ADDENDUM NO. 1

To Proposal Documents for

RFP EVMS GROSSLAB19-101

Gross Anatomy Lab Improvements at Lewis Hall

Date: May 07, 2019

To All Concerned:

The original Proposal Documents are amended as noted in this Addendum No. 1, and the Addendum shall become part of the Proposal Documents. Bidders must acknowledge receipt of this Addendum during the RFP submittal process by so noting on the pricing form when submitting proposals.

Pertaining to the initial Request for Proposal package:

Item 1. AIA Contract forms, (modified), will be posted on the EVMS Solicitations website at:
https://www.evms.edu/about_evms/administrative_offices/materials_management/solicitations/.
These will be the basis for the contract with EVMS for this project.

Item 2. The mandatory Pre-proposal Meeting sign-in sheet, Agenda and Meeting Notes have been posted at the above website. (Note, check this site often and prior to proposal submission for any additional information.)

Pertaining to the Specifications

Item 1. Attached specification section, "028213, Engineering Control of Asbestos Containing Materials", shall be incorporated within and the requirements contained therein shall become part of the proposal documents.

Item 2. Attached specification section, "028313, Lead Cadmium, and Chromium Construction" shall be incorporated within and the requirements contained therein shall become part of the proposal documents.

Item 3. Specification section 011000, paragraph 1.4, B. shall be edited as follows: Concurrent work: Owner has awarded separate contracts and will ***not assign to this contractor***….

Pertaining to the Drawings:

An additional drawing sheet, "HM101", is attached and shall become part of the proposal

documents.

Drawing LS120, Demolition View - Auditorium Ceiling, add the following clarification: Ceiling removal will be required at areas where structural reinforcement is indicated. This includes the AHU-1 roof curb and the pipe support curbs. Note added to sheet LS120.

Drawing LS120, Demolition Schedule: The Demolition Schedule has been revised. See attached revised sheet LS120.

Drawing A120: Wall type schedule has been modified to include missing wall type. See attached revised sheet.

Drawing A610: The finish colors and finish schedule have been revised. See attached sheet A610 for revisions.

Drawing S100: The additional steel reinforcing shown on this sheet will also be required below the pipe support roof curbs. Provide similar to AHU-1 curb reinforcing. See Sheet M201 & M202 for locations. Pipe support curbs shall be centered over two joists.

Drawing P001: Add the following requirement to the "Core Drill Box Note"; "Core drilling shall be scheduled and performed between the hours of 7:00 PM and 7:00 AM, Monday through Friday or anytime on Saturdays or Sundays. Notify EVMS staff a minimum of 24 hours in advance of core drilling operations".

Drawing M101: Add the following clarification to New Work note "13"; "Fume hood ductwork to be galvanized sheet metal".

Add the following Clarification to New Work notes "12" & "14"; This ductwork to be spiral wound, galvanized sheet metal.

Modify the routing of AHU-1 exhaust discharge ductwork as indicated in the attached revised M101.

Drawing M502, Rooftop Piping Curb Support Detail. Add the following note: "Provide structural steel reinforcing below each curb support in accordance with detailing for AHU-1 curb supports shown on S100. Curb supports shall be centered over two joists."

"Hot Water Coil Piping for AHU Detail" has been revised. See attached revised sheet M502.

Drawing M601: The Air Handling Unit Schedule, Note 10 and diagram shall be edited to indicate that the Kinetics ESR vibration isolation roof curb shall be "owner furnished, contractor installed, (OFCI)".

Drawing M701, Controls has been revised. See attached sheet M701for revisions.

Drawing E001: See attached revised sheet.

Drawing ED202: See attached revised sheet.

Drawing E202: See attached revised sheet.

Drawing E602: See attached revised sheet.

Pertaining to Pre-Proposal Questions

1. Virtexco RFI questions with answers are included as an attachment.
2. The drawings specify wood doors, however there is nothing in the specifications, division 8, referring to wood doors. See the wood door requirements added above under "Pertaining to the Specifications"
3. Can you tell me what type of material the fume hood duct is to be constructed of? Also, can you tell me the same for the 36" stack from AHU-1? See the answers above under "Drawing M101"
4. It appears as if the owner has preferred vendors suppling Commissioning, HVAC equipment and controls to them and I will in turn be assigned those contracts. No, EVMS will retain the separate contracts for indicated Equipment, Controls and Commissioning. See the modification to specification section 011000 above.
5. Would you kindly define for me the proper forms and in the proper order I need to put them in for my submission on Friday. I realize this question is a bit redundant but I'd like my submission to be exactly right, and exactly what you're expecting. All required forms are listed on page 26 of the RFP (attachments A through G), in addition to the required bid bond guarantee.
6. Can NABCO Door operators be an approved equal substitute? No, the three listed are currently utilized at EVMS and no substitutions are permitted.

Attachments

Item 1: Specification Section 028213, Engineering Control of Asbestos Containing Materials

Item 2: Specification Section 028313, Lead Cadmium, and Chromium Construction

Item 3: New Drawing sheet HM101

Item 4: Davis-Bacon Wage Rates

Item 5: AHU-1 Shop Drawing Submittal

Item 6: Revised Drawings: LS120, A120, A610, M101, M502, M701, E001, ED202, E202 & E602

Item 7: Virtexco RFI's with Responses

Proposal due date remains unchanged: May 10, 2019, no later than 2:00 PM.

END OF ADDENDUM NO. 1

SECTION 028213 ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION OF THE WORK

A. Related Documents- “Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this Section”

B. Perform all planning, administration, execution, and cleaning necessary to safely remove asbestos-containing or contaminated materials. Approval of or acceptance by Owner's Project Monitor, Engineer, Architect or Owner of various construction activities or methods proposed by Contractor does not constitute an assumption of liability either by the Owner's Project Monitor, Engineer, Architect or Owner for inadequacy or adverse consequences of said activities or methods.

C. The work covered by this section includes the handling of asbestos-containing materials which are encountered during project and describes some of the resultant procedures and equipment required to protect workers and occupants of the building or area, or both, from contact with airborne asbestos fibers. Procedures for removal of these materials are located in Part 3 - Execution.

D. An asbestos inspection was performed. Destructive activities such as breaking into walls, ceilings, or floors were not performed in order to obtain samples. Therefore, if during the work suspect asbestos containing materials are uncovered, the Contractor shall stop work until the materials are properly identified and addressed. Sampling documentation is available to the Contractor in the Bidder Information Section.

1.2 WORK INCLUDED

A. The project, Renovate Gross Anatomy Lab at Lewis Hall, is located at 700 W. Olney Road in Norfolk, Va. The project is located on the Eastern Virginia Medical School (EVMS) campus. Asbestos-containing materials to be removed include: 12-inch floor tile and mastic, and assumed bulletin board mastic.

B. Include all work listed in these specifications and incidentals thereto. Require that all phases of the work be executed by skilled craftsman experienced in their respective trades. Work to be performed includes but is not limited to:

1. Pre-Installation Meeting
    A. Convene one week before starting work of this section.
    B. conduct conference at Project site to comply with requirements of Division 1 Section “Project Meetings.”
2. Prior to the commencement of work, all work and work practices shall be approved by the Owner and the Architect.
3. Coordinate work with Owner and Owner's Project Monitor.
4. Coordinate work and phases with General Contractor and other trades.
5. Preparation of workspace as specified.
6. Remove asbestos-containing materials, package it for disposal and properly dispose in an EPA and state approved landfill.
7. Clean-up of the area as specified elsewhere.
8. Ensure that all services provided under this contract shall be performed by competent craft personnel and in a good workmanlike manner in accordance with the manufacturer's

recommended procedures. Contractor's personnel shall conform to all Occupational Safety and Health Administration and Environmental Protection Agency guidelines and requirements for asbestos removal and employee monitoring.

C. Contractor may subcontract any phase or portion of the work. However, such subcontract shall not relieve Contractor from enforcing the use of all required health and safety equipment and procedures by subcontractor and its employees providing any phase of the work in contaminated areas. Require and verify that all materials and methods used by subcontractor are consistent with materials and methods for established and safe asbestos removal procedures and consistent with the Project Manual. Existing conditions are reflected correctly to the best of Owner's knowledge. Should minor conditions be encountered which are not exactly as indicated, modification to work shall be made as required at no additional expense to Owner. Contractor is advised that destructive activities, such as, breaking into walls, was not performed in order to locate asbestos-containing materials. Therefore, the Contractor is advised to proceed with caution in all phases of the work. Contractor is responsible for air monitoring required for the safety of its employees. Contractor is responsible for compliance with Project Manual, confirming and correlating all quantities dimensions, selecting fabrication processes and techniques "including means, methods, and sequencing" of construction, coordinating the work with that of all other trades and performance of the work in a safe satisfactory method. Unless provided for otherwise, the Contractor shall guarantee all work covered under this contract against defects resulting from the use of substandard materials, equipment, or workmanship for one year from the date of final acceptance by the Owner. Any work which has to be corrected due to the Contractor's faulty workmanship, equipment, tools or materials shall be done at no additional expense to the Owner.

D. Contractor agrees to guarantee and hold harmless Owner, Owner’s agents and employees, against any and all claims arising out of the infringement or alleged infringement by Contractor, or any of Contractor’s agents, employees or subcontractors, of any rights secured under copyright, trademark or patent protection. In that regard, Contractor hereby represents, on behalf of itself, its agents, employees and/or subcontractors, that all necessary licenses for the use of any copyright, trademark or patent have been obtained, are in full force and effect at the time of execution of this contract, and shall remain in full force and effect during the term of this contract and any extension hereof.

