute acceptance of work not done in accordance with Construction Documents or relieve Contractor of liability in respect to any expressed warranties or responsibility for faulty materials or workmanship.
   1. In no event shall making of any payment required by Contract constitute or be construed as waiver by County of any breach of covenants of Contract or waiver of any default of Contractor and making of any such payment by County while any such default or breach shall exist shall in no way impair or prejudice right of County with respect to recovery of damages or other remedy as result of such breach or default.

B. Contractor shall remedy and make good all defective workmanship and materials and pay for any damage to other work resulting there from, which appear within period of one (1) year from date of substantial completion, providing such defects are not clearly due to abuse or misuse by County. Department will give notice of observed defects with reasonable promptness.

C. Guarantee on work executed after certified date of substantial completion will begin on date when such work is inspected and approved by Architect / Engineer and Public Works Project Manager.

D. Where guarantees or warrantees are required in sections of Specifications for periods in excess of one (1) year, such longer terms shall apply; however, Contractor's Performance and Payment Bonds shall not apply to any guarantee or warranty period in excess of one (1) year.

40. CONFLICTING CONDITIONS

A. Any provision in any of Construction Documents which may be in conflict or inconsistent with any Articles in these General Conditions of Contract or Supplementary Conditions shall be void to extent of such conflict or inconsistency.

B. In case of ambiguity or conflict between Drawings and Specifications, Specifications shall govern.

C. Printed dimensions shall be followed in preference to measurements by scale. Large-scale drawings take precedence over small-scale drawings. Dimensions on Drawings and details are subject to field measurements of adjacent work.

41. NOTICE AND SERVICE THEREOF

A. Any notice to Contractor from Department relative to any part of this Contract shall be in writing and considered delivered and service thereof completed, when said notice is posted, by certified or registered mail, to Contractor at Contractor's last given address, or delivered in person to said Contractor, or Contractor's authorized representative on the Work.

42. PROTECTION OF LIVES AND HEALTH

A. In order to protect lives and health of Contractor's employees under Contract, Contractor shall comply with all pertinent provisions of Wisconsin Administrative Code, Rules of Department of Commerce, relating to Safety and Health.

B. Contractor alone shall be responsible for safety, efficiency and adequacy of Contractor's tools, equipment and methods, and for any damage that may result from their failure or their improper construction, maintenance or operation.

43. AFFIRMATIVE ACTION PROVISION AND MINORITY / WOMEN / DISADVANTAGED BUSINESS ENTERPRISES

A. Affirmative Action Provisions.
   1. During term of their Contract, Contractor agrees not to discriminate on basis of race, religion, color, sex, handicap, age, sexual preference, marital status, physical appearance, or national origin against any person, whether recipient of services (actual or potential), employee, or applicant for employment. Such equal opportunity shall include but not be limited to following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation or level of service(s). Contractor agrees to post in conspicuous places, these affirmative action standards so as to be visible to all employees, service recipients and applicants for this paragraph. Listing of prohibited bases for discrimination shall no be construed to amend in any fashion state or federal law setting forth additional bases and exceptions shall be permitted only to extent allowable in state or federal law.
   2. Contractor is subject to this Article only if Contractor has twenty (20) or more employees and receives $20,000.00 or more in annual aggregate contracts with County. Contractor shall file and Affirmative Action Plan with Dane County Contract Compliance Specialist in accord with Chapter 19 of Dane County Code of Ordinances. Such plan must be filed within fifteen (15) business days of effective date of this Contract and failure to do so by said date shall constitute ground for immediate termination of Contract by County. Contractor shall also, during term of this Contract, provide copies of all announcements of employment opportunities to County's Office of Equity & Inclusion, and shall report annually number of persons, by race, sex and handicap status, who apply for employment, and, similarly classified, number hired and number rejected.

3. Contact Dane County Contract Compliance Specialist at Dane County Office of Equity & Inclusion, 210 Martin Luther King, Jr. Blvd., Room 356, Madison, WI 53703, 608/266-4192.
4. In all solicitations for employment placed on Contractor's behalf during term of this Contract, Contractor shall include statement to affect Contractor is "Equal Opportunity Employer". Contractor agrees to furnish all information and reports required by County's Contract Compliance Specialist as same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and provision of this Contract.

B. Minority / Women / Disadvantaged / Emerging Small Business Enterprises.
1. Chapter 19.508 of Dane County Code of Ordinances is official policy of Dane County regarding utilization of, to fullest extent of, Minority Business Enterprises (MBEs), Women Business Enterprises (WBEs) Disadvantage Business Enterprises (DBEs) and Emerging Small Business Enterprises (ESBEs).
2. Contractor may utilize MBEs / WBEs / DBEs / ESBEs as subcontractors or suppliers. List of subcontractors will be required of low bidder as stated in this Contract. List shall indicate which are MBEs / WBEs / DBEs / ESBEs and percentage of subcontract awarded, shown as percentage of total dollar amount of bid.

44. COMPLIANCE WITH FAIR LABOR STANDARDS

A. During term of this Contract, Contractor shall report to County Contract Compliance Specialist, within ten (10) business days, any allegations to, or findings by National Labor Relations Board (NLRB) or Wisconsin Employment Relations Commission (WERC) that Contractor has violated statute or regulation regarding labor standards or relations. If investigation by Contract Compliance Specialist results in final determination that matter adversely affects Contractor's responsibilities under this Contract, and which recommends termination, suspension or cancellation of this Contract, County may take such action.

B. Contractor may appeal any adverse finding by Contract Compliance Specialist as set forth in Dane County Ordinance 25.015(11)(c) through (e).

C. Contractor shall post this statement in prominent place visible to employees: "As condition of receiving and maintaining contract with Dane County, this employer shall comply with federal, state and all other applicable laws prohibiting retaliation or union organizing."

45. DOMESTIC PARTNERSHIP BENEFITS

A. Not Used.

46. USE AND OCCUPANCY PRIOR TO ACCEPTANCE

A. Contractor agrees to use and occupancy of portion or unit of the Work before formal acceptance by Department, provided Department:
1. Secures written consent of Contractor; except when in opinion of Public Works Project Manager, Contractor is chargeable with unwarranted delay in final cleanup of punch list items or other Contract requirements.
2. Secures endorsement from insurance carrier and consent of Surety permitting occupancy of building or use of the Work during remaining period of construction, or, secures consent of Surety.

3. Assumes all costs and maintenance of heat, electricity and water.
4. Accepts all work completed within that portion or unit of the Work to be occupied, at time of occupancy.

47. MINIMUM WAGES

A. Contractor shall post, at appropriate conspicuous point on site of project, schedule showing all determined minimum wage rates for various classes of laborers and mechanics to be engaged in the Work under this Contract and all deductions, if any, required by law to be made from unpaid wages actually earned by laborers and mechanics so engaged.

B. Supplementary Conditions section in Construction Documents lists wage determinations required by State Law.

C. If, after award of Contract, it becomes necessary to employ any person in trade or occupation not classified in wage determinations, such person shall be paid at not less than such rate as shall be determined by Wisconsin Department of Workforce Development. Such approved minimum rate shall be retroactive to time of initial employment of such person in such trade or occupation. Contractor shall notify Department of Contractor's intention to employ persons in trades or occupations not so classified in sufficient time for Department to obtain approved rates for such trades or occupations.

D. Specified wage rates are minimum rates only, and Department will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of applicable rate contained in this Contract. Contractor shall adjust any disputes in regard to payment of wages in excess of those specified in this Contract.

48. CLAIMS

A. No claim may be made until Department's Deputy Public Works Director has reviewed Architect / Engineer's decision as provided for in Article 35 of General Conditions of Contract. If any claim remains unresolved after such review by Department's Deputy Public Works Director, the claim may be filed under Wisconsin Statute 893.80. Work shall progress during period of any dispute or claim. Unless specifically agreed between parties, venue will be in Dane County, Wisconsin.

49. ANTITRUST AGREEMENT

A. Contractor and County recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by County. Therefore, Contractor hereby assigns to County any and all claims for such overcharges as to goods and materials purchased in connection with this Contract, except as to overcharges which result from antitrust violations commencing after price is established under this Contract and any change order thereto.

50. INSURANCE

A. Contractor Carried Insurance:
   1. Contractor shall not commence work under this Contract until Contractor has obtained all insurance required under this Article and has provided evidence of such insurance to Risk Manager, 425 City-County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53703. Contractor shall not allow any subcontractor to commence work until insurance

required of subcontractor has been so obtained and approved. Company providing insurance must be licensed to do business in Wisconsin.

2. Worker's Compensation Insurance:
   a) Contractor shall procure and shall maintain during life of this Contract, Worker's Compensation Insurance as required by statute for all of Contractor's employees engaged in work at site of project under this Contract and, in case of any such work sublet, Contractor shall require subcontractor similarly to provide Worker's Compensation Insurance for all of latter's employees to be engaged in such work unless such employees are covered by protection afforded by Contractor's Worker's Compensation Insurance.
   b) If any claim of employees engaged in hazardous work on project under this Contract is not protected under Worker's Compensation Statute, Contractor shall provide and shall cause each subcontractor to provide adequate Employer's Liability Insurance for protection of such of Contractor's employees as are not otherwise protected.
3. Contractor's Public Liability and Property Damage Insurance:
   a) Contractor shall procure and maintain during life of this Contract, Contractor's Public Liability Insurance and Contractor's Property Damage Insurance in amount not less than $1,000,000 bodily injury, including accidental death, to any one person, and subject to same limit for each person, in amount not less than $1,000,000 on account of one accident, and Contractor's Property Damage Insurance in amount not less then $1,000,000 or combined single limit of at least $1,000,000 with excess coverage over and above general liability in amount not less than $5,000,000. Contractor shall add "Dane County" as additional insured for each project.
   b) Contractor's Public Liability and Property Damage Insurance shall include Products, Completed Operation, and Contractual Liability under Insurance Contract. "Contractor shall in all instances save, defend, indemnify and hold harmless County and Architect / Engineer against all claims, demands, liabilities, damages or any other costs which may accrue in prosecution of the Work and that Contractor will save, defend, indemnify and hold harmless County and Architect / Engineer from all damages caused by or as result of Contractor's operations" and each shall be listed as additional insured on Contractor's and subcontractors' insurance policies.
   c) Obligations of Contractor under Article 50.A.2.b) shall not extend to liability of Architect / Engineer, agents or employees thereof, arising out of:
      1) Preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications; or
      2) Giving of or failure to give directions or instructions by Architect / Engineer, agents or employees thereof provided such giving or failure to give is primary cause of injury or damage.
   d) Contractor shall procure and shall maintain during life of this Contract, Comprehensive Automobile Liability Insurance covering owned, non-owned and hired automobiles for limits of not less than $1,000,000 each accident single limit, bodily injury and property damage combined with excess coverage over and above general liability in amount not less than $5,000,000.
   e) Contractor shall either:
      1) Require each subcontractor to procure and to maintain during life of subcontract, subcontractor's Public Liability Property Damage Insurance, and Comprehensive Automobile Liability Insurance of type and in same amount specified in preceding paragraphs; or
      2) Insure activities of subcontractors in Contractor's own policy.
4. Scope of Insurance and Special Hazards: Insurance required under Article 50.A.2 & 50.A.3. hereof shall provide adequate protection for Contractor and subcontractors, respectively, against damage claims which may arise from operations under this Contract, whether such operation be by insured or by anyone directly or indirectly employed by

insured and also against any of special hazards which may be encountered in performance of this Contract as enumerated in Supplementary Conditions.

5. Proof of Carriage of Insurance: Contractor shall furnish Risk Manager with certificates showing type, amount, class of operations covered, effective dates, dates of expiration of policies and "Dane County" listed as additional insured. Such certificates shall also contain (substantially) following statement: "Insurance covered by this certificate will not be canceled or materially altered, except after ten (10) business days written notice has been received by Risk Manager."

B. Builder's Risk:
   1. County shall provide Builder's Risk insurance coverage for its insurable interests in construction or renovation projects with completed value of $1,000,000 or less. Therefore, if project completed value is more than $1,000,000, Contractor shall obtain and maintain in force, at its own expense, Builder's Risk Insurance on all risks for amount equal to full completed value of covered structure or replacement value of alterations or additions. Any deductible shall not exceed $25,000 for each loss. Policy shall include occupancy clause and list Dane County as loss payee.

C. Indemnification / Hold Harmless:
   1. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from performance of the Work, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, and is caused in whole or in part by any act or omission of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by part indemnified hereunder.
   2. In any and all claims against Dane County, its boards, commissions, agencies, officers, employees and representatives or by any employee of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, indemnification obligation under this Contract shall not be limited in any way by any limitation on amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under worker's compensation acts, disability benefits or other employee benefit acts.
   3. Obligations of Contractor under this Contract shall not extend to liability of Architect / Engineer, its agents or employees arising out of:
      a) Preparation or approval of maps, drawings, opinion, reports, surveys, change orders, designs or specifications; or
      b) Giving of or failure to give directions or instruction by Architect / Engineer, its agents or employees provided such giving or failure to give is primary cause of injury or damage.
   4. Dane County shall not be liable to Contractor for damages or delays resulting from work by third parties or by injunctions or other restraining orders obtained by third parties.

51. WISCONSIN LAW CONTROLLING

A. It is expressly understood and agreed to by parties hereto that in event of any disagreement or controversy between parties, Wisconsin law shall be controlling.

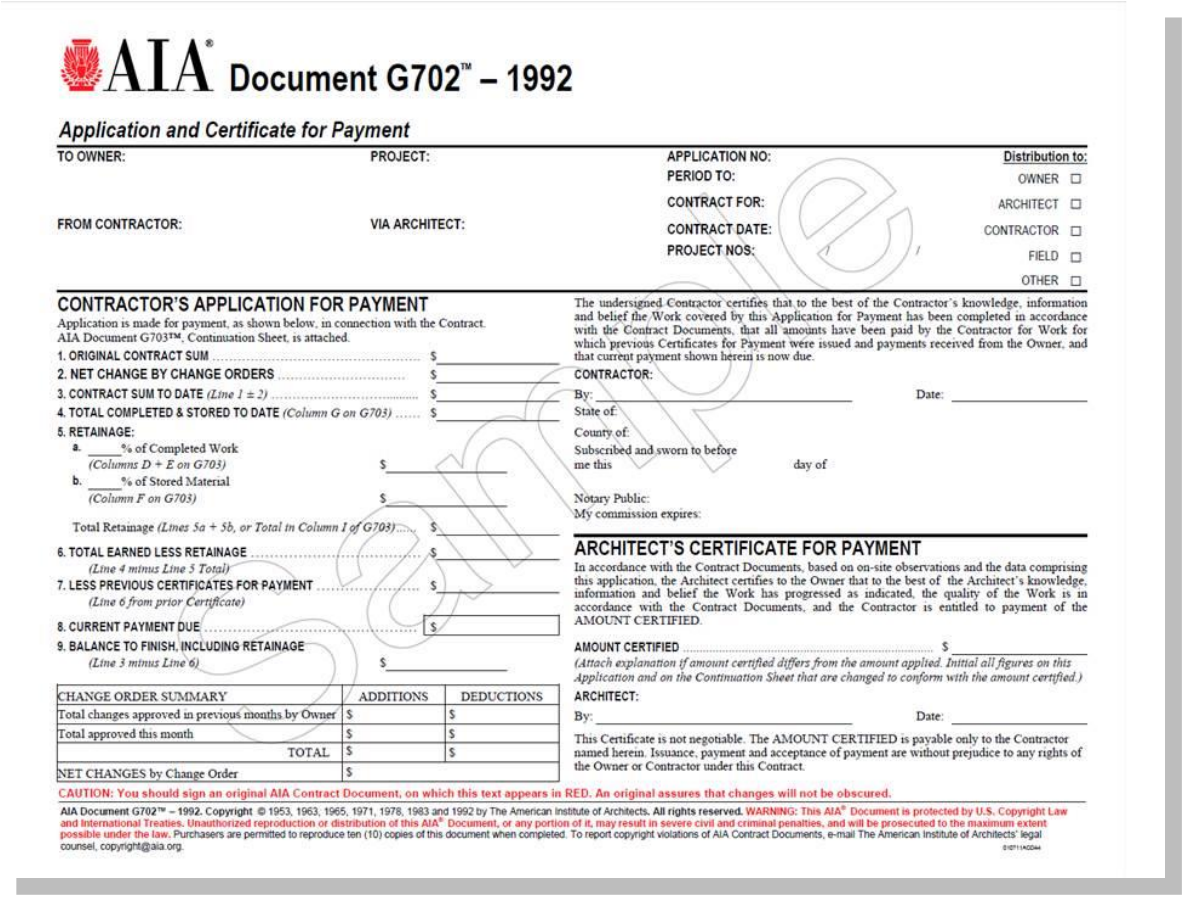
END OF SECTION

SECTION 00 73 00

SUPPLEMENTARY CONDITIONS

1. APPLICATION & CERTIFICATE FOR PAYMENT

A. Every contractor engaged in performance of any contract for Department of Public Works, Highway & Transportation shall submit partial and final Application & Certificate for Payment for work under said contract. Form shall provide similar information as shown on AIA G702™ and G703™ forms (samples shown below). Forms shall be submitted to Public Works Project Manager for approval.



AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER: PROJECT: APPLICATION NO: Distribution to:
PERIOD TO: OWNER ☐
CONTRACT FOR: ARCHITECT ☐
FROM CONTRACTOR: VIA ARCHITECT: CONTRACT DATE: CONTRACTOR ☐
PROJECT NOS: / / FIELD ☐
OTHER ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703™, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM ..... $
2. NET CHANGE BY CHANGE ORDERS ..... $
3. CONTRACT SUM TO DATE *(Line 1 ± 2)* ..... $
4. TOTAL COMPLETED & STORED TO DATE *(Column G on G703)* ..... $
5. RETAINAGE:
   a. ____% of Completed Work *(Columns D + E on G703)* $
   b. ____% of Stored Material *(Column F on G703)* $
   Total Retainage *(Lines 5a + 5b, or Total in Column I of G703)* ..... $
6. TOTAL EARNED LESS RETAINAGE ..... $ *(Line 4 minus Line 5 Total)*
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT ..... $ *(Line 6 from prior Certificate)*
8. CURRENT PAYMENT DUE ..... $
9. BALANCE TO FINISH, INCLUDING RETAINAGE *(Line 3 minus Line 6)* $

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this month	$	$
TOTAL	$	$
NET CHANGES by Change Order	$	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:
By: Date:
State of:
County of:
Subscribed and sworn to before me this day of
Notary Public:
My commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $
(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)
ARCHITECT:
By: Date:

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

AIA® Document G703™ – 1992

Continuation Sheet

AIA Document G702™–1992, Application and Certificate for Payment, or G732™–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
In tabulations below, amounts are in US dollars.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED: FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED: THIS PERIOD	MATERIALS PRESENTLY STORED (Not in D or E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C – G)	RETAINAGE (If variable rate)
	GRAND TOTAL								

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

2. INSURANCE

A. Not Applicable.

3. ASBESTOS DISPOSAL PROCEDURES

A. Asbestos disposal requires strict adherence to federal, state and local regulations and requirements.

B. Chapter 41.80(4) of Dane County Ordinances prohibits disposal of any toxic substance at Dane County Landfill without prior written permission.

C. Any violation of disposal regulations and requirements will result in being prohibited from using Dane County Landfill for asbestos waste disposal and will result in fines according to limits set in Chapter 41 (Solid Waste Management) of Dane County Ordinances.

D. Please refer to, but do not use, attached **sample** Asbestos Disposal Permit. You will not be allowed to dispose of asbestos waste without submitting **official** Asbestos Disposal Permit, only available from Dane County Waste & Renewables Engineer.

E. For complete information on asbestos disposal procedures or if you should have any questions, contact Dane County Waste & Renewables Engineer at 608/267-0120.

END OF SECTION

ASBESTOS DISPOSAL PERMIT

DANE COUNTY RODEFELD LANDFILL
7102 U.S. HIGHWAY 12 & 18
MADISON, WISCONSIN
608/838-9555

PLEASE TYPE OR PRINT LEGIBLY

1. TO BE FILLED OUT BY ASBESTOS GENERATOR (SOURCE):

GENERATOR COMPANY NAME: _____

ASBESTOS SITE: _____
(STREET ADDRESS, CITY, STATE, ZIP)

MAILING: _____
(STREET ADDRESS, CITY, STATE, ZIP)

CONTACT NAME: _____ WORK PHONE: _____

SIGNATURE: _____ OTHER PHONE: _____
(WHERE AVAILABLE AT TIME OF DELIVERY TO LANDFILL)

EMAIL ADDRESS: _____

2. TO BE FILLED OUT BY REMOVAL CONTRACTOR:

ASBESTOS REMOVAL CONTRACTOR: _____

MAILING: _____
(STREET ADDRESS, CITY, STATE, ZIP)

CONTACT NAME: _____ WORK PHONE: _____

PROJECT SUPERVISOR'S SIGNATURE: _____

PROJECT SUPERVISOR'S NAME: _____

ASBESTOS HANDLING:

NON-BULKY ITEMS		BULKY ITEMS	
DOUBLE WRAPPED?	Y ____ N ____	DOUBLE WRAPPED?	Y ____ N ____
WETTED?	Y ____ N ____	WETTED?	Y ____ N ____
SEALED?	Y ____ N ____	SEALED?	Y ____ N ____
NO. OF BAGS:	_____	NO. OF BAGS:	_____
APPROX. VOLUME:	_____ CU.YDS.	APPROX. VOLUME:	_____ CU.YDS.

PROJECT AND MATERIAL DESCRIPTION: _____

_____

_____

_____

_____

SOURCE OF BAGS / PLASTIC WRAP:

COMPANY NAME: _____

MAILING: _____
(STREET ADDRESS, CITY, STATE, ZIP)

PHONE NO.: _____

SPECIFY THICKNESS: _____ MILS

I AGREE TO ADHERE TO ALL TERMS AND CONDITIONS OF THIS PERMISSION. IF I AM SIGNING IN A REPRESENTATIVE CAPACITY, I ASSERT THAT I AM AUTHORIZED TO BIND MY PRINCIPAL IN ALL RESPECTS.

SIGNATURE: _____

PRINTED NAME: _____

DATED THIS _____ DAY OF _____, 20___

3. TO BE FILLED OUT BY WASTE HAULER:

HAULING COMPANY NAME: _____

CONTACT NAME: _____ WORK PHONE: _____

DRIVER'S NAME: _____ DATE: _____

DRIVER'S SIGNATURE: _____
(upon delivery)

4. TO BE FILLED OUT BY LANDFILL SUPERVISOR / ATTENDANT:

DATE OF DISPOSAL: _____ TRANSACTION NO.: _____

WEIGHT: _____ COPY GIVEN TO TRANSPORTER? Y _____ N _____

DISCREPANCIES: _____

_____

SIGNATURE: _____

PRINTED NAME: _____

DISPOSAL COODINATES: _____E to _____E, _____N to _____N

ELEVATION Base: _____ Top: _____

Department of Public Works, Highway & Transportation
Public Works Engineering Division
608/266-4018

Gerald J. Mandli, P.E.
Commissioner / Director

Joseph T. Parisi
County Executive

Deputy Director
Todd Draper

1919 Alliant Energy Center Way
Madison, Wisconsin 53713
Fax: 608/267-1533
www.countyofdane.com/pwht/public_works.aspx

BEST VALUE CONTRACTING APPLICATION

CONTRACTORS / LICENSURE APPLICANTS

The Dane County Department of Public Works requires contractors & subcontractors to be a Best Value Contractor (BVC) before being hired. Contractor & subcontractor application documents should be turned in immediately. Contractor approval or exemption must be complete prior to Bid Due Date / Time. All subcontractors must also be approved or prove their exemption before performing any work under a County contract. This document shall be completed, properly executed, along with the necessary attachments and additional information that the County requires for the protection and welfare of the public in the performance of a County contract.

Contractors or subcontractors of any tier who attain qualification status will retain that status for a period of three (3) years from the date of qualification. Contractors shall notify the Dane County Department of Public Works, Highway & Transportation within fifteen (15) days of any changes to its business or operations that are relevant to the application or status. Failure to do so could result in suspension, revocation of the contractor's qualification, debarment from County contracts for up to three (3) years and / or other sanctions available under the law.

No contracts will be awarded for construction work performed on Dane County projects unless the contractor is currently approved as a Wisconsin Trade Trainer or has applied for approval as an Apprenticeship Trade Trainer to the Wisconsin Department of Workforce Development and agrees to an acceptable apprenticeship program. If you are not currently approved as a Wisconsin Trade Trainer, or have not applied for approval as an Apprenticeship Trade Trainer, please contact the Department of Workforce Development - Bureau of Apprenticeship Standards at 608/266-3133 or visit their web site at: https://dwd.wisconsin.gov/apprenticeship/.

Fill out BVC Application or check current BVC listing at Public Works Engineering Division web site (publicworks.countyofdane.com/bvc). The following page shows what the questions are on the application.

EXEMPTIONS TO QUALIFICATION

Contractors performing work that does not apply to an apprenticeable trade, as outlined in Appendix A, is the only reason for claiming an exemption if not an active Wisconsin Trades Trainer. See Question 18A.

SEC.	PROOF OF RESPONSIBILITY	CHECK IF APPLICABLE
1	Does your firm acknowledge that in doing work under any County Public Works Contract, it will be required to use as subcontractors only those contractors that are also qualified with the County or become so within five (5) days after the Bid Due Date?	Yes: ☐ No: ☐
2	Does your firm possesses all technical qualifications and resources, including equipment, personnel and financial resources, necessary to perform the work required for any project or obtain the same through the use of responsible, qualified subcontractors?	Yes: ☐ No: ☐
3	Will your firm possess all valid, effective licenses, registrations or certificates required by federal, state, county, or local law, which are necessary for the type of work to be performed including, but not limited to, those for any type of trade work or specialty work?	Yes: ☐ No: ☐
4	Will your firm meet all bonding requirements as required by applicable law or contract specifications?	Yes: ☐ No: ☐
5	Will your firm meet all insurance requirements as required by applicable law or specifications, including general liability insurance, workers compensation insurance and unemployment insurance requirements?	Yes: ☐ No: ☐
6	Will your firm maintain a substance abuse policy for employees hired for public works contracts that comply with Wis. Stats. Sec. 103.503?	Yes: ☐ No: ☐
7	Will your employees who will perform work on a Public Works project all be covered under a current workers compensation policy and be properly classified under such policy?	Yes: ☐ No: ☐
8	Will your employees who will perform work on a Public Works project have the opportunity to enroll in minimum essential coverage and not be subject to an enrollment period of more than 60 days per the federal Affordable Care Act, sec 1513?	Yes: ☐ No: ☐
9	Will your firm fully abide by the equal opportunity and affirmative action requirements of all applicable laws, including County ordinances?	Yes: ☐ No: ☐
10	Has your firm been the subject of any order or judgement from any State or Federal Agency or court concerning employment practice, including but not limited to: classification of employees under state unemployment or workers compensation laws; minimum wage, overtime pay, recordkeeping, and child labor standards imposed by federal or state law; and employment discrimination or unfair labor practices prohibited by federal or state law. (Attach copies of any order or judgement)	Yes: ☐ No: ☐ If Yes, attach details.
11	Is your firm authorized or registered to transact business in the state by the Department of Financial Institutions in compliance with Wis. Stat. chs. 178, 179, 180, 181, or 183?	Yes: ☐ No: ☐ If Yes, attach details.
12	In the past three (3) years, has your firm had control or has another corporation, partnership or other business entity operating in the construction industry controlled it? If so, please attach a statement explaining the nature of the firm relationship?	Yes: ☐ No: ☐ If Yes, attach details.
13	In the past three (3) years, has your firm had any type of business, contracting or trade license, certification or registration revoked or suspended?	Yes: ☐ No: ☐ If Yes, attach details.

14	In the past three (3) years, has your firm been debarred by any federal, state or local government agency?	Yes: ☐ No: ☐ If Yes, attach details.
15	In the past three (3) years, has your firm defaulted or failed to complete any contract?	Yes: ☐ No: ☐ If Yes, attach details.
16	In the past three (3) years, has your firm committed a willful violation of federal, state or local government safety laws as determined by a final decision of a court or government agency authority.	Yes: ☐ No: ☐ If Yes, attach details.
17	In the past three (3) years, has your firm been in violation of any law relating to your contracting business where the penalty for such violation resulted in the imposition of a penalty greater than $10,000?	Yes: ☐ No: ☐ If Yes, attach details.
18	Is your firm an active Wisconsin Trade Trainer as determined by the Wisconsin Bureau of Apprenticeship Standards?	Yes: ☐ No: ☐ If Yes, attach details.
18A	Is your firm claiming an exemption to qualification?	Yes: ☐ No: ☐ If Yes, attach details.
19	Contractor has been in business less than one year?	Yes: ☐ No: ☐

SIGNATURE SECTION

Your firm's Officer, or the individual who would sign a bid and / or contract documents must sign this document.

I do hereby certify that all statements herein contained are true and correct to the best of my knowledge:

Signature: _____

(Application is invalid without signature)

Print Name: _____ Date: _____

Title: _____

NAME AND ADDRESS OF CONTRACTOR	
Name of Firm:	
Address:	
City, State, Zip:	
Phone Number:	
Fax Number:	
E-mail Address:	

REMEMBER!

RETURN ALL TO FORMS AND ATTACHMENTS, OR QUESTIONS TO:

TODD DRAPER
EMAIL: DRAPER@COUNTYOFDANE.COM
OFFICE: (608) 267-0119, FAX: (608) 267-1533

DANE COUNTY DEPARTMENT OF PUBLIC WORKS, HGHWAY & TRANSPORTATION
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

APPENDIX A

APPRENTICEABLE TRADES:

- Bricklayer
- Boilermaker
- Carpenter
- Cement Mason (Concrete Finisher)
- Cement Mason (Heavy Highway)
- Construction Craft Laborer
- Data Communications Installer
- Electrician
- Elevator Mechanic / Technician
- Environmental Systems Technician / HVAC Service Technician / HVAC Install & Service
- Glazier
- Heavy Equipment Operator / Operating Engineer
- Insulation Worker (Heat & Frost)
- Iron Worker (Assembler, Metal Buildings)
- Painter / Decorator
- Plasterer
- Plumber
- Roofer / Waterproofer
- Sheet Metal Worker
- Sprinkler Fitter
- Steamfitter (Service & Refrigeration)
- Taper & Finisher
- Telecommunications (Voice, Data & Video) Installer / Technician
- Tile Setter

END OF SECTION

SECTION 00 73 11

FAIR LABOR PRACTICES CERTIFICATION

The undersigned, for and on behalf of the BIDDER, APPLICANT or PROPOSER named herein, certifies as follows:

A. That he or she is an officer or duly authorized agent of the above-referenced BIDDER, APPLICANT or PROPOSER, which has a submitted a bid, application or proposal for a contract or agreement with the county of Dane.

B. That BIDDER, APPLICANT or PROPOSER has (check one):

_____ not been found by the National Labor Relations Board ("NLRB") or the Wisconsin Employment Relations Commission ("WERC") to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

_____ been found by the National Labor Relations Board ("NLRB") or the Wisconsin Employment Relations Commission ("WERC") to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

_____ _____

Officer or Authorized Agent Signature Date

_____

Printed or Typed Name and Title

_____

Printed or Typed Business Name

NOTE: You can find information regarding the violations described above at: www.nlrb.gov and werc.wi.gov.

For reference, Dane County Ordinance 25.09 is as follows:

(1) BIDDER RESPONSIBILITY. (a) Any bid, application or proposal for any contract with the county, including public works contracts regulated under chapter 40, shall include a certification indicating whether the bidder has been found by the National Labor Relations Board (NLRB) or the Wisconsin Employment Relations Committee (WERC) to have violated any statute or regulation regarding labor standards or relations within the last seven years. The Controller shall investigate any such finding and make a recommendation to the committee, which shall determine whether the conduct resulting in the finding affects the bidder's responsibility to perform the contract.

If you indicated that the NLRB or WERC have found you to have such a violation, you must include copies of any relevant information regarding such violation with your proposal, bid or application.

Include this completed Certification with your bid, application or proposal.

END OF SECTION

SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Summary
2. Summary of the Work
3. Contractor Use of Premises
4. Applications for Payment
5. Change Procedures
6. Alternates
7. Lump Sum Allowances for Work
8. Coordination
9. Cutting and Patching
10. Conferences
11. Progress Meetings
12. Job Site Administration
13. Submittal Procedures
14. Proposed Products List
15. Shop Drawings
16. Product Data
17. Samples
18. Manufacturers' Instructions
19. Manufacturers' Certificates
20. Quality Assurance / Quality Control of Installation
21. References
22. Interior Enclosures
23. Protection of Installed Work
24. Parking
25. Staging Areas
26. Occupancy During Construction and Conduct of Work
27. Protection
28. Progress Cleaning
29. Products
30. Transportation, Handling, Storage and Protection
31. Product Options
32. Substitutions
33. Starting Systems
34. Demonstration and Instructions
35. Contract Closeout Procedures
36. Final Cleaning
37. Adjusting
38. Operation and Maintenance Data
39. Spare Parts and Maintenance Materials

40. As-Built and Record Drawings and Specifications

1.2 SUMMARY OF THE WORK

A. Project Description: Perform the Work as specified and detailed in Construction Documents package. Contractor to provide construction services to replace existing HVAC equipment at South Madison Human Services Office..

B. Permits: Prior to commencement of the Work, Contractor to secure any and all necessary permits for completion of the Work and facility occupancy. Provide Public Works Project Manager with copies of all permits.

1.3 CONTRACTOR USE OF PREMISES

A. Limit use of premises to allow work by Contractors or Subcontractors and access by Owner.

B. Coordinate utility outages and shutdowns with Owner.

C. Contractors or Subcontractors shall not visit the site if they are or have recently been ill.

1.4 APPLICATIONS FOR PAYMENT

A. Submit each Application for Payment on AIA G702™ and G703™ forms or approved contractors invoice form. Contractor shall have these forms notarized and signed.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Payment Period: Monthly.

D. Submit Applications for Payment to Architect / Engineer electronically for initial approval. Architect / Engineer will forward approved copies to Owner who will also approve & process for payment.

1.5 CHANGE PROCEDURES

A. Contractor's costs for Products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from contingency allowance.

1.6 ALTERNATES

A. Alternates quoted on Bid Form shall be reviewed and accepted or rejected at Owner's option.

B. Coordinate related work and modify surrounding work as required.

C. Schedule of Alternates: there are no alternates proposed for this project.

1.7 COORDINATION

A. Coordinate scheduling, submittals, and work of various sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.

C. Coordinate space requirements and installation of mechanical and electrical work that are indicated diagrammatically on Drawings.

D. Refer to Drawings for recommended work sequence and duration.

E. Contractor shall provide Public Works Project Manager with work plan that ensures the Work will be completed within required time of completion.

1.8 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching new work; restore work with new Products.

B. Submit written request in advance of cutting or altering structural or building enclosure elements.

C. Fit work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

D. Refinish surfaces to match adjacent finishes.

1.9 CONFERENCES

A. Owner will schedule preconstruction conference after Award of Contract for all affected parties.

B. Contractor shall submit Construction Schedule at pre-construction meeting.

C. When required in individual Specification section, convene pre-installation conference at project site prior to commencing work of Section.

D. Safe distancing & face masks are required for all conference attendees. Conferences will be limited to 10 people; please limit number of attending staff & subcontractors. If there are more than 10 people, group will be split & there will be two or more conferences. Allow sufficient time if you do not make it in to first group.