E. The performance and execution of the work shall be monitored by a representative and/or representatives appointed by the Owner to ensure full compliance with these specifications and all applicable regulations. The Owner will bear the cost in connection with the laboratory and inspection work required for initial final clearances and inspection in this specification: however, the cost of Contractor delays and subsequent visual inspections and laboratory analysis for personal and area samples taken because the limits specified were exceeded in the initial tests shall be borne by the Contractor.

F. The Owner and/or appointed representatives reserve the right to halt the project until hazardous or potentially hazardous conditions are corrected. It will be the responsibility of the Contractor to pay for the consultant services and costs involved to correct the non-compliance.

G. In the facility office there is an Asbestos Hazard Emergency Response Act (“AHERA”) Management plan. The Contractor shall review the AHERA Management Plan before starting any work at the facility. The Contractor shall contact the Principal of the facility to coordinate its review of the AHERA Management Plan.

1.3 WORK NOT INCLUDED IN THE CONTRACT DOCUMENTS

Area air monitoring, visual inspections, clearance inspections, and clearance sampling for Owner by Owner's Project Monitor.

1.4 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

ANSI Z88.2	Respiratory Protection

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 732	Aging Effects of Artificial Weathering on Latex Sealants
ASTM D 552	Mandrel Band Test of Attached Organic Coatings
ASTM D 1331	Surface and Interfacial Tension of Solutions of Surface-Active Agents
ASTM D 2794	Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM E 84	Surface Burning Characteristics of Building Materials
ASTM E 96	Water Vapor Transmission of Material
ASTM E 119	Fire Tests of Building Construction and Materials
ASTM E 1368-90	Standard Practice for Visual Inspection of Asbestos Abatement Projects

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1926.103	Respiratory Protection
29 CFR 1926.51	Sanitation
29 CFR 1926.200	Accident Prevention Signs and Tags
29 CFR 1926.59	Hazard Communication
29 CFR 1926.1101	Asbestos, Tremolite, Anthophyllite, Actinolite
40 CFR 61, SUBPART A	General Provisions
40 CFR 61, SUBPART M	National Emission Standards for Hazardous Air Pollutants

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 560/5-85-024	Guidance for Controlling Asbestos-Containing Materials in Buildings
EPA 40 CFR Part 763	Asbestos Hazard Emergency Response Act (AHERA) – Asbestos Containing Materials in Schools

UNDERWRITERS LABORATORIES INC. (UL)

UL 586 1985 (R 1988)	High-Efficiency, Particulate, Air Filter Units, Sixth Edition

COMMONWEALTH OF VIRGINIA (VA)

9 VAC 20-81	Virginia Solid Waste Management Regulations
16 VAC 25-20	Regulation Concerning Licensed Asbestos Contractor Notification, Asbestos Project Permits, and Permit Fees
16 VAC 25-30	Regulations for Asbestos Emissions Standards for Demolition and Renovation Construction Activities And The Disposal of Asbestos-Containing Construction Wastes
18 VAC 15-20	Virginia Asbestos Licensing Regulations

1.5 DEFINITIONS

A. Airlock: System for permitting ingress or egress of personnel without permitting air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least three feet apart.

B. Amended Water: Water containing a wetting agent or surfactant with a surface tension tested in accordance with ASTM D 1331.

C. Architect: Architectural Firm or any individual employed by the firm providing architectural services for the project.

D. Area Sampling: Sampling of asbestos fiber concentrations within the asbestos control area and outside the asbestos control area which approximates the concentrations of airborne fibers in the theoretical breathing zone but is not actually collected in the breathing zone of an employee.

E. Asbestos: The term asbestos includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite and any of these minerals that has been chemically treated or altered. Materials are considered to contain asbestos if the asbestos content is more than one percent of the material by area.

F. Asbestos Control Area: That area where asbestos removal operations are performed which is isolated by physical boundaries to prevent unauthorized entry of personnel and to prevent the spread of asbestos dust, fibers, or debris. Two examples of an asbestos control area are: a full containment and a "glovebag."

G. Asbestos Fibers: Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.

H. Asbestos Permissible Exposure Limit: 0.1 fibers per cubic centimeter of air as an 8-hour time weighted average as defined by 29 CFR 1926.1101 or other federal legislation having legal jurisdiction for the protection of workers health.

I. Background: The ambient airborne asbestos concentration in an uncontaminated area as measured prior to any asbestos hazard abatement efforts. Background concentrations for other (contaminated) areas are measured in similar but asbestos free locations.

J. Class I Asbestos Work: Activities defined by OSHA involving the removal of thermal system insulation (TSI) and surfacing ACM.

K. Class II Asbestos Work: Activities defined by OSHA involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos- containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Certain "incidental" roofing materials such as mastic, flashing and cements when they are still intact are excluded from Class II asbestos work. Removal of small amounts of these materials, which would fit into a glovebag, may be classified as a Class III job.

L. Class III Asbestos Work: Activities defined by OSHA that involve repair and maintenance operations, where ACM, including TSI and surfacing ACM, is likely to be disturbed. Operations may include drilling, abrading, cutting a hole, cable pulling, crawling through tunnels or attics and spaces above the ceiling, where asbestos is actively disturbed or asbestos-containing debris is actively disturbed.

M. Class IV Asbestos Work: Maintenance and custodial construction activities during which employees contact but do not disturb ACM and activities to clean-up dust, waste and debris resulting from Class I, II, and III activities. This may include dusting surfaces where ACM waste and debris and accompanying dust exists and cleaning up loose ACM debris from TSI or surfacing ACM following construction.

N. Clean Room: An uncontaminated area or room which is part of worker decontamination enclosure system, with provisions for storage of worker street clothes and protective equipment. Also known as the "Change Room."

O. Competent Person: One who is on the work site at the asbestos control area and capable of identifying existing asbestos; chrysotile, crocidolite, amosite, tremolite, anthophyllite, or actinolite hazards in the workplace and who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.1101. The duties of the competent person include at least the following: establishing the asbestos regulated work area, ensuring its integrity, and controlling entry to and exit from the asbestos regulated work area; supervising any employee exposure monitoring required by the standard; ensuring that all employees working within such an asbestos regulated work area wear the appropriate personal protective equipment, are trained in the use of appropriate methods of exposure control, and use the hygiene facilities and decontamination procedures specified in the standard; and ensuring that engineering controls in use are in proper operating condition and are functioning properly.

P. Contractor: The Contractor is that individual, or entity under contract to perform the herein listed work.

Q. Critical Barrier: Seal applied to openings connecting the abatement area with adjacent spaces that will not be included in the containment. Critical barriers shall not be exposed to the gross removal environment. Examples of openings requiring critical barriers include, but are not limited to: HVAC vents and diffusers, doorways, windows, floor, wall, and ceiling penetrations, and air plenums.

R. Curtained Doorway: A device to allow ingress or egress from the room to another while minimizing air movement between the rooms. Two curtained doorways spaced a minimum of three feet apart form an airlock.

S. Decontamination Enclosure System: A series of connected rooms, with airlocks between any two adjacent rooms, for the decontamination of workers or of materials and equipment. Decontamination systems shall be contiguous and adjacent to the enclosed asbestos control area.

T. Duct Tape: Utility grade laminated polyethylene/cloth tape with calendered adhesive system.

U. Encapsulants: Specific materials in various forms used to chemically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulants as follows that must comply with performance requirements as specified herein.

1. Removal Encapsulant (can be used as a wetting agent).
2. Bridging Encapsulant (used to provide a tough, durable surface coating to asbestos-containing material).
3. Penetrating Encapsulant (used to penetrate the asbestos-containing material down to substrate, encapsulating all asbestos-containing material down to substrate, encapsulating asbestos fibers).
4. Lock-Down Encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces, after fine cleaning from which asbestos-containing material has been removed).

V. Engineer: Individual employed by the Engineering Consulting Firm to design the project.

W. Equipment Decontamination Enclosure System: A decontamination system for waste materials and equipment, typically consisting of a designated area of the work area, a washroom, and a holding area with airlocks between any two adjacent rooms. Not to be used for personnel entry/exit.

X. Friable Asbestos Material: Material that contain more than one percent asbestos by area that can be crumbled, pulverized, or reduced to powder by hand pressure or which under normal use or maintenance emits or can be expected to emit asbestos fibers into the air.

Y. HEPA Filter Equipment: High efficiency particulate air (HEPA) filtered vacuum and/or exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall retain 99.97 percent of particles 0.3 microns or larger as indicated in UL 586.

Z. Lockdown: Lockdown is the procedure of applying a protective coating or sealant to a surface from which asbestos-containing material has been removed. Its primary function is to control and minimize airborne asbestos fiber generation that might result from any asbestos-containing residue on the substrate.

AA. Nonfriable Asbestos Material: Material that contains asbestos in which the fibers have been temporarily locked in by a bonding agent, coating, binder, or other material so that the asbestos is well bound and will not normally release asbestos fibers during any appropriate use, handling, storage or transportation. It is understood that asbestos fibers will be released under other conditions such as renovation or removal.

BB. Owner: Individual or representative employed by the Owner.

CC. Personnel Decontamination Enclosure System: A decontamination system for personnel, consisting typically of a clean room, a shower room and an equipment room (dirty change room) with airlocks between any two adjacent rooms.

DD. Owner's Project Monitor: Individual on site who provides project monitor services (air monitoring,

work observations, etc.) for compliance with the Project Manual, in the interest of the Owner.

EE. Negative Pressure System: A system in which static pressure in an enclosed control area is lower than that of the environment outside the control area as specified herein.

FF. Personal Sampling: Air sampling to determine airborne fiber concentrations within the breathing zone of a specific employee, perform in accordance with 29 CFR 1926.1101.

GG. Removal: The act of removing asbestos-containing or contaminated materials from the work area under properly controlled conditions to a suitable disposal site.