1.10 PROGRESS MEETINGS

A. Day & time of progress meetings to be determined at pre-construction meeting.

B. Schedule and administer meetings throughout progress of the Work at minimum of one (1) per week, with Public Works Project Manager, involved Dane County staff & other individuals as required.

C. Preside at meetings, record minutes, and distribute copies within two (2) business days to those affected by decisions made.

D. Owner shall schedule and administer meetings throughout progress of the Work at minimum of one (1) per week.

E. Owner shall preside at meetings, record minutes, and distribute copies within two (2) business days to those affected by decisions made.

F. Attendance at progress meetings by General Contractor, subcontractors, or their authorized representative, is mandatory.

G. Contractors shall give verbal reports of progress on the Work, discuss schedule for upcoming period and present all conflicts, discrepancies or other difficulties for resolution.

H. In-person meetings shall be limited & shall follow current *Public Health - Madison & Dane County* procedures & recommendations (see publichealthmdc.com/documents/office_space_checklist.pdf and publichealthmdc.com/coronavirus/forward-dane/current-order). Whenever possible, meetings shall be held via teleconference or videoconference, to be hosted by contractor or consultant. Dane County reserves right to mandate safe physical distancing & use of face masks by all personnel while inside any County facility or on any County grounds.

1.11 JOB SITE ADMINISTRATION

A. Contractor shall have project superintendent on site minimum of four (4) hours per week during progress of the Work.

B. Contractor shall not change their project superintendent or project manager for duration of the Work without written permission of Public Works Project Manager.

C. Engineer shall perform two (2) site visits during progress of the Work.

1.12 SUBMITTAL PROCEDURES

A. Submittal form to identify Project, Contractor, Subcontractor or supplier; and pertinent Construction Documents references.

B. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction work, and coordination of

information is in accordance with requirements of the Work and Construction Documents.

C. Identify variations from Construction Documents and Product or system limitations that may be detrimental to successful performance of completing the Work.

D. Revise and resubmit submittals as required; identify all changes made since previous submittal.

1.13 PROPOSED PRODUCTS LIST

A. Within fifteen (15) business days after date of Award of Contract, submit complete list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

1.14 SHOP DRAWINGS

A. Submit number of copies that Contractor requires, plus three (3) copies that shall be retained by Public Works Project Manager.

1.15 PRODUCT DATA

A. Submit number of copies that Contractor requires, plus two (2) copies that shall be retained by Public Works Project Manager.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.

1.16 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of Product.

B. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns for Public Works Project Manager's selection.

1.17 MANUFACTURERS' INSTRUCTIONS

A. When specified in individual Specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

1.18 MANUFACTURERS' CERTIFICATES

A. When specified in individual Specification sections, submit manufacturers' certificate to Public Works Project Manager for review, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.19 QUALITY ASSURANCE / QUALITY CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply fully with manufacturers' instructions.

C. Comply with specified standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.20 REFERENCES

A. Conform to reference standard by date of issue current as of date for receiving bids.

B. Should specified reference standard conflict with Construction Documents, request clarification from Public Works Project Manager before proceeding.

1.21 INTERIOR ENCLOSURES

A. Provide temporary partitions as required to separate work areas from Owner occupied areas, to prevent distribution of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

1.22 PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection where specified in individual Specification sections.

1.23 PARKING

A. Arrange for temporary parking areas to accommodate construction personnel.

B. All contractors and their employees shall cooperate with General Contractor and others in parking of vehicles to avoid interference with normal operations and construction activities.

C. Do not obstruct existing service drives and parking lots with equipment, materials and / or vehicles. Keep accessible for Owner’s use at all times.

1.24 STAGING AREAS

A. Coordinate staging areas with Public Works Project Manager prior to starting the Work.

B. On-site space for use as staging areas and storage of materials is limited and will be apportioned among various Contractors as their needs dictate with due regard for storage requirements of each Contractor. Each Contractor shall be responsible for safety of equipment and materials that are stored on site.

1.25 OCCUPANCY DURING CONSTRUCTION AND CONDUCT OF WORK

A. Areas of existing facility will be occupied during period when the Work is in progress. Work may be done during normal business hours (8:00 am to 4:30 pm), but confer with Owner, schedule work and store materials so as to interfere as little as possible with normal use of premises. Work performed on Saturday shall be by permission of Owner. Notify Owner when coring or similar noise making work is to be done and obtain Owner's written approval of schedule. If schedule is not convenient for Owner, reschedule and resubmit new times for Owner approval. Coring of floor along with other noisy work may have to be done on second and third shifts.

B. Work shall be done and temporary facilities furnished so as not to interfere with access to any occupied area and so as to cause least possible interference with normal operation of facility or any essential service thereof.

C. Contractor shall, at all times, provide approved, safe walkways and facility entrances for use by Owner, employees and public.

D. Contractor shall provide adequate protection for all parts of facility, its contents and occupants wherever the Work under this Contract is to be performed.

E. Each Contractor shall arrange with Owner to make necessary alterations, do new work, make connections to all utilities, etc., and at such times as will not cause interruption of utility services to facility. Contractor doing this work shall protect, cap, cut off and / or replace and relocate existing pipes, electrical work and other active utilities encountered which may interfere with new construction work.

F. New work in extension of existing work shall correspond in all respects with that to which it connects or similar existing work unless otherwise indicated or specified.
   1. Existing work shall be cut, altered, removed or replaced as necessary for performance of Contract obligations.
   2. Work remaining in place, damaged or defaced by reason of work done under this Contract shall be restored equal to its condition at time of Award of Contract.
   3. If removal of work exposes discolored or unfinished surfaces or work out of alignment, such surfaces shall be refinished or materials replaced as necessary to make continuous work uniform and harmonious.

G. Contractor is not responsible for providing & maintaining temporary toilet facilities.

H. Contractor & subcontractors shall follow all current *Public Health - Madison & Dane County* procedures & recommendations (see publichealthmdc.com/documents/office_space_checklist.pdf and publichealthmdc.com/coronavirus/forward-dane/current-order). Dane County reserves right to mandate safe physical distancing & use of face masks by all personnel while inside any County facility or on any County grounds.

1.26 PROTECTION

A. Contractor shall protect from damage / injury all trees, shrubs, hedges, plantings, grass, mechanical, electrical & plumbing equipment, walks and driveways and pay for any damage to same resulting from insufficient or improper protection.

B. Contractor shall provide and maintain barricades & signage to prohibit public access to construction site.

C. Contractor shall provide and maintain guard lights at all barricades, railings, obstructions in streets, roads or sidewalks and at all trenches adjacent to public walks or roads.

1.27 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

1.28 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by Construction Documents.

1.29 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

A. Transport, handle, store and protect Products in accordance with manufacturer's instructions.

1.30 PRODUCT OPTIONS

A. Where definite material is specified, it is not intentional to discriminate against "equal" product made by another manufacturer. Intention is to set definite standard of material quality. Should bidder choose to bid materials other than those specified, bidder shall submit said materials specifications to Public Works Project Manager for approval at least seven (7) business days prior to Bid Due Date.

B. Products and materials that are not specified, but have been approved for use by Public Works Project Manager shall be identified in addenda to all bidding contractors.

C. Requests for material or product substitutions submitted after Bid Due Date may be considered. Owner reserves right to approve or reject substitutions based on Specification requirements and intended use.

1.31 SUBSTITUTIONS

A. Public Works Project Manager shall consider requests for Substitutions only up to seven (7) business days prior to date of Bid Due Date.

B. Document each request with complete data substantiating compliance of proposed Substitution with Construction Documents.

C. Submit three (3) copies of requests for Substitution for consideration. Limit each request to one (1) proposed Substitution.

D. Substitutions shall not change contract price established at Bid Due Date.

1.32 STARTING SYSTEMS

A. Provide written notification prior to start-up of each equipment item or system.

B. Ensure that each piece of equipment or system is ready for operation.

C. Execute start-up under supervision of responsible persons in accordance with manufacturers' instructions.

D. Submit written report that equipment or system has been properly installed and is functioning correctly.

1.33 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of final inspection.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.

C. Owner may choose to photograph or videotape demonstration session; demonstration and demonstrator shall be to level of satisfaction of Owner.

1.34 CONTRACT CLOSEOUT PROCEDURES

A. Submit written certification that Construction Documents have been reviewed, the Work has been inspected, and the Work is complete in accordance with Construction Documents and ready for Public Works Project Manager's inspection.

B. Submit final Application for Payment identifying total adjusted Contract Sum / Price, previous payments, and amount remaining due.

1.35 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior surfaces exposed to view.

C. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.36 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.37 OPERATION AND MAINTENANCE MANUAL

A. Provide two (2) bound, hard-copy operation and maintenance manuals that include all systems, materials, products, equipment, mechanical and electrical equipment and systems supplied and installed in the Work. Provide electronic version of operation and maintenance manual also.

1.38 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual Specification Sections.

B. Deliver to the Work site and place in location as directed.

1.39 AS-BUILT AND RECORD DRAWINGS AND SPECIFICATIONS

A. Contractor-produced Drawings and Specifications shall remain property of Contractor whether Project for which they are made is executed or not. Contractor shall furnish Architect / Engineer with original marked up redlines of Construction Documents' drawings and specifications that shall include all Addendums, Change Orders, Construction Bulletins, on-site changes, field corrections, etc. These are project As-Built Drawings & Specifications.

B. Architect / Engineer shall update original Construction Documents to include all Addendums & any other changes including those provided by Contractor in As-Built Drawings & Specifications. These updates are project Record Drawings & Specifications.

C. Architect / Engineer shall furnish Public Works Project Manager with Record Drawings as detailed in Professional Services Agreement.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT, DISPOSAL & RECYCLING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Summary
2. Waste Management Goals
3. Construction and / or Demolition Waste Management
4. Waste Management Plan
5. Reuse
6. Recycling
7. Materials Sorting and Storage On Site
8. Lists of Recycling Facilities Processors and Haulers
9. Waste Management Plan Form

B. Related Sections:
1. Section 01 00 00 - General Requirements

1.2 WASTE MANAGEMENT GOALS

A. Dane County requires that as many waste materials as possible produced as result of this project be salvaged, reused or recycled in order to minimize impact of construction waste on landfills and to minimize expenditure of energy and cost in fabricating new materials. Additional information may be found in Dane County Green Building Policy, Resolution 299, 1999-2000.

1.3 CONSTRUCTION AND / OR DEMOLITION WASTE MANAGEMENT

A. All construction and demolition waste suitable for recycling may go to Dane County Construction & Demolition Recycling Facility located at 7102 US Hwy 12, Madison, located across from Yahara Hills Golf Course. This facility can receive mixed loads of construction and demolition waste. For complete list of acceptable materials, see landfill.countyofdane.com/services/construction.

B. Dane County Landfill, also at 7102 US Hwy 12, Madison, must receive all other waste from this project. landfill.countyofdane.com/services/landfill.

1.4 WASTE MANAGEMENT PLAN

A. Contractor shall develop Waste Management Plan (WMP) for this project. Contact the Dane County Special Projects & Materials Manager with questions. Outlined in RECYCLING section of this specification are examples of materials that can be recycled or reused as well as recommendations for waste sorting methods.

B. Contractor shall complete WMP and include cost of recycling / reuse in Bid. Submit WMP to Public Works Project Manager within fifteen (15) business days of Bid Due date, with Bid. Copy of blank WMP form is in this Section. Submittal shall include cover letter and WMP form with:

1. Information on:
    a. Types of waste materials produced as result of work performed on site;
    b. Estimated quantities of waste produced;
    c. Identification of materials with potential to be recycled or reused;
    d. How materials will be recycled or reused;
    e. On-site storage and separation requirements (on site containers);
    f. Transportation methods; and
    g. Destinations.

1.5 REUSE

A. Contractors and subcontractors are encouraged to reuse as many waste materials as possible. Investigate salvage for materials not reusable on site.

1.6 RECYCLING

A. These materials may be recycled at Dane County Construction & Demolition Recycling Facility:
    1. Wood.
    2. Wood Pallets.
    3. PVC Plastic (pipe, siding, etc.).
    4. Asphalt & Concrete.
    5. Bricks & Masonry.
    6. Vinyl Siding.
    7. Cardboard.
    8. Metal.
    9. Unpainted Gypsum Drywall.
    10. Shingles.

B. These materials can be recycled elsewhere in Dane County area:
    1. Fluorescent Lamps.
    2. Foam Insulation & Packaging (extruded and expanded).
    3. Carpet Padding.
    4. Barrels & Drums.

C. All materials must be recycled at WDNR permitted waste processing facilities that adhere to all State Statutes.

1.7 MATERIALS SORTING AND STORAGE ON SITE

A. Contractor shall provide separate containers for recyclable materials. Number of containers will be dependent upon project and site conditions.

B. Contractor shall provide on-site locations for subcontractors supplied recycling containers to help facilitate recycling.

C. Dane County allows mixed loads of recycled materials only per instructions at landfill.countyofdane.com/services/construction.

1.8 LISTS OF RECYCLING FACILITIES PROCESSORS AND HAULERS

A. Refer to landfill.countyofdane.com/services/construction for information on Dane County Construction & Demolition Recycling Facility.

B. Web site landfill.countyofdane.com/recycle-locations lists current information for Dane County Recycling Markets. Contractors can also contact Allison Rathsack, 608/266-4990, or local city, village, town recycling staff listed at site landfill.countyofdane.com/resources/local-contacts. Statewide listings of recycling / reuse markets are available from UW Extension at uwgb.edu/solid-hazardous-waste-education-center/.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

WASTE MANAGEMENT PLAN FORM

Contractor Name: _____

Address: _____

_____

Phone No.: _____ Recycling Coordinator: _____

MATERIAL	ESTIMATED QUANTITY	DISPOSAL METHOD (CHECK ONE)	RECYCLING / REUSE COMPANY OR DISPOSAL SITE
Salvaged & reused building materials	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Wood	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Wood Pallets	_____ units	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
PVC Plastic	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Asphalt & Concrete	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Bricks & Masonry	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Vinyl Siding	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Cardboard	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Metals	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Unpainted Gypsum / Drywall	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Shingles	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Fluorescent Lamps	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Foam Insulation	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Carpet Padding	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Barrels & Drums	_____ units	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Glass	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____

WASTE MANAGEMENT PLAN FORM

Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____

SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

PART 1 GENERAL

1.1 SCOPE

A. This section includes information common to two or more technical specification sections or items that are of a general nature, not conveniently fitting into other technical sections. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Quality Assurance
      f. Alternate Bids
      g. Continuity of Existing Services
      h. Protection of Finished Surfaces
      i. Sleeves and Openings
      j. Sealing and Fire Stopping
      k. Submittals
      l. Off Site Storage
      m. Permits, Certificates and Inspections
      n. Operating and Maintenance Data
      o. Training of Owner Personnel
      p. Record Drawings
      q. Cleaning
      r. Warranty
   2. Part 2 – Products
      a. Access Panels and Doors
      b. Identification
      c. Sealing and Fire Stopping
   3. Part 3 – Execution
      a. Demolition
      b. Cutting and Patching
      c. Building Access
      d. Equipment Access
      e. Coordination
      f. Identification
      g. Lubrication
      h. Sleeves and Openings
      i. Sealing and Fire Stopping

1.2 RELATED WORK

A. Section 23 05 13 - Common Motor Requirements for HVAC.

B. Section 23 33 00 - Air Duct Accessories.

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this section.

1.4 REFERENCE STANDARDS

A. Abbreviations of standards organizations referenced in other sections are as follows:

1.	AABC	Associated Air Balance Council
2.	ADC	Air Diffusion Council
3.	AGA	American Gas Association
4.	AMCA	Air Movement and Control Association
5.	ANSI	American National Standards Institute
6.	ARI	Air-Conditioning and Refrigeration Institute
7.	ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
8.	ASME	American Society of Mechanical Engineers
9.	ASTM	American Society for Testing and Materials
10.	EPA	Environmental Protection Agency
11.	GAMA	Gas Appliance Manufacturers Association
12.	IEEE	Institute of Electrical and Electronics Engineers
13.	ISA	Instrument Society of America
14.	MCA	Mechanical Contractors Association
15.	MICA	Midwest Insulation Contractors Association
16.	MSS	Manufacturer's Standardization Society of the Valve & Fitting Industry, Inc.
17.	NBS	National Bureau of Standards
18.	NEBB	National Environmental Balancing Bureau
19.	NEC	National Electric Code
20.	NEMA	National Electrical Manufacturers Association
21.	NFPA	National Fire Protection Association
22.	SMACNA	Sheet Metal and Air Conditioning Contractors' National Association. Inc.
23.	UL	Underwriters Laboratories Inc.
24.	ASTM E814	Standard Test Method for Fire Tests of Through-Penetration Fire Stops
25.	ASTM E84	Standard Test Method for Surface Burning Characteristics of Building Materials

1.5 QUALITY ASSURANCE

A. Refer to Division 1, General Conditions, Equals and Substitutions.

B. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and for obtaining the performance from the system into which these items are placed. This may include changes found necessary during the testing, adjusting, and balancing phase of the project.

1.6 ALTERNATE BIDS

A. All work required for removal and replacement of existing RTU-5 and RTU-15 shall be bid as Alternate 1.

1.7 CONTINUITY OF EXISTING SERVICES

A. Do not interrupt or change existing services without prior written approval from the owner, or facilities maintenance. When interruption is required, coordinate the down-time with the user agency to minimize disruption to their activities. Unless specifically stated, all work involved in interrupting or changing existing services is to be done during normal working hours.

1.8 PROTECTION OF FINISHED SURFACES

A. Refer to Division 1, General Requirements, Protection of Finished Surfaces.

B. Furnish one can of touch-up paint for each different color factory finish which is to be the final finished surface of the product. Deliver touch-up paint with other "loose and detachable parts" as covered in the General Requirements.

1.9 SLEEVES AND OPENINGS

A. Refer to Division 1, General Requirements, Sleeves and Openings.

1.10 SEALING AND FIRE STOPPING

A. Sealing and fire stopping of sleeves/openings between ductwork, piping, etc. and the sleeve, structural or partition opening shall be the responsibility of the contractor whose work penetrates the opening. Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with section 07 84 00 Fire Stopping.

1.11 SUBMITTALS

A. Refer to Division 1, General Conditions, Submittals.

B. Submit for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents.

C. Before submitting electrically powered equipment, verify that the electrical power and control requirements for the equipment are in agreement with the motor starter schedule on the electrical drawings. Include a statement on the shop drawing transmittal to the architect/engineer that the equipment submitted and the motor starter schedules are in agreement or indicate any discrepancies. See related comments in Section 23 05 13 in Part 1 under Electrical Coordination.

D. Include wiring diagrams of electrically powered equipment.

E. Submit electronic (PDF) copy of all submittals for review by A/E, Architect, Owner, Owners Representative and Building Operator.

1.12 OFF SITE STORAGE

A. Any required offset storage of material is the responsibility of the contractor. Materials or equipment damaged while stored offsite, or while transported to or from offset storage will not be allowed to be installed.

1.13 PERMITS, CERTIFICATES AND INSPECTIONS

A. Refer also to Division 1, General Conditions, Permits, Regulations, Utilities and Taxes.

B. Obtain and pay for all required local and State construction permits.

C. Obtain and pay for all required local, State and Federal installation inspections except those provided by the Architect/Engineer in accordance with code. Deliver originals of these certificates to the Project Representative. Include copies of the certificates in the Operating and Maintenance Instructions.

1.14 OPERATION AND MAINTENANCE DATA

A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

B. In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation:
   1. Records of tests performed a to certify compliance with system requirements
   2. Certificates of inspection by regulatory agencies
   3. Lubrication instructions, including list/frequency of lubrication
   4. Copies of all approved shop drawings.
   5. Manufacturer's wiring diagrams for electrically powered equipment
   6. Temperature control record drawings and control sequences
   7. Parts lists for manufactured equipment
   8. Warranties
   9. Additional information as indicated in the technical specification sections

C. Provide two (2) hardcopies of the Operation and Maintenance Manual. Manuals shall be organized in three ring binders with dividers and reference tabs. Manuals shall be delivered as follows:
   1. One copy to the Site.
   2. One copy to the Public Works Main Office

D. Provide two (2) electronic (Adobe PDF) copies of the Operation and Maintenance Manual.
   1. Provide each copy on a separate portable USB flash drive.
   2. Deliver each portable USB drive with hardcopy manuals to parties listed above.

1.15 TRAINING OF OWNER PERSONNEL

A. Instruct user agency personnel in the proper operation and maintenance of systems and equipment provided as part of this project. Include not less than 8 hours of instruction, using the Operating and Maintenance manuals during this instruction. Demonstrate startup and shutdown procedures for all equipment. All training to be during normal working hours.

1.16 RECORD DRAWINGS

A. Refer to Division 1, General Requirements, Record Drawings.

B. Maintain accurate as-built or record drawings throughout the duration of the project. As-built drawings shall be available on site at all times for review by the A/E or owner.

C. If, during project closeout, the A/E or owner observes installations that are not accurately recorded on the as-built or record drawings, the record drawings will not be accepted and the contractor will be required, at their own expense, to provide updated and accurate record drawings.

D. In addition to the data indicated in the General Requirements, maintain temperature control record drawings on originals prepared by the installing contractor/subcontractor. Include copies of these record drawings with the Operating and Maintenance manuals.

1.17 CLEANING

A. Keep the premises broom clean and free of surplus materials, rubbish and debris.

B. Clean all equipment, piping, duct, strainers, filters, etc. prior to building turnover to owner. All systems shall be turned over to owner in condition ready for operation.

1.18 WARRANTY

A. Warrant that work shall function for one year immediately following the acceptance of the system(s). The date of acceptance shall be an agreed upon date by all parties, including Division 23 contractor, General Contractor, Owner, Tenant and A/E.

B. Keep the system in good working order at no expense, unless defects are clearly the result of improper usage.

C. Warranty calls shall be at no cost to the owner.

D. Submit for acceptance of the work, written certification that the entire system has been installed and adjusted for operation in accordance with the Contract Documents.

PART 2 PRODUCTS

2.1 ACCESS PANELS AND DOORS

A. LAY-IN CEILINGS:
1. Removable lay-in ceiling tiles in 2 x 2 foot or 2 x 4 foot configuration provided under Section 09500 are sufficient; no additional access provisions are required unless specifically indicated.

B. Plaster Walls and Ceilings:
1. 16 gauge frame with not less than a 20 gauge hinged door panel, prime coated steel for general applications, stainless steel for use in toilets, showers, and similar wet areas, concealed hinges, screwdriver operated cam latch for general applications, key lock for use in public areas, UL listed for use in fire rated partitions if required by the application. Use the largest size access opening possible, consistent with the space and the equipment needing service; minimum size is 12" by 12".

2.2 IDENTIFICATION

A. STENCILS
1. Not less than 1 inch high letters/numbers for marking pipe and equipment.

B. SNAP-ON PIPE MARKERS
1. Cylindrical self-coiling plastic sheet that snaps over piping insulation and is held tightly in place without the use of adhesive, tape or straps. Not less than 1 inch high letters/numbers and flow direction arrows for piping marking. W. H. Brady, Seton, Marking Services, or equal.

C. ENGRAVED NAME PLATES
1. White letters on a black background, 1/16 inch thick plastic laminate, beveled edges, screw mounting, Setonply Style 2060 by Seton Name Plate Company or Emedolite- Style EIP by EMED Co., or equal by Marking Services, or W. H. Brady.

2.3 SEALING AND FIRE STOPPING

A. NON-RATED PENETRATIONS
1. Pipe Penetrations
a. At pipe penetrations of non-rated interior walls, floors and exterior walls above grade, use urethane caulk in annular space between pipe insulation and sleeve. For non-rated drywall, plaster or wood walls where sleeve is not required use urethane caulk in annular space between pipe insulation and wall material.
2. Duct Penetrations
a. Concealed Locations:
1) Pack annular space with fiberglass batt insulation or mineral wool insulation. Provide 4" sheet metal escutcheon around duct on both sides of partition or floor to cover annular space.
b. Exposed Locations
1) Where a duct is exposed with no ceiling, the opening shall be patched to match the existing construction tight to the duct or duct insulation.

PART 3 EXECUTION

3.1 DEMOLITION

A. Perform all demolition as indicated on the drawings to accomplish new work. Where demolition work is to be performed adjacent to existing work that remains in an occupied area, construct temporary dust partition to minimize the amount of contamination of the occupied space. Where pipe or duct is removed and not reconnected with new work, cap ends of existing services as if they were new work. Coordinate work with the user agency to minimize disruption to the existing building occupants.

B. All pipe, wiring and associated conduit, insulation, ductwork, and similar items demolished, abandoned, or deactivated are to be removed from the site by the Contractor. All piping and ductwork specialties are to be removed from the site by the Contractor unless they are dismantled and removed or stored by the user agency. All designated equipment is to be turned over to the user agency for their use at a place and time so designated. Maintain the condition of material and/or equipment that is indicated to be reused equal to that existing before work began.

3.2 CUTTING AND PATCHING

A. Refer to Division 1, General Requirements, Cutting and Patching.

B. Any cutting and patching not specifically indicated to be provided by others shall be performed by the Division 23 contractor.

3.3 BUILDING ACCESS

A. Arrange for the necessary openings in the building to allow for admittance of all apparatus. When the building access was not previously arranged and must be provided by this contractor, restore any opening to its original condition after the apparatus has been brought into the building.

3.4 EQUIPMENT ACCESS

A. Install all piping, conduit, ductwork, and accessories to permit access to equipment for maintenance and service. Coordinate the exact location of wall and ceiling access panels and doors with the General Contractor, making sure that access is available for all equipment and specialties. Access doors in general construction are to be furnished by the Mechanical Contractor and installed by the General Contractor.

B. Provide color coded thumb tacks or screws, depending on the surface, for use in accessible ceilings which do not require access panels.

3.5 COORDINATION

A. Verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to, diffusers, register, grilles, and recessed or semi-recessed heating and/or cooling terminal units installed in/on architectural surfaces.

B. Coordinate all work with other contractors prior to installation. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.

C. Cooperate with the test and balance agency in ensuring Section 23 05 93 specification compliance. Verify system completion to the test and balance agency (flushing, pressure testing, chemical treatment, filling of liquid systems, proper pressurization and air venting of hydronic systems, clean filters, clean strainers, duct and pipe systems cleaned, controls adjusted and calibrated, controls cycled through their sequences, etc.), ready for testing, adjusting and balancing work. Install dampers, shutoff and balancing valves, flow measuring devices, gauges, temperature controls, etc., required for functional and balanced systems. Demonstrate the starting, interlocking and control features of each system so the test and balance agency can perform its work.

3.6 IDENTIFICATION

A. Identify equipment in mechanical equipment rooms by stenciling equipment number and service with one coat of black enamel against a light background or white enamel against a dark background. Use a primer where necessary for proper paint adhesion. Do not label equipment such as cabinet heaters and ceiling fans in occupied spaces.

B. Where stenciling is not appropriate for equipment identification, engraved name plates may be used.

C. Identify piping not less than once every 30 feet, not less than once in each room, adjacent to each access door or panel, and on both side of the partition where exposed piping passes through walls, floors or roofs. Pipe shall be labeled with
1. Pipe content (HWS, HWR, CWS, CWR, etc.).
2. Pipe flow direction.
3. Pipe size.

D. Use one coat of black enamel against a light background or white enamel against a dark background for stenciling, or provide snap-on pipe markers as specified in Part 2 – Products.

E. Use engraved name plates to identify control equipment.

3.7 LUBRICATION

A. Lubricate all bearings with lubricant as recommended by the manufacturer before the equipment is operated for any reason. Once the equipment has been run, maintain lubrication in accordance with the manufacturer's instructions until the work is accepted by the owner. Maintain a log of all lubricants used and frequency of lubrication; include this information in the Operating and Maintenance Manuals at the completion of the project.

3.8 SLEEVES AND OPENINGS

A. Pipe penetrations in existing concrete floors: Core drill openings.

B. Pipe penetrations through existing floors located in food service areas that do not require a T rating: Core drill sleeve opening large enough to insert schedule 40 sleeve, extend sleeve 2 inches above the floor and grout area around sleeve with hydraulic setting, non-shrink grout. Size sleeve to allow insulated pipe to run through sleeve and paint the sleeve.

C. Where penetrating pipe or conduit weight is supported by floor, provide manufactured product or structural bearing collar designed to carry load.

3.9 DUCT SLEEVES:

A. Duct sleeves are not required in non-rated partitions or floors.

B. Provide sleeve required for fire dampers in fire-rated partitions and floors. Reference fire damper details on drawings.

3.10 SEALING AND FIRE STOPPING

A. NON-RATED PENETRATIONS:
   1. Pipe Penetrations – Interior and Exterior Walls Above Grade
      a. Pipe penetrations are required to be sealed. Apply sealant to both sides of the penetration in such a manner that the annular space between the pipe sleeve or cored opening and the pipe or insulation is completely blocked.
      b. At interior penetrations, finish should match the adjacent partition finish.

END OF SECTION

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SECTION 23 05 13

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.1 SCOPE

A. This section includes requirements for single and three phase motors that are used with equipment specified in other sections. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Quality Assurance
      f. Shop Drawings
      g. Operating and Maintenance Data
      h. Electrical Coordination
      i. Product Criteria
   2. Part 2 – Products
      a. Three Phase, Single Speed Motors
      b. Single Phase, Single Speed Motors
      c. Motors Used on Variable Frequency Drives
   3. Part 3 – Execution
      a. Installation

1.2 RELATED WORK

A. None.

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this section.

1.4 REFERENCE STANDARDS

A. ANSI/IEEE 112 Test Procedure for Polyphase Induction Motors and Generators

B. ANSI/NEMA MG-1 Motors and Generators

C. ANSI/NFPA 70 National Electrical Code

1.5 QUALITY ASSURANCE

A. Refer to division 1, General Conditions, Equals and Substitutions.

1.6 SHOP DRAWINGS

A. Refer to division 1, General Conditions, Submittals.

B. Include with the equipment which the motor drives the following motor information: motor manufacturer, horsepower, voltage, phase, hertz, rpm, full load efficiency. Include project wiring diagrams prepared by the contractor specifically for this work.

1.7 OPERATION AND MAINTENANCE DATA

A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.8 ELECTRICAL COORDINATION

A. All starters, overload relay heater coils, disconnect switches and fuses, relays, wire, conduit, pushbuttons, pilot lights, and other devices required for the control of motors or electrical equipment are furnished and installed by this Contractor, except as specifically noted elsewhere in this division of specifications.

B. Electrical drawings and/or specifications show number and horsepower rating of all motors furnished by this Contractor, together with their actuating devices. Should any discrepancy in size, horsepower rating, electrical characteristics or means of control be found for any motor or other electrical equipment after contracts are awarded, Contractor is to immediately notify the architect/engineer of such discrepancy. Costs involved in any changes required due to equipment substitutions initiated by this contractor will be the responsibility of this contractor. See related comments in Section 23 05 00 - Common Work Results for HVAC, under Shop Drawings.

C. This Contractor will provide all power wiring and control wiring.

1.9 PRODUCT CRITERIA

A. Motors to conform to all applicable requirements of NEMA, IEEE, ANSI, and NEC standards and shall be listed by U.L. for the service specified.

B. Select motors for conditions in which they will be required to perform; i.e., general purpose, splashproof, explosion proof, standard duty, high torque or any other special type as required by the equipment or motor manufacturer's recommendations.

C. Furnish motors for starting in accordance with utility requirements and compatible with starters as specified.

PART 2 PRODUCTS

2.1 THREE PHASE, SINGLE SPEED MOTORS

A. Use NEMA rated three phase, 60 hertz motors for all motors 1/2 HP and larger unless specifically indicated.

B. Use NEMA general purpose, continuous duty, Design B , normal starting torque, T-frame or U-frame motors with Class B or better insulation unless the manufacturer of the equipment on which the motor is being used has different requirements. Use open drip-proof motors unless totally enclosed fan-cooled, totally enclosed non-ventilated, explosion-proof, or encapsulated motors are specified in the equipment sections.

C. Use grease lubricated anti-friction ball bearings with housings equipped with plugged/capped provision for relubrication, rated for minimum AFBMA 9, L-10 life of 20,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at the end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.

D. All open drip-proof motors to have a 1.15 service factor. Other motor types may have minimum 1.0 service factors.

E. All motors 1 HP and larger, except specially wound motors and inline pump motors 56 frame and smaller, to be high efficiency design with full load efficiencies which meet or exceed the values listed below when tested in accordance with NEMA MG 1.

FULL LOAD NOMINAL MOTOR EFFICIENCY BY MOTOR SIZE AND SPEED

	-----Open Drip-Proof Motors------		
MOTOR	-------Nominal Motor Speed-------		
HP	1200 rpm	1800 rpm	3600 rpm
1	82.5	85.5	77.0
1-1/2	86.5	86.5	84.0
2	87.5	86.5	85.5
3	88.5	89.5	85.5
5	89.5	89.5	86.5
7-1/2	90.2	91.0	88.5
	----Totally Enclosed Fan-Cooled----		
MOTOR	-------Nominal Motor Speed------		
HP	1200 rpm	1800 rpm	3600 rpm
1	82.5	85.5	77.0
1-1/2	87.5	86.5	84.0
2	88.5	86.5	85.5
3	89.5	89.5	86.5
5	89.5	89.5	88.5
7-1/2	91.0	91.7	89.5

2.2 SINGLE PHASE, SINGLE SPEED MOTORS

A. Use NEMA rated 115 volt, single phase, 60 hertz motors for all motors 1/3 HP and smaller.

B. Use permanent split capacitor or capacitor start, induction run motors equipped with permanently lubricated and sealed ball or sleeve bearings and Class A insulation. Service factor to be not less than 1.35.

2.3 MOTORS USED ON VARIABLE FREQUENCY DRIVES

A. In addition to the requirements specified above, the motor must be suitable for use with the drive specified in Section 23 05 14, including but not limited to motor cooling. Motor shall comply

with NEMA MG1 Part 31 to provide windings capable to withstand up to 1600 peak Volts with a rise time of 0.1 µs. Provide bearing protection grounding rings to bleed current from the motor shaft to the motor casing. Manufacturers: Aegis SGR, Inpro/Seal CDR, or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Mount motors on a rigid base designed to accept a motor, using shims if required under each mounting foot to get a secure installation.

B. When motor will be flexible coupled to the driven device, mount coupling to the shafts in accordance with the coupling manufacturer's recommendations. Using a dial indicator, check angular misalignment of the two shafts; adjust motor position as necessary so that the angular misalignment of the shafts does not exceed 0.002 inches per inch diameter of the coupling hub. Again using the dial indicator, check the shaft for run-out to assure concentricity of the shafts; adjust as necessary so that run-out does not exceed 0.002 inch.

C. When motor will be connected to the driven device by means of a belt drive, mount sheaves on the appropriate shafts in accordance with the manufacturer's instructions. Use a straight edge to check alignment of the sheaves; reposition sheaves as necessary so that the straight edge contacts both sheave faces squarely. After sheaves are aligned, loosen the adjustable motor base so that the belt(s) can be added and tighten the base so that the belt tension is in accordance with the drive manufacturer's recommendations. Frequently recheck belt tension and adjust if necessary during the first day of operation and again after 80 hours of operation.

D. Verify the proper rotation of each three-phase motor as it is being wired or before the motor is energized for any reason.