HH. Shower Room: A room constituting an airlock, between the clean room and the equipment room in the worker decontamination enclosure system, with hot and cold running water suitably arranged for complete showering during decontamination.

II. Spray Glue: Fine liquid adhesive contained in an aerosol type can used for surface preparation and temporary bonding when hanging poly sheeting.

JJ. Surfactant: A chemical wetting agent added to water to improve penetration. The surfactant shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent, mixed in a proportion of one fluid ounce to 5 gallons of water or as specified by the manufacturer. An equivalent surfactant shall be understood to mean a material with a surface tension in accordance with ASTM D 1331.

KK. Time Weighted Average (TWA): The TWA is an 8-hour time weighted average airborne concentration of airborne fibers. TWA exposure may be established with one or more consecutive samples totaling at least 7 hours, but preferably the full 8 hours of the shift.

LL. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with amended water and disposing of these cleaning tools as asbestos contaminated waste.

MM. Wetting Agent: That specific agent used to reduce airborne asbestos levels by physically bonding asbestos fibers to material to be removed. An equivalent wetting agent must have a surface tension in accordance with ASTM D 1331.

1.6 SUBMITTALS

A. Instructions: Submit "Pre-Job Submittals" and "Post-Job Submittals" in accordance with Section 013300 [VERIFY SUBMITTAL SECTION] to Architect for review. The work may not proceed until the complete pre-job submittal package has been reviewed by the Architect. Make submittals required by this specification and the Project Manual in a timely manner and at approximate times in the execution of the work to allow for sufficient and prompt review by the Architect. Revise and resubmit as necessary to establish compliance with the specified requirements. Requests for final payment will not be approved until the Post-Job Submittal package has been reviewed and accepted by Architect. Carefully review and coordinate all aspects of each item being submitted. Verify that each item and its appropriate submittal conform in all respects with the specified requirements. The submission of submittal packages is a formal process. Accordingly, each submittal package or elements of a submittal package shall be forwarded formally by letter. This forwarding letter shall be signed by an officer of the Contractor's company who has the authority to commit company resources. Any submittal packages or any subsequent element of a submittal package that is not formally forwarded as described will be rejected as non-conforming by the Architect. All items listed in this section are applicable. If in the opinion of the Contractor, an item listed is not

applicable, the Contractor must submit documentation substantiating his position. If a submittal is unavailable, the Contractor must submit documentation reconstructing the missing information as best as can be accomplished.

1. Identification of Submittals: Number consecutively and clearly identify all submittals. Show identification on at least the first page of each submittal, and elsewhere as necessary for positive identification of the submittal. Accompany each individual submittal with a letter of transmittal showing all information required for identification and checking. Make revisions when required and resubmit for review. Review is only for general conformance with the design of the project and general compliance with the information given in this specification and the Project Manual.
2. Timing of Submittals: Make submittals far enough in advance of scheduled dates of commencement, execution or installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery. Accept responsibility for delays resulting from incomplete submittal packages.

B. Pre-job Submittals:

1. Notification: Notice of impending commencement of asbestos removal work in writing to the appropriate agencies. Those listed below are for information only. The notifications must be made at least 20 days before work commences on the project. Include copy and acknowledgment of notification in submittal package and comply with the applicable notice period set forth in EPA 40 CFR 61.146. Include one copy of notifications in submittal package along with Certified Mail Receipt of Notification to aforementioned agencies. If the time from signing of the Contract to the scheduled start of work is less than the applicable notice period, seek a waiver (if applicable) of the notice period. Without written approval from all of said agencies, do not shorten the applicable notice period. It is the Contractor's responsibility to contact the correct agencies in sufficient time to support the work.

U.S. EPA Region 3
Mail Code 3LC62
1650 Arch Street
Philadelphia, PA 19103-2029

and to: Department of Labor and Industry
Powers-Taylor Building
13 South Thirteenth Street
Richmond, VA 23219
Phone (804) 786-9865
Fax (804) 371-7634

2. Insurance: Insurance certificate issued to Owner by Contractor's insurance carrier listing all coverages as specified in the General Conditions and include Owner and Owner's Project Monitor as additional insureds.

3. Employee Documentation: Provide the following documentation for each and every employee assigned to the project by contractor or subcontractor, regardless of their role on the Project. Submit this information as one package per employee, arranged alphabetically.

    a. For each employee assigned to this project, provide documentation that shows that the employee has received and understands instruction on the hazards of

asbestos exposure, personal protective equipment usage, use of decontamination procedures, the procedure for entering and exiting the work areas, other topics described in 29 CFR 1926.1101 and on all aspects of the work procedures and protective measures to be used on this Project.

b. For each employee assigned to this project, provide a copy, certified to be a true copy by an officer in the company, of the Physician's most recent written opinion required by 29 CFR 1926.1101 and respirator fit test.

c. For each employee assigned to this project, provide a copy of their Virginia worker/supervisor license and a valid government photo ID.

4. Permits: Submit any building permits as required by the state of Virginia for the asbestos abatement, construction, or renovation work required during the progress of the work. If no permits are required, so state by means of a letter of explanation signed by a company officer.

5. Landfill Documentation: Submit written evidence that the proposed landfill for disposal is approved by the US EPA, State and local regulatory agency (s) to receive asbestos-containing waste.

6. Written Respiratory Program: Submit Contractor's written respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134 and 29 CFR 1926.1101.

7. Respirator Technical Data: Submit technical data on the different types of respirators to be used in accomplishing the work. Include model numbers and tested/certified (TC) numbers issued by NIOSH and MSHA.

8. A copy of the Negative Exposure Assessment must be submitted to the Owner for approval prior to the commencement of work. If a Negative Exposure Assessment is not available all work must begin in the maximum respiratory requirements as determined by all federal, state and local regulations.

9. Written Contractor Safety Program: Submit evidence of comprehension of this Safety Program by the employees assigned to this project. The program shall cover the requirements of OSHA regulations for Employee Training and Emergency Action Plan as per 29 CFR 1910.38, including the following items:

    a. Fire and Heavy Smoke Conditions
    b. Employee Injuries and Accidents
    c. Emergency Exits and Evacuation
    d. First Aid Training and Responsible Person on site.
    e. Ladder and Scaffolding Safety
    f. Electrical Safety Procedures
    g. Heat and Heat Stress Hazards
    h. Slip, Trip and Fall Hazards
    i. Eye Hazards and Eye Protection
    j. Overhead Hazards and Hardhats
    k. Back Injuries and Prevention
    l. Carbon Monoxide and other Toxic Poisonings

10. Manufacturer's Catalog Data:

    a. Vacuums

b. Respirators
c. Amended water

11. MSDS: Submit manufacturer's certification or independent test reports confirming that materials to be utilized on this Project meet or exceed all performance criteria required by Specifications. Include certifications that replacement materials do not contain asbestos and are compatible with the substrates to which they will be applied. Include material safety data sheets (MSDS) for all materials to be used on the project.

12. Work Area: Written description and sketch of the asbestos removal procedures to determine if work will be an outside or inside asbestos removal project (AHERA regulations apply for all inside asbestos removal activities), site specific plans for sequencing of the work, construction of the enclosure, mini-enclosure, regulated work area, decontamination procedures, methods of complying with 40 CFR 61, and barriers in compliance with the Contract Documents.

13. Rental Equipment: In situations where rental equipment is utilized, provide a copy of the written notification to the rental company concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

14. Sign In/ Sign Out: Provide a copy of the Sign In/Sign Out Log showing the following as a minimum: date, name, social security number, entering and leaving time, company or agency represented and reason for entry for all persons entering the work areas.

15. Personal Air Monitoring: Submit the qualifications of air monitoring testing lab to be used for personal air monitoring as required by OSHA Regulations. OSHA personal air sample results must be posted within 24 hours from the time the sample was collected. Personal air sampling will be conducted by Contractor. Submit the name, address, telephone number, and proof of current licensing by the NC DHHS of the testing laboratory selected. Include certification verifying persons counting the samples have been judged proficient by successful participation within the last year in the American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing (PAT) Program.

16. Work Isolation & Emergency Evacuation: Submit a description of the plan for isolation of then work area and an emergency evacuation plan, for approval by Owner.

17. Trade Notification: Submit a notarized written statement from all trades, stating that they are aware of the dangers of asbestos exposure and are to avoid disturbing the asbestos-containing materials in anyway.

18. Citations: Submit a notarized written statement from an officer of the company verifying that the Contractor has not been cited for any major safety violations by Federal, State or Local Agencies, while conducting asbestos abatement.

C. Post-job Submittals:

1. Sign In/Sign Out: Submit a copy of the completed Sign In/Sign Out logs showing the following as a minimum: date, name, social security number, entering and leaving time, company or agency represented and reason for entry for all persons entering the work areas.

2. Personal Air Monitoring Results: A copy of employee personal air monitoring results

taken in compliance with 29 CFR 1926.1101.

3. Waste Manifests: Submit receipts from landfill operator which acknowledge the Contractor's deliveries of asbestos containing/contaminated waste material. Receipts shall be provided within 3 days from the date which the waste left the work site. Receipts shall include: date, quantity and signature of authorized representative of the landfill.

1.7 HEALTH AND SAFETY TRAINING

A. Medical Surveillance: All employees working on the project shall be on a medical surveillance program in accordance with 29 CFR 1926.1101.

B. Training Course: Provide all employees working on the project with appropriate training in accordance with 29 CFR 1926.1101.

1.8 OWNER'S PROJECT MONITOR

A. Payment of Testing: Owner will provide and pay Owner's Project Monitor to perform routine and special testing of the work performed under the Contract Documents to determine general compliance.

B. Duties of Project Monitor: The Project Monitor will provide area sampling, perform on-site work site observation and documentation of work activities.

C. Contractor's Responsibility: Work performed by the Owner's Project Monitor shall not relieve the Contractor from providing its own air testing for compliance with all applicable codes, regulations, requirements and as specified in this Section and elsewhere in the Contract Documents.

D. Cooperation: Contractor will cooperate with Owner's Project Monitor, Owner, and Architect in all aspects of the testing and inspections to expedite testing and inspections and corresponding results.

E. Access: Contractor will provide Owner's Project Monitor, Owner, Architect access to the work at all times and in all locations requested as necessary.

F. Retesting: Contractor will pay for all testing and retesting subsequent to noncompliance with the Contract Documents. Contractor will pay for retesting and resampling by Owner's Project Monitor.

G. Results: Owner's Project Monitor will perform all testing and analysis promptly and issue results expeditiously in order to minimize any possible delay in the progress of the work.

PART 2 - PRODUCTS

2.1 ENCAPSULANTS

Shall conform to current USEPA requirements, shall contain no toxic or hazardous substances, no solvents and shall conform to the following performance requirements.

A. Removal Encapsulants:

Requirement	Test Standard

Flame Spread - 25, Smoke Emission – 50	ASTM E 84
Combustion Toxicity University of Zero Mortality	Pittsburgh Protocol
Life Expectancy - 20 years	ASTM C 732, Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E 96

B. Lock-down Encapsulant:

Flame Spread - 25, Smoke Emission – 50	ASTM E 84
Combustion Toxicity University of Pittsburgh Zero Mortality	Protocol
Life Expectancy - 20 years Accelerated Aging Test	ASTM C 732
Permeability - Minimum 0.4 perms	ASTM E 96
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E 119
Bond Strength - 100 pounds of force/ foot (Tests compatibility with cementitious and fibrous fire-proofing)	ASTM E 736

PART 3 - EXECUTION

3.1 GENERAL

A. Scheduling: The Contractor shall furnish qualified personnel within the specified time frame of receiving notice to proceed call from the Owner.

B. Storage: Site storage and access is limited. Coordinate storage and access with Owner. All ACM waste must be stored in locked, covered, leakproof containers.

C. Building Occupancy: The building will be unoccupied during the work.

D. Parking: Limited parking is available.

E. Building Security: Maintain personnel on the site at all times when the work areas are open or not properly secured. Secure work areas completely at the end of each working day. Coordinate with the General Contractor concerning security of building after normal hours.

F. Correction of Damage to Property: Consider any damage to building or property not identified in the pre-job damage survey as having resulted from execution of this Contract and correct at no additional expense to Owner.

G. Observations: Owner's Project Monitor will observe the work for completeness and general compliance with the requirements of this specification and the Project Manual. Notify Owner's Project Monitor at least 3 days in advance of the need and readiness for such observations. Should advance notice not be given to Owner's Project Monitor, Owner's Project Monitor will make reasonable effort to comply with time of requested observations. Do not proceed until such observations by Owner's Project Monitor are made. Any delay in the completion of the Project caused by lack of advance notice by Contractor to Owner's Project Monitor shall not be sufficient cause for any extension of time or extension of the Project completion deadline. Also, compensation for time spent by Owner's Project Monitor on the Project resulting from prearranged meetings at which the work has not progressed to the designated point shall be the responsibility of Contractor and will be deducted from future payments due to Contractor.

H. Sign In/ Sign Out Log: Maintain a Sign-In/ Sign Out Log in the immediate vicinity of the work. Maintain log from the time the first activity is performed involving the disturbance of asbestos-containing material until acceptance of the final air test results by Owner's Project Monitor. Require all persons entering the work areas, including the Contractor's workers, Owner's Project Monitor, Owner or agents of the Owner, and Architect to register each time upon entering and leaving work areas. Indicate name, social security number, time, company or agency represented and reason for entering work area.

I. Utilities: The cost of water and power consumed will be paid by the Contractor.

J. Clean Up: Leave all areas visibly clean at completion of work

3.2 EQUIPMENT

Make available to the Owner, Owner's Project Monitor, and Architect as many sets of personal protective equipment as required herein, for entry to the asbestos control area at all times for inspection of the asbestos control area.

A. Respirators: Provide personnel engaged in the removal of asbestos materials with the respiratory protection stated below. The use of any other type of respiratory protection must be requested in writing by the Contractor to the Owner. The request shall identify the specific type of respiratory protection requested and the reasoning behind the choice. A different request shall be filed for each type of operation. For removal of asbestos-containing materials, workers are required to wear a minimum of half face dual HEPA filtered cartridge respiratory protection. All respiratory protection shall comply with 29 CFR 1926.1101 and 29 CFR 1910.134.

B. Exterior Whole-Body Protection:

1. Protective Clothing: Provide personnel with disposable protective whole-body clothing, head coverings, rubber gloves, and eye protection for asbestos abatement work procedures. Provide disposable plastic or rubber gloves to protect hands. Make sleeves secure at the wrists; and make clothing secure at the neck by the use of tape.
2. Personal Decontamination Unit: Provide a three-stage personal decontamination unit. The decontamination unit shall be physically attached to the asbestos control area for the removal. The decontamination process shall consist of HEPA vacuuming to remove asbestos contamination from the outer layer of disposable clothing and place in disposable bag as

contaminated waste. Respirators shall be worn while employees remove all gross contamination and debris from their work clothing using a HEPA vacuum. Employees shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers for disposal. Employees shall not remove their respirators in the equipment room. Employees shall shower prior to entering the clean room. Used shower water shall be collected and filtered to remove asbestos contamination. Filters and residue shall be disposed of as asbestos contaminated material. Filtered water shall be discharged to the sanitary system. Wastewater filters shall be installed in series with the first stage pore size of 20 microns and the second stage pore size of 5 microns. The floor of the decontamination unit's clean room shall be kept dry and clean at all times. Water from the shower shall not be allowed to wet the floor in the clean room. Surfaces of the clean room and shower shall be wet-wiped 2 times after each shift change with a disinfectant solution. Proper housekeeping and hygiene requirements shall be maintained.

For removal of floor tile and mastic and bulletin board mastic a detached decontamination unit may be used. Workers are required to "double suit" before entering the asbestos control area. The decontamination process shall consist of HEPA vacuuming to remove asbestos contamination from the outer layer of disposable clothing and place in disposable bag as contaminated waste. HEPA vacuum to remove any contamination from inner layer of protective clothing and while still wearing the inner layer of protective clothing and respiratory protection and proceed to the detached decontamination unit to complete decontamination. The detached decontamination unit shall not be more than 50’ from the asbestos control area. Post decontamination procedures in Change Room for duration of project.

C. Warning Signs and Labels: Provide warning signs at all approaches to asbestos control areas containing concentrations of airborne asbestos fibers. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos.

1. Warning Sign: Provide vertical format conforming to 29 CFR 1910.145(d)(4), AND 29 CFR 1926.1101 minimum 20 by 14 inches displaying the following legend in the lower panel:

Legend	Notation
DANGER	1-inch Sans Serif Gothic
ASBESTOS	1-inch Sans Serif Gothic
MAY CAUSE CANCER	1/4-inch Sans Serif Gothic or Block
CAUSES DAMAGE TO LUNGS	1/4-inch Sans Serif Gothic or Block
AUTHORIZED PERSONNEL ONLY	1/4-inch Gothic
WEAR RESPIRATORY PROTECTION	
AND PROTECTIVE CLOTHING	
IN THIS AREA	1/4-inch Gothic

Spacing between lines shall be at least equal to the height of the upper of any two lines.

2. Warning labels: Provide labels conforming to 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST

AVOID CREATING DUST

D. Tools: Vacuums shall be leak proof to the filter and equipped with HEPA filters. Filters on vacuums shall conform to ANSI Z9.2 and UL 586. Do not use power tools to remove asbestos-containing materials. Remove all residual asbestos from reusable tools prior to storage or reuse.

3.3 GENERAL WORK PROCEDURE

Perform asbestos related work in accordance with 29 CFR 1926.1101 and as specified herein. Personnel shall wear and utilize protective clothing and equipment as specified herein. Eating, smoking, drinking, chewing of tobacco, or applying cosmetics shall not be permitted in the asbestos work or control areas. Coordinate sequence of work area preparation throughout the building with Owner and other trades to properly segregate work areas from areas that must remain fully or partially operational or in which other construction is being performed. Personnel of other trades not engaged in the removal of asbestos shall not be exposed at any time to airborne concentrations of asbestos. Coordinate with Owner to shut down and isolate the heating, ventilating, and air conditioning system to the asbestos regulated areas, prior to the commencement of asbestos preparatory work. Disconnect electrical service prior to the commencement of asbestos preparatory work. Provide auxiliary electrical service as required using Ground Fault Interrupt (GFI) circuits. All electrical work shall be performed by a licensed electrical contractor. If an asbestos spill occurs outside of the asbestos control area, stop work immediately and follow the emergency procedures outlined herein.

A. Emergency Exits: The Contractor shall establish emergency and fire exits from the work area. Aid for a seriously injured worker will not be delayed for reasons of decontamination. Emergency procedures shall have priority.

B. Furnishings: Mobile objects such as chairs, equipment and furnishings located in the building will be removed by the Owner before asbestos work begins.

C. Class II Removal, Contained Area: Removal of asbestos containing floor tile and mastic is a Class II removal activity. Establish designated limits for the asbestos regulated area with the use of red barrier tape, and maintain all other requirements for asbestos control area except local exhaust. Spread one layer of 6-mil plastic sheeting on the walls extending at least two feet up wall for a splash guard. Seal all critical barriers with two layers of 6-mil plastic sheeting. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal sampling of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

D. Class II Removal, Regulated Area: Removal of suspect asbestos-containing bulletin board mastics are Class II removal activities. Establish designated limits for the asbestos regulated area with the use of red barrier tape, and maintain all other requirements for asbestos control area except local exhaust.