E. Lubricate all motors requiring lubrication. Record lubrication material used and the frequency of use. Include this information in the maintenance manuals.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SCOPE

A. This section includes air and water testing, adjusting and balancing for the entire project. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Description
      f. Submittals
   2. Part 2 – Products
      a. Instrumentation
   3. Part 3 – Execution
      a. Preliminary Procedures
      b. Existing Equipment / Scope of Work
      c. Performing Testing, Adjusting and Balancing
      d. Deficiencies

1.2 RELATED WORK

A. Section 23 05 00 Common Work Results for HVAC

B. Section 23 07 00 HVAC Insulation

C. Section 23 09 23 Direct Digital Control System for HVAC

1.3 REFERENCE

A. Applicable provisions of the General Conditions, Supplementary General Conditions and General Requirements in Division 1 govern work under this section.

1.4 REFERENCE STANDARDS

A. AABC National Standards for Total System Balance, Sixth Edition, 2002.

B. ASHRAE ASHRAE Handbook, 2015 HVAC Applications, Chapter 38, Testing Adjusting and Balancing.

C. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems, Seventh Edition, 2005.

D. TABB Tab Procedural Guide, First Edition, 2003.

1.5 DESCRIPTION

A. The Contractor will separately contract with an independent test and balance agency to perform all testing, adjusting, and balancing of air and hydronic systems required for this project. Work related to the testing, adjusting, and balancing that must be performed by the installing mechanical contractor is specified in other section of these specifications.

B. Provide total mechanical systems testing, adjusting and balancing. Requirements include the balance of air and water distribution, adjustment of new and existing systems and equipment to provide design requirements indicated on the drawings, electrical measurement and verification of performance of all mechanical equipment, all in accordance with standards published by AABC, NEBB, or TABB.

C. Test, adjust and balance all air and hydronic systems so that each room, piece of equipment or terminal device meets the design requirements indicated on the drawings and in the specifications.

D. Accomplish testing, adjusting and balancing work in a timely manner that allows partial occupancy of major buildings, occupancy of one building when the project involves many buildings, and completion of the entire project in the time stated in the Instruction to Bidders and in accordance with the completion schedule established for this project.

E. Verify that provisions are being made to accomplish the specified testing, adjusting and balancing work. If problems are found, handle as specified in Part 3 under Deficiencies.

1.6 QUALITY ASSURANCE

A. Qualifications
   1. An independent Firm specializing in the Testing and Balancing of HVAC systems for a minimum of 3 years. A Firm not engaged in the commerce of furnishing or providing equipment or material generally related to HVAC work other then that specifically related to installing Testing and Balancing components necessary for work in this section such as, but not limited to sheaves, pulleys, and balancing dampers.
   2. A certified member of AABC or certified by NEBB or TABB in the specific area of work performed. Maintain certification for the entire duration of the project. If certification of firm or any staff performing work is terminated or expires during the duration of the project, contact A/E immediately.
   3. Technicians on this project must have satisfactorily completed work on a minimum of (3) three projects of at least 50% in size, and of similar complexity. Size is defined as the quantity of each specific individual item requiring testing and balancing such as, but not limited to, equipment, devices, terminal devices, and grilles and diffusers.
   4. Submit Qualifications of firm and project staff to A/E and Owners Representative when requested.

1.7 SUBMITTALS

A. See also Related Work in this section.

B. Submit testing, adjusting and balancing reports bearing the seal and signature of the NEBB, AABC or TABB Certified Test and Balance Supervisor. The reports certify that the systems have been tested, adjusted and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed and are operating; and are an accurate record of all final quantities measured to establish normal operating values of the systems.

C. Format:
   1. Cover page identifying project name, project number and descriptive title of contents. Divide the contents of the report into the below listed divisions:
      a. General Information
      b. Summary
      c. Air Systems
      d. Hydronic Systems

D. Contents: Provide the following minimum information, forms and data:
   1. General Information: Inside cover sheet identifying Test and Balance Agency, Contractor, Architect, Engineer, Project Name and Project Number. Include addresses, contact names and telephone numbers. Also include a certification sheet containing the seal and signature of the Test and Balance Supervisor.
   2. Summary: Provide summary sheet describing mechanical system deficiencies. Describe objectionable noise or drafts found during testing, adjusting and balancing. Provide recommendations for correcting unsatisfactory performances and indicate whether modifications required are within the scope of the contract, are design related or installation related. List instrumentation used during testing, adjusting and balancing procedures.
   3. The remainder of the report to contain the appropriate standard NEBB, AABC, or TABB forms for each respective item and system. Fill out forms completely. Where information cannot be obtained or is not applicable indicate same.

PART 2 PRODUCTS

2.1 INSTRUMENTATION

A. Provide all required instrumentation to obtain proper measurements. Application of instruments and accuracy of instruments and measurements to be in accordance with the requirements of NEBB, AABC, or TABB Standards and instrument manufacturer's specifications.

B. All instruments used for measurements shall be accurate, and calibration histories for each instrument to be available for examination by A/E upon request. Calibration and maintenance of all instruments to be in accordance with the requirements of NEBB, AABC, or TABB Standards

PART 3 EXECUTION

3.1 PRELIMINARY PROCEDURES

A. Review preconstruction meeting report, applicable construction bulletins, applicable change orders and approved shop drawings of equipment, outlets/inlets and temperature controls.

B. Check filters for cleanliness, dampers and valves for correct positioning, equipment for proper rotation and belt tension, temperature controls for completion of installation and hydronic systems for proper charge and purging of air.

C. Notify Owners Project Representative on a daily basis during balancing. Identify deficiencies preventing completion of testing, adjusting and balancing procedures. Do not proceed until systems are fully operational with all components necessary for complete testing, adjusting and balancing. Installing Contractors are required to provide personnel to check and verify system completion, readiness for balancing and assist Balancing Agency in providing specified system performance.

3.2 EXISTING EQUIPMENT / SCOPE OF WORK

A. The following equipment shall be tested, adjusted and balanced:
1. AHU-1 (Supply, Return and Outside Air. Hot Water to heating coil)
2. AHU-2 (Supply, Return and Outside Air)
3. RTU-5 (Supply, Return and Outside Air)
4. RTU-15 (Supply, Return and Outside Air)
5. RTU-30 (Supply, Return and Outside Air)
6. RTU-31 (Supply, Return and Outside Air)
7. RTU-32 (Supply, Return and Outside Air)
8. RTU-34 (Supply, Return and Outside Air)

3.3 PERFORMING TESTING, ADJUSTING AND BALANCING

A. Perform testing, adjusting and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards except as may be modified below.

B. Unless specifically instructed in writing, all work in this specification section is to be performed during the normal workday.

C. In areas containing ceilings, remove ceiling tile to accomplish balancing work; replace tile when work is complete and provide new tile for any tile that are damaged by this procedure. If the ceiling construction is such that access panels are required for the work of this section and the panels have not been provided, inform the owner's project representative.

D. Cut insulation, ductwork and piping for installation of test probes to the minimum extent necessary for adequate performance of procedures. Patch using materials identical to those removed, maintaining vapor barrier integrity and pressure rating of systems.

E. In air systems employing filters, blank off sufficient filter area to simulate a pressure drop that is midway between that of a clean filter and that of a dirty filter.

F. Measure and record system measurements at the fan to determine total flow. Adjust equipment as required to yield specified total flow at terminals. Proceed taking measurements in mains and branches as required for final terminal balancing. Perform terminal balancing to specified flows balancing branch dampers, deflectors, extractors and valves prior to adjustment of terminals.

G. Measure and record static air pressure conditions across fans, coils and filters. Indicate in report if cooling coil measurements were made on a wet or dry coil and if filter measurements were made on a clean or dirty filter. Spot check static air pressure conditions directly ahead of terminal units.

H. Adjust outside air, return air and relief air dampers for design conditions at both the minimum and maximum settings and record both sets of data. Balance modulating dampers at extreme conditions and record both sets of data. Balance variable air volume systems at maximum air flow rate, full cooling, and minimum flow rate, full heating; record all data.

I. Provide fan and motor drive sheave adjustments necessary to obtain design performance. Provide drive changes specifically noted on drawings, if any. If work of this section indicates that any drive or motor is inadequate for the application, advise the owner's project representative by giving the representative properly sized motor/drive information (in accordance with manufacturers original service factor and installed motor horsepower requirements); Confirm any change will keep the duct/piping system within its design limitations with respect to speed of the device and pressure classification of the distribution system. Required motor/drive changes not specifically noted on drawings or in specifications will be considered an extra cost and will require an itemized cost breakdown submitted to owner's project representative. Prior authorization is needed before this work is started.

J. Final air system measurements to be within the following range of specified cfm:
   1. Fans 0% to +10%

K. Final water system measurements must be within the following range of specified gpm:
   1. Heating flow rates 0% to -10%

L. Contact the temperature control Contractor for assistance in operation and adjustment of controls during testing, adjusting and balancing procedures. Cycle controls and verify proper operation and setpoints. Include in report description of temperature control operation and any deficiencies found.

M. Permanently mark equipment settings, including damper and valve positions, control settings, and similar devices allowing settings to be restored. Set and lock memory stops.

N. Leave systems in proper working order, replacing belt guards, closing access doors and electrical boxes, and restoring temperature controls to normal operating settings.

O. Coordinate AHU minimum outside air set points with the Temperature Control Contractor.

3.4 DEFICIENCIES

A. Division 23 00 00 contractor to correct any installation deficiencies found by the test and balance agency that were specified and/or shown on the Contract Documents to be performed as part of that division of work. Test and balance agency will notify the A/E of these items and instructions will be issued to the Division 23 00 00 contractor for correction of the deficient work. All corrective work to be done at no cost to the Owner or A/E. Retest mechanical systems, equipment, and devices once corrective work is complete as specified.

END OF SECTION

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SECTION 23 07 00

HVAC INSULATION

PART 1 GENERAL

1.1 SCOPE

A. This section includes insulation specifications for heating, ventilating and air conditioning piping, ductwork and equipment. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Quality Assurance
      f. Description
      g. Definitions
      h. Shop Drawings
      i. Operation and Maintenance Data
      j. Environmental Requirements
   2. Part 2 – Products
      a. Materials
      b. Insulation Types
      c. Adhesives, Mastics, Sealants, and Reinforcing Materials Jackets
      d. Accessories
   3. Part 3 – Execution
      a. Examination
      b. Installation
      c. Protective Jacket Installation
      d. Piping, Valve and Fitting Insulation
      e. Piping Protective Jackets
      f. Pipe Insulation Schedule
      g. Duct Insulation
      h. Duct Insulation Schedule
      i. Equipment Insulation
      j. Equipment Insulation Schedule

1.2 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC

B. Section 23 21 13 - Hydronic Piping

C. Section 23 31 00 - HVAC Ducts and Casings

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this section.

1.4 REFERENCE STANDARDS

A. ASTM International
1. ASTM B209 Aluminum and Aluminum Alloy Sheet and Plate
2. ASTM C165 Test Method for Compressive Properties of Thermal Insulations
3. ASTM C177 Heat Flux and Thermal Transmission Properties
4. ASTM C240 Cellular Glass Insulation Block
5. ASTM C302 Density of Preformed Pipe Insulation
6. ASTM C272 Water Absorption of Core Materials for Sandwich Constructions
7. ASTM C355 Test Methods for Test for Water Vapor Transmission of Thick Materials
8. ASTM C449 Mineral Fiber Hydraulic Setting Thermal Insulation Cement
9. ASTM C518 Heat Flux and Thermal Transmission Properties
10. ASTM C534 Preformed Flexible Elastomeric Thermal Insulation
11. ASTM C547 Mineral Fiber Preformed Pipe Insulation
12. ASTM C552 Cellular Glass Block and Pipe Thermal Insulation
13. ASTM C578 Preformed, Block Type Cellular Polystyrene Thermal Insulation
14. ASTM C612 Mineral Fiber Block and Board Thermal Insulation
15. ASTM C921 Properties of Jacketing Materials for Thermal Insulation
16. ASTM C1136 Flexible Low Permeance Vapor Retarders for Thermal Insulation
17. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension
18. ASTM D1000 Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications
19. ASTM D1621 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics
20. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics
21. ASTM D1940 Method of Test for Porosity of Rigid Cellular Plastics
22. ASTM D2126 Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
23. ASTM D2240 Standard Test Method for Rubber Property—Durometer Hardness
24. ASTM D5590 Test Method for Determining the Resistance of Coatings to Fungal Defacement
25. ASTM E84 Surface Burning Characteristics of Building Materials
26. ASTM E814 Standard Test Method for Fire Tests of Penetration Firestop Systems

B. MICA National Commercial & Industrial Insulation Standards

C. NFPA 225 Surface Burning Characteristics of Building Materials

D. UL 723 Surface Burning Characteristics of Building Materials

1.5 QUALITY ASSURANCE

A. Refer to division 1, General Conditions, Equals and Substitutions

B. Label all insulating products delivered to the construction site with the manufacturer's name and description of materials.

C. Insulation systems shall be applied by experienced contractors. Within the past five (5) years, the contractor shall be able to document the successful completion of a minimum of three (3) projects of at least 50% of the size and similar scope of the work specified in this section.

1.6 DESCRIPTION

A. Furnish and install all insulating materials and accessories as specified or as required for a complete installation. The following types of insulation are specified in this section:
1. Pipe Insulation
2. Duct Insulation

B. Install all insulation in accordance with the latest edition of MICA (Midwest Insulation Contractors Association) Standard and manufacturer's installation instructions. Exceptions to these standards will only be accepted where specifically modified in these specifications, or where prior written approval has been obtained from the A/E.

1.7 DEFINITIONS

A. Concealed: shafts, furred spaces, space above finished ceilings, utility tunnels and crawl spaces. All other areas, including walk-through tunnels, shall be considered as exposed.

1.8 SHOP DRAWINGS

A. Refer to division 1, General Conditions, Submittals.

B. Submit a schedule of all insulating materials to be used on the project, including adhesives, fastening methods, fitting materials along with material safety data sheets and intended use of each material. Include manufacturer's technical data sheets indicating density, thermal characteristics, jacket type, and manufacturer's installation instructions.

1.9 OPERATION AND MAINTENANCE DATA

A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not store insulation materials on grade or where they are at risk of becoming wet. Do not install insulation products that have been exposed to water.

B. Protect installed insulation work with plastic sheeting to prevent water damage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturers: Armacell, CertainTeed, Manson, Childers, Dow, Extol, Fibrex, Halstead, Foster, Imcoa, Johns Manville, Knauf, Owens-Corning, , Pittsburgh Corning, , VentureTape or approved equal.

B. Materials or accessories containing asbestos will not be accepted.

C. Use composite insulation systems (insulation, jackets, sealants, mastics, and adhesives) that have a flame spread rating of 25 or less and smoke developed rating of 50 or less, with the following exceptions:
   1. Pipe insulation which is not located in an air plenum may have a flame spread rating not over 25 and a smoke developed rating no higher than 450 when tested in accordance with UL 723 and ASTM E84.

2.2 INSULATION TYPES

A. Insulating materials shall be fire retardant, moisture and mildew resistant, and vermin proof. Insulation shall be suitable to receive jackets, adhesives and coatings as indicated.

B. Rigid Fiberglass Insulation
   1. Minimum nominal density of 3 lbs. per cu. ft., and thermal conductivity of not more than 0.23 at 75 degrees F, 0.25 at 125 degrees F, 0.27 at 150 degrees F, 0.29 at 200 degrees F, 0.32 at 250 degrees F, minimum compressive strength of 25 PSF at 10% deformation, rated for service to 450 degrees F.

C. Elastomeric Insulation:
   1. Flexible closed cell, minimum nominal density of 5.5 lbs. per cu. ft., thermal conductivity of not more than 0.27 at 75 degrees F, minimum compressive strength of 4.5 psi at 25% deformation, maximum water vapor permeability of 0.17 perm inch, maximum water absorption of 6% by weight, rated for service range of -20 degrees F to 220 degrees F on piping and 180 degrees F where adhered to equipment.

2.3 ADHESIVES, MASTIC, SEALANTS, AND REINFORCING MATERIALS

A. Products shall be compatible with surfaces and materials on which they are applied, and shall be suitable for use at operating temperatures of systems to which they are applied.

B. Fiberglass Insulation Adhesive
   1. Must comply with ASTM C916, Type II: Foster 85-60, Childers CP-127, Duro Dyne SSG.

C. Vapor Retarding Mastic
   1. Below ambient equipment/piping insulation, mastic water vapor permeance shall be less than 0.03 perms at 45 mils dry film thickness per ASTM E 96: Foster 30-65 Vapor Fas, Childers CP-34,Vimasco 749.

2.4 JACKETS

A. PVC Fitting Covers And Jackets (PFJ)
   1. White PVC film, gloss finish one side, semi-gloss other side, FS LP-535D, Composition A, Type II, Grade GU. Ultraviolet inhibited indoor/outdoor grade to be used where exposed to high humidity, ultraviolet radiation, in kitchens or food processing areas or installed outdoors. Jacket thickness to be minimum .02” indoors/.03”outdoors for piping 12” and smaller, .03” indoors/.04” outdoors for piping 15” and larger.

B. All Service Jackets (ASJ)
   1. Heavy duty, fire retardant material with white kraft reinforced foil vapor retarding jacket, factory applied to insulation with a self-sealing pressure sensitive adhesive lap, maximum permeance of .02 perms and minimum beach puncture resistance of 50 units.

C. Foil Scrim All Service Jackets (FSJ)
   1. Glass fiber reinforced foil kraft laminate, factory applied to insulation. Maximum permeance of .02 perms and minimum beach puncture resistance of 25 units.

D. Protective Metal Jackets (PMJ)
   1. 0.016 inch thick aluminum or 0.010 inch thick stainless steel with safety edge for indoor installations and 0.024 inch thick aluminum or 0.016 inch thick stainless steel with safety edge for outdoor installations.

E. Self-Adhering Jackets (SAJ)
   1. 5-ply, self-adhering multiple laminated waterproofing material with reflective aluminum foil, high density polymer films and cold weather acrylic adhesive providing zero (0.0) permeance. Minimum 6 mils material thickness, 25lb puncture resistance when tested in accordance with ASTM D1000 and flame spread/smoke developed rating of 10/20 when tested in accordance with UL 723.
   2. Vapor retarding tape shall be specifically designed and manufactured for use with the self-adhering jacket specified above. Tape shall be provided by the same manufacturer that provides jacketing. Vapor retarding tapes used with self-adhering jackets shall have a maximum permeance of 0.0 perms.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that all piping, equipment, and ductwork are tested and approved prior to installing insulation. Do not insulate systems until testing and inspection procedures are completed.

B. Verify that all surfaces are clean, dry and without foreign material before applying insulation materials.

3.2 INSTALLATION

A. All materials shall be installed by skilled labor regularly engaged in this type of work. Allmaterials shall be installed in strict accordance with manufacturer’s recommendations,

building codes, and industry standards. Do not install products when the ambient temperature or conditions are not consistent with the manufacturer's recommendations. Surfaces to be insulated must be clean and dry.

B. Locate insulation and cover seams in the least visible location. All surface finishes shall be extended in such a manner as to protect all raw edges, ends and surfaces of insulation.

C. Install insulation with smooth and even surfaces. Poorly fitted joints or use of filler in voids will not be accepted. Provide neatly beveled and coated terminations at all nameplates, uninsulated fittings, or at other locations where insulation terminates.

D. Use full length material (as delivered from manufacturer) wherever possible. Scrap piecing of insulation or pieces cut undersize and stretched to fit will not be accepted.

E. All pipe and duct insulation shall be continuous through walls, ceiling or floor openings and through sleeves except where firestop or firesafing materials are required. Vapor retarding jacket shall be maintained continuous through all penetrations.

F. Provide a continuous unbroken moisture vapor retarding jacket on insulation applied to systems noted below. Attachments to cold surfaces shall be insulated and vapor sealed to prevent condensation.

G. Provide a complete vapor retarding jacket for insulation on the following systems:
   1. Refrigerant
   2. Insulated Duct
   3. Equipment, ductwork or piping with a surface temperature below 65 degrees F

3.3 PROTECTIVE JACKET INSTALLATION

A. PVC Fitting Covers And Jackets (PFJ)
   1. Lap seams and joints a minimum of 2 inches and continuously seal PVC with welding solvent recommended by jacket manufacturer. Lap slip joint ends 4" without fasteners where required to absorb expansion and contraction. For sections where vapor retarding jacket is not required and jacket requires routine removal, tack fasteners may be used. Secure PVC fitting covers with tack fasteners. For systems requiring a vapor retarding jacket, apply a 1-1/2" band of mastic over ends, throat, seams and penetrations.

B. All Service Jackets (ASJ) and Foil Scrim All Service Jackets (FSJ)
   1. Install according to manufacturer's recommendations using factory supplied lap seals and butt strip seals.

C. Protective Metal Jacket (PMJ)
   1. Lap seams a minimum of 2 inches. Secure with metal bands for end to end joints, and rivets or sheet metal screws for longitudinal joints. Rivets, screws, and bands to be constructed of the same material as the jacket. Locate seams on bottom for exterior applications. Seal laps with 1/8" bead of metal jacketing sealant to prevent water entry.

D. Self-Adhering Jackets (SAJ)
   1. Install according to manufacturer's recommendations. Cut allowing minimum 4" overlap on ends and 6" on longitudinal joints. Align parallel to surface. Remove release paper and press flat to surface to avoid wrinkles. Rub entire surface for full adhesion and sealing at joint overlaps. On exterior applications, provide a bead of compatible caulk along exposed edges.
   2. Piping with self-adhering (SAJ) jackets shall have elbows, fittings, valves and butt joints wrapped with 2 layers of vapor retarding tape. Piping with a PVC jacket (PFJ) installed over the self-adhering (SAJ) jacket may be provided with a single, lapped layer of vapor retarding tape for elbows, fittings and valves under the PVC jacket. Vapor retarding tape shall be compatible with the jacket material used.

3.4 PIPING, VALVE, AND FITTING INSULATION

A. General
   1. Install insulation with butt joints and longitudinal seams closed tightly. Provide minimum 2" lap on jacket seams and 2" tape on butt joints, firmly cemented with lap adhesive unless otherwise noted. Additionally secure with staples along seams and butt joints.
   2. On systems requiring a vapor retarding jacket, seal off all raw ends of insulation and butt joints with vapor retarding mastic at intervals of not more than 20 feet on piping. Coat staples, longitudinal and transverse seams with vapor retarding mastic and on systems requiring vapor retarding jacket, coat insulated elbows, fittings, and valves with vapor retarding mastic.
   3. Install insulation continuous through pipe hangers and supports with hangers and supports on the exterior of insulation. Where a vapor retarding jacket is not required or where roller hangers are not being used, hangers and supports may be attached directly to piping with insulation completely covering hanger or support and jacket sealed at support rod penetration. Where riser clamps are required to be attached directly to piping requiring vapor retarding jacket, extend insulation and vapor retarding jacketing/coating around riser clamp.
   4. Where insulated piping is installed on hangers and supports, the insulation shall be installed continuous through the hangers and supports. High density inserts shall be provided as required to prevent the weight of the piping from crushing the insulation. Pipe shields are required at all support locations. The insulation shall not be notched or cut to accommodate the supporting channels.
   5. Fully insulate all reheat coil piping, fittings and valves (with the exception of unions) up to coil connection to prevent condensation when coil is inactive during cooling season. Provide a vapor proof seal between the pipe insulation and the insulated coil casing.

B. Fittings And Valves
   1. Fittings, valves, unions, flanges, couplings and specialties may be insulated with factory molded or built up insulation of the same thickness as adjoining insulation. Where the ambient temperature exceeds 150 degrees F, cover insulation with fabric reinforcing and mastic. Where the ambient temperatures do not exceed 150 degrees, furnish and install PVC fitting covers.

3.5 PIPING PROTECTIVE JACKETS

A. In addition to the jackets specified in the pipe insulation schedule below the following protective jackets are required:

B. Provide a protective PVC (PFJ) jacket for the following insulated piping:
   1. All new hydronic or condensate piping within mechanical rooms.

C. Provide a protective metal (PMJ) or self-adhering (SAJ) jacket for the following insulated piping:
   1. All new exterior installed refrigeration piping.

3.6 PIPE INSULATION SCHEDULE

A. Provide insulation on new and existing remodeled piping as indicated in the following schedule:

SERVICE	INSULATION	JACKET	INSULATION THICKNESS BY PIPE SIZE				
			< 1”	1” to < 1-1/2”	1-1/2” to < 4”	4” to < 8”	8” and Larger
Heating Hot Water	Rigid Fiberglass	ASJ	1.5”	1.5”	2”	2”	2”
Refrigeration Suction							
> 40°F	Elastomeric	None	1.5”	1.5”	1.5”	1.5”	1.5”
40°F to 20°F	Elastomeric	None	1.5”	1.5”	1.5”	1.5”	1.5”
Cooling Coil Condensate	Rigid Fiberglass	ASJ	1.5”				

B. The following piping and fittings are not to be insulated
   1. Piping unions for systems not requiring a vapor retarding Jacket

C. For systems with fluid temperatures 65° F or less, furnish and install removable elastomeric insulation covers, plugs or caps for all mechanical equipment and devices that require access by balancing contractors or service and maintenance personnel. Examples include but are not limited to: flow sensing devices, circuit setters, manual ball valve air vents, drain valves, blowdown valves, pressure/temperature test plugs, grease fittings, pump bearing caps, equipment labels, etc. Covers shall be tight fitting to ensure a complete vapor retarding barrier.

3.7 DUCT INSULATION

A. General
   1. Secure flexible duct insulation on sides and bottom of ductwork over 24" wide and all rigid duct insulation with weld pins. Space fasteners 18” on center or less as required to prevent sagging.
   2. Secure rigid board insulation to ductwork with weld pins. Apply insulation with joints firmly butted as close as possible to the equipment surface. Pins shall be located a maximum of 3” from each edge and spaced no greater than 12” on center.
   3. Install weld pins without damage to the interior galvanized surface of the duct. Clip pins back to washer and cover penetrations with tape of same material as jacket. Firmly butt seams and joints and cover with 4” tape of same material as jacket. Seal tape with plastic applicator and secure with staples. All joints, seams, edges and penetrations to be fully vapor sealed with vapor retarding mastic.
   4. Stop and point insulation around access doors and damper operators to allow operation without disturbing insulation or jacket material.

5. External supply duct insulation is not required where ductwork contains continuous 1" acoustical liner. Provide 4" overlap of external insulation over ends of acoustically lined sections.
6. Where insulated ductwork is supported by trapeze hangers, the insulation shall be installed continuous through the hangers. Drop the supporting channels required to facilitate the installation of the insulation. Where rigid board or flexible insulation is specified, install high density inserts to prevent the weight of the ductwork from crushing the insulation.

3.8 DUCT INSULATION SCHEDULE

A. Provide duct insulation on new and existing remodeled ductwork in the following schedule:

SERVICE	INSULATION TYPE	JACKET	THICKNESS
Mixed air ducts	Rigid Fiberglass	FSJ	2"
Exposed supply ducts*	Rigid Fiberglass	FSJ	2"
Outside Air Ducts	Rigid Fiberglass	FSJ	2"

* Exposed supply branch ducts located in the space they are serving do not require insulation. Exposed supply main ducts running through spaces they serve shall be insulated as exposed supply ducts scheduled above.

3.9 EQUIPMENT INSULATION

A. General
1. Do not insulate over equipment access manholes, fittings, nameplates or ASME stamps. Bevel and seal insulation at these locations.

3.10 EQUIPMENT INSULATION SCHEDULE:

A. Provide equipment insulation as follows:

EQUIPMENT	INSULATION TYPE	JACKET	THICKNESS
Reheat coil casing in supply ducts	Rigid Fiberglass	FSJ	2"

END OF SECTION

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SECTION 23 09 23

DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.1 SCOPE

The existing building utilizes a Trend direct digital control (DDC) system. This project will replace existing heating, cooling and ventilation equipment. The project scope is to disconnect existing controls and sensors on removed equipment and reconnect and reinstall existing controls (provide new sensors as required) on the new/replacement equipment. The contractor is responsible for all direct digital control integration, materials and programming required to replicate existing functions and sequences. This project scope is summarized below:

1. Four Small tonnage rooftop units (RTU-30, RTU-31, RTU-32 and RTU-34)
    a. Units (existing and new) are single zone constant volume systems.
    b. Remove and replace each RTU with the same tonnage unit.
    c. Existing controller to remain (controller mounted inside the building on duct below units).
    d. Existing room sensors to remain.
    e. Existing control wiring can be reused, provided wires are of proper length.
2. Rooftop unit (RTU-5)
    a. Existing unit is nominal 10 ton single zone constant volume system.
    b. New unit is a nominal 10 ton single zone variable volume system (2-speed fan).
    c. Existing controller to remain.
    d. Existing room sensor to remain.
    e. Existing control wiring can be reused, provided wires are of proper length.
    f. Provide additional control sequence to incorporate 2-stage supply fan.
3. Rooftop unit (RTU-15)
    a. Existing unit is nominal 5 ton constant volume unit used with variable air volume system that includes an existing bypass.
    b. New unit is nominal 5 ton constant volume unit that will be used with the existing variable air volume system and existing bypass.
    c. Existing controller to remain.
    d. Existing room sensors to remain.
    e. Existing VAV bypass to remain.
    f. Existing control wiring can be reused, provided wires are of proper length.
4. AHU-1 / ACCU-10
    a. Existing system is a constant volume reheat system. Existing AHU-1 is a constant volume blower coil with DX cooling and hot water heating. ACCU-10 is an existing 2 stage condensing unit.
    b. New system is a constant volume reheat system. New AHU-1 is a constant volume blower coil with DX cooling and hot water heating. New ACCU-10 is a 2 stage condensing unit.
    c. Existing controller to remain.
    d. Existing room sensors to remain.
    e. Existing unit sensors to be removed and reinstalled in new unit.

f. Existing control wiring can be reused, provided wires are of proper length.

5. AHU-2 / ACCU-3 and ACCU-4
   a. Existing system is a constant volume reheat system. Existing AHU-2 is a constant volume blower coil with DX cooling and electric heating. ACCU-3 and ACCU-4 are single stage condensing units.
   b. New system is a constant volume reheat system. New AHU-2 is a constant volume blower coil with DX cooling and electric heating. New ACCU-3 and ACCU-3 are single stage condensing units.
   c. Existing controller to remain.
   d. Existing room sensors to remain.
   e. Existing unit sensors to be removed and reinstalled in new unit.
   f. Existing control wiring can be reused, provided wires are of proper length.

B. Any new control work, controllers, etc. shall be integrated into the existing Trend DDC system.

C. Work in this section includes Direct Digital Control (DDC) panels, main communication trunk, software programming, and other equipment and accessories necessary to constitute a complete Direct Digital Control (DDC) system. This system interfaced with pneumatic/electric controls (Section 23 09 14) utilizing Direct Digital Control signals to operate actuated control devices will meet, in every respect, all operational and quality standards specified herein.
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Other Work
      f. Quality Assurance
      g. Submittals
      h. Operation and Maintenance Data
      i. Material Delivery and Storage

   2. Part 2 – Products
      a. General
      b. Direct Digital Controls (DDC)
      c. Local Control Panels
      d. Networking/Communications
      e. Thermostats
      f. Controllers
      g. Software License Agreement
      h. Operator Interface Requirements
   3. Part 3 – Execution
      a. General
      b. Installation
      c. Training
      d. Commissioning, Verification and Closeout
      e. Sequences of Operation

1.2 RELATED WORK

A. Applicable provisions of Division 1 govern work under this Section.

B. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC – Coordination

C. Division 23 - HVAC - Equipment provided to be controlled or monitored

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this section.

1.4 REFERENCE STANDARDS

A. FCC Part 15, Subpart J, Class A - Digital Electronic Equipment to Radio Communication Interference

1.5 OTHER WORK

A. The A/E must properly coordinate the necessary power wiring.

1.6 QUALITY ASSURANCE

A. Manufacturer:
   1. Trend controllers and field devices to be integrated into the existing Trend based building automation system / front end. No other manufacturers will be considered.

B. Installer:
   1. The installer shall be specialized and experienced and authorized Trend DDC control systems and installation for not less than 5 years. All engineering work shall be done by qualified employees of Trend, or qualified employees of a Trend Authorized Representative that provides engineering and commissioning of Trend control equipment. Where installing contractor is an authorized representative of Trend, submit written confirmation of such authorization. Indicate in letter of authorization that the installing contractor has successfully completed all necessary training required for the engineering, installation, and commissioning of equipment and systems to be provided for the project and that such authorization has been in effect for a period of not less than three years. The letter of authorization should also indicate that the installing contractor is authorized to install Trend equipment at the project location at the time the project is bid. Installation of the equipment shall be done by qualified mechanics and/or electricians in the direct employ or be directly subcontracted and under the supervision of Trend or Authorized Trend Representative.

C. Response Time
   1. During warrantee period, four (4) hours or less, 24-hours/day, 7 days/week.

D. Electrical Standards
   1. Provide electrical products, which have been tested, listed and labeled by Underwriters' Laboratories (UL) and comply with NEMA standards.

E. DDC Standards
   1. DDC manufacturer shall provide written proof with shop drawings that the equipment being provided is in compliance with F.C.C. rules governing the control of interference caused by Digital Electronic Equipment to Radio Communications (Part 15, Subpart J, Class A).

1.7 SUBMITTALS

A. Include the following information:
   1. Details of construction, layout, and location of each temperature control panel within the building, including instruments location in panel and labeling. Indicate which piece of mechanical equipment is associated with each controller and what area within the building is being served by that equipment. For terminal unit control, provide a room schedule that would list mechanical equipment tag, room number of space served, address of DDC controller, and any other pertinent information required for service.
   2. Product Data
      a. Submit manufacturer's specifications for each control device furnished, including installation instructions and startup instructions. General catalog sheets showing a series of the same device is not acceptable unless the specific model is clearly marked. Annotated software program documentation shall be submitted for system sequences, along with descriptive narratives of the sequence of operation of the entire system involved. Submit wiring diagram for each electrical control device along with other details required to demonstrate that the system has been coordinated and will function as a system.
   3. Maintenance Data
      a. Submit maintenance data and spare parts lists for each control device. Include this data in maintenance manual.
   4. Record Drawings
      a. Update existing control drawings with any new work that is performed.

1.8 OPERATION AND MAINTENANCE DATA

A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.9 MATERIAL DELIVERY AND STORAGE

A. Provide factory shipping cartons for each piece of equipment and control device. This contractor is responsible for storage of equipment and materials inside and protected from the weather.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide DDC control products in sizes and of capacities as required, conforming to manufacturer's standard materials and components as published in their product information,

designed and constructed as recommended by the manufacturer and as required for application indicate.

B. System shall be capable of operating with 120 VAC power supply, fully protected with a shutdown-restart circuit, and associated hardware and software.

2.2 DIRECT DIGITAL CONTROLS

A. The existing direct digital control system to be used.

2.3 LOCAL CONTROL PANELS

A. Existing control panels to be used.

2.4 THERMOSTATS

A. Existing thermostats to be used.

2.5 CONTROLLERS

A. Existing controllers shall be used.

2.6 SOFTWARE LICENSE AGREEMENT

A. Existing software license agreement to be used.

2.7 OPERATOR INTERFACE REQUIREMENTS

A. The existing web-based browser interface and graphic-based display shall be used. Modify existing graphics as required to reflect new equipment.

PART 3 EXECUTION

3.1 GENERAL

A. All electronic work required as an integral part of the Direct Digital Control system work is the responsibility of this section unless specifically indicated otherwise.

B. This contractor shall provide all labor, materials, engineering, software, permits, tools, checkout and certificates required to install a complete Direct Digital Control system as herein specified.

C. Any and all points added with this project shall be grouped for display purposes into the system such that all points associated with a new or existing DDC system can appear together on the flat panel display or printed log. Assignment of points to a group shall not be restricted by hardware configuration of the points of direct digital control. It shall be possible to assign a point to appear in more than one system. An English descriptor and an alpha/numeric identifier shall identify each system.

D. This Direct Digital Control system as herein specified shall be fully integrated and completely installed by this section. It shall include all required computer CPU software and hardware. Include the engineering, installation, supervision, calibration, software programming, and checkout necessary for a fully operational system.

3.2 INSTALLATION

A. All work and materials are to conform in every detail to the rules and requirements of the National Electrical Code and present manufacturing standards. All wiring and cable installation shall conform with the wiring installation as specified in the installation section of Section 23 09 14. All material shall be UL approved.

B. Install system and materials in accordance with manufacturer's instructions, rough-in drawings and details on drawings.

C. Line voltage wiring to power the DDC Controllers, not provided by the Division 26 contractor, to be by this contractor.

D. Label all control devices with the exception of dampers, valves, and terminal unit devices with permanent printed labels that correspond to control drawings. Temperature control junction and pullboxes shall be identified utilizing spray painted green covers. Other electrical system identification shall follow the 26 05 53 specification.

E. All control devices and electrical boxes mounted on insulated ductwork shall be mounted over the insulation. Provide mounting stand-offs where necessary for adequate support. Cutting and removal of insulation to mount devices directly on ductwork is not acceptable. This contractor shall coordinate with the insulation contractor to provide for continuous insulation of ductwork.

F. Provide all electrical relays and wiring, line and low voltage, for control systems, devices and components. Install all high voltage and low voltage wiring (includes low voltage cable) in rigid metal conduit. All conduit must be installed in accordance with electrical sections (Division 26) of this specification and the National Electrical code.

G. Conduit shall be a minimum of 1/2 " for low voltage control provided the pipe fill does not exceed 40%.

H. Minimum low voltage wiring gauge to be 18 AWG for outputs and 20 AWG for inputs. All low voltage wiring to be stranded.

I. Low voltage wiring can be run without conduit above accessible lay-in tile ceilings. All wiring in mechanical rooms, above inaccessible hard ceilings, exterior locations, and in any exposed areas, and in all other locations should be in conduit. Wire for wall sensors must be run in conduit. Wiring for radiation valves shall be run in conduit where routed through walls.

J. Where wiring is installed free-air, installation shall consider the following:
   1. Wiring shall utilize the cable tray wherever possible.
   2. Wiring shall run at right angles and be kept clear of other trades work.

3. Wiring shall be supported utilizing "J" or "Bridal-type" steel mounting rings anchored to ceiling concrete, piping supports, walls above ceiling or structural steel beams. Mounting rings shall be of open design (not a closed loop) to allow additional wire to be strung without being threaded through the ring. For mounting rings that do not completely surround the wire, attach the wire to the mounting ring with a strap.
4. Supports shall be spaced at a maximum 4-foot interval unless limited by building construction. If wiring "sag" at mid-span exceeds 6-inches; another support shall be used.
5. Wiring shall never be laid directly on the ceiling grid or attached in any manner to the ceiling grid wires.
6. Wall penetrations shall be sleeved.

K. Wiring shall not be attached to existing cabling, existing tubing, plumbing or steam piping, ductwork, ceiling supports or electrical or communications conduit.

L. Mount control panels adjacent to associated equipment on vibration-free walls or free-standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and on cabinet face.

M. Provide as-built control drawings of all systems served by each local panel in a location adjacent to or inside of panel cover. Provide a protective cover or envelope for drawings.

N. All tubing, cable and individual wiring is to be permanently tagged, with numbers corresponding with "Record Drawings", spares are to be labelled as "Spare".

O. Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of 4 hours.

3.3 COMMISSIONING, VERIFICATION AND CLOSEOUT

A. Provide technician to work with air balancing contractor and/or provide balancing contractor with necessary hardware to over-ride DDC controllers for air balancing.

B. Update graphics associated with RTU-5 to reflect 2-stage fan.

C. Provide documentation to demonstrate that new sequence associated with RTU-5 (2-stage fan control) is operational with no issues.

3.4 SEQUENCE OF OPERATION

A. Four Small tonnage rooftop units (RTU-30, RTU-31, RTU-32 and RTU-34)
1. Existing control sequences to remain.

B. Rooftop unit (RTU-5)
1. Modify existing control sequence to incorporate 2-stage fan speed control.

C. Rooftop unit (RTU-15)

1. Existing control sequences to remain.

D. AHU-1 / ACCU-10
   1. Existing control sequences to remain.

E. AHU-2 / ACCU-3 and ACCU-4
   1. Existing control sequences to remain.

END OF SECTION

SECTION 23 21 13

HYDRONIC PIPING

PART 1 GENERAL

1.1 SCOPE

A. This section contains specifications for all HVAC hydronic pipe and pipe fittings for this project. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Shop Drawings
      f. Quality Assurance
      g. Delivery, Storage, and Handling
      h. Design Criteria
   2. Part 2 – Products
      a. Heating Hot Water
      b. Cooling Coil Condensate
      c. Hydronic Valves
   3. Part 3 – Execution
      a. Erection
      b. Copper Pipe Joints
      c. Cooling Coil Condensate
      d. Shut-off Valves
      e. Balancing Valves
      f. Piping System Leak Tests
      g. Hydronic Piping System Flushing

1.2 RELATED WORK

A. Section 23 07 00 - HVAC Insulation

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this section.

1.4 REFERENCE STANDARDS

A. ANSI B16.22 Wrought Copper and Wrought Copper Alloy Solder Joint Pressure Fittings

B. ASTM B75 Seamless Copper Tube

C. ASTM B88 Seamless Copper Water Tube

1.5 SHOP DRAWINGS

A. Refer to division 1, General Conditions, Submittals.

B. Contractor shall submit schedule indicating the ASTM specification number of the pipe being proposed along with its type and grade and sufficient information to indicate the type and rating of fittings for each service.

C. Copper Tube
1. Statement from manufacturer on his letterhead that the pipe furnished meets the ASTM specification contained in this section.

1.6 QUALITY ASSURANCE

A. Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Promptly inspect shipments to insure that the material is undamaged and complies with specifications.

B. Offsite storage agreements will not relieve the contractor from using proper storage techniques.

C. Storage and protection methods must allow inspection to verify products.

1.8 DESIGN CRITERIA

A. Use only new material, free of defects, rust and scale, and meeting the latest revision of ASTM specifications as listed in this specification.

B. Construct all piping for the highest pressures and temperatures in the respective system in accordance with ANSI B31, but not less than 125 psig unless specifically indicated otherwise.

C. Where ASTM B88, type L hard temper copper tubing is specified, ASTM B88, type K hard temper copper tubing may be substituted at Contractor's option.

PART 2 PRODUCTS

2.1 HEATING HOT WATER

A. 2" and Smaller: ASTM A53, type F, standard weight (schedule 40) black steel pipe with ASTM A126/ANSI B16.4, class 125, standard weight cast iron threaded fittings.

B. Contractor may use ASTM B88 seamless, type L, hard temper copper tube with ANSI B16.22 wrought copper solder-joint fittings in lieu of steel pipe for all sizes. Mechanically formed tee

fittings may be used in lieu of wrought copper solder-joint tee fittings for branch takeoff up to one-half (1/2) the diameter of the main.

2.2 COOLING COIL CONDENSATE

A. ASTM B88, type L hard temper copper tubing with ASTM B145/ANSI B16.23 cast red bronze or ASTM B75/ANSI B16.29 wrought solder-type drainage fittings.

2.3 HYDRONIC VALVES

A. Ball Valve
   1. 2" and smaller: Two piece bronze body; threaded or soldered ends, as appropriate to the pipe material; stainless steel or chrome plated brass/bronze ball; conventional port; glass filled teflon seat; threaded packing gland follower; blowout-proof stem; 600 psig WOG.
   2. Valve stems shall allow operators to clear insulation without interference. Provide stem extensions when valve operators interfere with pipe insulation.

B. Balance Valve
   1. 2” and smaller: Bronze or copper alloy body with calibrated ball, globe or venturi/valve arrangement, integral pointer and calibrated scale to register degree of valve opening, memory stop, drain tapping, threaded or soldered ends, with or without integral unions, P/T or Shraeder pressure taps with integral check valves and seals, adjustable memory stop, suitable for 200 psig water working pressure at 250°F.
      a. Armstrong CBV, Bell & Gossett Circuit Setter Plus, Griswold Quickset, Nexus Orturi, Nibco 1710 Series, Taco Accu-Flo, Tour & Anderson STAS/STAD, Victaulic series 786/787.

PART 3 EXECUTION

3.1 ERECTION

A. Carefully inspect all pipe, fittings, valves, equipment and accessories before installation. Any items that are unsuitable, cracked or otherwise defective shall be rejected and removed from the job site immediately. Excluding minor surface rust, piping that exhibits significant oxidation or corrosion will be rejected.

B. Exercise care at every stage of storage, handling, laying and erecting to prevent entry of foreign matter into piping, fittings, valves, equipment and accessories. Do not erect or install any item that is not clean.

C. Remove all lose dirt, scale, oil, chips, burrs and other foreign material from the internal and external surfaces of all pipe and piping components prior to assembly, including debris associated with cutting, threading and welding.

D. During fabrication and assembly, remove slag and weld spatter from internal pipe surfaces at all joints by peening, chipping and wire brushing.

E. During construction, until system is fully operational, keep all openings in piping and equipment closed except when actual work is being performed on that item of the system. Use plugs, caps, blind flanges or other items designed for this purpose.

F. Furnish and install all flanges, caps, bypasses, drains, valves, etc. required to facilitate flushing and draining all heating and cooling system piping.

G. Install all piping parallel to building walls and ceilings and at heights which do not obstruct. Where interferences develop in the field, offset or reroute piping as required to clear such interferences. In all cases, consult drawings for exact location of pipe spaces, ceiling heights, door and window openings, or other architectural details before installing piping.

H. Mitered ells, notched tees, and orange peel reducers are not acceptable. On threaded piping, bushings are not acceptable.

I. Install all valves, control valves, and piping specialties, including items furnished by others, as specified and/or detailed. Make connections to all equipment installed by others where that equipment requires the piping services indicated in this section.

3.2 COPPER PIPE JOINTS

A. Remove all slivers and burrs remaining from the cutting operation by reaming and filing both pipe surfaces. Clean fitting and tube with emery cloth or sandpaper. Remove residue from the cleaning operation, apply flux, and assemble joint. Use 95-5 solder or brazing to secure joint as specified for the specific piping service.

B. Where mechanically formed tee fittings are allowed, form mechanically extracted collars in a continuous operation, consisting of drilling a pilot hole and drawing out the tube surface to form a collar having a height of not less than three times the thickness of the tube wall. Use an adjustable collaring device. Notch and dimple the branch tube. Remove all debris created by the forming process from the inside of the pipe. Braze the joint, applying heat properly so that pipe and tee do not distort; remove distorted connections.

3.3 COOLING COIL CONDENSATE

A. Trap each cooling coil drain pan connection with a trap seal of sufficient depth to prevent conditioned air from moving through the piping. Extend drain piping to nearest code approved drain location. Construct trap with plugged tee for cleanout purposes as detailed.

3.4 SHUT-OFF VALVES

A. Install shut-off valves at all equipment, at each branch take-off from mains, and at each automatic valve for isolation or repair.

3.5 BALANCING VALVES

A. Provide balancing valves for all major equipment and at each major branch takeoff and at the discharge of each pump as indicated on drawings and details.

3.6 PIPING SYSTEM LEAK TESTS

A. Not required.

3.7 HYDRONIC PIPING SYSTEM FLUSHING

A. Not required.

END OF SECTION

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SECTION 23 23 00

REFRIGERANT PIPING

PART 1 GENERAL

1.1 SCOPE

A. This section contains specifications for all Refrigerant piping for this project. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Shop Drawings
      f. Quality Assurance
      g. Delivery, Storage, and Handling
      h. Design Criteria
   2. Part 2 – Products
      a. Refrigerant Piping
      b. Refrigerant Piping Accessories
   3. Part 3 – Execution
      a. Preparation
      b. Erection
      c. Refrigerant Piping
      d. Refrigerant Piping Accessories

1.2 RELATED WORK

A. Section 23 07 00 - HVAC Insulation

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this section.

1.4 REFERENCE STANDARDS

A. ANSI B16.22 Wrought Copper and Wrought Copper Alloy Solder Joint Pressure Fittings

B. ASTM B88 Seamless Copper Water Tube

C. ASTM B280 Seamless Copper Tube for Air Conditioning and Refrigeration Field Service

D. ASHRAE 15 Safety Code for mechanical Refrigeration

1.5 SHOP DRAWINGS

A. Refer to division 1, General Conditions, Submittals.

B. Contractor shall submit schedule indicating the ASTM specification number of the pipe being proposed along with its type and grade and sufficient information to indicate the type and rating of fittings for each service.

C. Copper Tube:
   1. Statement from manufacturer on his letterhead that the pipe furnished meets the ASTM specification contained in this section.

1.6 QUALITY ASSURANCE

A. Order all copper refrigeration tube with each shipping unit marked with the purchase order number, metal or alloy designation, temper, size, and name of supplier; with soft straight lengths or coils identified with a tag indicating that the product was manufactured in accordance with ASTM B280; and with each hard temper straight length identified throughout its length by a blue colored marking not less than 3/16 inch in height and a legend at intervals of not greater than three feet that includes the designation "ACR" and pipe outside diameter.

B. Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Promptly inspect shipments to insure that the material is undamaged and complies with specifications.

B. Cover pipe to eliminate rust and corrosion while allowing sufficient ventilation to avoid condensation. Do not store materials directly on grade. Protect pipe, tube, and fitting ends so they are not damaged. Where end caps are provided or specified, take precautions so the caps remain in place. If end caps are not present on tube bearing the "ACR" designation, clean and re-cap in accordance with ASTM B280. Protect fittings, flanges, and unions by storage inside or by durable, waterproof, above ground packaging.

C. Offsite storage agreements will not relieve the contractor from using proper storage techniques.

D. Storage and protection methods must allow inspection to verify products.

1.8 DESIGN CRITERIA

A. Use only new material, free of defects and scale, and meeting the latest revision of ASTM specifications as listed in this specification.

B. Where ASTM B88, type L hard temper copper tubing is specified, ASTM B88, type K hard temper copper tubing may be substituted at Contractor's option.

PART 2 PRODUCTS

2.1 REFRIGERANT PIPING

A. ASTM B88 type L hard drawn copper tube, cleaned and capped in accordance with ASTM B280, and marked "ACR", with ANSI B16.22 wrought copper or forged brass solder-type fittings.

B. Precharged tubing line sets may be used on systems 3-1/2 tons and less in size.

2.2 REFRIGERANT PIPING ACCESSORIES

A. Provide all refrigerant piping specialties with a maximum working pressure of full vacuum to 450 psig and a maximum working temperature of 225 deg F. For systems using R-410A, provide all refrigerant piping specialties with a maximum working pressure of full vacuum to 850 psig and a maximum working temperature of 225 deg F.

B. Flexible pipe connectors: Double braided bronze hose flexible pipe connectors with solder end connections.

C. Filter Dryers: For circuits 15 tons and over provide angle pattern filter dryers with replaceable core. For circuits below 15 tons provide straight pattern filter dryers without replaceable core.

D. Sight glasses: Two piece brass construction with solder end connections. Include color indicator for sensing moisture.

E. Solenoid Valves: Two way normally closed with two piece brass body, full port, stainless steel plug, stainless steel spring, teflon diaphragm and solder end connections. Provide replaceable coil assembly.

F. Hot Gas Bypass Valves: Provide with integral solenoid valve, external equalizer connection and adjustable pilot assembly.

G. Thermostatic Expansion Valves: Brass body, bronze disc, neoprene seat, bronze bonnet, stainless steel spring and solder end connections.

H. Charging Valves: Provide ¼” SAE brass male flare access ports with finger tight, quick seal caps. Provide 2-inch long copper extension sections.

I. Check valves: Spring loaded type with bronze body, bronze disc, neoprene seat, bronze bonnet, stainless steel spring and solder end connections.

PART 3 EXECUTION

3.1 PREPARATION

A. Remove all foreign material from interior and exterior of pipe and fittings.

3.2 ERECTION

A. Install all piping parallel to building walls and ceilings and at heights which do not obstruct any portion of a window, doorway, stairway, or passageway. Where interferences develop in the field, offset or reroute piping as required to clear such interferences. In all cases, consult drawings for exact location of pipe spaces, ceiling heights, door and window openings, or other architectural details before installing piping.

B. Do not route piping through transformer vaults or above transformers, panelboards, or switchboards, including the required service space for this equipment, unless the piping is serving this equipment

C. This requirement is based on NFPA 70, 2014 450-47.

D. Do not install piping running through any elevator shaft, public stairway, stair landing, or means of egress.

E. Install all valves and piping specialties, including items furnished by others, as specified and/or detailed. Make connections to all equipment installed by others where that equipment requires the piping services indicated in this section.

3.3 REFRIGERANT PIPING

A. Refrigeration piping to be installed by firms who are experienced in installation of such piping and in accordance with the requirements of the International Mechanical Code, Chapter 11 and the Wisconsin Administrative Code Chapter SPS 345.

B. All brazing filler metals shall have a melting temperature above 1400 degrees F and contain a mimimum of 6% silver.

C. Tubing to be new and delivered to the job site with the original mill end caps in place. Clean and polish all joints before brazing. Avoid prolonged heating and burning during brazing. Purge all lines with nitrogen during brazing. Provide manual shut-off and check valves as required.

D. No refrigerant is to be vented directly to the atmosphere except that which may escape through leaks in the system during leak testing. During evacuation procedures, use equipment designed to recover and allow recycling of the refrigerant.

E. Leak test the system by charging the system to a pressure of 10 psig with an HFC refrigerant, with the compressor suction and discharge valves closed and with all other system valves open. Increase pressure to 300 psig with dry nitrogen. Rap all joints with a mallet and check for leaks with an electric leak detector having a certified sensitivity of at least one ounce per year. Seal any leaks that may be found and retest.

F. After completion of the leak test, evacuate the system with a vacuum pump to an absolute pressure not exceeding 1500 microns while the system ambient temperature is above 60°F. Break the vacuum to 2 psig with the refrigerant to be used in the system. Repeat the evacuation process, again breaking the vacuum with refrigerant. Install a drier of the required size in the liquid line, open the compressor suction and discharge valves, and evacuate to an absolute pressure not

exceeding 500 microns. Leave the vacuum pump running for not less than two hours without interruption. Raise the system pressure to 2 psig with refrigerant and remove the vacuum pump.

G. Charge refrigerant directly from original drums through a combination filter-drier. Each drier may be used for a maximum of three cylinders of refrigerant and then must be replaced with a fresh drier. Charge the system by means of a charging fitting in the liquid line. Weigh the refrigerant drum before charging so that an accurate record can be kept of the weight of refrigerant put in the system. If refrigerant is added to the system through the suction side of the compressor, charge in vapor form only.

3.4 REFRIGERANT PIPING ACCESSORIES

A. Install accessories in accordance with the manufacturer's written instructions and recommendations.

END OF SECTION

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SECTION 23 31 00

HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SCOPE

A. This section includes specifications for all duct systems used on this project. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Quality Assurance
      f. Shop Drawings
      g. Design Criteria
   2. Part 2 – Products
      a. General
      b. Ductwork Pressure Class
      c. Materials
      d. Low Pressure Ductwork (Maximum 2 inch pressure class)
      e. Duct Sealant
      f. Gaskets
   3. Part 3 – Execution
      a. Installation
      b. Low Pressure Duct (Maximum 2 inch pressure class)
      c. Cleaning

1.2 RELATED WORK

A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this Section.

1.4 REFERENCE STANDARDS

A. ASTM International
   1. ASTM A90 Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles
   2. ASTM A623 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
   3. ASTM A527 Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality

4. ASTM 924 Standard Specification for General Requirements for Sheet Steel, Metallic-coated by the Hot-dip Method
5. ASTM C 411 Test Method for Hot Surface Performance of High Temperature Thermal Insulation
6. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials
7. ASTM C 916 Standard Specification for Adhesives for Duct Thermal Insulation

B. NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems

C. ANSI SS-EN 485-2 Aluminum and Aluminum Alloys-Sheet, Strip and Plate-Part 2: Mechanical Properties

D. UL 181 Standard for Safety for Factory Made Air Ducts and Air Connectors.

E. NAIMA Fibrous Glass Duct Liner Standard

1.5 QUALITY ASSURANCE

A. Refer to division 1, General Conditions, Equals and Substitutions.

1.6 SHOP DRAWINGS

A. Refer to Division 1, General Conditions, Submittals.
1. Include manufacturer's data and/or Contractor data for the following:
a. Schedule of duct systems including material of construction, gauge, pressure class, system class, method of reinforcement, joint construction, fitting construction, and support methods, all with details as appropriate.
b. Duct sealant and gasket material.
c. Duct liner including data on thermal conductivity, air friction correction factor, and limitation on temperature and velocity.

1.7 DESIGN CRITERIA

A. Construct all ductwork to be free from vibration, chatter, objectionable pulsations and leakage under specified operating conditions.

B. Use material, weight, thickness, gauge, construction and installation methods as outlined in the following SMACNA publications, unless noted otherwise:
1. HVAC Duct Construction Standards, Metal and Flexible, 3rd Edition, 2005
2. HVAC Air Duct Leakage Test Manual, 2nd Edition, 2012
3. HVAC Systems - Duct Design, 4th Edition, 2006
4. Rectangular Industrial Duct Construction Standard, 2nd Edition, 2004
5. Round Industrial Duct Construction Standards, 2nd Edition, 1999
6. Thermoplastic Duct (PVC) Construction Manual, 2nd Edition, 1995

C. Use products which conform to NFPA 90A, possessing a flame spread rating of not over 25 and a smoke developed rating no higher than 50.

1.8 DELIVERY, STORAGE AND HANDLING

A. Promptly inspect shipments to ensure that Ductwork is undamaged and complies with the specification.

B. Protect Ductwork against damage.

C. Protect Ductwork by storing inside or by durable, waterproof, above ground packaging. Do not store material on grade. Protect Ductwork from dirt, dust, construction debris and foreign material. Where end caps/packaging are provided, take precautions so caps/packaging remain in place and free from damage.

D. Offsite storage agreements do not relieve the contractor from using proper storage techniques.

E. Storage and protection methods must allow inspection to verify products.

PART 2 PRODUCTS

2.1 GENERAL

A. All sheet metal used for construction of duct shall be 24 gauge or heavier except for round and spiral ductwork and spiral duct take-offs 12” and below may be 26 gauge where allowed in SMACNA HVAC Duct Construction Standards, Metal and Flexible, 3rd Edition, 2005.

B. Duct sizes indicated on plans are net inside dimensions; where duct liner is specified, dimensions are net, inside of liner.

2.2 DUCTWORK PRESSURE CLASS

A. Minimum acceptable duct pressure class, for all ductwork except transfer ductwork, is 2 inch W.G. positive or negative, depending on the application. Transfer ductwork minimum acceptable duct pressure class is 1 inch W.G. positive or negative, depending on the application.

2.4 MATERIALS

A. Galvanized Steel Sheet
   1. Use ASTM A 653 galvanized steel sheet of lock forming quality. Galvanized coating to be 1.25 ounces per square foot, both sides of sheet, G90 in accordance with ASTM A90. Provide “Paint Grip” finish or galvanneal sheetmetal for ductwork that will be painted.

2.5 LOW PRESSURE DUCTWORK (Maximum 2 inch pressure class)

A. Fabricate and install ductwork in sizes indicated on the drawings and in accordance with SMACNA recommendations, except as modified below.

B. Construct so that all interior surfaces are smooth. Use slip and drive or flanged and bolted construction when fabricating rectangular ductwork. Use spiral lock seam construction when fabricating round spiral ductwork. Sheet metal screws may be used on duct hangers, transverse

joints and other SMACNA approved locations if the screw does not extend more than 1/2 inch into the duct.

C. Use elbows and tees with a center line radius to width or diameter ratio of 1.5 wherever space permits. When a shorter radius must be used due to limited space, install single wall sheet metal splitter vanes in accordance with SMACNA publications, Type RE 3. Where space will not allow and the C value of the radius elbow, as given in SMACNA publications, exceeds 0.31, use rectangular elbows with turning vanes as specified in Section 23 33 00. Square throat-radius heel elbows will not be acceptable. Straight taps or bullhead tees are not acceptable.

D. Where rectangular elbows are used, provide turning vanes in accordance with Section 23 33 00.

E. Provide expanded take-offs or 45 degree entry fittings for branch duct connections with branch ductwork airflow velocities greater than 700 fpm. Square edge 90-degree take-off fittings or straight taps will not be accepted.

F. Button punch snaplock construction will not be accepted on aluminum ductwork.

G. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

2.6 DUCT SEALANT

A. Manufacturer: 3M 800, 3M 900, H.B. Fuller/Foster, Hardcast, Hardcast Peal & Seal, Lockformer cold sealant, Mon-Eco Industries, United Sheet Metal, or approved equal. Silicone sealants are not allowed in any type of ductwork installation.

B. Install sealants in strict accordance with manufacturer's recommendations, paying special attention to temperature limitations. Allow sealant to fully cure before pressure testing of ductwork, or before startup of air handling systems.

2.7 GASKETS

A. 2 inch pressure class and lower
   1. Soft neoprene or butyl gaskets in combination with duct sealant for flanged joints.

PART 3 EXECUTION

3.1 INSTALLATION

A. Verify dimensions at the site, making field measurements and drawings necessary for fabrication and erection. Check plans showing work of other trades and consult with Architect in the event of any interference.

B. Make allowances for beams, pipes or other obstructions in building construction and for work of other contractors. Transform, divide or offset ducts as required, in accordance with SMACNA HVAC Duct Construction Standards, Figure 4-7, except do not reduce duct to less than six inches

in any dimension and do not exceed an 8:1 aspect ratio. Where it is necessary to take pipes or similar obstructions through ducts, construct easement as indicated in SMACNA HVAC Duct Construction Standards, Figure 4-8, Fig. E. In all cases, seal to prevent air leakage. Pipes or similar obstructions may not pass through high pressure or fume exhaust ductwork.

C. Test openings for test and balance work will be provided under Section 23 05 93.

D. Provide frames constructed of angles or channels for coils, filters, dampers or other devices installed in duct systems, and make all connections to such equipment including equipment furnished by others. Secure frames with gaskets and screws or nut, bolts and washers.

E. Install duct to pitch toward outside air intakes and drain to outside of building. Solder or seal seams to form watertight joints.

F. Where two different metal ducts meet, the joint shall be installed in such a manner that metal ducts do not contact each other by using proper seal or compound.

G. Install all motor operated dampers and connect to or install all equipment furnished by others. Blank off all unused portions of louvers, as indicated on the drawings, with 1-1/2 inch board insulation with galvanized sheet metal backing on both sides.

H. Do not install ductwork through dedicated electrical rooms or spaces unless the ductwork is serving this room or space.

I. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

J. Provide adequate access to ductwork for cleaning purposes.

K. Provide temporary capping of ductwork openings to prevent entry of dirt, dust and foreign material.

L. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 DUCTWORK SUPPORT

A. Support ductwork in accordance with SMACNA HVAC Duct Construction Standards, Figure 5-5, except supporting ductwork with secure wire method is not allowed.

B. Support with 3/32 inch, 7 x 7, stainless steel air-craft cable, with matching serrated spring loaded wedge mechanism fasteners rated for actual load. Steel cable hanging systems will be allowed on round ductwork under 12 inches diameter if installed utilizing two fasteners with two cable loops. Comply with the manufacturer’s installation instructions.

3.3 LOW PRESSURE DUCT (Maximum 2 inch pressure class)

A. Seal all duct, with the exception of transfer ducts, in accordance with SMACNA seal class "A"; all seams, joints, and penetrations shall be sealed.

B. Install a manual balancing damper in each branch duct and for each diffuser or grille. The use of splitter dampers, extractors, or grille face dampers will not be accepted for balancing dampers.

C. Hangers must be wrapped around bottom edge of duct and securely fastened to duct with sheetmetal screws or pop rivets. Trapeze hangers may be used at contractor's option.

END OF SECTION

SECTION 23 62 13

PACKAGED AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSING UNITS

PART 1 GENERAL

1.1 SCOPE

A. This section includes specifications for air cooled condensing units for use with split system type air conditioning. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Quality Assurance
      f. Submittals
      g. Operation and Maintenance Data
      h. Delivery, Storage and Handling
      i. Warranty
   2. Part 2 – Product
      a. Units up to 5 Tons
      b. Units 6 to 15 Tons
   3. Part 3 – Execution
      a. Installation
      b. Controls
      c. Electrical
      d. Startup
      e. Training

1.2 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC

1.3 REFERENCE

A. Applicable provisions of Division 1 shall govern work under this section.

1.4 REFERENCE STANDARDS

A.	ARI 210/240	Unitary Air Conditioning and Heat Pump Equipment
B.	ARI 365	Commercial and Industrial Unitary Air Conditioning Condensing Units
C.	ASHRAE 15	Safety Standard for Refrigeration Systems
D.	ASHRAE 90.1	(2004 edition)Energy Standard for Buildings Except Low Rise Residential Buildings

E. NEC National Electrical Code

F. ASTM B117 Standard Practice for Operating Salt Spray (fog) Apparatus

G. UL Underwriters Laboratory

1.5 QUALITY ASSURANCE

A. Refer to Division 1, General Conditions, Equals and Substitutions.

B. Unit Energy Efficiency Ratio (EER), Coefficient of Performance (COP) and Integrated Part Load Value (IPLV) shall meet the minimum applicable requirements of ASHRAE 90.1(2004 edition). Units that are labeled ENERGY STAR® will be acceptable.

C. Rate unit performance in accordance with the latest edition of ARI Standard 365 or ARI Standard 210/240, whichever is applicable for the equipment.

D. Construct units in accordance with ASHRAE 15, UL standards and the NEC. Units shall carry the UL label.

E. Factory run test units to see that each control device operates properly. Pressure test, evacuate, charge with holding charge of refrigerant and full oil charge prior to shipping from the factory.

1.6 SUBMITTALS

A. Refer to Division 1, General Conditions, Submittals

B. Submit air cooled condensing unit shop drawings including the following information: specific manufacturer and model numbers, dimensional and weight data, required clearances, materials of construction, capacities and ratings, stages of unloading capacity achievable without hot gas bypass (and with hot gas bypass if applicable), refrigerant type and charge, component information, size and location of piping connections, electrical connections, wiring diagrams and information for all specialties and accessories.

C. Submit manufacturer's installation and start-up instructions, maintenance data, troubleshooting guide, parts lists, controls and accessories.

D. At substantial completion, submit warranty certificate and copy of start-up report.

1.7 OPERATION AND MAINTENANCE DATA

A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.8 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's instructions for storing, rigging, unloading, and transporting units. Protect units from physical damage. Leave factory-shipping covers in place until installation.

B. Ship units to jobsite fully assembled

1.9 WARRANTY

A. Provide a one-year parts and labor warranty on the entire unit beginning upon substantial completion of project.

B. Provide a five-year parts warranty on the compressor(s) beginning upon substantial completion of project.

PART 2 PRODUCTS

2.1 UNITS UP TO 5 TONS

A. Manufacturers: Carrier, Daikin, Trane or approved equal.
1. Provide factory assembled, outdoor mounted, air-cooled condensing unit suitable for on grade or rooftop installation. Include compressor, air cooled condenser, refrigerant, lubrication system, interconnecting wiring, safety and operating controls, motor starting components and additional features as specified herein or required for safe, automatic operation. Capacity and steps of unloading as indicated in the equipment schedule. Refrigerant shall be R-410A.

B. CABINET
1. Construct cabinet of heavy gauge, galvanized steel coated with weather resistant paint. Provide removable access panels to facilitate full access to the compressor, fan and control components.

C. COMPRESSOR
1. Provide hermetic reciprocating or scroll type compressor with built in motor winding temperature and current protection, liquid and suction service valves, gage ports, sight glass and liquid line filter dryer. Provide crankcase heater with reciprocating type compressors. Mount compressors on vibration isolators.

D. CONDENSER
1. Provide condenser coils with aluminum alloy plate fins mechanically fastened to seamless copper tubing with integral subcooler. Construct coils with design working pressure suitable for the refrigerant.
2. Provide direct-drive statically and dynamically balanced propeller type fans with vertical or horizontal discharge as indicated on the drawings and guards constructed of heavy gage PVC coated wire or galvanized steel.

E. POWER WIRING
1. Provide factory installed 24-volt control circuit with fusing; control power transformer and all associated internal wiring. Provide a single point power connection to the unit(s). Provide factory installed magnetic contactors for compressor and condenser motors.
2. Electrical characteristics shall be as indicated in the equipment schedule.

F. CONTROLS
1. Provide a terminal strip for external control of compressor stages for field provided controls.
2. Provide high/low refrigerant pressure cutouts with manual reset and anti-short cycle compressor timer.
3. Unit must be capable of operating down to ambient temperature of 40 deg F. Provide low ambient lockout to prevent compressor from operating below 40 degrees.

2.2 UNITS 6 TO 15 TONS

A. Manufacturers: Carrier, Daikin, Trane or approved equal.

B. Provide factory assembled, outdoor mounted, air-cooled condensing unit suitable for on grade or rooftop installation. Include compressor(s), air cooled condenser, refrigerant, lubrication system, interconnecting wiring, safety and operating controls, motor starting components and additional features as specified herein or required for safe, automatic operation. Capacities, number of refrigeration circuits, steps of unloading and minimum capacity without hot gas bypass shall be as indicated in the equipment schedule. Refrigerant is to be R-410A.

C. CABINET
1. Construct cabinet of heavy gauge, galvanized steel coated with paint. Cabinet must meet the 500-hour salt spray exposure test in accordance with ASTM B117. Provide lifting holes to facilitate rigging and access panels to facilitate access to all-internal areas of unit that require service or repair.

D. COMPRESSORS
1. Provide scroll hermetic type or reciprocating type compressors.
2. Scroll compressors: Direct drive suction cooled motor with built in motor temperature and current protection. Provide oil pump with dirt separator, sight glass, liquid line filter dryer, crankcase heater, liquid line and gas line service valves with gage ports.
3. Reciprocating Compressors: Hermetic or semi hermetic compressors with built in temperature and current protection, liquid line, suction line and discharge line service valves with gage ports, liquid line filter drier, sight glass and crankcase heater. Provide oil level site glass on semi hermetic units. Mount compressors on vibration isolators.

E. CONDENSER
1. Provide condenser coils with aluminum alloy plate fins mechanically fastened to seamless copper tubing with integral subcooler. Construct coils with design working pressure suitable for the refrigerant.
2. Provide direct-drive statically and dynamically balanced propeller type fans with vertical discharge and guards constructed of heavy gage PVC coated wire or galvanized steel.

F. POWER WIRING
1. Provide factory installed 24-volt control circuit with fusing, control power transformer and all associated internal wiring. Provide a single point power connection to the unit(s). Provide factory installed magnetic contactors for compressor and condenser motors. Electrical characteristics shall be as indicated in the equipment schedule.