E. Emergency Procedures: In the event of an asbestos spill outside the asbestos control area, stop work immediately. Notify the Owner and Owner's Project Monitor. Isolate the area where the spill has occurred with the use of red asbestos barrier tape and closing all means of access. The Owner shall determine the clean up requirements and if sampling performed by the Owner’s Project Monitor is required to determine thoroughness of cleaning. The Contractor is responsible for all costs associated with clean up and sampling.

3.4 REMOVAL PROCEDURE

Wet asbestos material with a fine spray of amended water during removal or other handling so as to reduce the emission of airborne fibers. Spray the asbestos-containing material repeatedly during each work shift to maintain a wet condition but do not use excessive amounts of water that results in ponding of the water. Do not allow the material to dry out. As the material is removed, carefully place it in sealable plastic disposal bags of 6-mil minimum thickness. Bagged asbestos waste shall be placed under negative pressure with the use of a HEPA vacuum, goose neck and duck tape to seal the bag, washed to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Asbestos containing material shall be containerized while wet. Lower and otherwise handle asbestos containing material as indicated in 40 CFR 61 – SUBPART M.

A. Removal of Asbestos-Containing Floor Tile and Mastic: Establish designated limits for the asbestos regulated work area with the use of red barrier tape, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal sampling of each worker engaged in the work. When removing vinyl floor tile and mastic which contain ACM , use the following practices. Floor tile shall be removed by adequately wet methods. Tiles shall be removed intact (if possible); wetting is not required when tiles are heated and removed intact. Flooring or its backing shall not be sanded. Scraping of residual adhesive and/or backing shall be performed using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

B. Removal of Asbestos-Containing Bulletin Boards: Removal of asbestos-containing bulletin boards is a Class II removal procedure. Prepare regulated work area as previously specified. Spread one layer of 6-mil plastic sheeting on the floor of the work area extending out in all directions. Carefully unscrew the bulletin board fasteners, remove bulletin board and wrap in 2 layers of 6-mil plastic sheeting, label for disposal.

C. Bagged Asbestos Waste: All bagged asbestos waste shall be placed in the disposal vehicle from the bag out area. All workers are required to wear proper respiratory protection and protective clothing during bag out procedures.

D. Clean-Up: Provide general clean-up of work area concurrent with the removal of all asbestos-containing materials. Do not permit accumulation of debris on workspace floor. Clean all equipment (excluding that which is needed for further cleaning) used in the work area and remove from work area via decontamination unit. Wet clean and HEPA vacuum all surfaces in the work area. Remove outer layer of plastic sheeting. Replace all pre-filters in negative air machines. Upon completion of the final cleaning, the Owner’s Project Monitor shall conduct a final visual inspection of the cleaned regulated area in accordance with ASTM E 1368. If the Owner’s Project Monitor rejects the clean regulated area as not meeting final cleaning requirements, the Contractor shall reclean as necessary. Recleaning and follow-up reinspection shall be at the Contractor's expense. Notify Owner's Project Monitor for visual inspection.

E. Lock Down: Once the work area has passed the visual inspection a post removal (lock down) encapsulant shall then be spray applied to the removal area. Maintain all asbestos regulated area. Wet clean and HEPA vacuum all surfaces in the work area. Proceed to paragraph “Sampling After Final Clean-Up” for final clearance.

F. Site Inspection: While performing asbestos removal work, the Contractor shall be subject to on-site

inspection by the Owner and Owner's Representative who may be assisted by the Owner's Project Monitor. If the work is found to be in violation of this specification, the Owner or the Owner's representative will issue a stop work order to be in effect immediately and until the violation is resolved. Standby time required to resolve the violation shall be at the Contractor's expense.

G. Air Sampling: Sampling performed in accordance with 29 CFR 1926.1101 shall be performed by the Contractor's Industrial Hygienist. Sampling performed for environmental and quality control reasons shall be performed by the Owner's Project Monitor. Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis.

1. Sampling During Asbestos Work: The Contractor shall provide personal sampling as indicated in 29 CFR 1926.1101. At the same time the Owner's Project Monitor will provide area sampling. If sampling outside the work area shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contractor and Owner immediately.

2. For interior regulated areas, the Owner's Project Monitor shall perform another visual inspection to ensure work area is visually clean. Based on the removal procedures, the Owner's Project Monitor will conduct final clearance air monitoring using non-aggressive air sampling techniques. The sampling and analytical method used will be NIOSH Method 7400 (PCM). For EPA PCM sampling and analysis, using the EPA Method specified in 40 CFR 763, establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the regulated work area. Results will be provided to the Owner within 48 hours. A sample will be taken for each regulated work area. The Contractor shall continue cleaning the work area and any contaminated areas at no additional expense to the Owner until the final clearance criteria is achieved. All costs associated with recleaning and resampling will be paid by the Contractor. If during the removal of asbestos-containing exterior materials, airborne fiber concentrations never exceed 0.01 fibers per cubic centimeter of air during the entire abatement process, final clearance sampling may be waived by the Owner's Project Monitor.

3. Sampling After Final Clean-Up (Clearance Sampling): Before final clearance sampling begins, the Owner's Project Monitor shall perform another visual inspection to ensure work area is visually clean. The Owner's Project Monitor will collect final clearance sampling using aggressive PCM air sampling techniques in accordance with current AHERA and NIOSH criteria for the full containment work area. The sampling and analytical method used will be Method 7400 (PCM). For EPA PCM sampling and analysis, using the EPA Method specified in 40 CFR 763, establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the regulated work area. The Contractor shall continue cleaning the work area and any contaminated areas at no additional expense to the Owner until the final clearance criteria is meet. All costs associated with recleaning and resampling will be paid by the Contractor. If during the removal of asbestos-containing exterior materials, airborne fiber concentrations never exceed 0.01 fibers per cubic centimeter of air during the entire abatement process, final clearance sampling may be waived by the Owner's Project Monitor.

H. Reacceptance Criteria: Once clearance samples are analyzed and determine that the area is in compliance, the asbestos regulated work area shall be removed. A final check shall be carried out to ensure that no dust or debris remains on surfaces as a result of dismantling operations. All tools,

equipment and materials from dismantling of the work site and all rubbish remaining upon completion of the work shall be removed by the Contractor. All temporary electrical and water connections shall be removed upon completion of the work. The site shall be left clean, neat and orderly and in the condition agreed upon by the Contractor and the Owner.

3.4 CLEAN-UP AND DISPOSAL

A. Housekeeping: Essential parts of asbestos dust control are housekeeping and cleanup procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. Do not blow down the space with compressed air.

B. Title to Materials: All materials resulting from asbestos work, except as specified otherwise, shall become the property of the contractor and shall be disposed of as specified in applicable local, state, and Federal regulations and herein.

C. Disposal of Asbestos:

1. Procedure for Disposal: Collect asbestos waste, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed fiber proof, waterproof, non-returnable containers (e.g. double plastic bags 6 mils thick, cartons, drums or cans). Wastes within the containers must be wetted to insure the security of the material in case of container breaching. Affix a warning, Department of Transportation (DOT) label and Project/Contractor information in accordance with 40 CFR Part 61 and 29 CFR 1910.1001 to each bag or use at least 6 mil minimum thickness bags with the approved warnings and DOT labeling preprinted on the bag. The name of the waste generator and the location at which the waste was generated shall be clearly indicated on the outside of each container. Prevent contamination of the transport vehicle (especially if the transport vehicle is a rented truck likely to be used in the future for non-asbestos purposes). These precautions include lining the vehicle cargo area with plastic sheeting (similar to work area enclosure) and thorough cleaning of the cargo area after transport and unloading of asbestos debris is complete. Dispose of waste asbestos material at an Environmental Protection Agency (EPA) or State-approved asbestos landfill. Contractor is required to coordinate with Owner disposal procedures. If temporary storage is utilized the area and container must first be approved by the Owner.

2. Asbestos Disposal Quantity Report: The Contractor shall record and report, to the Architect, Engineer and Owner, the amount of asbestos-containing material removed and released for disposal. Deliver the report for the previous day at the beginning of each day shift with amounts of material removed during the previous day reported in linear feet or square feet as described initially in this specification and in cubic feet for the amount of asbestos-containing material released for disposal. Allow the Owner's Project Monitor to inspect, record and report the amount of asbestos-containing material removed and released for disposal on a daily basis.

END OF SECTION 028213–

SECTION 028313 LEAD, CADMIUM, AND CHROMIUM IN CONSTRUCTION

PART 1 - GENERAL

1.1 DESCRIPTION OF THE WORK

A. Perform all planning, administration, execution, and cleaning necessary to safely perform the lead, cadmium, chromium work. Approval of or acceptance by Owner, Owner's Project Monitor or Architect of various construction activities or methods proposed by Contractor does not constitute an assumption of liability either by the Owner, Owner's Project Monitor, Architect for inadequacy or adverse consequences of said activities or methods.

B. The work covered by this section includes the removal and/or disturbance of paint containing lead, cadmium, chromium that is encountered during the renovation project and describes some of the resultant procedures and equipment required to protect workers and the surrounding area from contact with airborne lead dust.

C. A Lead Inspection was performed as part of the hazardous materials survey. Sampling documentation is available to the Contractor in the Bidder Information Section.

1.2 WORK INCLUDED

A. The project, Renovate Gross Anatomy Lab at Lewis Hall, is located at 700 W. Olney Road in Norfolk, Va. The project is located on the Eastern Virginia Medical School (EVMS) campus. This project consists of the removal and/or disturbance of painted surfaces that contain lead, cadmium, chromium above the laboratory minimum detection limit for the described project.