G. CONTROLS
1. Provide a terminal strip for external control of compressor stages for field provided controls.
2. Provide high/low refrigerant pressure cutouts with manual reset and anti-shortcycle compressor timer.
3. Unit must be capable of operating down to ambient temperature of 40 deg F. Provide low ambient lockout to prevent compressor from operating below 40 degrees.

2.3 REFRIGERANT PIPING SIZING

A. The unit manufacturer shall provide the final refrigeration pipe sizing process to insure conformance to specific unit requirements such as max lengths, refrigerant velocities, unloading considerations and proper oil return. This contractor shall provide refrigeration piping drawings from the field which details the way the piping will actually be installed.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install units, piping and accessories in accordance with the manufacturer's written instructions and recommendations.

B. Units shall be mounted a minimum of 10'-0" from any roof edge.

C. Mount unit(s) on treated 4x4 lumber with lag screws. 4x4 lumber shall sealed with an exterior rated paintable water-repellant sealer/preservative prior to installation. 4x4 lumber shall be set on EPDM rubber roof pads to protect existing roof membrane

D. Maintain adequate service access and airflow clearances for all components as recommended by the manufacturer and as indicated on the drawings.

E. Charge unit(s) with full oil charge and refrigerant charge based on the entire refrigeration system pipe size and length.

3.2 CONTROLS

A. New units replace existing units. Control of the new units shall match the control of the existing units.

B. Existing control wiring can be used, if applicable, for the new units. If new control wiring is required, provide all control wiring in conduit in compliance with Section 23 09 23.

3.3 ELECTRICAL

A. New units replace existing units. The capacity (nominal tons) of the new units shall match the existing (removed) units. New units shall have the same voltage, phase and breaker size of the existing units. Coordinate requirements with existing conditions.

3.4 STARTUP

A. Adjust units for maximum operating efficiency, adjust all controls to required final settings and demonstrate that all components are functioning properly. Submit four copies of a written startup report following the initial startup. Include in the report: work done to the system, all readings taken, a statement certifying that the refrigeration system(s) are leak free and a statement certifying that the unit(s) have been placed in proper running condition as recommended by the manufacturer and as intended in the drawings and specifications.

3.5 TRAINING

A. Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of 4 hours.

END OF SECTION

SECTION 23 75 30

PACKAGED ROOFTOP AIR CONDITIONG UNITS

PART 1 GENERAL

1.1 SCOPE

A. This section contains specifications for all Refrigerant piping for this project. Included are the following topics:
   1. Part 1 – General
      a. Scope
      b. Related Work
      c. Reference
      d. Quality Assurance
      e. Delivery, Storage and Handling
      f. Design Criteria
      g. Shop Drawings
      h. Warranties
   2. Part 2 – Products
      a. Manufacturers
      b. General
      c. Unit Cabinet -Single Wall Type
      d. Supply Fan, Motor and Control
      e. Gas Heating Section
      f. Evaporator Coils
      g. Refrigeration System
      h. Air Cooled Condensers
      i. Controls
      j. Unit Electrical
      k. Unit Filter Section
      l. Economizer
      m. Smoke Detector
      n. Roof Curbs
   3. Part 3 – Execution
      a. Installation
      b. Roof Curbs
      c. Start-Up

1.2 RELATED WORK

A. Section 23 05 00 – Common Work Results for HVAC

B. Section 23 05 13 – Common Motor Requirements for HVAC Equipment

C. Section 23 07 00 - HVAC Insulation

D. Section 23 09 23 – Direct Digital Controls System

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this section.

1.4 QUALITY ASSURANCE

A. Substitution of Materials: Refer to Division 1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Promptly inspect shipments to insure that the material is undamaged and complies with specifications.

B. Offsite storage agreements will not relieve the contractor from using proper storage techniques.

C. Storage and protection methods must allow inspection to verify products.

1.6 DESIGN CRITERIA

A. Units shall be certified in accordance with ARI Standard 210.

B. Heating system shall be certified by the American Gas Association (AGA).

1.7 SHOP DRAWINGS

A. Submit shop drawings for all equipment specified under this section. Include data concerning sizes, dimensions, weights, heating capacities, materials of construction, ratings, electrical data, wiring diagrams, controls, options and manufacturers installation requirements, instructions and recommendation.

1.8 WARRANTIES

A. Refrigeration compressors shall have a 5 year warranty on parts.

B. The gas heat exchanger shall have a 25 year non-prorated warranty.

PART 2 PRODUCTS

2.1 GENERAL

A. Manufacturers:
1. Aaon, Carrier, Daikin, Johnson Controls, Trane or prior approved equal.
2. The basis of design is Trane.

B. Units shall be designed for roof curb mounting outdoors as shown on the drawings and shall consist of compressors, condensers, evaporator coils, condenser, exhaust and evaporator fans, refrigeration and factory installed temperature controls, filters, exhaust, return and outdoor air dampers and outdoor airflow monitoring stations. Units shall be designed internally for down discharge application.

C. Air dampers shall be of the low leakage type and certified not to exceed 3 CFM square foot face area leakage at 1" water column static pressure differential when closed.

D. Units shall be factory assembled and tested, piped, internally wired and fully charged with refrigerant and oil and shipped in one piece. Units shall be factory run tested.

E. All control and power wiring shall be numbered. Wiring shall be connected to numbered wiring terminals. Electrical components shall bear U.L. approval.

F. All fans and compressors shall have spring type vibration isolators.

2.2 UNIT CABINET – SINGLE WALL TYPE

A. The unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked enamel finish. Cabinet interior shall be insulated with 1" thick neoprene coated fiberglass. Cabinet panels shall be easily removable for service access to all operating components. A condensate drain connection for the indoor coil shall be provided.

2.3 SUPPLY FAN, MOTOR AND CONTROL

A. Direct Drive Fan
   1. Indoor fans shall be direct drive plenum or forward curved style fans as scheduled. Fan motor shall be premium efficiency and fans shall have permanently lubricated bearings.
   2. System to be dynamically balanced and include rubber vibration isolators.
   3. Fan control (constant volume, variable volume, ECM motor, variable frequency drive, etc.) shall be as indicated on the drawings.

2.4 GAS HEATING SECTION

A. Aluminum heat exchanger with multiple concavities, an induced draft blower and an electronic pressure switch to lockout the gas valve until the combustion chamber is purged and combustion airflow is established.

B. Furnace shall include a gas ignition system consisting of an electronic igniter to a pilot system, which will be continuous when the heater is operating, but will shut off the pilot when heating is not required.

C. Unit shall include a single gas connection and have gas supply piping entrances in the unit base for through-the-curb gas piping and in the outside cabinet wall for across the roof gas piping.

D. Provide with stages of capacity as scheduled.

2.5 EVAPORATOR COILS

A. Indoor and outdoor coils shall be of non-ferrous construction with aluminum plate fins mechanically bonded to seamless copper tubes with brazed joints. Evaporator coil shall be full face active design to allow proper variable volume part load control.

2.6 REFRIGERATION SYSTEM

A. Refrigeration system shall be factory charged and designed for use with R-410A refrigerant.

B. Compressors shall be scroll type with thermal overload protection and stages of capacity as scheduled.

C. Compressors to have vibration isolation and a factory installed crankcase heater.

D. Unit shall be furnished with scheduled number of compressors and circuits.

E. Each refrigeration circuit shall include an expansion valve for refrigerant flow control and liquid line sight glass.

F. Each refrigeration circuit shall include low and high pressure switches, overloads, anti-recycle timing device, Schrader type service fittings on both low and high pressure sides, factory installed replaceable core liquid line filter driers and adjustable low ambient lockout.

2.7 AIR COOLED CONDENSORS

A. Fans shall be vertical discharge.

B. Coils shall be multi-pass and fabricated with aluminum microchannel tubes.

C. Condenser fans shall use electronically communicated fan motors controlled via head pressure. Fans shall continually modulate based on head pressure with mechanical cooling operation to a minimum of 35 deg. F. Provide adjustable lockout.

2.8 CONTROLS

A. Unit will be controlled by the building automation system.

B. Provide terminal strip controls for integration into the existing building automation system.

C. See control drawings and Section 23 09 23

2.9 UNIT ELECTRICAL

A. All internal electrical components shall be pre-wired for single point power connection and include unit non-fused disconnect switch with lock out, tag out provisions. Units shall have electrical characteristics as specified on the equipment schedule, and shall allow either aluminum or copper main conductors to be connected to terminal block power connections. Provide a factory installed and fused 115V convenience outlet to facilitate servicing of unit. Outlet shall be powered, when power is “off” to unit. Unit shall allow utility connections within roof curb perimeter or through the unit cabinet.

B. Each poly-phase motor and compressor shall be protected against overcurrent and single phasing conditions requiring manual reset. Over temperature protection with automatic reset shall be provided on all motors

C. Each unit shall be provided with a code compliant disconnect.

D. New units replace existing units. The capacity (nominal tons) of the new units shall match the existing (removed) units. New units shall have the same voltage, phase and breaker size of the existing units. Coordinate requirements with existing conditions.

2.10 UNIT FILTER SECTION

A. Provide minimum MERV 8 filters in unit.

B. Standard filter section shall consist of low velocity, disposable media type filters. Filter face velocity shall not exceed 300 FPM at nominal airflows. Provide one extra set of air filters. Filter types and arrangements shall be as specified on the plan schedule.

2.11 ECONOMIZER

A. All units shall include outdoor air modulating control for "free cooling" operation. Economizer control shall:

B. Contain low leak damper.

C. Contain a spring return motor to close dampers during power failure.

D. Use 100% outside air during integrated (simultaneous) economizer and mechanical cooling when enthalpy permits.

E. Utilize discharge air sensor and enthalpy change-over for damper control. When below enthalpy setpoint, reset damper to minimum position during mechanical cooling.

F. Contain adjustable outdoor air thermostat to lock out mechanical cooling when outdoor air is below the setpoint.

2.12 POWER EXHAUST

A. As indicated on the drawings, include integral exhaust fan with fan drive, 1750 rpm motor, overload protection, and backdraft damper. Exhaust shall be permitted to operate only in conjunction with the unit economizer to maintain proper building pressure. Static pressure controller shall stop fans if building static drops below setting.

2.13 SMOKE DETECTOR

A. Provide return air smoke detector for each rooftop unit.

B. Unit shall shut down on trip of smoke detector, requiring a manual reset.

2.14 ROOF CURBS

A. Units will need to be mounted on existing roof curbs that are currently flashed in to the existing roof.

B. Provide custom roof curb adaptor, as required for each rooftop unit application to mate the new rooftop unit, to the existing roof curb (flashed into the existing roof). Provide custom

curb adaptor for each application that will offset from existing curb dimensions to new unit dimensions.

C. Constructed of not less than 18 gauge galvanized steel reinforced so it is structurally capable of supporting the intended load with no penetrations through the curb flashing, inside and outside corner sections that are mitered and continuously welded, filled with 3 pound density rigid fiberglass insulation,, nominal two inch wood nailer, galvanized steel counter flashing.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide a weatherproof fusible electrical disconnect switch with fuses to disconnect all electrical power to unit.

B. Unit and roof curbs shall be installed and operated in strict accordance with the Manufacturer's instructions.

C. Provide flexible connections at each duct connection.

D. Mount the units level.

E. Fan drive sheaves shall be adjusted or replaced by the Contractor at the job site to provide the design air volumes.

F. Install smoke detector in return air duct at unit.

3.2 ROOF CURBS

A. Secure bottom of curb adaptor to existing roof curb. Secure equipment to curb in accordance with equipment manufacturer's instructions..

B. The interior space within the unit roof curbing shall be sound deadened with layers of insulation and drywall sheets.

3.3 START UP

A. Unit manufacturer shall provide services of factory trained serviceman to supervise installation and initial startup and adjustment. 4 copies of written service report shall be submitted to Engineer following initial startup, signed by serviceman responsible for performing startup and adjustment work. It shall state work completed, indicate readings taken and state unit has been placed in proper running condition as recommended by unit manufacturer.

END OF SECTION

SECTION 23 82 00

HEATING AND COOLING TERMINAL UNITS

PART 1 GENERAL

1.1 SCOPE

A. This section includes specification for heating and cooling terminal equipment using water and/or steam as the source. Included are the following topics:
   1. Part One – General
      a. Scope
      b. Related Work
      c. Reference
      d. Reference Standards
      e. Quality Assurance
      f. Shop Drawings
      g. Operation and Maintenance Data
      h. Design Criteria
   2. Part 2 – Products
      a. Blower Coil Units
   3. Part 3 – Execution
      a. Installation
      b. Blower Coil Units

1.2 RELATED WORK

A. Section 23 05 13 - Common Motor Requirements for HVAC Equipment

1.3 REFERENCE

A. Applicable provisions of Division 1 govern work under this Section.

1.4 REFERENCE STANDARDS

A. ARI 210 Standard for Unitary Air-Conditioning Equipment

B. ARI 410 Standard for Forced-Circulation Air-Cooling and Air-Heating Coils

C. CS 140

1.5 QUALITY ASSURANCE

A. Refer to division 1, General Conditions, Equals and Substitutions

1.6 SHOP DRAWINGS

A. Refer to division 1, General Conditions, Submittals.

B. Include dimensions, capacities, materials of construction, ratings, weights, wiring diagrams, and appropriate identification for all equipment in this section. Include color selection chart where applicable.

1.7 OPERATION AND MAINTENANCE DATA

A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.8 DESIGN CRITERIA

A. Forced Circulation Coils: Ratings certified in accordance with ARI 410.

B. Electrical Equipment and heaters shall be UL listed for the service specified.

C. Electrical components and work must be in accordances with National Electrical Code.

PART 2 PRODUCTS

2.1 BLOWER COIL UNITS

A. Manufacturers: Envirotec, VTS, Carrier or Trane

B. Unit types and arrangements as specified on Drawing Schedule.

C. Units to have 18 gauge steel cabinet with 1” thick 1.6 lb/cubic foot density scrim reinforced foil faced insulation. Access door shall be hinged with lift and turn fasteners.

D. Furnish with separate hot water coil (or electric heating coil) and direct expansion refrigerant coil, with the hot water coil (or electric heating coil) in the reheat position. All coils shall be seamless copper tubes with collared aluminum fins. Water coils shall be provided with a manual air vent fitting to allow for coil venting. Valve core type vent fittings shall not be accepted. All coils shall have aluminum fins and 0.016" tube wall thickness.

E. All coils shall be hydrostatically tested with air under water at 450 PSIG minimum pressure and rated for a maximum of 450 PSIG working pressure at 200°F.

F. Provide with welded stainless-steel sloped condensate drain pan. Condensate pan shall be insulated.

G. Use direct drive centrifugal type fans, statically and dynamically balanced for operation without objectionable noise and vibration. Mount fan assembly on rubber isolators.

H. Fan motors shall be electronically commutated with thermal overload protection and a constant torque operation. Motors shall feature permanently lubricated ball bearings and operate on three or single phase power.

I. The unit fan motor shall be completely factory wired to an external electrical enclosure. Each unit shall include fan control package with 24 volt control voltage. Each unit shall include a motor control board, motor circuit fusing, control circuit transformer and terminal strip for connection of field wiring. Motor shall be capable of speed modulation via a 0-10 vdc signal from the building automation system. Provide with a non-fused disconnect.

J. Furnish each unit with filter rack and 2" MERV 8 filters. Provide additional spare set of filters.

K. Provide ducted units with air inlet and outlet duct collars.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's installation instructions.

B. Maintain all code required clearances in front of electrical devices.

C. Install branch water piping to each unit with minimum of 2 elbows to allow for expansion and contraction of piping system.

D. Coordinate location of units with other trades.

E. After installation, provide protective covers to prevent accumulation of dirt on units during balance of construction.

F. Mount units in locations indicated on Drawings and as detailed. Install drain valve on coil side of shutoff valves for each hot and chilled water coil.

END OF SECTION

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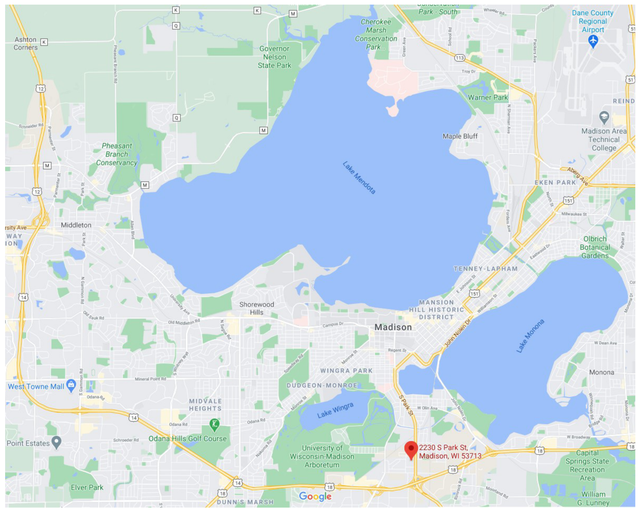
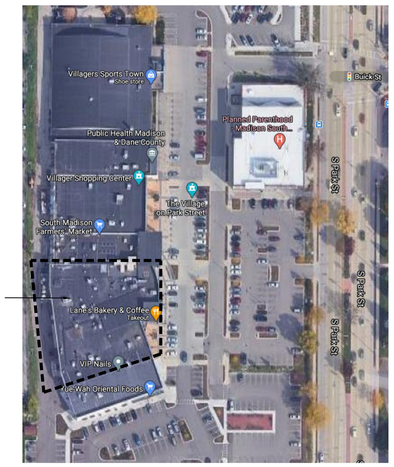
HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH DANE COUNTY AND MADISON
SOUTH MADISON OFFICE
MADISON, WISCONSIN

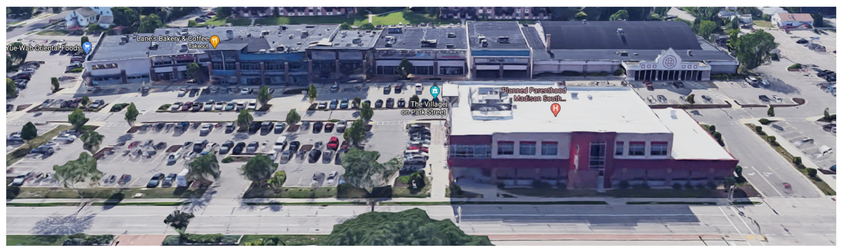
CONSTRUCTION DOCUMENTS

JUNE 15TH, 2021

DANE COUNTY RFB#: 321010







TENANT:

DANE COUNTY PUBLIC WORKS

1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713

CONSULTANT:

JDR ENGINEERING, INC.

5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
PHONE : 608-277-1728
JDR PROJECT NO. : 21.0065

BUILDING LOCATION:

Villager Shopping Center
2230 S. Park St.
Madison, WI 53713

SHEET INDEX:

ABBREVIATIONS

ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
ACU	AIR CONDITIONING UNIT
AD	ACCESS DOOR
ADJ	ADJUSTABLE
A/E	ARCHITECT/ENGINEER
AF	AIR FOIL
AFF	ABOVE FINISHED FLOOR
AFMS	AIR FLOW MEASURING STATION
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AMP	AMPERE
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ASC	ABOVE SUSPENDED CEILING
ATR	AIR TROFFER - RETURN
ATS	AIR TROFFER - SUPPLY
AUTO	AUTOMATIC
B	BOILER
BB	BASEBOARD
BC	BOOSTER COIL
BCU	BLOWER COIL UNIT
BDD	BACK DRAFT DAMPER
BHP	BRAKE HORSEPOWER
BI	BACKWARD INCLINED
BLDG	BUILDING
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STRUCTURE
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
C	CONVECTOR
CA	COMBUSTION AIR
CAB	CABINET
CCC	COOLING COIL CONDENSATE
CD	CEILING DIFFUSER
CF	CEILING (DESTRATIFICATION) FAN
CFM	CUBIC FEET PER MINUTE
CL	CENTERLINE
CLG	CEILING
CMU	CONCRETE MASONARY UNIT
COMB	COMBINATION OR COMBUSTION
CONC	CONCRETE
COND	CONDENSATE
CONTR	CONTRACTOR
COP	COEFFICIENT OF PERFORMANCE
CP	CONDENSATE PUMP
CU	COPPER
CUH	CABINET UNIT HEATER
CW	COLD WATER
D	DRAIN
DB	DRY BULB
DC	DRY COOLER
DCO	DOOR CUTOFF BY GC
DDC	DIRECT DIGITAL CONTROL
DEPT	DEPARTMENT
DG	DOOR GRILLE BY GC
DIA	DIAMETER
DN	DOWN
DSA	DUCT SOUND ATTENUATOR
DSF	DESTRATIFICATION FAN
DWD	DUAL WALL DUCTWORK
DWDI	DOUBLE WIDTH DOUBLE INLET
DWG	DRAWING
E	EXISTING
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EER	ENERGY EFFICIENCY RATIO
EG	EXHAUST GRILLE
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EQUIP	EQUIPMENT
ER	EXHAUST REGISTER
ETR	EXISTING TO REMAIN
EWH	ELECTRIC WALL HEATER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXT	EXTERIOR OR EXTERNAL
°F	DEGREES FAHRENHEIT
FA	FREE AREA
FC	FORWARD CURVED
FCU	FAN COIL UNIT
FD	FLOOR DRAIN OR FIRE DAMPER
FFA	FROM FLOOR ABOVE
FFB	FROM FLOOR BELOW
FILL	FILL LINE
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FM	FLOW METER
FPM	FEET PER MINUTE
FS	FLOW SWITCH
FT	FOOT OR FEET
G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
H	HUMIDIFIER
HB	HOSE BIBB
HC	HEATING CONTRACTOR
HD	HUB DRAIN
HDT	HORIZONTAL DRAW THRU
HG	MERCURY
HGT	HEIGHT
HP	HORSEPOWER
HR	HOUR
HVAC	HEATING VENTILATING AND AIR CONDITIONING
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HX	HEAT EXCHANGER
HYD	HYDRANT
HZ	HERTZ
IN	INCH
IPLV	INTEGRATED PART LOAD VALUE
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LP	LOW PRESSURE GAS
LR	LINEAR RETURN
LWT	LEAVING WATER TEMPERATURE
M	MOTOR OPERATED DAMPER
MAT	MIXED AIR TEMPERATURE
MA	MIXED AIR
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	1000 BRITISH THERMAL UNITS/HOUR
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFS	MAXIMUM FUSE SIZE
MH	MANHOLE
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
MUA	MAKE-UP AIR UNIT
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NPLV	NOMINAL PART LOAD VALUE
NTS	NOT TO SCALE
O	OXYGEN
OA	OUTDOOR AIR
OAT	OUTDOOR AIR TEMPERATURE
OC	ON CENTER
OPD	OPPOSED BLADE DAMPER
P	PUMP
PD	PUMP DISCHARGE
PLBG	PLUMBING
PRELIM	PRELIMINARY
PRESS	PRESSURE
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
R	REFRIGERANT
RA	RETURN AIR
RCP	RADIANT CEILING PANEL
RD	ROOF DRAIN
REQD	REQUIRED
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELIEF HOOD
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RTU	ROOF TOP UNIT
S	SUPPLY
SA	SUPPLY AIR
SCR	SILICONE CONTROLLED RECTIFIERS
SD	SLOT DIFFUSER
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SUPPLY FAN
SG	SUPPLY GRILLE
SM	SHEET METAL
SQ FT	SQUARE FEET
SR	SUPPLY REGISTER
SRG	SECURITY RETURN GRILLE
SS	STAINLESS STEEL
SWSI	SINGLE WIDTH SINGLE INLET
T	THERMOSTAT/TEMPERATURE SENSOR
TA	THROWAWAY
TCAC	TEMPERATURE CONTROL AIR COMPRESSOR
TCC	TEMPERATURE CONTROL CONTRACTOR
TCP	TEMPERATURE CONTROL PANEL
TCV	TEMPERATURE CONTROL VALVE
TEMP	TEMPORARY
TF	TRANSFER FAN
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TG	TRANSFER GRILLE
TO	TEST OPENINGS
TS	TIP SPEED
TYP	TYPICAL
UH	UNIT HEATER
UST	UNDERGROUND STORAGE TANK
UV	UNIT VENTILATOR
UNEX	UNEXCAVATED
V	VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VEL	VELOCITY
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VSC	VARIABLE SPEED CONTROL
W TO W	WALL TO WALL
WB	WET BULB
WC	WATER COLUMN
WF	WALL FIN
WP	WEATHER PROOF
WPD	WATER PRESSURE DROP
YH	YARD HYDRANT

PIPING SYSTEMS

- GENERAL SHUTOFF VALVE SEE SPECIFICATIONS FOR TYPE
- BALL VALVE
- GAUGE VALVE
- BUTTERFLY VALVE
- GATE VALVE
- GLOBE VALVE
- GLOBE, ANGLE VALVE
- PLUG VALVE (GAS)
- CALIBRATED BALANCE/SHUTOFF VALVE (FLOW MEASURING)
- 2-WAY TEMPERATURE CONTROL VALVE (PNEUMATIC OR ELECTRIC)
- 3-WAY TEMPERATURE CONTROL VALVE (PNEUMATIC OR ELECTRIC)
- DRAIN VALVE (W/ HOSE CONNECTION & BRASS CAP)
- RELIEF (R) OR SAFETY (S) VALVE
- SOLENOID VALVE
- BLIND FLANGE
- CAP
- CONNECTION, BOTTOM
- CONNECTION, TOP
- ELBOW, TURNED UP
- ELBOW, TURNED DOWN
- AIR VENT
- VACUUM BREAKER
- FLEXIBLE CONNECTOR
- TEMPERATURE SENSOR
- PITCH OF PIPE
- PRESSURE GAUGE AND COCK
- STRAINER
- STRAINER, W/ BLOW DOWN VALVE
- THERMOMETER
- PETES PLUG
- FLOW DIRECTION IN PIPES
- HANGERS
- UNION
- PIPE FLANGE
- FLOW REGULATOR
- CONDENSATE
- ATMOSPHERIC VENT
- GAS
- HOT WATER SUPPLY
- HOT WATER RETURN
- REFRIGERANT HOT GAS
- REFRIGERANT SUCTION
- REFRIGERANT LIQUID
- DRAIN

DUCTWORK SYSTEMS

- DUCT SIZE, (FIRST FIGURE IS SIDE SHOWN)
- ROUND DUCT
- CHANGE OF ELEVATION IN DIRECTION OF AIR FLOW
- ACCESS DOOR, VERTICAL OR HORIZONTAL
- ACOUSTICAL DUCT LINER
- FLEXIBLE CONNECTION
- DUCT SOUND ATTENUATOR
- DUCT TRANSITION (DOUBLE LINE)
- DUCT TRANSITION (RECT. TO ROUND)
- DUCT TRANSITION (SINGLE LINE)
- HIDDEN DUCTWORK
- BACK DRAFT DAMPER
- DUCT HEATER, ELECTRIC
- MOTOR OPERATED DAMPER
- MANUAL VOLUME DAMPER
- SMOKE DETECTOR
- FIRE DAMPER
- COMBINATION FIRE/SMOKE DAMPER
- STANDARD BRANCH, SUPPLY, RETURN, OR EXHAUST, NO SPLITTER
- ROOF VENTILATOR OR HOOD ON ROOF ABOVE
- ROOF VENTILATOR OR HOOD ON ROOF
- DUCT CAP
- END OF DUCT
- POSITIVE PRESSURE DUCT SECTION
- POSITIVE PRESSURE DUCT (DOWN OR AWAY)
- NEGATIVE PRESSURE DUCT SECTION
- NEGATIVE PRESSURE DUCT (DOWN OR AWAY)
- FLEXIBLE DUCT DIFFUSER CONNECTION
- SIDEWALL AIR DEVICE
- EXHAUST, RETURN, OR TRANSFER AIR DEVICE
- SUPPLY AIR DEVICE
- LINEAR OR SLOT AIR DEVICE
- TRANSFER GRILLE ASSEMBLY
- LOUVER AND BIRD SCREEN
- ELBOW WITH TURNING VANES
- TERMINAL UNIT, MIXING
- BOOSTER COIL
- AIR FLOW
- POINT OF NEW CONNECTION (PIPE OR DUCT)
- SQUARE FEET
- ELEVATION SYMBOL

GENERAL SYMBOLS

- THERMOSTAT OR TEMPERATURE SENSOR
- THERMOSTAT OR TEMPERATURE SENSOR WITH SECURITY COVER
- HUMIDISTAT OR HUMIDITY SENSOR
- HUMIDISTAT OR HUMIDITY SENSOR WITH SECURITY COVER
- MOTOR STARTER
- SPEED CONTROLLER
- START/STOP SWITCH
- CARBON DIOXIDE SENSOR
- EXISTING TO REMAIN (DUCTWORK, PIPING, & EQUIPMENT)
- EXISTING TO BE REMOVED (DUCTWORK, PIPING, & EQUIPMENT)
- NEW DUCTWORK/PIPING
- NEW EQUIPMENT

GENERAL PROJECT NOTES:

1. EXISTING PROJECT CONDITIONS: INFORMATION PERTAINING TO EXISTING PROJECT CONDITIONS, SUCH AS PRESENT LOCATIONS OF ARCHITECTURAL AND STRUCTURAL BUILDING COMPONENTS, MECHANICAL AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, ROUGH-INS AND OTHER MISCELLANEOUS CONSTRUCTION, APPEARS ON THE DRAWINGS, WHILE SUCH INFORMATION HAS BEEN BASED ON AVAILABLE RECORDS AND COLLECTED WITH REASONABLE CARE, THE ARCHITECT AND ENGINEER DO NOT ASSUME ANY EXPRESSED OR IMPLIED GUARANTEE THAT CONDITIONS SO INDICATED ARE SHOWN ENTIRELY COMPLETE, CORRECT AND REPRESENTATIVE OF THOSE ACTUALLY EXISTING. ALL CONTRACTORS SHALL SATISFY THEMSELVES AS TO ALL EXISTING JOB CONDITIONS PRIOR TO BIDDING, AND VERIFY ALL DIMENSIONS AT THE SITE.
2. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO COMMENCING WORK. REPORT ANY DISCREPANCIES TO THE A/E IMMEDIATELY.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL DIRECT DIGITAL CONTROL INTEGRATION, MATERIALS, AND PROGRAMMING REQUIRED TO REPLICATE EXISTING DIRECT DIGITAL CONTROL FUNCTIONS AND SEQUENCES.
4. SEE DETAILS, SCHEDULES, SCHEMATICS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

GENERAL ELECTRICAL NOTES:

5. ALL ELECTRICAL WORK WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.
6. CONTRACTOR TO DE-ENERGIZE EQUIPMENT DESIGNATED FOR DEMOLITION PRIOR TO REMOVAL.
7. ANY/ALL WIRING AND CABLING THAT IS DISCONNECTED AS PART OF THIS PROJECT SHALL BE REMOVED BACK TO SOURCE AND AVAILABLE COMPONENTS SHALL BE RELABELED AS "SPARE"
8. ALL ELECTRICAL WORK SHALL COMPLY WITH ALL EXISTING BUILDING STANDARDS/MINIMUM REQUIREMENTS.
9. ALL ELECTRICAL WORK SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE AND ALL LOCAL AND STATE CODES.
10. ALL CONDUCTORS SHALL BE COPPER.
11. ALL WIRING SHALL BE ROUTED IN EMT CONDUIT AT A MINIMUM.
12. ALL EQUIPMENT SHALL BE LABELED TO MATCH BUILDING STANDARDS.
13. ALL ELECTRICAL BOXES SHALL BE LABELED WITH THE PANEL AND CIRCUIT NUMBER(S).
14. FIELD VERIFY ALL ELECTRICAL REQUIREMENTS WITH EXISTING CONDITIONS.
15. ALL DISCONNECTS SHALL BE HEAVY DUTY RATED.
16. ALL WORK TO BE DONE IN COMPLIANCE WITH ALL STATE AND LOCAL CODES AND ALL MANUFACTURER'S INSTRUCTIONS.
17. ALL EQUIPMENT IS TO BE PROVIDED COMPLETE WITH OPERATION AND MAINTENANCE MANUALS AND SYSTEM SCHEMATICS.
18. PROVIDE ALL REQUIRED LOW-VOLTAGE WIRING PER NATIONAL ELECTRIC CODE.