B. Work covered by this section includes any activity that will disturb paint and materials coated with paint containing lead, cadmium and chromium above the laboratory's minimum detection limit. All work must be performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127. High exposure work activities include, but are not limited to, Group 1, Group 2, and Group 3 Tasks outlined below.

Group 1:	manual demolition
	manual scraping and sanding
	heat-gun applications
	power tool cleaning with dust collection systems
	spray painting with lead-based paint
Group 2:	lead burning
	using lead-containing mortar
	power tool cleaning without dust collection systems
	rivet busting
	cleanup activities where dry expendable abrasives are used
	movement and removal of abrasive blasting enclosures
Group 3:	abrasive blasting
	welding, cutting and burning on steel structures

The permissible exposure limits (PEL) established by OSHA are 5 ug/m3 for cadmium, 5 ug/m3 for chromium (chromates) and 50 ug/m3 for lead. If the PEL is exceeded, appropriate measures must be taken to reduce the hazard and provide training and personal protective equipment.

C. The Contractor is responsible for developing a project approach by coordinating the requirements of this specification with the various subcontractors performing other components of the contract in order to execute the work. The work techniques selected by the Contractor will determine the abatement measures necessary. The project approach shall be based on historical data and experience with similar scope projects. The work includes disposal of materials generated from the work. Refer to the contract drawings for more specific information regarding lead, cadmium, and chromium paint work.

D. Include all work listed in these specifications and incidentals thereto. Require that all phases of the work be executed by skilled craftsman experienced in their respective trades. Work to be performed includes but is not limited to:

1. Preparation of work space as specified
2. Removal and/or disturbance of paint containing lead, cadmium, chromium.
3. Clean-up of the area as specified.
4. Disposal of materials resulting from the work, shall become the property of the Contractor and shall be disposed of in accordance with local, state, and federal regulations.
5. Ensure that all services provided under this contract shall be performed by competent craft personnel and in a good workmanlike manner in accordance with the manufacturer's recommended procedures. Contractor's personnel shall conform with all Occupational Safety and Health Administration and, Environmental Protection Agency guidelines and requirements for lead exposure in construction.

E. Existing conditions are reflected correctly to the best of Owner's knowledge. Should minor conditions be encountered which are not exactly as indicated, modification to work shall be made as required at no additional expense to Owner. Contractor is responsible for air monitoring required for the safety of its employees and area air sampling. Contractor is responsible for compliance with Lead Work Plan, selecting fabrication processes and techniques "including means, methods, and sequencing" of construction, coordinating the work with that of all other trades and performance of the work in a safe satisfactory method. The Contractor shall guarantee all work covered under this contract against defects resulting from the use of substandard materials, equipment, or workmanship.

F. Contractor agrees to guarantee and hold harmless Owner, Owner's agents and employees, against any and all claims arising out of the infringement or alleged infringement by Contractor, or any of Contractor's agents, employees or subcontractors, of any rights secured under copyright, trademark or patent protection. In that regard, Contractor hereby represents, on behalf of itself, its agents, employees and/or subcontractors, that all necessary licenses for the use of any copyright, trademark or patent have been obtained, are in full force and effect at the time of execution of this contract, and shall remain in full force and effect during the term of this contract and any extension hereof.

G. The performance and execution of the work shall be monitored by a representative and/or representative appointed by the Owner to ensure full compliance with these specifications and all applicable regulations. The Owner will bear the cost in connection with the laboratory and inspection work required for initial final clearances and inspection in this specification: however, the cost of Contractor delays and subsequent visual inspections and laboratory analysis for personal and area samples taken because the limits specified were exceeded in the initial tests shall be borne by the Contractor.

H. The Owner and/or appointed representatives reserve the right to halt the project until hazardous or potentially hazardous conditions are corrected. It will be the responsibility of the Contractor to pay for the consultant services and costs involved to correct the non-compliance.

I. Prior to the commencement of work, all work and work practices shall be approved by the Owner and the Architect.

1.3 WORK NOT INCLUDED IN THE PROJECT MANUAL

A. Area air monitoring, visual inspections, clearance inspections and clearance sampling for Owner by Owner's Project Monitor.

1.4 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred within the text by the basic designation only.

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

ANSI Z9.2	Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z88.2-80	Respiratory Protection

CODE OF FEDERAL REGULATIONS

29 CFR 1926.21	Safety Training and Education
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.59	Hazardous Communication
29 CFR 1926.62	Lead Exposure in Construction
29 CFR 1926.1127	Occupational Exposure to Cadmium in the Construction Industry
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.103	Respiratory Protection
40 CFR 260	Hazardous Waste Management Systems: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 745	Lead; Requirements for Lead-Based Paint Activities
49 CFR 172	Hazardous Materials, Tables, and Hazardous Materials Communications Regulations

49 CFR 178	Shipping Container Specification

VIRGINIA ADMINISTRATIVE CODE (VAC)

9 VAC 20-60	Virginia Hazardous Waste Management Regulations
9 VAC 20-81	Solid Waste Management Regulations
18 VAC 15-30	Lead-Based Paint Activities Regulations

1.5. DEFINITIONS

A. Abate or Abatement: The elimination of exposure to lead-based substances that may result in lead toxicity or poisoning, by the demolition of or encapsulation of lead-containing substances, by thorough cleanup procedures, and by post-cleanup treatment of surfaces.

A. Action Level: Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 ug/m^3) calculated as an 8-hour time-weighted average (TWA).

B. Airborne Lead Control: Contractor will conduct lead work operations within the lead control area in a manner which maintains airborne lead concentrations outside the control area boundary at less than 30 micrograms per cubic meter of air at all times.

C. Architect: Architectural Firm or any individual employed by the firm providing architectural services for the project.

D. Area Sampling: Sampling of airborne lead concentrations within the lead control area and outside the exclusion boundary which may reach the breathing zone of Contractor's employees.

E. Authorized Visitor: Any federal or state representative, Owner, Architect/Engineer.

F. Cadmium Action Level: Employee exposure, without regard to use of respirators, to an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air averaged over an 8-hour period in an occupational/industrial environment.

G. Cadmium Permissible Exposure Limit (PEL): Employee exposure, without regard to use of respirators, to an airborne concentration of cadmium of 5 micrograms per cubic meter of air averaged over an 8-hour period in an occupational/industrial environment.

H. Clean Room: An uncontaminated area or room that is part of the worker decontamination enclosure system, with provisions for storage of workers' street clothes and protective equipment. Also known as the "Change Room."

I. Competent Person: One who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

J. Contractor: The Contractor is that individual, or entity under contract to perform the herein listed work.

K. Contractor's Certified Industrial Hygienist (CIH): An Industrial Hygienist employed by a professional monitoring firm who is certified by the American Board of Industrial Hygiene in Comprehensive Practice. The services of the Contractor's CIH shall be paid for by the Contractor.

L. Contractor's Industrial Hygienist (IH): An Industrial Hygienist employed by a professional monitoring firm who is under the direct supervision of the CIH. The services of the Contractor's Industrial Hygienist shall be paid for by the Contractor.

M. Contractor's Testing Laboratory: The Contractor's Testing Laboratory shall be retained and paid for by the Contractor to collect and analyze any required airborne lead in accordance with EPA regulations. The Contractor's Testing Laboratory must be approved by the National Lead Laboratory Accreditation Program (NLLAP).

N. Cleaning Solution: Solution that contains at least one ounce of 5 percent TSP to each gallon of hot water or according to the manufacturer's recommendations.

O. Chromium Action Level: An airborne concentration of chromium of 2.5 micrograms per cubic meter of air (2.5 ug/m3) calculated as an 8- hour time-weighted average (TWA).

P. Chromium Permissible Exposure Limit (PEL): Employee exposure, without regard to use of respirators, to an airborne concentration of chromium of 100 micrograms per cubic meter of air averaged over an 8-hour period in an occupational/industrial environment.

Q. Decontamination Enclosure System: A series of connected rooms, with curtained doorways between any two adjacent rooms, for the decontamination of workers or of materials and equipment. A worker decontamination enclosure system always contains at least five airlocks (rooms). An equipment decontamination system always contains at least three airlocks (rooms).

R. Eight Hour Time Weighted Average (TWA): Airborne concentration of lead to which an employee is exposed, averaged over an 8-hour workday as indicated in 29 CFR 1926.62.

S. Encapsulate or Encapsulation: To resurface or cover surfaces and to seal or caulk seams with durable material, so as to prevent and control chalking, or flaking lead-containing substances from becoming part of house dust or accessible to children.

T. Enclosure: Procedures necessary to completely enclose material containing lead-based paint behind airtight, impermeable, permanent barriers.

U. Environmental Consultant: Environmental Consultant or any individual employed by the firm providing environmental consulting services for the Project.

V. Equipment Decontamination Enclosure System: A decontamination enclosure system for materials and equipment, typically consisting of a washroom, an airlock, and a holding area.

W. Group 1 Task: Activities performed on surfaces covered with paint that contains lead concentrations at or above the laboratory's minimum detection limit. The following trigger activities are considered Group 1 Tasks and are examples of work methods which require appropriate protective measures in accordance with 29 CFR 1926.62: manual demolition, manual scrapping, manual sanding, heat applications, general cleanup, power tool cleaning with dust collection system, and spray painting with lead-based paints.

X. Group 2 Task: Activities performed on surfaces covered with paint that contains lead concentrations at or above the laboratory's minimum detection limit. The following trigger activities are considered Group 2 Tasks and are examples of work methods which require appropriate protective measures in accordance with 29 CFR 1926.62: lead burning, using lead-containing mortar, power tool cleaning without dust collection system, rivet blasting, cleanup activities where dry expendable abrasives are used, and movement and removal of abrasive blasting enclosures.