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PH: 608.277.1728 FAX: 608.271.7046
JDR PROJECT NO: 21.0065

CONSULTANTS

ISSUED

REVISIONS / ADDENDA

PROJECT # :	21.0065
DRAWN :	JDR
CHECKED :	JDR
DATE :	06/15/2021
PHASE :	BIDDING

PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

SYMBOLS AND ABBREVIATIONS

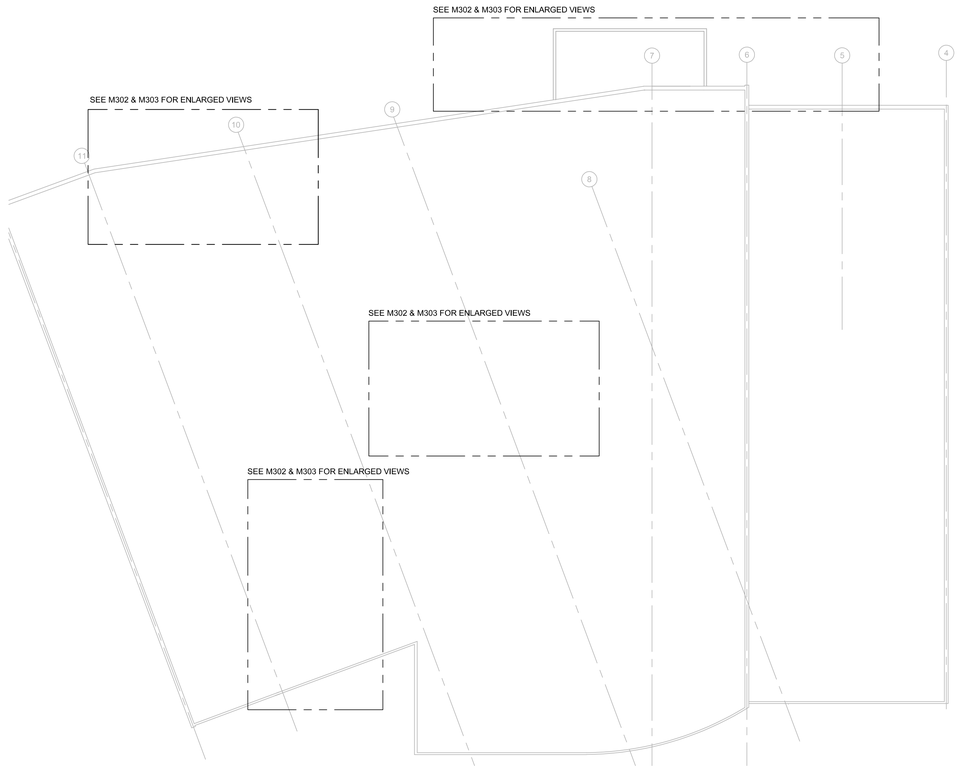
M000

2 M100 FIRST FLOOR PLAN OVERALL
SCALE: 1/16"=1'-0"

NORTH

1 M100 BASEMENT PLAN OVERALL
SCALE: 1/16"=1'-0"

NORTH



3 M100 ROOF PLAN OVERALL
SCALE: 1/16"=1'-0"

NORTH

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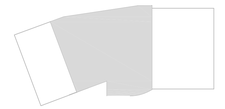

KEY PLAN

NORTH

ISSUED

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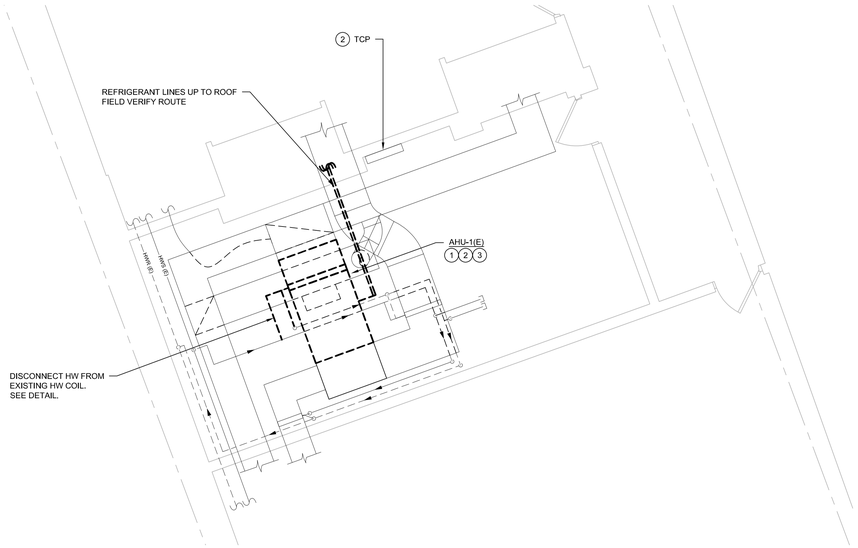
HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

OVERALL
FLOOR PLANS

M100



1 M300 ENLARGED BASEMENT MECHANICAL ROOM DEMOLITION

SCALE: 1/4"=1'-0"

NORTH

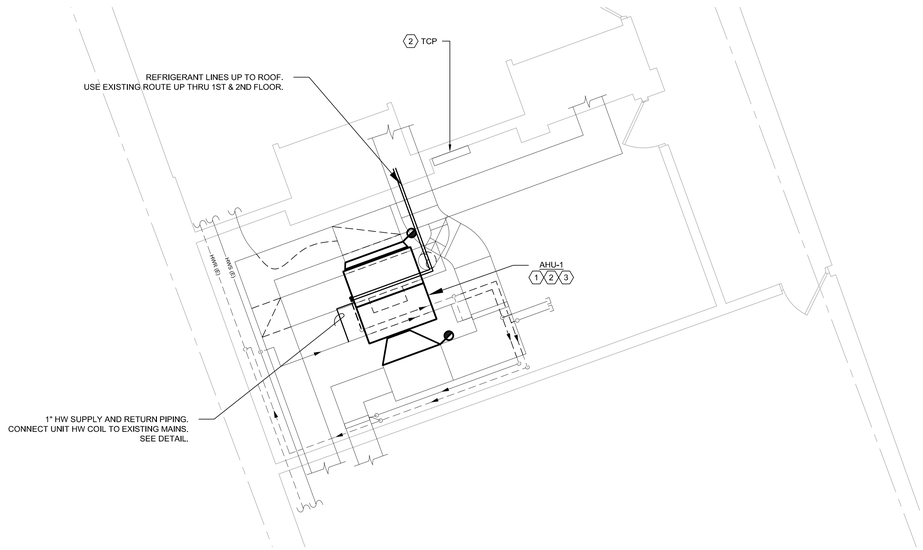
KEYED NOTES:

1. DEMOLISH EXISTING AHU COMPLETE INCLUDING:
   - DISCONNECT POWER.
   - ALL REFRIGERANT PIPING FROM UNIT UP TO ROOF.
   - CONDENSATE DRAIN LINES.
   - HOT WATER COIL, PIPING, AND VALVES. PREPARE FOR NEW WORK.
   - DISCONNECT SUPPLY AND RETURN DUCT, REMOVE EXISTING FILTER RACK AND FLEX CONNECTIONS.

2. UNIT IS CONTROLLED VIA AN EXISTING DIRECT DIGITAL CONTROL SYSTEMS (TREND CONTROL SYSTEM INSTALLED BY VESTA TECHNOLOGIES. THE EXISTING AIR HANDLER CONTROL SYSTEM INCLUDES THE FOLLOWING EXISTING HARDWARE / POINTS:
   - AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL
   - MIXED AIR TEMPERATURE (MAT) SENSOR
   - DISCHARGE AIR TEMPERATURE (DAT) SENSOR
   - SUPPLY AIR FAN STATUS
   - OUTDOOR AIR TEMPERATURE SENSOR
   - FAN START / STOP
   - ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR)
   - HOT WATER HEAT TEMPERATURE CONTROL VALVE (TCV)
   - DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY - SINGLE ACCU)

   AS PART OF THIS PROJECT THE FOLLOWING SHALL OCCUR:
   - EXISTING AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL TO REMAIN
   - REMOVE EXISTING MAT SENSOR AND AND RETAIN FOR REUSE. REUSE EXISTING CABLING.
   - REMOVE DAT SENSOR AND RETAIN FOR REUSE. REUSE EXISTING CABLING.
   - EXISTING SUPPLY AIR FAN CURRENT SENSOR (STATUS) TO REMAIN.
   - EXISTING OUTDOOR AIR TEMPERATURE SENSOR AND CABLING TO REMAIN.
   - EXISTING FAN START / STOP RELAY TO REMAIN. REUSE EXISTING CABLING.
   - EXISTING ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR) AND CABLING TO REMAIN.
   - REMOVE EXISTING HOT WATER TCV, RETAIN FOR REINSTALLATION. REUSE EXISTING CABLING.
   - NEW DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY - SINGLE UNIT) TO BE PROVIDED. REUSE EXISTING CABLING.

3. DISCONNECT POWER TO AHU-1(E) FAN MOTOR. AHU FAN MOTOR (1.5 HP) FED BY EXISTING 208V/1P BREAKER.



2 M300 ENLARGED BASEMENT MECHANICAL ROOM NEW WORK

SCALE: 1/4"=1'-0"

NORTH

KEYED NOTES:

1. NEW AHU-1:
   - CONNECT CONDENSATE DRAIN WITH TRAP DOWN TO FLOOR DRAIN.
   - REFRIGERANT PIPE SIZING SHALL BE CONFIRMED BY VENDOR BASED ON FINAL PIPE ROUTING, ELEVATION GAIN, ETC. CONNECT REFRIGERANT PIPING TO UNIT, USE EXISTING ROUTE UP THRU 1ST & 2ND FLOOR TO ROOF.
   - CONNECT HW SUPPLY AND RETURN FROM MAINS TO UNIT. REUSE EXISTING 3-WAY TCV VALVE. PROVIDE NEW ISOLATION AND BALANCE VALVES.
   - TRANSITION FROM UNIT SUPPLY AND RETURN OPENINGS TO EXISTING DUCT.

2. UNIT IS CONTROLLED VIA AN EXISTING DIRECT DIGITAL CONTROL SYSTEMS (TREND CONTROL SYSTEM INSTALLED BY VESTA TECHNOLOGIES. THE EXISTING AIR HANDLER CONTROL SYSTEM INCLUDES THE FOLLOWING EXISTING HARDWARE / POINTS:
   - AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL
   - MIXED AIR TEMPERATURE (MAT) SENSOR
   - DISCHARGE AIR TEMPERATURE (DAT) SENSOR
   - SUPPLY AIR FAN STATUS
   - OUTDOOR AIR TEMPERATURE SENSOR
   - FAN START / STOP
   - ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR)
   - HOT WATER HEAT TEMPERATURE CONTROL VALVE (TCV)
   - DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY - SINGLE ACCU)

   AS PART OF THIS PROJECT THE FOLLOWING SHALL OCCUR TO THE NEW UNIT:
   - EXISTING AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL TO REMAIN
   - REINSTALL MAT SENSOR. REUSE EXISTING CABLING.
   - REINSTALL DAT SENSOR. REUSE EXISTING CABLING.
   - REINSTALL EXISTING SUPPLY AIR FAN CURRENT SENSOR (STATUS).
   - EXISTING OUTDOOR AIR TEMPERATURE SENSOR AND CABLING TO REMAIN.
   - REINSTALL EXISTING FAN START / STOP RELAY. REUSE EXISTING CABLING.
   - EXISTING ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR) AND CABLING TO REMAIN.
   - REINSTALL EXISTING HOT WATER TCV. REUSE EXISTING CABLING.
   - NEW DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY - SINGLE UNIT) TO BE PROVIDED. REUSE EXISTING CABLING.

3. RECONNECT POWER TO AHU-1 FAN MOTOR. AHU FAN MOTOR (1.5 HP) FED BY EXISTING 208V/1P BREAKER.

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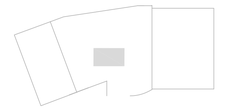
CONSULTANTS



KEY PLAN

NORTH

ISSUED

REVISIONS / ADDENDA

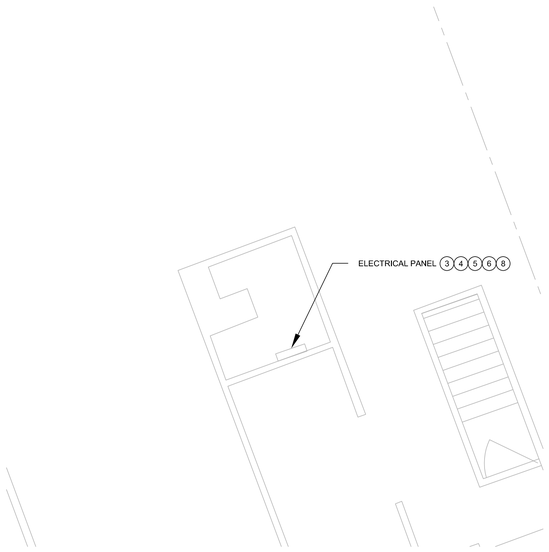
PROJECT # :	21.0065
DRAWN :	JDR
CHECKED :	JDR
DATE :	06/15/2021
PHASE :	BIDDING

PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

ENLARGED BASEMENT MECHANICAL ROOM

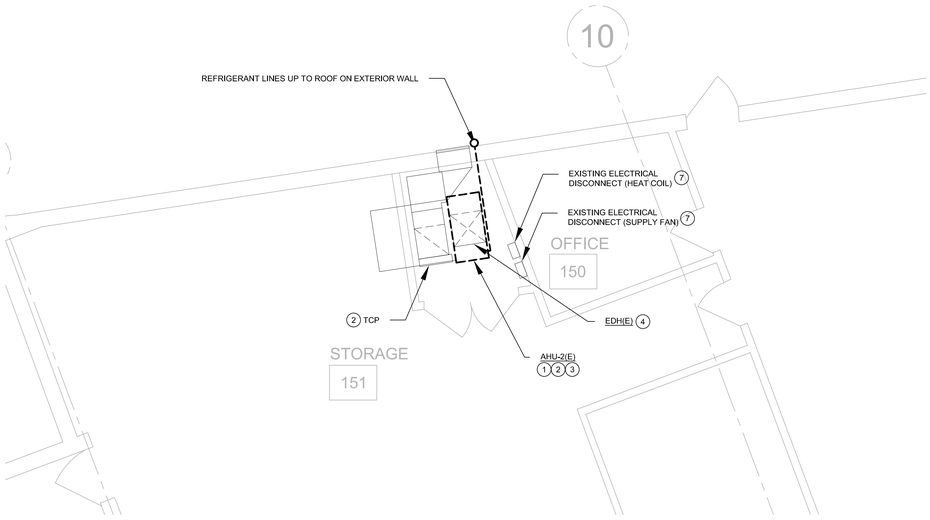
M300



3 M301 ENLARGED FIRST FLOOR ELECTRICAL ROOM

SCALE: 1/4"=1'-0"

NORTH



1 M301 ENLARGED FIRST FLOOR MECHANICAL ROOM DEMOLITION

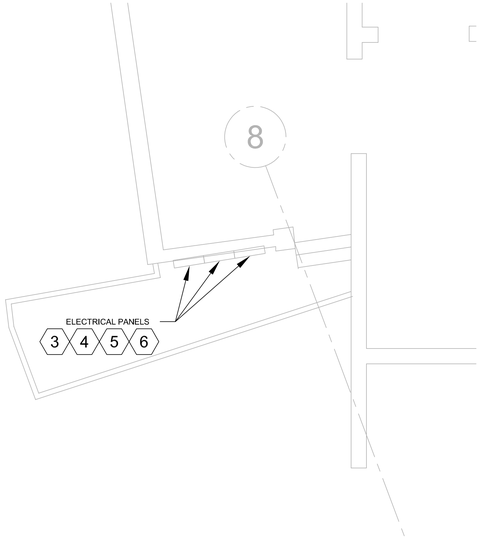
SCALE: 1/4"=1'-0"

NORTH

KEYED NOTES:

1. DEMOLISH EXISTING AHU COMPLETE INCLUDING:
   - DISCONNECT POWER
   - ALL REFRIGERANT PIPING FROM UNIT UP TO ROOF.
   - CONDENSATE DRAIN LINES.
   - DISCONNECT ELECTRIC HEATER AND REMOVE.
   - DISCONNECT SUPPLY AND RETURN DUCT. PREPARE FOR NEW WORK.
2. UNIT IS CONTROLLED VIA AN EXISTING DIRECT DIGITAL CONTROL SYSTEMS (TREND CONTROL SYSTEM INSTALLED BY VESTA TECHNOLOGIES. THE EXISTING AIR HANDLER CONTROL SYSTEM INCLUDES THE FOLLOWING EXISTING HARDWARE / POINTS:
   - AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL
   - MIXED AIR TEMPERATURE (MAT) SENSOR
   - DISCHARGE AIR TEMPERATURE (DAT) SENSOR
   - SUPPLY AIR FAN STATUS
   - OUTDOOR AIR TEMPERATURE SENSOR
   - FAN START / STOP
   - ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR)
   - ELECTRIC HEAT (2 STAGES OF CAPACITY)
   - DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY - 2 SEPARATE ACCU'S)

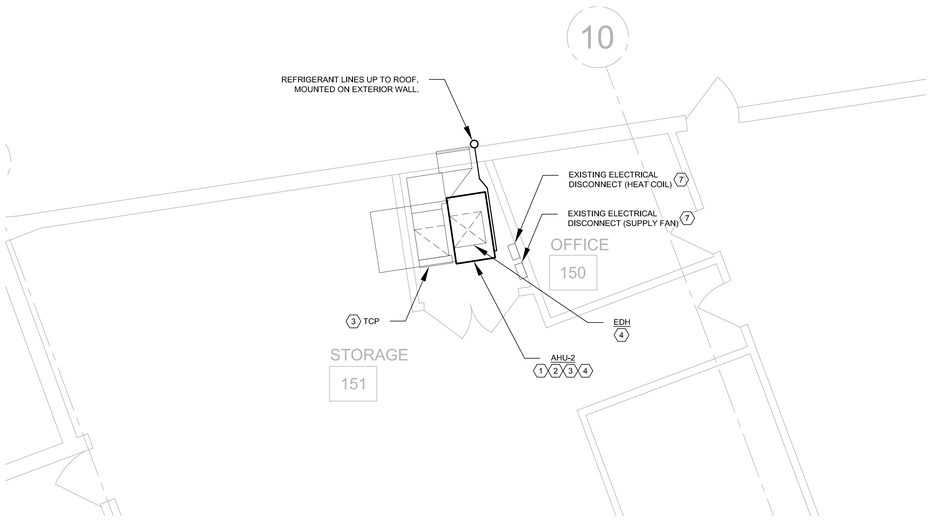
   AS PART OF THIS PROJECT THE FOLLOWING SHALL OCCUR:
   - EXISTING AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL TO REMAIN
   - REMOVE EXISTING MAT SENSOR AND RETAIN FOR REUSE. REUSE EXISTING CABLING.
   - REMOVE DAT SENSOR AND RETAIN FOR REUSE. REUSE EXISTING CABLING.
   - EXISTING SUPPLY AIR FAN CURRENT SENSOR (STATUS) TO REMAIN.
   - EXISTING OUTDOOR AIR TEMPERATURE SENSOR AND CABLING TO REMAIN.
   - EXISTING FAN START / STOP RELAY TO RMAIN. REUSE EXISTING CABLING.
   - EXISTING ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR) AND CABLING TO REMAIN.
   - REMOVE ELECTRIC HEAT (2 STAGES OF CAPACITY). NEW ELECTRIC HEAT TO BE PROVIDED. REUSE EXISTING CABLING.
   - NEW DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY) TO BE PROVIDED. REUSE EXISTING CABLING.
3. DISCONNECT POWER TO AHU-2(E) FAN MOTOR. AHU FAN MOTOR FED BY EXISTING 208V/3P 20 AMP BREAKER.
4. DISCONNECT POWER TO AHU-2(E) ELECTRIC HEATING COIL. HEATING COIL FED BY EXISTING 208/V/3P 60 AMP BREAKER.
5. DISCONNECT POWER TO ACCU-3(E). ACCU FED BY EXISTING 208V/3P 40 AMP BREAKER.
6. DISCONNECT POWER TO ACCU-4(E). ACCU FED BY EXISTING 208V/3P 40 AMP BREAKER.
7. EXISTING DISCONNECTS TO REMAIN.
8. EXISTING PANEL "A" (SEC 2). 208 VOLT 3 PHASE 4 WIRE.



4 M301 ENLARGED FIRST FLOOR ELECTRICAL ROOM

SCALE: 1/4"=1'-0"

NORTH



2 M301 ENLARGED FIRST FLOOR MECHANICAL ROOM NEW WORK

SCALE: 1/4"=1'-0"

NORTH

KEYED NOTES:

1. NEW AHU-2:
   - RECONNECT CONTROLS FROM EXISTING BUILDING AUTOMATION SYSTEM.
   - EC TO CONNECT POWER TO UNIT.
   - PROVIDE RAILS VERIFY HEIGHT OF DRAIN, CONNECT CONDENSATE DRAIN WITH, TRAP OUT, THRU EXISTING OPENING IN EXTERIOR WALL.
   - REFRIGERANT PIPE SIZING SHALL BE CONFIRMED BY VENDER BASED ON FINAL PIPE ROUTING, ELEVATION GAIN, ETC. CONNECT REFRIGERANT PIPING TO UNIT OUT THRU EXISTING OPENING IN EXTERIOR WALL. REFRIGERANT PIPING MOUNTED TO EXTERIOR WALL UP TO ROOF.
   - INSTALL ELECTRIC HEATER IN DUCT PLENUM THEN TRANSITION TO EXISTING SUPPLY DUCT.
   - TRANSITION FROM RETURN OPENING TO EXISTING DUCT.
2. UNIT IS CONTROLLED VIA AN EXISTING DIRECT DIGITAL CONTROL SYSTEMS (TREND CONTROL SYSTEM INSTALLED BY VESTA TECHNOLOGIES. THE EXISTING AIR HANDLER CONTROL SYSTEM INCLUDES THE FOLLOWING EXISTING HARDWARE / POINTS:
   - AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL
   - MIXED AIR TEMPERATURE (MAT) SENSOR
   - DISCHARGE AIR TEMPERATURE (DAT) SENSOR
   - SUPPLY AIR FAN STATUS
   - OUTDOOR AIR TEMPERATURE SENSOR
   - FAN START / STOP
   - ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR)
   - ELECTRIC HEAT (2 STAGES OF CAPACITY)
   - DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY - 2 SEPARATE ACCU'S)

   AS PART OF THIS PROJECT THE FOLLOWING SHALL OCCUR TO THE NEW UNIT:
   - EXISTING AIR HANDLER CONTROLLER IN ADJACENT TEMPERATURE CONTROL PANEL TO REMAIN
   - REINSTALL EXISTING MAT SENSOR. REUSE EXISTING CABLING.
   - REINSTALL DAT SENSOR. REUSE EXISTING CABLING.
   - REINSTALL EXISTING SUPPLY AIR FAN CURRENT SENSOR (STATUS).
   - EXISTING OUTDOOR AIR TEMPERATURE SENSOR AND CABLING TO REMAIN.
   - REINSTALL EXISTING FAN START / STOP RELAY. REUSE EXISTING CABLING.
   - EXISTING ECONOMIZER DAMPERS (OUTSIDE AIR AND RETURN AIR) AND CABLING TO REMAIN.
   - NEW ELECTRIC HEAT (2 STAGES OF CAPACITY') TO BE PROVIDED. REUSE EXISTING CABLING.
   - NEW DIRECT EXPANSION (DX) COOLING (2 STAGES OF CAPACITY - 2 SEPARATE ACCU'S) TO BE PROVIDED. REUSE EXISTING CABLING.
3. RECONNECT POWER TO AHU-2 FAN MOTOR. USE EXISTING 208V/3P 20 AMP BREAKER AND FEEDERS.
4. RECONNECT POWER TO AHU-2 ELECTRIC HEATING COIL. USE EXISTING 208/V/3P 60 AMP BREAKER.
5. RECONNECT POWER TO ACCU-3(E). USE EXISTING 208V/3P 40 AMP BREAKER.
6. RECONNECT POWER TO ACCU-4(E). USE EXISTING 208V/3P 40 AMP BREAKER.
7. REUSE EXISTING DISCONNECTS.

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CONSULTANTS

KEY PLAN

NORTH

ISSUED

REVISIONS / ADDENDA

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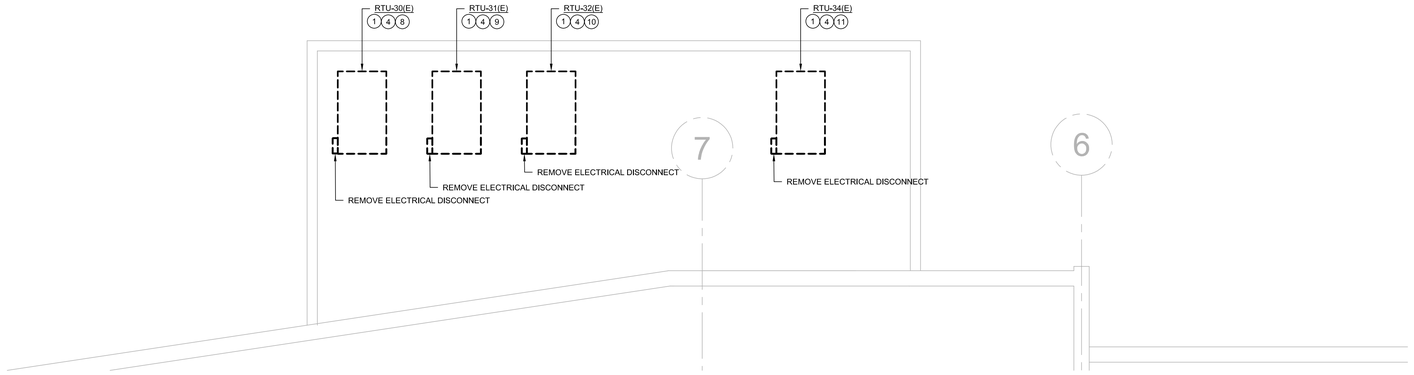
HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

ENLARGED FIRST FLOOR MECHANICAL ROOM

M301



1 M302 ENLARGED ROOF PLAN DEMOLITION
SCALE: 1/4"=1'-0"

NORTH

KEYED NOTES:

1. DEMOLISH EXISTING RTU COMPLETE INCLUDING:
   - DISCONNECT CONTROLS FROM UNIT.
   - DISCONNECT POWER TO UNIT. PREPARE FOR NEW WORK.
   - DEMOLISH EXISTING CURB ADAPTERS, EXISTING ROOF CURBS TO REMAIN.
2. DEMOLISH EXISTING AIR COOLED CONDENSING UNIT COMPLETE INCLUDING:
   - DISCONNECT CONTROLS FROM UNIT.
   - DISCONNECT POWER TO UNIT. PREPARE FOR NEW WORK.
   - DISCONNECT AND REMOVE EXISTING REFRIGERANT PIPE FROM CONDENSING UNIT TO AHU-2 ON FIRST FLOOR.
3. DEMOLISH EXISTING AIR COOLED CONDENSING UNIT COMPLETE INCLUDING:
   - DISCONNECT CONTROLS FROM UNIT.
   - DISCONNECT POWER TO UNIT. PREPARE FOR NEW WORK.
   - DISCONNECT AND REMOVE EXISTING REFRIGERANT PIPE FROM CONDENSING UNIT TO AHU-1 ON BASEMENT FLOOR.
4. RTU IS CONTROLLED VIA AN EXISTING DIRECT DIGITAL CONTROL SYSTEMS (TREND CONTROL SYSTEM INSTALLED BY VESTA TECHNOLOGIES). DISCONNECT EXISTING BAS CONTROLS FROM RTU. EXISTING CONTROLLER AND SENSORS SHALL BE REUSED ON NEW RTU.
5. ACCU IS CONTROLLED VIA AN EXISTING DIRECT DIGITAL CONTROL SYSTEMS (TREND CONTROL SYSTEM INSTALLED BY VESTA TECHNOLOGIES). SEE M300 AND M301 FOR SCOPE OF CONTROL WORK.
6. DISCONNECT POWER TO RTU-5(E). RTU FED BY EXISTING 208V/3P 60 AMP BREAKER.
7. DISCONNECT POWER TO RTU-15(E). RTU FED BY EXISTING 208V/3P BREAKER.
8. DISCONNECT POWER TO RTU-30(E). RTU FED BY EXISTING 208V/3P BREAKER.
9. DISCONNECT POWER TO RTU-31(E). RTU FED BY EXISTING 208V/3P BREAKER.
10. DISCONNECT POWER TO RTU-32(E). RTU FED BY EXISTING 208V/3P BREAKER.
11. DISCONNECT POWER TO RTU-34(E). RTU FED BY EXISTING 208V/3P BREAKER.
12. DISCONNECT POWER TO ACCU-3(E). ACCU FED BY EXISTING 208V/3P BREAKER.
13. DISCONNECT POWER TO ACCU-4(E). ACCU FED BY EXISTING 208V/3P BREAKER.
14. DISCONNECT POWER TO ACCU-10(E). ACCU FED BY EXISTING 208V/3P BREAKER.

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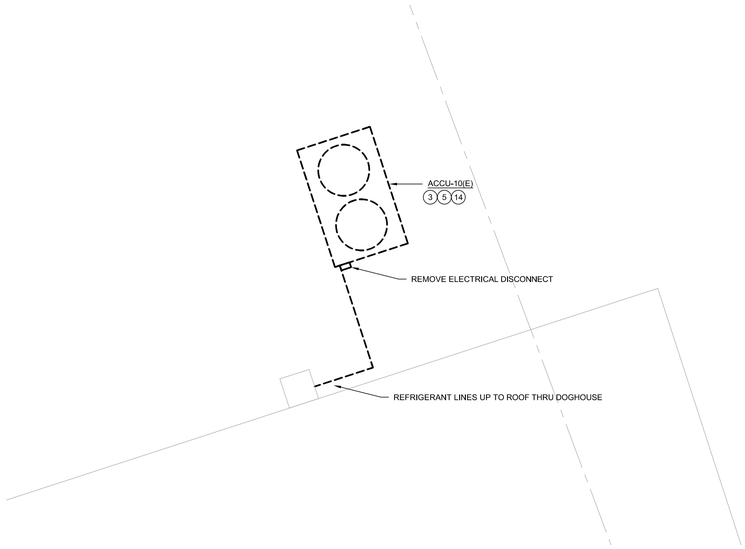
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
PH: 608.271.7728 FAX: 608.271.7046
JDR PROJECT NO: 21.0065

CONSULTANTS

KEY PLAN

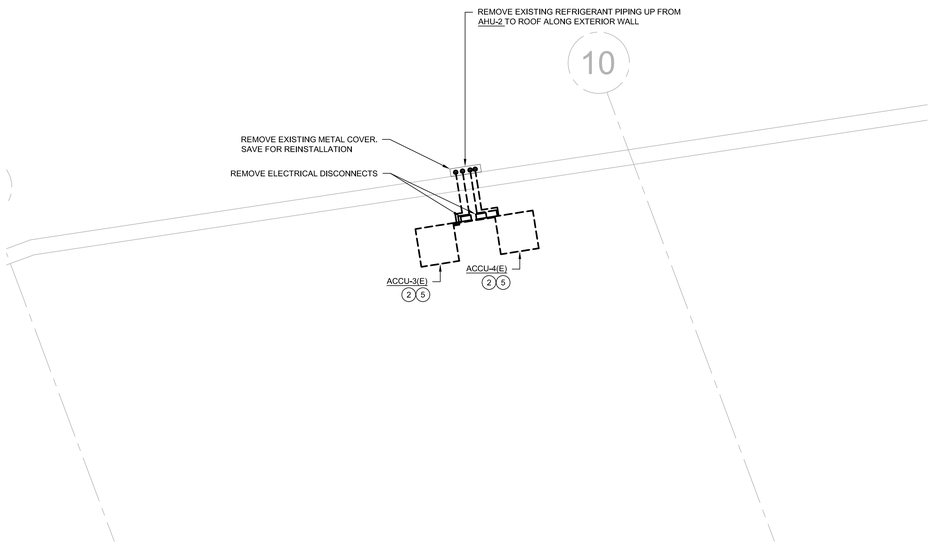
NORTH

ISSUED



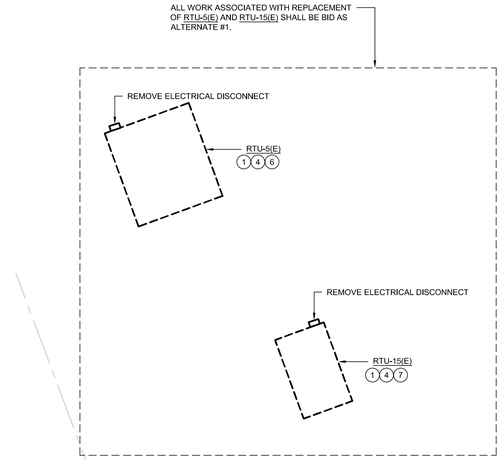
2 M302 ENLARGED ROOF PLAN NEW WORK
SCALE: 1/4"=1'-0"

NORTH



3 M302 ENLARGED ROOF PLAN NEW WORK
SCALE: 1/4"=1'-0"

NORTH



4 M302 ENLARGED ROOF PLAN NEW WORK
SCALE: 1/4"=1'-0"

NORTH

REVISIONS / ADDENDA

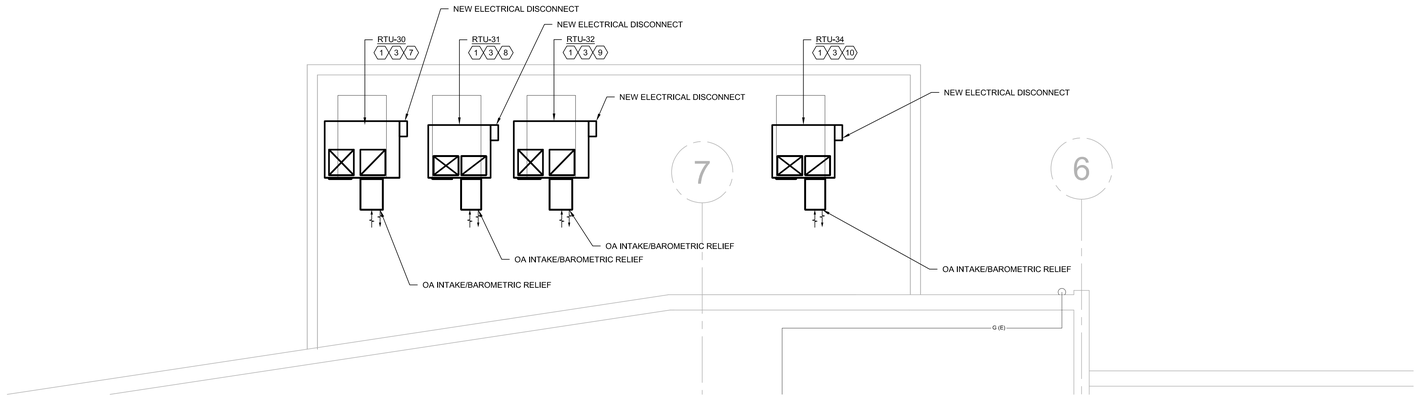
PROJECT # :	21.0065
DRAWN :	JDR
CHECKED :	JDR
DATE :	06/15/2021
PHASE :	BIDDING

PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

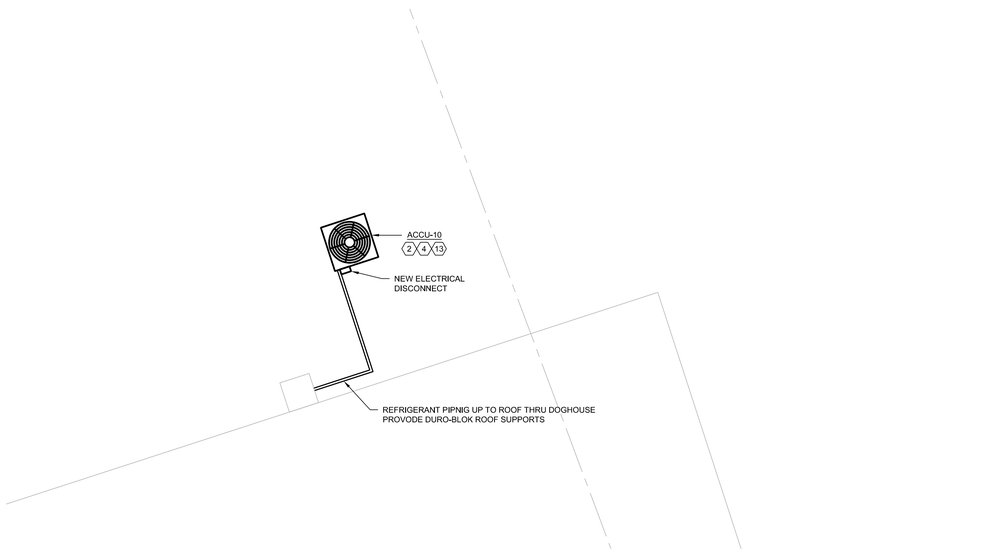
ENLARGED ROOF PLAN DEMOLITION

M302



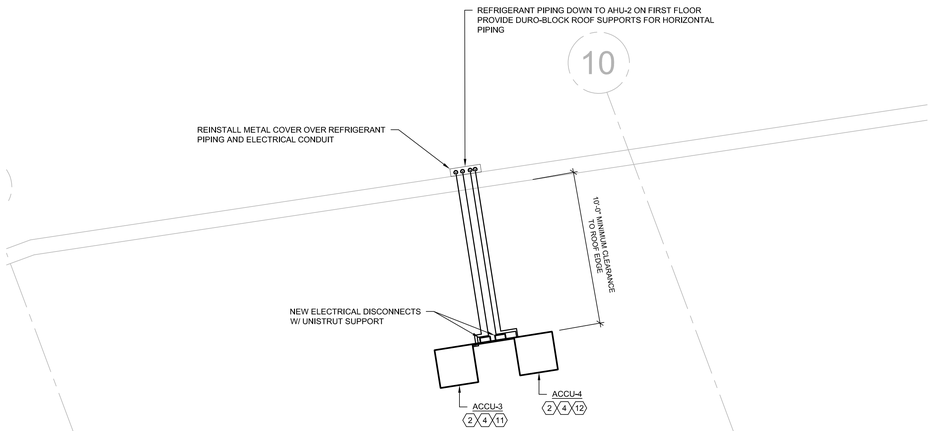
1 M303 ENLARGED ROOF PLAN NEW WORK
SCALE: 1/4"=1'-0"

NORTH



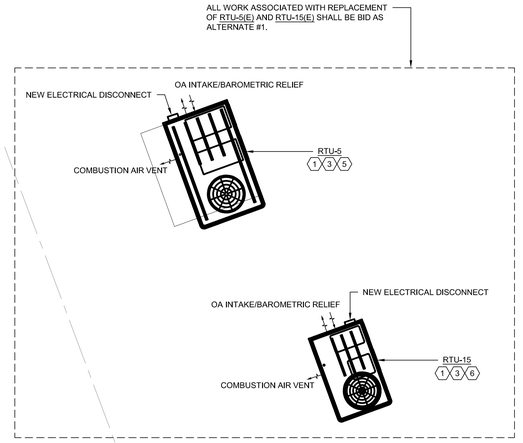
2 M303 ENLARGED ROOF PLAN NEW WORK
SCALE: 1/4"=1'-0"

NORTH



3 M303 ENLARGED ROOF PLAN NEW WORK
SCALE: 1/4"=1'-0"

NORTH



4 M303 ENLARGED ROOF PLAN NEW WORK
SCALE: 1/4"=1'-0"

NORTH

KEYED NOTES:

1. MOUNT NEW RTU TO EXISTING CURB USING CURB ADAPTOR. TRANSITION EXISTING SUPPLY AND RETURN DUCT AND CONNECT TO EXISTING DUCTING.
2. PROVIDE TREATED 4"x4" TO SUPPORT CONDENSING UNITS. PROVIDE EPDM RUBBER ROOF MATTING BETWEEN EXISTING EPDM ROOF AND NEW TREATED LUMBER SUPPORT. SECURE CONDENSING UNIT TO SUPPORTS WITH LAG SCREWS.
3. RECONNECT EXISTING CONTROLS / CONTROLLER TO NEW RTU.
4. RECONNECT EXISTING CONTROLS TO ACCU. SEE M300 AND M301 FOR ADDITIONAL INFORMATION.
5. RECONNECT POWER TO NEW RTU-5. USE EXISTING 208V/3P 60 AMP BREAKER AND FEEDERS.
6. RECONNECT POWER TO NEW RTU-15. USE EXISTING 208V/3P BREAKER AND FEEDERS.
7. RECONNECT POWER TO NEW RTU-30. USE EXISTING 208V/3P BREAKER AND FEEDERS..
8. RECONNECT POWER TO NEW RTU-31. USE EXISTING 208V/3P BREAKER AND FEEDERS.
9. RECONNECT POWER TO NEW RTU-32. USE EXISTING 208V/3P BREAKER AND FEEDERS.
10. RECONNECT POWER TO NEW RTU-34. USE EXISTING 208V/3P BREAKER AND FEEDERS.
11. RECONNECT POWER TO NEW ACCU-3. USE EXISTING 208V/3P BREAKER AND FEEDERS.
12. RECONNECT POWER TO NEW ACCU-4. USE EXISTING 208V/3P BREAKER AND FEEDERS.
13. RECONNECT POWER TO NEW ACCU-10. USE EXISTING 208V/3P BREAKER AND FEEDERS

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JDR PROJECT NO: 21.0065

CONSULTANTS

KEY PLAN

NORTH

ISSUED

REVISIONS / ADDENDA

PROJECT # :	21.0065
DRAWN :	JDR
CHECKED :	JDR
DATE :	06/15/2021
PHASE :	BIDDING

PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

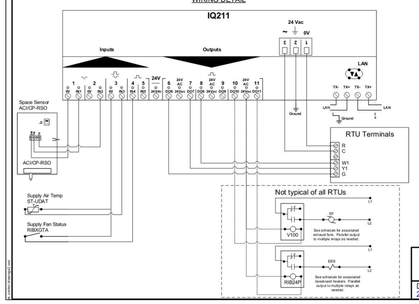
ENLARGED ROOF PLAN NEW WORK

M303

RTU WIRING

Typical of 9
RTU-1, 5, 16, 17, 18, 30, 31, 32, & 34

WIRING DETAIL



SEQUENCE

Constant Volume Rooftop Units
RTU-1, 5, 16, 17, 18, 30, 31, 32, & 34

Unoccupied: The rooftop unit shall close the outdoor air damper, open return air damper, and the fan shall be off. If space temperature falls below 60F (adj) or rises above 85F (adj.) the BMS shall enable the fan, and cycle heating and cooling as necessary to maintain the unoccupied set points. Factory supplied enthalpy controls shall enable the economizer for cooling when conditions allow.