Y. Group 3 Task: Activities performed on surfaces covered with paint that contains lead concentrations at or above the laboratory's minimum detection limit. The following trigger activities are considered Group 3 Tasks and are examples of work methods which require appropriate protective measures in accordance with 29 CFR 1926.62: abrasive blasting, welding, cutting, and burning on steel structures.

Z. Hand Washing Facility: A temporary wash facility, that provides employees with running water, soap and towels for the purpose of hygiene practices. Hand washing facility is for the decontamination of personnel exposed to lead and cadmium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

AA. HEPA or High Efficiency Particle Air: A filter capable of filtering out particles of 0.3 microns or greater from a body of air at 99.97 percent efficiency or greater.

BB. HEPA Vacuum Equipment: Vacuuming equipment equipped with a HEPA-filtration system.

CC. Lead Action Level: Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 ug/m3) calculated as an 8-hour time-weighted average (TWA).

DD. Lead Paint: Any paint containing lead greater than the laboratory minimum detection limit.

EE. Lead Cadmium, Chromium Control Area: An area where lead paint operations are performed which is isolated by physical boundaries to prevent unauthorized entry of personnel thereby preventing the exposure to, or spread of lead, cadmium, and chromium. Physical boundaries shall be established and located such that the level of airborne lead shall not exceed action levels outside of the established boundary at any time.

FF. Lead Permissible Exposure Limit: Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/m^3) calculated as an 8-hour time-weighted average (TWA).

GG. NESHAPS: National Emissions Standard for Hazardous Air Pollutants.

HH. NIOSH: National Institute for Occupational Safety and Health.

II. OSHA: Occupational Safety and Health Administration.

JJ. Owner: Individual or representative employed by the Owner.

KK. Owner's Project Monitor: The Owner's Project Monitor shall be retained and paid for by the Owner for the duration of the lead cadmium, and chromium work. The Owner's Project Monitor shall conduct area monitoring for airborne lead, cadmium, and chromium dust.

LL. Personal Sampling: Sampling of airborne lead concentration within the breathing zone of an employee to determine eight-hour time weight average concentration in accordance with 29 CFR 1926.62 and 29 CFR 1926.1127. Samples shall be considered an area within a hemisphere, forward of the shoulders with a radius of six to nine inches and centered at the nose or mouth of an employee.

MM. Physical Boundary: Area physically roped or partitioned off around lead, cadmium, and chromium control area to limit unauthorized entry of personnel.

NN. Plastic Sheeting: Plastic sheet material of specified thickness used for protection of walls, floors, etc., and used to seal openings into the work area.

OO. Shower Room: A room constituting an airlock, between the clean room and the equipment room in the worker decontamination enclosure system, with hot and cold or warm running water suitably arranged for complete showering during decontamination.

PP. Training: Contractor and Contractor employees will be trained in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, 18 VAC 15-30 and shall be licensed by the Commonwealth of Virginia to perform lead work.

QQ. TSP: Tri-Sodium Phosphate

RR. Wet Cleaning: The process of eliminating lead, cadmium, and chromium contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with cleaning solution and disposing of these cleaning tools as lead, cadmium, and chromium waste.

1.6 SUBMITTALS

A. Instructions: Submit "Pre-Job Submittals" and "Post Job Submittals" in accordance with Section 01300. The work may not proceed until the complete pre-job submittal package has been reviewed by the Architect. Update submittals to the Architect on a weekly basis to account for all new equipment and employees used on the Project. Make submittals required by this specification and the Lead Work Plan in a timely manner and at approximate times in the execution of the work to allow for sufficient and prompt review by the Architect. Review is only for general conformance with the design of the project and general compliance with the information given in this specification and the Project Manual. Revise and resubmit as necessary to establish compliance with the specified requirements. Requests for final payment will not be approved until the Post-Job Submittal package has been reviewed by the Architect. Carefully review and coordinate all aspects of each item being submitted. Verify that each item and its appropriate submittal conform in all respects with the specified requirements. Any submittal packages or any subsequent element of a submittal package that is not formally forwarded as described will be rejected as non-conforming by the Architect. All items listed in this section are applicable. If in the opinion of the Contractor, an item listed is not applicable, the Contractor must submit documentation substantiating his position. If a submittal is unavailable, the Contractor must submit documentation reconstructing the missing information as best as can be accomplished.

B. PRE-JOB SUBMITTALS

1. Lead Work Plan (LWP): Submit a detailed job-specific plan of the work procedures to be used in the removal and disturbance of lead, cadmium, and chromium painted building components / surfaces. The plan shall be prepared, signed, and sealed, including certification number and date, by the CIH. Such plan shall include a sketch (or sketches) showing the location, size, and details of lead control area(s), location and details of decontamination rooms, change rooms, shower facilities, mechanical ventilation system, and requirements of TCLP testing of debris. The plan shall outline tasks which will disturb lead paint including but not limited to Group 1, Group 2, and Group 3 Tasks. The plan shall also include interface of trades involved in the work, sequencing of lead, cadmium, and chromium work, waste disposal plan, personal air monitoring, respirators and protective equipment to be used, and a detailed description of the method of containment of the operation to ensure that airborne lead, cadmium, and chromium action concentrations are not exceeded. The plan will describe the protective measures to be taken to protect the Contractor's employees and the public from exposure to lead at a level greater than or equal to action levels at all times. The plan shall include cleanup procedures and final clearance sampling strategy. The plan shall incorporate the requirements of this specification and be approved by the Architect and Owner prior to the start of lead work.

2. Occupational and Environmental Assessment Data Report

   a. Some lead and cadmium work may not require full implementation of the requirements of 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127. Based on the experience of the Contractor and/or the use of a specific process or method for performing the work, the Contractor may be able to provide historic data (previous 12 months) to demonstrate that airborne exposures are controlled below the action level. Such methods or controls shall be fully presented in the LWP. In order to reduce the full implementation of 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127, the Contractor shall provide documentation in an Assessment Data Report.

   a. Submit occupational and environmental assessment report to the Owner and Architect prior to start of work, signed by the testing laboratory employee performing the analysis, and the CIH.

   a. Submit a report that supports the determination regarding the reduction of the need to fully implement the requirements of 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127, and supporting the LWP. The exposure assessment shall represent each job classification, or if working conditions are similar to previous jobs by the same employer, provide previously collected exposure data that can be used to estimate worker exposures per 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127. The data shall represent the worker's regular daily exposure to lead, cadmium, and chromium for stated work.

   a. Submit worker exposure data conducted during the task-based trigger operations of 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127 with a complete process description in supporting a negative assessment.

   a. The initial assessment shall determine the requirement for further monitoring and the need to fully implement the control and protective requirements including the compliance program (LWP) per 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127.

3. Contractor's Testing Laboratory: Submit name, address and telephone number of the Contractor's testing laboratory. The Contractor's Testing Laboratory must be approved by the National Lead Laboratory Accreditation Program (NLLAP). This submittal must be approved by the Architect and Owner prior to the start of lead work.

4. Contractor's Certified Industrial Hygienist (CIH): Submit name, address and telephone number of the CIH (Certified by the American Board of Industrial Hygiene in Comprehensive Practice) selected to prepare the Lead Work Plan. The CIH shall show proof of experience sufficient to provide a sound and extensive knowledge of Federal laws and Commonwealth of Virginia Occupational Safety and Health regulations governing licensure and training of workers, air monitoring techniques, implementation of a respiratory protection program, and the safety and health requirements applicable to the work to be performed. The CIH shall be licensed and insured to perform the work in the Commonwealth of Virginia, hold current Commonwealth of Virginia certifications as Lead Inspector/Risk Assessor and/or Lead Planner/Project Designer, show a minimum of two years experience as a CIH in the Commonwealth of Virginia and be the direct supervisor over the IH.

5. Contractor's Industrial Hygienist (IH) Submit name, address and telephone number of the IH selected to collect the personnel air samples, in accordance with 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127. The IH shall show proof of current Commonwealth of Virginia certification as a Lead Inspector/Risk Assessor, experience sufficient to provide a sound and extensive knowledge of Federal laws and Commonwealth of Virginia Occupational Safety and Health regulations governing licensure and training of workers, air monitoring techniques, implementation of a respiratory protection program, and the safety and health requirements applicable to the work to be performed. The IH shall The Contractor's IH shall be under the direct supervision of the CIH.

6. Monitoring Results: Airborne lead samples shall be analyzed promptly and the results shall be reviewed by the Owner's Project Monitor within 48 hours of collection of each sample. The Contractor shall notify the Owner immediately of exposure to airborne lead concentrations exceeding 30 micrograms per cubic meter of air. If levels equal or exceed 30 micrograms per cubic meter, work must be stopped immediately and corrective action taken. Written reports of all monitoring results shall be submitted to the Architect and Owner within one week after sample collection, and must be signed by the Contractor's CIH.

7. Identification Number: Generators, transporters, treaters, storers, and disposers that do not have and maintain an EPA Identification Number must obtain an identification number under the requirements of state of North Carolina Hazardous Waste Management Regulations, as applicable. Submit the disposal contractors or subcontractors EPA Identification Number.

8. Insurance: Insurance certificate issued to Owner by Contractor's insurance carrier listing all coverages as specified in the General Conditions and include Owner and Owner's Project Monitor as additional insureds.

9. Transportation Permits All required permits, site location, and arrangements for transport and disposal of all waste materials. Submit notarized certification that landfill site to be used meets all Environmental Protection Agency regulatory standards. Include name of disposal subcontractor, if applicable.

10. Building Permits: Any building permits as required by the Commonwealth of Virginia and local government for the work required during the progress of the work.