A button on the space sensor shall allow occupants to override the rooftop unit to the occupied mode for 2 hours (adj).

Optimum Start: The BMS system shall utilize an optimum start program that will start the unit in advance of the scheduled time in order to reach set point by occupancy. During optimum start, the economizer will remain closed to the outdoor air, unless free cooling is enable and required.

Occupied: The rooftop unit fans shall run continuously, outdoor air damper open to minimum position, and the BMS will cycle heating and cooling to maintain occupied space set point. If space temperature falls below 68F (adj), or rises above 74F (adj), the BMS will cycle heating and cooling as necessary to maintain set point. Factory supplied enthalpy controls shall enable the economizer for cooling when conditions allow.

Alarms: If the supply fan fails to start when commanded, the BMS will disable the heating and cooling functions and generate an alarm. Should any space sensor fall below 45F (adj), the BMS will generate an alarm.

Emergency Shutdown: Rooftop units shall shut down on indication of smoke from the smoke detector in the return ductwork, or signal from fire alarm panel. All wiring and material related to the smoke detection system by electrical contactor.

Electric Baseboard Heaters: The BMS will enable the baseboard heaters during the occupied mode. Internal thermostats on the baseboard heaters will cycle them to maintain set point. During the unoccupied mode, power will be removed from the baseboard heaters by the BMS.

Exhaust Fans: The BMS will enable the exhaust fans during the occupied mode. During the unoccupied mode, the exhaust fans will be disabled.

RTU	Controlled Exhaust Fans	Controlled Electric Baseboard
RTU-1	EF-7	Open Office 220 & Office 217
RTU-5	EF-3 thru EF-4 & EF-6 Existing EFs See M203	
RTU-16		Open Office 222
RTU-17	EF-5	
RTU-18		Open Office 139 Conference 145
RTU-30		
RTU-31		
RTU-32		
RTU-34		

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DRAWN BY: AS JOB# 958015
DATE: 7/12/19 DWG# 4

RTU-15 WIRING

Typical of 1
Serves: 2nd Floor

WIRING DETAIL

SEQUENCE

Variable Volume Rooftop Unit RTU-15

Unoccupied: The rooftop unit shall close the outdoor air damper, open return air damper, the fan shall be off, and zone dampers will be open. If space temperature falls below 60F (adj) or rises above 85F (adj) the BMS shall enable the fan, and cycle heating and cooling as necessary to maintain the unoccupied set points. Factory supplied enthalpy controls shall enable the economizer for cooling when conditions allow.

A button on the space sensor shall allow occupants to override the rooftop unit to the occupied mode for 2 hours (adj).

Optimum Start: The BMS system shall utilize an optimum start program that will start the unit in advance of the scheduled time in order to reach set point by occupancy. During optimum start, the economizer will remain closed to the outdoor air, unless free cooling is enable and required.

Occupied: The rooftop unit fans shall run continuously, outdoor air damper open to minimum position, and the BMS will cycle heating and cooling to maintain occupied space set point. If space temperature falls below 68F (adj), or rises above 74F (adj), the BMS will cycle heating and cooling as necessary to maintain set point. Factory supplied enthalpy controls shall enable the economizer for cooling when conditions allow.

The BMS will modulate the bypass damper to maintain the supply static set point.

Alarms: If the supply fan fails to start when commanded, the BMS will disable the heating and cooling functions and generate an alarm. Should any space sensor fall below 45F (adj), the BMS will generate an alarm.

Emergency Shutdown: Rooftop units shall shut down on indication of smoke from the smoke detector in the return ductwork, or signal from fire alarm panel. All wiring and material related to the smoke detection system by electrical contactor.

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DRAWN BY: AS JOB# 958015
DATE: 7/12/19 DWG# 5

RTU-15 ZONE DAMPERS

Typical of 4
Serves: 2nd Floor

SEQUENCE OF OPERATIONS

Variable Volume and Temperature Boxes

Unoccupied: The zone dampers will be open. If the space temperature rises above the unoccupied cooling set point, the associated air handling unit will be enabled and the BMS will cycle cooling stages to maintain the unoccupied cooling set point. If space temperature falls below the unoccupied heating set point, the associated air handling unit will enabled, and the BMS will cycle heating stages to maintain the unoccupied cooling set point.

Occupied: When the associated air handling unit is in a heating mode and the zone is below set point, the zone damper will modulate open. As space temperature rises above the space set point the damper will modulate closed. When the associated air handling unit is in a cooling mode and the zone is below set point, the zone damper will modulate open. As space temperature falls below the space set point, the damper will modulate closed. When the associated air handling unit is not in a heating or cooling mode, the zone damper will be open.

SEQUENCE

Module: IQ222 **Lan:** 20
Node: 21
Location: Open Office 210 **System:** VVT Zones

Channel	Tag	Point Description	Detail	UI	Dest	Cable #	Wire
Universal Inputs							
1	TR-RO	Office 217 Temp	IQ2-UI2	T	Rm 217	21-1	PUR 22/6 TP
2	TR-RO	Open Office 210 Temp	IQ2-UI2	T	Rm 210	21-2	PUR 22/6 TP
3	TR-RO	Conference 221 Temp	IQ2-UI2	T	Rm 221	21-3	PUR 22/6 TP
4	TR-RO	Conference 222 Temp	IQ2-UI2	T	Rm 222	21-4	PUR 22/6 TP
5						21-5	
6						21-6	
Analog Outputs							
9	LMB24-SR	ZD-1 Damper	IQ2-AO5	n/a	Rm 220	21-9	ORG-S 18/4 TP
10	LMB24-SR	ZD-2 Damper	IQ2-AO5	n/a	Rm 220	21-10	ORG-S 18/4 TP
11	LMB24-SR	ZD-3 Damper	IQ2-AO5	n/a	Rm 220	21-11	ORG-S 18/4 TP
12	LMB24-SR	ZD-4 Damper	IQ2-AO5	n/a	Rm 220	21-12	ORG-S 18/4 TP
13				n/a		21-13	
14				n/a		21-14	

UI Jumper Legend DI=Digital C=Current T=Thermistor V=Voltage

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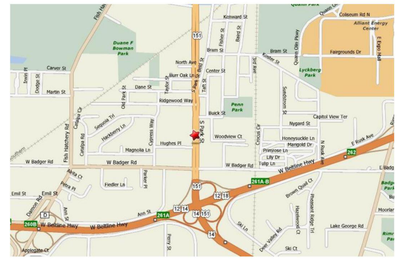
DRAWN BY: AS JOB# 958015
DATE: 7/12/19 DWG# 6

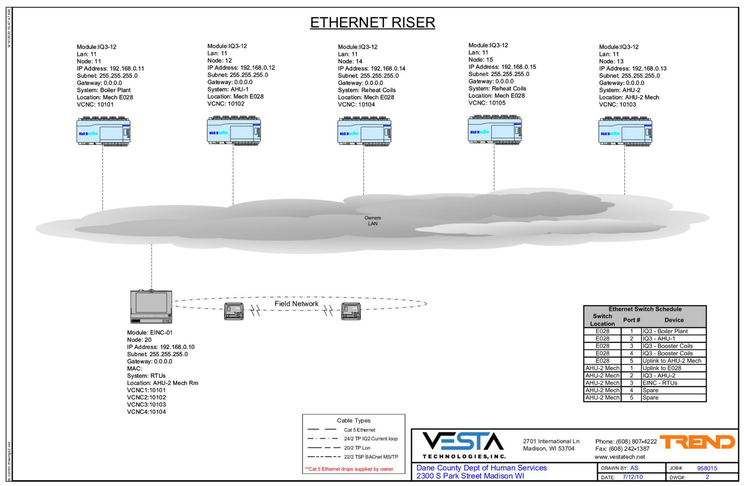
TREND VESTA TECHNOLOGIES

Dane County
Department of Human Services

PROJECT # 958015



ETHERNET RISER



Ethernet Switch Schedule		
Switch Location	Port #	Device
E028	1	IQ3 - Boiler Plant
E028	2	IQ3 - AHU-1
E028	3	IQ3 - Booster Coils
E028	4	IQ3 - Booster Coils
E028	5	Uplink to AHU-2 Mech
AHU-2 Mech	1	Uplink to E028
AHU-2 Mech	2	IQ3 - AHU-2
AHU-2 Mech	3	EINC - RTUs
AHU-2 Mech	4	Spare
AHU-2 Mech	5	Spare

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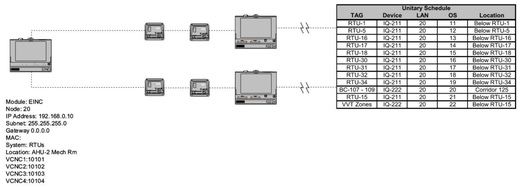
DATE: 7/12/19 DWG# 2

UNITARY RISER



Unitary Schedule				
TAG	Device	LAN	OS	Location
RTU-1	IQ-211	20	11	Below RTU-1
RTU-5	IQ-211	20	12	Below RTU-5
RTU-16	IQ-211	20	13	Below RTU-16
RTU-17	IQ-211	20	14	Below RTU-17
RTU-18	IQ-211	20	15	Below RTU-18
RTU-30	IQ-211	20	16	Below RTU-30
RTU-31	IQ-211	20	17	Below RTU-31
RTU-32	IQ-211	20	18	Below RTU-32
RTU-34	IQ-211	20	19	Below RTU-34
BC-107 - 109	IQ-222	20	20	Corridor 129
RTU-15	IQ-211	20	21	Below RTU-15
VVT Zones	IQ-222	20	22	Below RTU-15

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DATE: 7/12/19 DWG# 3

EXISTING DIRECT DIGITAL CONTROL DRAWINGS ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS

JDR ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
PH: 608.277.1728 FAX: 608.271.7046
JDR PROJECT NO: 21.0065

CONSULTANTS

ISSUED

REVISIONS / ADDENDA

PROJECT # : 21.0065

DRAWN : JDR

CHECKED : JDR

DATE : 06/15/2021

PHASE : BIDDING

PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

EXISTING DIRECT DIGITAL CONTROL DRAWINGS

M600

AHU-2

Serves: 1st Floor
Located: Storage Rm 151

SEQUENCE OF OPERATIONS

Existing Air Handling Unit AHU-2

Unoccupied: The air handling unit shall close the outdoor air damper, open return air damper, and the fan shall be off. If space temperature falls below 60F (adj) or rises above 85F (adj) the BMS shall enable the fan, modulate heating valve, and stage cooling as necessary to maintain the unoccupied set points. The BMS shall utilize the economizer dampers during the cooling mode, if the outdoor conditions allow.

A button on the space sensor shall allow occupants to override the rooftop unit to the occupied mode for 2 hours (adj).

Optimum Start: The BMS system shall utilize an optimum start program that will start the unit in advance of the scheduled time in order to reach set point by occupancy. During optimum start, the economizer will remain closed to the outdoor air, unless free cooling is enable and required.

Occupied: The supply fan shall run continuously, outdoor air damper open to minimum position, and the BMS will stage electric heating, and stage cooling to maintain the supply air set point. The BMS will reset the supply air temperature set point based on zone space temperature and deviance from set point. The supply set point reset schedule shall be adjustable.

During occupied times the outdoor air damper will be at the minimum position set point. The economizer will be used for free cooling when the outdoor conditions allow. If the economizer cannot maintain the supply set point, mechanical cooling shall be enabled. Minimum on / off times shall be utilized on all digital outputs to prevent short cycling of equipment.

Alarms: If the supply fan fails to start when commanded, the BMS will disable the heating and cooling functions and generate an alarm. Should any space sensor fall below 45F (adj), the BMS will generate an alarm. A freeze protection thermostat, located downstream of the heating coil, will disable the fan, close the outdoor air damper and open the heating valve, if the discharge tempature falls below 45F (adj).

Emergency Shutdown: Rooftop units shall shut down on indication of smoke from the smoke detector in the return ductwork, or signal from fire alarm panel. All wiring and material related to the smoke detection system by electrical contactor.

EF-8 & Existing EF

Occupied: Fan shall run continuously.
Unoccupied: Fan shall be disabled.

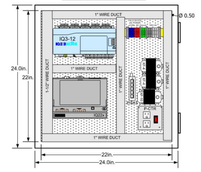
POINT SCHEDULE

Module: IQ3-12 **Lan:** 11
IP Address: **192.168.1.13** **Node:** 13
Subnet: **255.255.255.0** **System:** AHU-2 & BC-110
Location: Storage RM 151 **VCNC:** 10103

Channel	Tag	Point Description	Detail	UU	Dest	Cable #	Wire
Universal Inputs							
1	ST-AVG-1	Mixed Air Temp	IQ3-U12	T	Rm 151	13-1	PUR-S 20/2 TSP
2	ST-DCT	Supply Air Temp	IQ3-U27	T	Rm 151	13-2	PUR-S 20/2 TSP
3	RIBX/DTA	Supply Fan Status	IQ3-U31	DI	Rm 151	13-3	Shared Cbl 13-11
4	TR-RSO	BC-110 Space Temp	IQ3-U22	T	Rm 126	13-4	PUR 22/6 TP
5		BC-110 Spt Adjust	IQ3-CD3	T	Rm 126	13-5	Shared Cable
6	ST-O24	Outdoor Air Temp	IQ3-CD5	T	N Wall	13-6	PUR-S 20/2 TSP
Analog Outputs							
11	V-100	Fan S/S	IQ3-AO4	n/a	Rm 151	13-11	ORG-S 18/4 TP
12	LF24-SR	Economizer Dampers	IQ3-AO5	n/a	Rm 151	13-12	ORG-S 18/4 TP
13	VCS-421E	Heat Stage 1/ Stage 2/ Stage 3	IQ3-AO6	n/a	Rm 151	13-13	ORG-S 18/4 TP
14	ZRM	DX Cooling Stage 1 / Stage 2	IQ3-AO7	n/a	Cond Unit	13-14	ORG-S 18/4 TP
15	38.51.012	EF-8 & Existing EF	IQ3-CD9	n/a		13-15	GRN 24/3 TP
16	TR24-SR	BC-110 Heating Valve	IQ3-AO8	n/a	Rm 151	13-16	ORG-S 18/4 TP

UI Jumper Legend DI=Digital C=Current T=Thermistor V=Voltage

AHU-2 Mech Room



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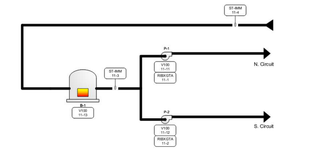
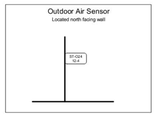
2300 S Park Street Madison WI
DRAWN BY: AS JOB# 958015
DATE: 7/12/10 DWG# 11

BOILER PLANT

Serves: Hot water system
Located: Mech Rm E027





POINT SCHEDULE

Module: IQ3-12 **Lan:** 11
IP Address: **192.168.1.11** **Node:** 11
Subnet: **255.255.255.0** **System:** Boiler Plant
Location: Basement Mech Rm E028 **VCNC:** 10101

Channel	Tag	Point Description	Detail	UU	Dest	Cable #	Wire
Universal Inputs							
1	RIBX/DTA	Pump-1 Status	IQ3-U13	DI	E027	11-1	Shared Cable 11-11
2	RIBX/DTA	Pump-2 Status	IQ3-U23	DI	E027	11-2	Shared Cable 11-12
3	ST-AMM	HWS Temp	IQ3-U07	T	E027	11-3	PUR-S 20/2 TSP
4	ST-AMM	HWR Temp	IQ3-U02	T	E027	11-4	PUR-S 20/2 TSP
5	TR-RSO	BC-1 Space Temp	IQ3-CD2	T	Rm 139	11-5	PUR 22/6 TP
6		BC-1 Spt Adjust	IQ3-CD3	T	Rm 139	11-6	Shared Cable
Analog Outputs							
11	V-100	N. Circuit Pump Enable	IQ3-AO4	n/a	E027	11-11	ORG-S 18/4 TP
12	V-100	S. Circuit Pump Status	IQ3-AO4	n/a	E027	11-12	ORG-S 18/4 TP
13	V-100	Boiler-1 Enable	IQ3-AO5	n/a	E027	11-13	GRN-S 18/2 TP
14				n/a		11-14	
15				n/a		11-15	
16				n/a		11-16	

UI Jumper Legend DI=Digital C=Current T=Thermistor V=Voltage

SEQUENCE OF OPERATIONS

Hot Water System

Pumps P-1 & P-2: The BMS will enable the lead pump to run when the outdoor air temperature falls below the OSA heating lockout of 65F (adj). If the lead pump fails to start, the lag pump will be started and an alarm will be generated. The BMS will rotate the lead pump every week to maintain equal runtimes.

Boiler B-1: Once flow has been proven, via current switches, the BMS will cycle the boiler to maintain the following adjustable reset schedule:

OAT	HWS
20F	200F
65F	155F

The BMS will override the reset schedule as necessary to maintain a minimum of 140F return water temperature to prevent condensation in the boiler.

Alarms: The BMS will generate an alarm if any pump fails to start or the hot water supply temperature falls below 100F (adj) when the heating system is enabled.

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2300 S Park Street Madison WI
DRAWN BY: AS JOB# 958015
DATE: 7/12/10 DWG# 7

Booster Coil

Serves: 1st Floor
Location: Rm 134

SEQUENCE OF OPERATIONS

Hot Water Booster Coils BC-101 thru BC-106

Unoccupied: The heating valve will be closed. If space temperature falls below 60F (adj) or rises above 85F (adj) the BMS shall enable the fan, and cycle heating and cooling as necessary to maintain the unoccupied set points.

A button on the space sensor shall allow occupants to override the air handling unit to the occupied mode for 2 hours (adj).

Occupied: The BMS will modulate the heating valve to maintain the space set point.

Alarms: Should any space sensor fall below 45F (adj), the BMS will generate an alarm.

POINT SCHEDULE

Module: IQ222 **Lan:** 20
Node: 20
Location: Corridor 125 **System:** BC-107 thru 109

Channel	Tag	Point Description	Detail	UU	Dest	Cable #	Wire
Universal Inputs							
1	TR-RSO	BC-107 Space Temp	IQ2-U22	T	Rm 125	20-1	PUR 22/6 TP
2		BC-107 Spt Adjust	IQ2-U22	T	Rm 125	20-2	Shared Cable
3	TR-RSO	BC-108 Space Temp	IQ2-U22	T	Rm 134	20-3	PUR 22/6 TP
4		BC-108 Spt Adjust	IQ2-U22	T	Rm 134	20-4	Shared Cable
5	TR-RSO	BC-109 Space Temp	IQ2-U22	T	Rm 135	20-5	PUR 22/6 TP
6		BC-109 Spt Adjust	IQ2-U22	T	Rm 135	20-6	Shared Cable
Analog Outputs							
9	TR24-SR	BC-107 Heating Valve	IQ2-AO5	n/a	Rm 134	20-9	ORG-S 18/4 TP
10	TR24-SR	BC-108 Heating Valve	IQ2-AO5	n/a	Rm 134	20-10	ORG-S 18/4 TP
11	TR24-SR	BC-109 Heating Valve	IQ2-AO5	n/a	Rm 135	20-11	ORG-S 18/4 TP
12				n/a		20-12	
13				n/a		20-13	
14				n/a		20-14	

UI Jumper Legend DI=Digital C=Current T=Thermistor V=Voltage

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DRAWN BY: AS JOB# 958015
DATE: 7/12/10 DWG# 11

AHU-1

Serves: 1st Floor
Located: Mech Rm E028

SEQUENCE OF OPERATIONS

Existing Air Handling Unit AHU-1

Unoccupied: The air handling unit shall close the outdoor air damper, open return air damper, and the fan shall be off. If space temperature falls below 60F (adj) or rises above 85F (adj) the BMS shall enable the fan, and cycle heating and cooling as necessary to maintain the unoccupied set points. The BMS shall utilize the economizer dampers during the cooling mode, if the outdoor conditions allow.

A button on the space sensor shall allow occupants to override the rooftop unit to the occupied mode for 2 hours (adj).

Optimum Start: The BMS system shall utilize an optimum start program that will start the unit in advance of the scheduled time in order to reach set point by occupancy. During optimum start, the economizer will remain closed to the outdoor air, unless free cooling is enable and required.

Occupied: The supply fan shall run continuously, outdoor air damper open to minimum position, and the BMS will cycle heating and cooling to maintain the supply air set point. The BMS will reset the supply air temperature set point based on zone space temperature and deviance from set point. The supply set point reset schedule shall be adjustable.

During occupied times the outdoor air damper will be at the minimum position set point. The economizer will be used for free cooling when the outdoor conditions allow. If the economizer cannot maintain the supply set point, mechanical cooling shall be enabled.

Minimum on / off times shall be utilized on all digital outputs to prevent short cycling of equipment.

Alarms: If the supply fan fails to start when commanded, the BMS will disable the heating and cooling functions and generate an alarm. Should any space sensor fall below 45F (adj), the BMS will generate an alarm.

Emergency Shutdown: Rooftop units shall shut down on indication of smoke from the smoke detector in the return ductwork, or signal from fire alarm panel. All wiring and material related to the smoke detection system by electrical contactor.

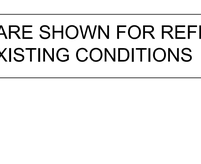
POINT SCHEDULE

Module: IQ3-12 **Lan:** 11
IP Address: **192.168.1.12** **Node:** 12
Subnet: **255.255.255.0** **System:** AHU-1
Location: Basement Mech Rm E028 **VCNC:** 10104

Channel	Tag	Point Description	Detail	UU	Dest	Cable #	Wire
Universal Inputs							
1	ST-AVG-1	Mixed Air Temp	IQ3-U12	T	E028	12-1	PUR-S 20/2 TSP
2	ST-DCT	Supply Air Temp	IQ3-U02	T	E028	12-2	PUR-S 20/2 TSP
3	RIBX/DTA	Supply Fan Status	IQ3-U03	DI	E028	12-3	Shared Cbl 12-11
4						12-4	
5	TR-RSO	BC-2 Space Temp	IQ3-CD3	T	Rm 126	12-5	PUR 22/6 TP
6		BC-2 Spt Adjust	IQ3-CD3	T	Rm 126	12-6	Shared Cable
Analog Outputs							
11	V-100	Fan S/S	IQ3-AO4	n/a	E027	12-11	18/4 TP
12	LF24-SR	Economizer Dampers	IQ3-AO5	n/a	E027	12-12	18/4 TP
13	NVF24-MF	Heating Valve	IQ3-AO6	n/a	E027	12-13	18/4 TP
14				n/a		12-14	
15	35.51.012	DX Cooling Stage 2	IQ3-AO7	n/a	Cond Unit	12-15	Shared Cable
16	38.51.012	DX Cooling Stage 2	IQ3-AO7	n/a	Cond Unit	12-16	GRN-S 18/2 TP

UI Jumper Legend DI=Digital C=Current T=Thermistor V=Voltage

Basement Mech E026



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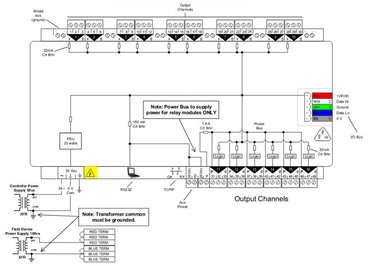
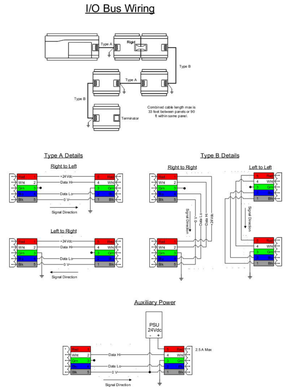
IQ3 Web Enabled Controller



I/O Bus Wiring



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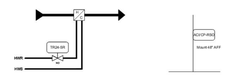
Booster Coil

Typical of 8
Location: 1st Floor



SEQUENCE OF OPERATIONS

Hot Water Booster Coils BC-101 thru BC-106

Unoccupied: The heating valve will be closed. If space temperature falls below 60F (adj) or rises above 85F (adj) the BMS shall enable the fan, and cycle heating and cooling as necessary to maintain the unoccupied set points.

A button on the space sensor shall allow occupants to override the air handling unit to the occupied mode for 2 hours (adj).

Occupied: The BMS will modulate the heating valve to maintain the space set point.

Alarms: Should any space sensor fall below 45F (adj), the BMS will generate an alarm.

POINT SCHEDULE

Module: IQ3-12 **Lan:** 11
IP Address: **192.168.1.14** **Node:** 14
Subnet: **255.255.255.0** **System:** BC-101 thru 103
Location: Basement Mech Rm E028 **VCNC:** 10103

Channel	Tag	Point Description	Detail	UU	Dest	Cable #	Wire
Universal Inputs							
1	TR-RSO	BC-101 Space Temp	IQ3-CD3	T	Rm 127	14-1	PUR 22/6 TP
2		BC-101 Spt Adjust	IQ3-CD3	T	Rm 127	14-2	Shared Cable
3	TR-RSO	BC-102 Space Temp	IQ3-CD3	T	Rm 120	14-3	PUR 22/6 TP
4		BC-102 Spt Adjust	IQ3-CD3	T	Rm 120	14-4	Shared Cable
5	TR-RSO	BC-103 Space Temp	IQ3-CD3	T	Rm 103	14-5	PUR 22/6 TP
6		BC-103 Spt Adjust	IQ3-CD3	T	Rm 103	14-6	Shared Cable
Analog Outputs							
11	TR24-SR	BC-101 Heating Valve	IQ3-AO5	n/a	E029	14-11	ORG-S 18/4 TP
12	TR24-SR	BC-102 Heating Valve	IQ3-AO5	n/a	E029	14-12	ORG-S 18/4 TP
13	TR24-SR	BC-103 Heating Valve	IQ3-AO5	n/a	E029	14-13	ORG-S 18/4 TP
14	NV24-MF	BC-1 Heating Valve	IQ3-AO5	n/a	E028	14-14	ORG-S 18/4 TP
15	NV24-MF	BC-2 Heating Valve	IQ3-AO5	n/a	E028	14-15	ORG-S 18/4 TP
16				n/a		14-16	

UI Jumper Legend DI=Digital C=Current T=Thermistor V=Voltage

POINT SCHEDULE

Module: IQ3-12 **Lan:** 11
IP Address: **192.168.1.15** **Node:** 15
Subnet: **255.255.255.0** **System:** AHU-1
Location: Basement Mech Rm E028 **VCNC:** 10104

Channel	Tag	Point Description	Detail	UU	Dest	Cable #	Wire
Universal Inputs							
1	TR-RSO	BC-104 Space Temp	IQ3-CD3	T	Rm 130	15-1	PUR 22/6 TP
2		BC-104 Spt Adjust	IQ3-CD3	T	Rm 130	15-2	Shared Cable
3	TR-RSO	BC-105 Space Temp	IQ3-CD3	T	Rm 131	15-3	PUR 22/6 TP
4		BC-105 Spt Adjust	IQ3-CD3	T	Rm 131	15-4	Shared Cable
5	TR-RSO	BC-106 Space Temp	IQ3-CD3	T	Rm 132	15-5	PUR 22/6 TP
6		BC-106 Spt Adjust	IQ3-CD3	T	Rm 132	15-6	Shared Cable
Analog Outputs							
11	TR24-SR	BC-104 Heating Valve	IQ3-AO5	n/a	E029	15-11	ORG-S 18/4 TP
12	TR24-SR	BC-105 Heating Valve	IQ3-AO5	n/a	E029	15-12	ORG-S 18/4 TP
13	TR24-SR	BC-106 Heating Valve	IQ3-AO5	n/a	E029	15-13	ORG-S 18/4 TP
14				n/a		15-14	
15				n/a		15-15	
16				n/a		15-16	

UI Jumper Legend DI=Digital C=Current T=Thermistor V=Voltage

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DRAWN BY: AS JOB# 958015
DATE: 7/12/10 DWG# 9

EXISTING DIRECT DIGITAL CONTROL DRAWINGS ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS

JDR ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
PH: 608.277.1728 FAX: 608.271.7046
JDR PROJECT NO. 21.0065

CONSULTANTS

ISSUED

REVISIONS / ADDENDA

PROJECT # : 21.0065

DRAWN : JDR

CHECKED : JDR

DATE : 06/15/2021

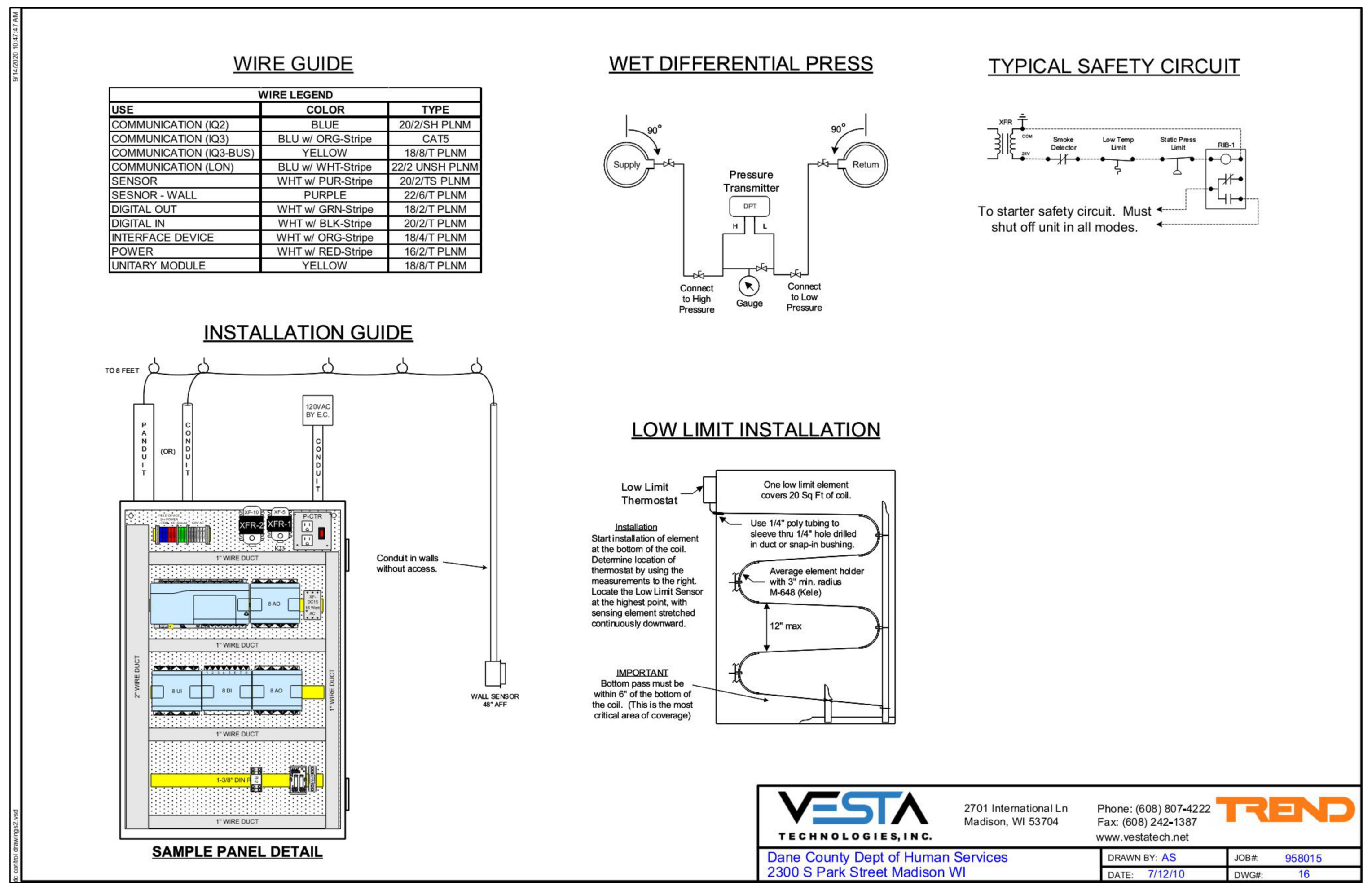
PHASE : BIDDING

PROJECT

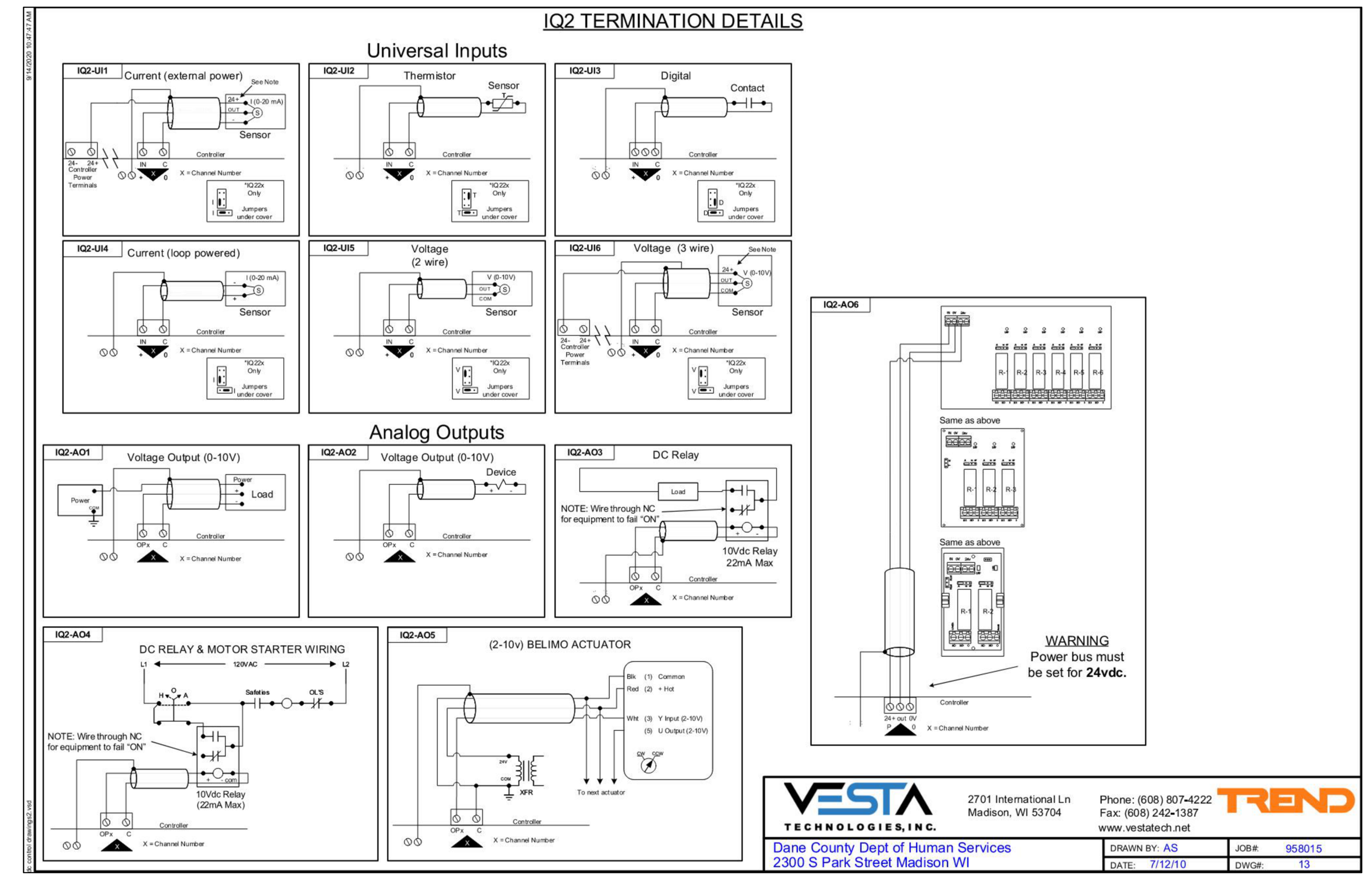
HVAC EQUIPMENT
REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

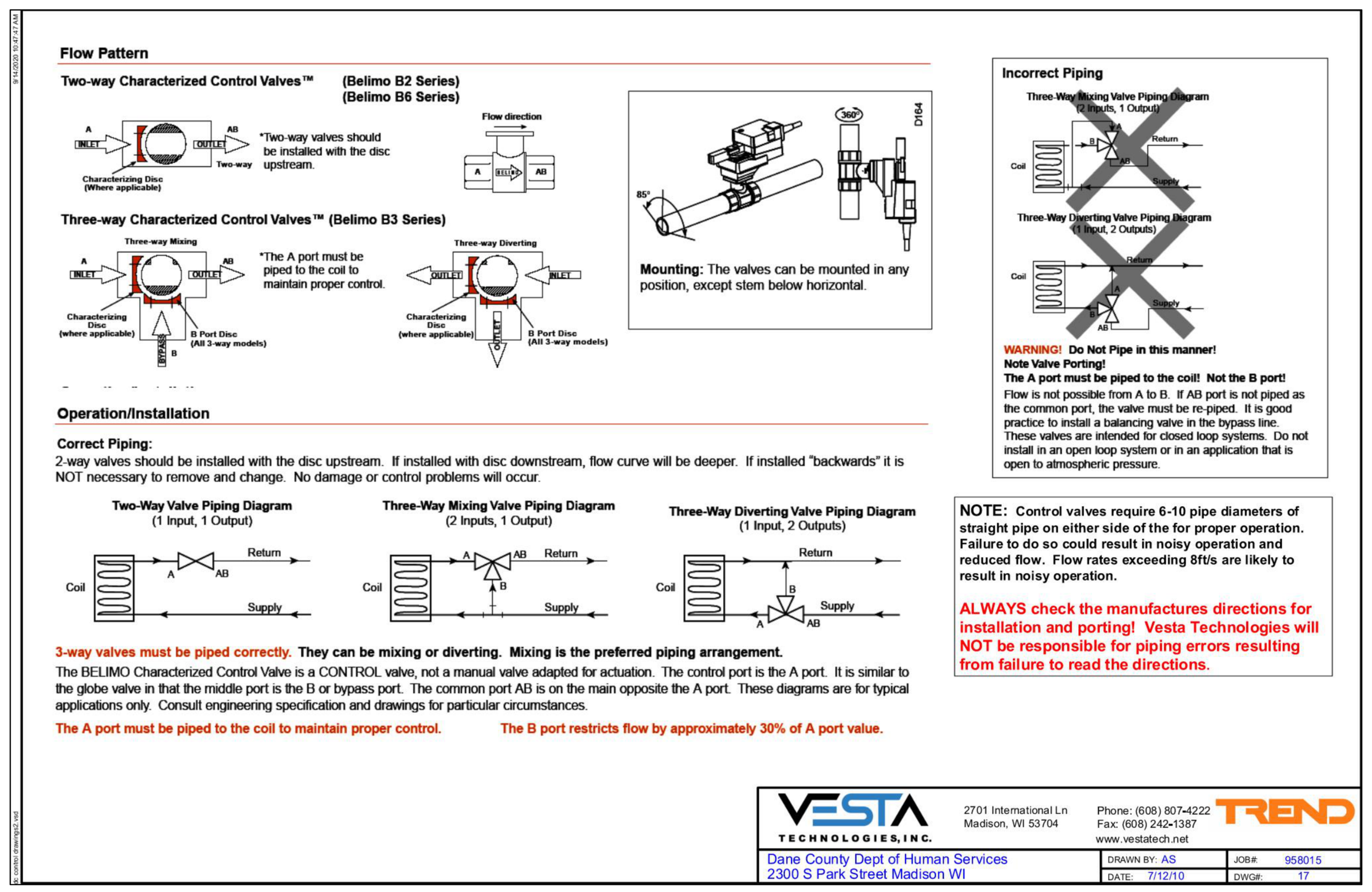
EXISTING DIRECT
DIGITAL CONTROL
DRAWINGS

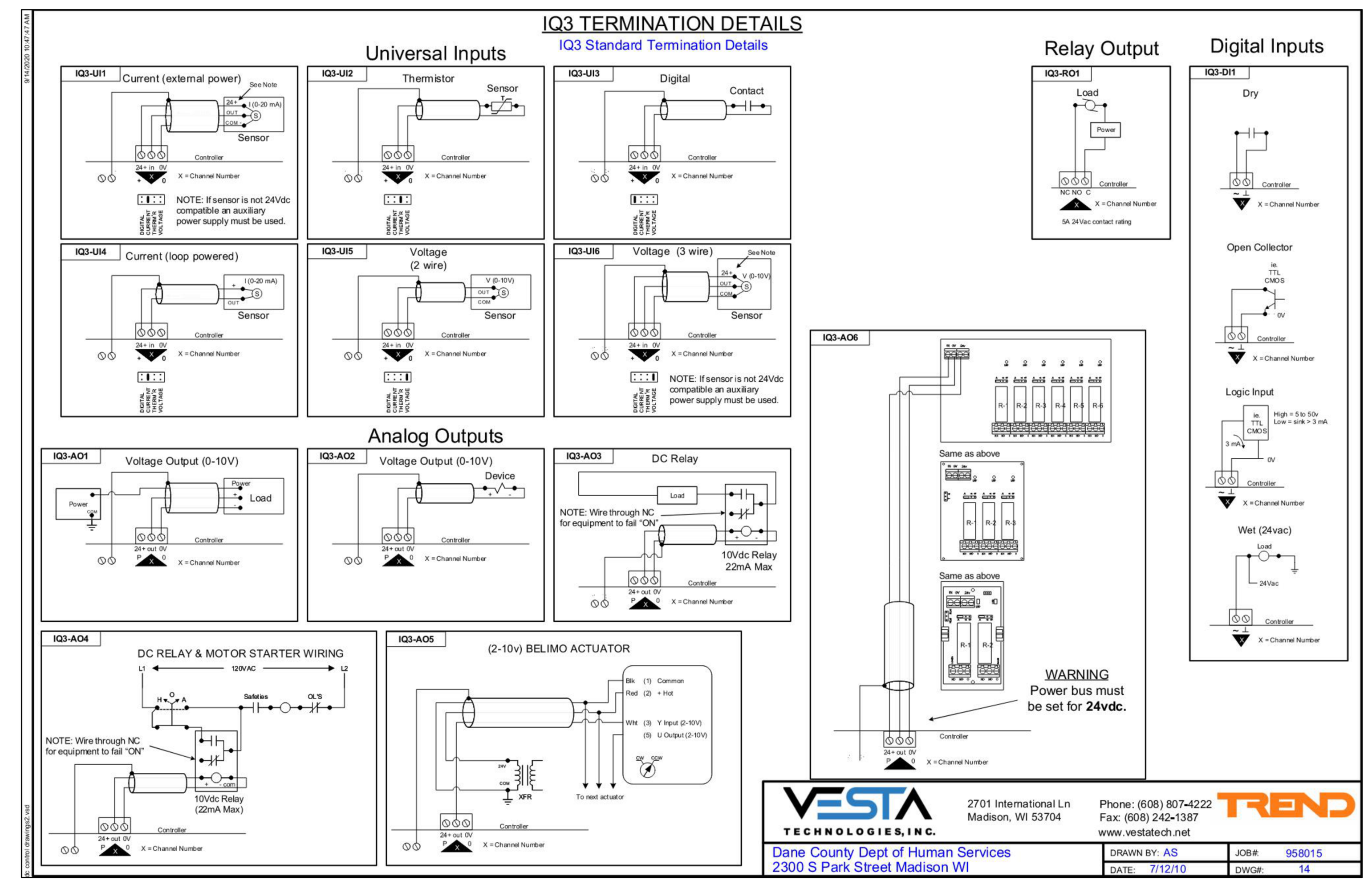
M601

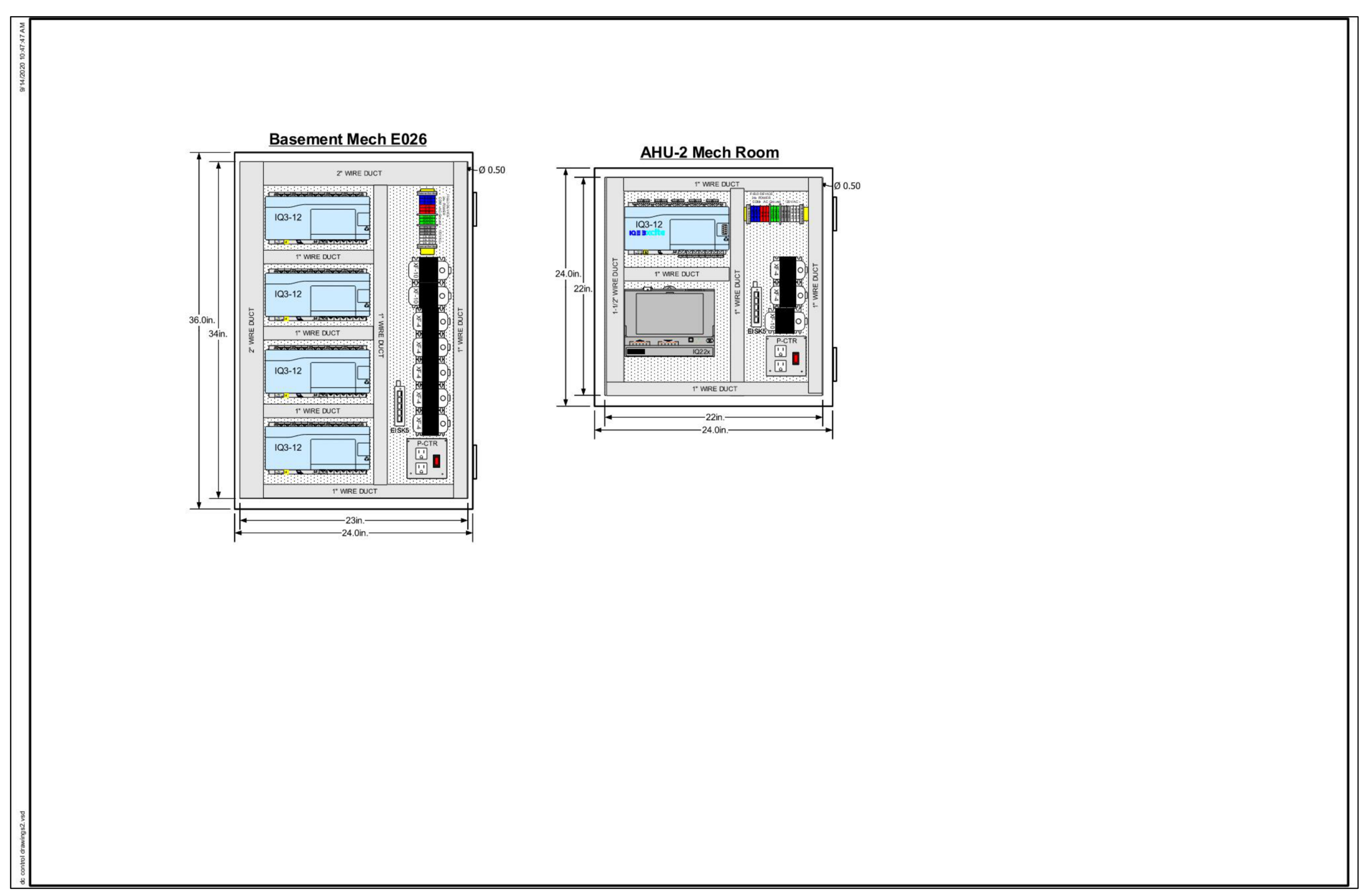


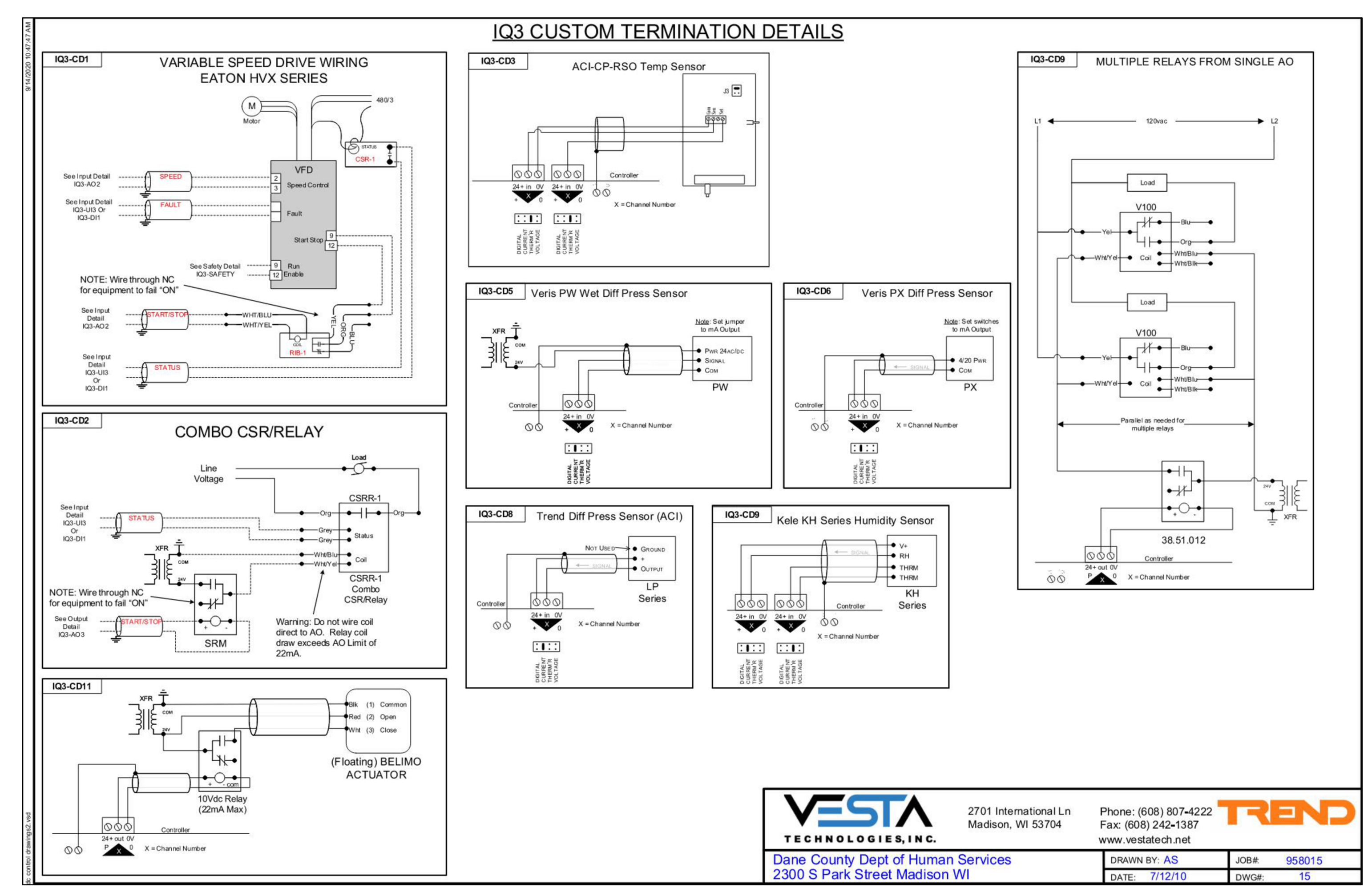
WIRE LEGEND		
USE	COLOR	TYPE
COMMUNICATION (IQ2)	BLUE	20/2/SH PLNM
COMMUNICATION (IQ3)	BLU w/ ORG-Stripe	CAT5
COMMUNICATION (IQ3-BUS)	YELLOW	18/8/T PLNM
COMMUNICATION (LON)	BLU w/ WHT-Stripe	22/2 UNSH PLNM
SENSOR	WHT w/ PUR-Stripe	20/2/TS PLNM
SESNOR - WALL	PURPLE	22/6/T PLNM
DIGITAL OUT	WHT w/ GRN-Stripe	18/2/T PLNM
DIGITAL IN	WHT w/ BLK-Stripe	20/2/T PLNM
INTERFACE DEVICE	WHT w/ ORG-Stripe	18/4/T PLNM
POWER	WHT w/ RED-Stripe	16/2/T PLNM
UNITARY MODULE	YELLOW	18/8/T PLNM











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5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
PH: 608.277.1728 FAX: 608.271.7046
JDR PROJECT NO. 21.0065

CONSULTANTS

ISSUED

REVISIONS / ADDENDA

PROJECT # : 21.0065

DRAWN : JDR

CHECKED : JDR

DATE : 06/15/2021

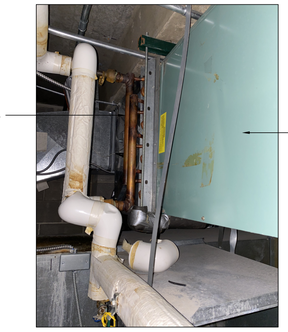
PHASE : BIDDING

PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

EXISTING DIRECT DIGITAL CONTROL DRAWINGS

M602



9 M700 EXISTING UNIT AHU-1
SCALE: N.T.S.

5 M700 EXISTING UNIT RTU-5
SCALE: N.T.S.

1 M700 EXISTING UNITS C-3 AND C-4
SCALE: N.T.S.

10 M700 EXISTING UNIT AHU-1
SCALE: N.T.S.

6 M700 EXISTING UNIT RTU-15
SCALE: N.T.S.

2 M700 EXISTING UNIT C-10
SCALE: N.T.S.

11 M700 EXISTING UNIT AHU-2
SCALE: N.T.S.

7 M700 EXISTING UNITS RTU-30, 31, 32 AND 34
SCALE: N.T.S.

3 M700 EXISTING UNIT C-10
SCALE: N.T.S.

8 M700 EXISTING UNIT AHU-1
SCALE: N.T.S.

4 M700 EXISTING UNITS RTU-5 AND RTU-15
SCALE: N.T.S.

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PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

EXISTING SITE PHOTOS

M700

PACKAGED ROOFTOP AIR CONDITIONING UNIT SCHEDULE

UNIT NO.		RTU-5	RTU-15	RTU-30	RTU-31	RTU-32	RTU-34	
LOCATION		ROOF (UPPER)	ROOF (UPPER)	ROOF (DOCK)	ROOF (DOCK)	ROOF (DOCK)	ROOF (DOCK)	
SYSTEM TYPE		SINGLE ZONE VAV	VAV SYSTEM WITH BYPASS	SINGLE ZONE CONSTANT VOLUME	SINGLE ZONE CONSTANT VOLUME	SINGLE ZONE CONSTANT VOLUME	SINGLE ZONE CONSTANT VOLUME	
MANUFACTURER		TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	
MODEL NO.		YSC120H3	YSC060G3	4YCC4042	4YCC4024	4YCC4042	4YCC4030	
ARI RATED CAPACITY (TONS)		10.0	5.0	3.5	2.0	3.5	2.5	
CABINET TYPE		SINGLE WALL	SINGLE WALL	SINGLE WALL	SINGLE WALL	SINGLE WALL	SINGLE WALL	
AIR HANDLING DATA	SUPPLY CFM	4,000	2,000	1,450	800	1,450	875	
	RETURN / EXHAUST CFM	-	-	-	-	-	-	
	OA CFM	450	250	175	100	175	100	
	EXT. SP (IN WC)	0.5	0.8	0.5	0.5	0.5	0.5	
	SUPPLY FAN CONTROL	VARIABLE SPEED	CONSTANT VOLUME	CONSTANT VOLUME	CONSTANT VOLUME	CONSTANT VOLUME	CONSTANT VOLUME	
	SUPPLY FAN TYPE	BI PLENUM	FC CENTRIFUGAL	ECM	CENTRIFUGAL	ECM	CENTRIFUGAL	
	SUPPLY FAN VFD	YES	NO	NO	NO	NO	NO	
	SUPPLY FAN HP	2.8	1.0	3/4	FRAC	3/4	FRAC	
	POWERED RELIEF FAN	YES	YES	NO	NO	NO	NO	
GAS HEATING DATA	EAT (°F)	70.0	70.0					
	LAT (°F)	102.7	126.4					
	INPUT (MBH)	200.0	150.0					
	OUTPUT (MBH)	160.0	121.5					
	FUEL TYPE	NAT. GAS	NAT. GAS					
	STAGES OF CAPACITY	2-STAGE	2-STAGE					
	HEAT EXCHANGER MATERIAL	ALUMINUM	ALUMINUM					
ELECTRIC HEATING DATA	MODEL #			BAYHTRV115	BAYHTRV110	BAYHTRV115	BAYHTRV110	
	INPUT (KW)			15	10	15	10	
	OUTPUT (MBH)			51.2	34.1	51.2	34.1	
	STAGES OF CAPACITY			2	1	2	1	
	VOLTAGE			208	208	208	208	
	PHASE			1	1	1	1	
COOLING DATA	REFRIGERANT	R410A	R410A	R410A	R410A	R410A	R410A	
	EAT (°F) DB / WB	80/67	80/67	-	-	-	-	
	LAT (°F) DB / WB	59.3/58.2	59.5/58.3	-	-	-	-	
	SENSIBLE CAPACITY (MBH)	96.8	49.3	-	-	-	-	
	TOTAL CAPACITY (MBH)	116.3	60.0	40.5	23.0	40.5	28.2	
	STAGES OF CAPACITY	2	1	1	1	1	1	
	AMBIENT TEMP. (°F)	95.0	95.0	95.0	95.0	95.0	95.0	
INTEGRAL DEHUMIDIFICATION		NO	NO	NO	NO	NO	NO	
FILTER	FILTER TYPE	PLEATED	PLEATED	PLEATED	PLEATED	PLEATED	PLEATED	
	FILTER DEPTH	2"	2"	2"	2"	2"	2"	
	FILTER EFFICIENCY	MERV 8	MERV 8	MERV 8	MERV 8	MERV 8	MERV 8	
ELEC DATA	VOLTS	208	208	208	208	208	208	
	PHASE	3	3	1	1	1	1	
	MCA	49.0	29.0	28.5	19.1	28.5	22.6	
	MOCP	60.0	40.0	45.0	30.0	45.0	35.0	
UNIT WEIGHT (LBS)		1,058	592	452	358	452	377	
REMARKS		1, 4	2, 4	3	3	3	3	

KEYED NOTES:

1 UNIT REPLACES AN EXISTING 10 TON SINGLE ZONE CONSTANT VOLUME UNIT.
2 UNIT REPLACE AN EXISTING 5 TON VAV UNIT WITH EXISTING EXTERNAL SUPPLY AIR BYPASS.
3 UNIT REPLACES AN EXISTING 2, 2.5 OR 3.5 SINGLE ZONE CONTSTANT VOLUME UNIT.
4 WORK INCLUDED AS PART OF ALTERNATE 1 ONLY.

BLOWER COIL UNIT SCHEDULE

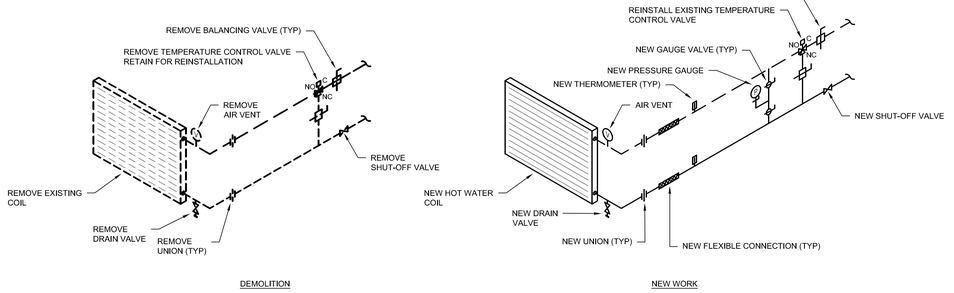
UNIT NO.		AHU-1	AHU-2	
SERVICE		FIRST FLOOR	FIRST FLOOR	
LOCATION		E028	151	
MANUFACTURER		DAIKIN	DAIKIN	
MODEL NO.		BCHD301	BCVD401	
AIR FLOW (CFM)		3,000	4,000	
MIN. OA (CFM)		300	400	
EXT. SP ("WG)				
TOTAL SP ("WG)		1.11	1.00	
UNIT ARR.		HORIZONTAL	VERTICAL	
UNIT FACE & BYPASS		NO	NO	
VIBRATION ISOLATOR TYPE		-	-	
SUPPLY AIR FAN				
FAN TYPE				
FAN RPM		1,275	999	
MOTOR BHP		1.47	1.86	
MOTOR HP		3.00	5.0	
MOTOR TYPE				
VARIABLE FREQUENCY DRIVE (VFD)		NO	NO	
VOLTAGE/PHASE		208/230-3-60	208/230-3-60	
MCA / MOCP		10.3/15	17.1/30	
AIR FILTER				
MAX FACE VELOCITY (FPM)				
FILTER	DEPTH	2	2	
	MERV	MERV 8	MERV 8	
	SP DROP (IN) CLEAN / DIRTY			
REFRIGERANT COOLING COIL				
PAIRED ACCU		ACCU-10	ACCU-3 / ACCU-4	
REFRIGERANT TYPE		R140A	R140A	
EAT (DB/WB) (F)		77.0 / 65.0	77.0 / 65.0	
LAT (DB/WB) (F)		55.3 / 54.1	56.5 / 55.0	
TOTAL CAPACITY (MBH)		98.3	121.9	
SENSIBLE CAPACITY (MBH)		71.1	89.7	
MAX FACE VELOCITY (FPM)		497	499	
ROWS		3	3	
FINS PER INCH		12	12	
MAX APD (IN WC)				
HOT WATER HEATING COIL				
HEATING AIR FLOW (CFM)		3,000		
EAT (F)		70		
LAT (F)		103.9		
CAPACITY (MBH)		111.2		
MAX FACE VELOCITY (FPM)		497		
MAX APD (IN WC)				
FLUID TYPE		WATER		
FLUID FLOW (GPM)		7.6		
EWT (F)		180		
LWT (F)		150		
MAX WPD (FT)		6.16		
TCV (TYPE)		3-WAY		
ELECTRIC HEATING COIL				
EAT (F)				
LAT (F)				
INPUT (KW)			36	
STAGE OF CAPACITY				
VOLTAGE			208/230	
PHASE			3	
REMARKS		1, 2	1, 2	

REMARKS
1. AIR HANDLING UNIT REPLACES EXISTING UNIT. CONTRACTOR TO CONFIRM EXISTING ELECTRICAL CONDITIONS.
2. PROVIDE NEW DISCONNECT AT UNIT.

AIR COOLED CONDENSING UNIT SCHEDULE

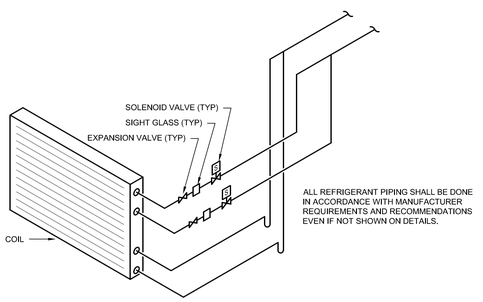
UNIT NO.		ACCU-3	ACCU-4	ACCU-10	
SERVICE		AHU-2	AHU-2	AHU-1	
LOCATION		ROOF	ROOF	ROOF	
MANUFACTURER		DAIKIN	DAIKIN	DAIKIN	
MODEL NO.		DX13SA0503	DX13SA0603	RCS07G091C	
NOMINAL COOLING CAPACITY (TON)		5	5	7.5	
TOTAL COOLING CAP. (MBH)		56.5	56.5	98.5	
REFRIGERANT SUCTION TEMP (°F)					
AMBIENT AIR TEMP TO COND (°F)		95	95	95	
NO. OF REFRIGERANT CIRCUITS		1	1	1	
STAGES OF CAPACITY		1	1	2	
HOT GAS BYPASS		NO	NO	NO	
LOW AMBIENT OPERATION		NO	NO	NO	
MINIMUM EER		11.0	11.0		
COMPRESSORS					
TYPE		SCROLL	SCROLL	SCROLL	
QUANTITY		1	1	1	
HP					
RLA		16	16	27.9	
CONDENSER FANS					
QUANTITY		1	1	1	
DIA / TYPE		-	-	-	
HP EACH		-	-	-	
REFRIGERANT	TYPE	R410A	R410A	R410A	
	SUCTION LINE SIZE HORIZONTAL	-	-	-	
	SUCTION LINE SIZE VERTICAL	-	-	-	
		-	-	-	
	LIQUID LINE SIZE	-	-	-	
	HOT GAS LINE SIZE	-	-	-	
UNIT ELEC. DATA	VOLTS	208	208	208	
	PHASE	3	3	3	
	MCA	21.3	21.3	37	
	MOCP	35	35	60	
UNIT WEIGHT (LBS)		233	233	307	
REMARKS		1,3,4	1,3,4	2,3,4	

KEYED NOTES
1. UNIT REPLACES EXISTING CARRIER MODEL 38THD60 5 TON UNIT (R22). EXISTING UNIT IS 208/3, 40 MOCP.
2. UNIT REPLACES EXISTING CARRIER UNIT. CONTRACTOR TO CONFIRM EXISTING ELECTRICAL CONDITIONS.
3. PROVIDE NEW DISCONNECT AT UNIT.
4. PROVIDE NEW REFRIGERANT PIPING FROM ACCU TO FAN COIL/BLOWER COIL.

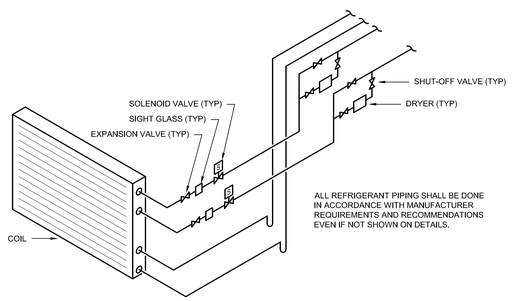


DEMOLITION NEW WORK

1 M800 AHU-1 HOT WATER COIL PIPING DETAIL
SCALE: NONE (WITH 3-WAY TCV)



2 M800 AHU-1 REFRIGERANT PIPING DETAIL
SCALE: NONE



1 M800 AHU-2 REFRIGERANT PIPING DETAIL
SCALE: NONE

JDR ENGINEERING, INC.
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MADISON, WI 53711
PH: 608.277.1728 FAX: 608.271.7046
JDR PROJECT NO: 21.0065

CONSULTANTS

ISSUED

REVISIONS / ADDENDA

PROJECT # : 21.0065
DRAWN : JDR
CHECKED : JDR
DATE : 06/15/2021
PHASE : BIDDING

PROJECT

HVAC EQUIPMENT REPLACEMENT
PUBLIC HEALTH
DANE COUNTY
AND MADISON
SOUTH MADISON OFFICE

SCHEDULES AND DETAILS

M800