11. Manufacturer's Specifications: Manufacturer's Specifications for air cleaning, vacuum equipment, and air handling equipment, as well as any special tools or safety equipment to be utilized on this Project.

12. Disposal Site: Identify the disposal site which is proposed for use in disposing of the debris generated on this Project. Include owner/operator, address and telephone number.

13. Training Employees: Train each employee performing lead work, disposal, and air sampling operations prior to the time of initial job assignment and annually thereafter, in accordance with 29 CFR 1926.21, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, 18 VAC 15-30 and state and local regulations where appropriate.

14. Training Certification: Submit a copy of a license and certificate for each employee, signed and dated by the accredited training provider, stating that the employee has received the required lead training. All Contractor personnel performing work activities which will disturb lead paint shall be licensed by the Commonwealth of Virginia, Department of Professional and Occupational Regulation as lead workers or supervisors.

15. Medical Surveillance Program and Employee Respirator Protection Program: The Contractor is required to establish and implement these programs as required by 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127. Submit medical and respirator fit test information for all employees. Submit pre-work blood lead levels and post work blood lead levels for all workers performing lead work during the execution of the work

C. POST-JOB SUBMITTALS

1. Waste Manifests: Submit waste manifests from landfill operator within 30 working days after delivery which acknowledge the Contractor's deliveries of waste material. Receipts shall include date, quantity of material delivered, and signature of authorized representation of landfill.

2. Employee Listing: Submit an alphabetical listing of each employee used on the Project and the exact dates on which present on the job site.

3. Employee and Environmental Area Air Monitoring Results: Provide all copies of employee (for compliance with 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127) air monitoring results collected by the Contractor.

1.7 HEALTH AND SAFETY TRAINING

A. Medical Surveillance: All employees working on the project shall be on a medical surveillance program in accordance with 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127.

B. Training Course: Provide all employees working on the project with appropriate training in accordance with 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127 and 18 VAC 15-30.

1.8 OWNER’S PROJECT MONITOR

A. Payment of Testing: Owner will provide and pay Owner's Project Monitor to perform routine and special testing.

B. Duties of Owner’s Project Monitor: The Owner’s Project Monitor will perform on-site work site observation and documentation of work activities. The Owner’s Project Monitor will collect environmental air samples during the work.

C. Contractor's Responsibility: Work performed by the Owner's Project Monitor shall not relieve the Contractor from providing its own air testing for compliance with all applicable codes, regulations, requirements and as specified in this Section and elsewhere in the Contract Documents.

D. Cooperation: Contractor will cooperate with Owner's Project Monitor, Owner, and Architect in all aspects of the testing to expedite testing and results.

E. Access: Contractor will provide Owner's Project Monitor, Owner, and Architect access to the work at all times and in all locations requested as necessary.

F. Retesting: Contractor will pay for all testing and retesting subsequent to noncompliance with the Contract Documents. Contractor will pay for retesting and resampling by Owner’s Project Monitor.

G. Results: Owner's Project Monitor will perform all testing and analysis promptly and issue results expeditiously in order to minimize any possible delay in the progress of the work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Plastic Sheeting: Thickness shall be 6-mil or greater, in sizes to minimize the frequency of joints. Use of "spray-on poly" is not permitted.

B. Tape: Duct tape or other type capable of sealing joints of adjacent sheets of plastic and for attachment of plastic sheet to finished or unfinished surfaces under both dry and wet conditions.

C. Cleaning Solution: Mixture of at least one ounce of 5 percent TSP to each gallon of HOT water.

D. Chemicals: Supply applicable Material Safety Data Sheets for all chemicals used in paint removal work. Use the least toxic product as approved by the CIH in the LWP.

E. Abrasive Materials: Abrasive blasting materials will not be allowed on this project. All removal work shall be by hand to keep the creation of lead dust to a minimum.

F. Impermeable Containers: Containers shall be suitable to receive and retain lead waste or contaminated materials until disposal at an approved site and labeled in accordance with OSHA Regulation 29 CFR 1926.62 and 49 CFR 173, 178 and 179.

G. Warning Labels and Signs: As required by OSHA 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127.

H. Other Materials: Provide all other materials, such as lumber, nails and hardware, which may be required to construct and dismantle the decontamination system and the barriers that isolate the work area.

2.2 TOOLS AND EQUIPMENT

A. Provide suitable tools for lead, cadmium, and chromium work.

B. Transportation: As required for loading, temporary storage, transit, and unloading of contaminated waste without exposure to persons or property. Use only enclosed or covered trucks to haul waste containers to prevent loss or damage of containers in route to the landfill.

C. Air Purifying Equipment: HEPA Filtration Systems. Verify that no internal air movement system or purification equipment exhausts contaminated air from inside the work area into uncontaminated areas.

D. Heat Blower Gun Equipment: If utilized, heat blower gun equipment shall be a flameless electrical paint softener type. Heat blower shall have controlled temperature settings to allow usage for temperatures below 1,100 degrees Fahrenheit.

E. Contained High Pressure Water Wash Equipment: If utilized, high pressure washing equipment shall be equipped with a collection system which captures all water. The water must be contained and treated as potentially hazardous waste.

PART 3 EXECUTION

3.1 CONTRACTOR OPERATIONS

A. The Contractor will carry out the disturbance of lead, cadmium, and chromium paint in accordance with the approved LWP and the requirements of this contract.

B. Scheduling: The General Contractor shall furnish qualified craft personnel in accordance with the Project Manual.

C. Storage: Site storage and access is limited. Coordinate storage and access with General Contractor.

D. Building Occupancy: The facility will be unoccupied during work.

E. Parking: Limited parking is available.

F. Building Security: Maintain personnel on the site at all times when the work areas are open or not properly secured. Secure work areas completely at the end of each working day.

G. Correction of Damage to Property: Consider any damage to building or property not identified by the Contractor prior to the start of the work, as having resulted from execution of this Contract and correct at no additional expense to Owner.

H. Sign In/ Sign Out Log: Maintain a Sign-In/ Sign Out Log in the immediate vicinity of the work. Maintain log from the time the first activity is performed involving the disturbance of lead painted building materials until acceptance of the work area by the Owner and Architect. Require all

persons entering the work areas, including the Contractor's workers, Owner or agents of the contractors to register each time upon entering and leaving work areas. Indicate name, social security number, time, company or agency represented and reason for entering work area.

I. Utilities: Water and power will be available per spec section 001500.

J. Clean Up: Leave all areas visibly clean at completion of the work.

3.2 WARNING SIGNS AND CAUTION SIGNS

A. Provide warning signs at approaches to lead, cadmium, and chromium control areas. Locate signs at such a distance that personnel may read the sign and avoid the area or take the necessary precautions before entering the area. Provide caution labels and affix labels to lead waste disposal containers.

B. Warning Sign: 29 CFR 1926.62, vertical format minimum 20 by 14 inches spacing between two consecutive lines shall be at least equal to the height of the upper line. Display the following legend:

WARNING
LEAD WORK AREA
POISON
NO SMOKING, EATING OR DRINKING

C. Caution Signs: At each separate work area, the Contractor performing the work shall display a caution sign in the following manner wherever the treatment process is reasonably expected to break or disturb any lead-containing substances.

CAUTION
LEAD HAZARD
DO NOT ENTER WITHOUT AUTHORIZATION

D. Prior to Work: At least 3 days before disturbing lead painted surfaces, the Contractor shall post warning signs immediately outside all entrances and exits to the work area except that, in emergency situations, posting shall be done as soon as possible.

E. Duration: The Contractor shall keep the signs posted until final clearance results are submitted and are accepted by the Owner’s Project Monitor as below the clearance levels.

3.3 LEAD CONTROL AREA REQUIREMENTS

A. The Contractor shall control access to the lead control area to prevent entry of unprotected and/or unauthorized personnel during work that is expected to produce airborne lead, cadmium, and chromium levels above the action level. Work operations and daily cleanup shall be performed to minimize the accumulation of lead, cadmium, and chromium dust within the work area. If the quantity of airborne lead, cadmium, and chromium monitored at any time is greater than or equal to action level inside the control area, stop work, correct the condition(s) causing the increase, and notify the Owner’s Project Monitor immediately. Work will not resume until the Owner and Owner’s Project Monitor has approved corrective actions. If adjacent areas are contaminated, clean the contaminated areas, monitor, and visually inspect the area as specified herein.

3.4 PERSONNEL PROTECTION

B. Instruct Workers: Prior to commencement of work, instruct all workers in the appropriate procedures for personnel protection. Insure that workers are knowledgeable in these procedures.

C. Worker Protection Enforcement: Acknowledge and agree to sole responsibility for enforcing worker protection requirements at least equal to those specified in this Section.

D. Respiratory Protection Requirements: Provide respiratory protection as required by 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127 based on the NIOSH "Respirator Decision Logic" from the time of the first operation until acceptance of final clearance testing inspection. Provide workers with personally issued and marked respiratory equipment approved by NIOSH, OSHA, MSHA and the Department of Health and Human Services. Whenever chemical preparation is used in conjunction with mechanical or powered technique, use additional combination cartridge as approved by the CIH.

E. Replacement Equipment: Where respirators with disposable filters are used, provide sufficient filters for replacement as necessary.

F. Respirator Upgrading: Use the most current issue of "NIOSH Respirator Decision Logic", NIOSH Pub. No. 87-108, to determine respirator upgrading.

G. Special Protective Equipment: When using chemical strippers, workers shall use chemically resistant clothing such as neoprene, nitrile, rubber, or PVC gloves, and face shields as mandated by OSHA.

H. Portable Eyewash Station: A portable eyewash station shall be on-site whenever eye-irritating paint removers are used.

I. Post: Provide and post in an appropriately designated common area the lead, cadmium, and chromium decontamination and work procedures to be followed by workers and the OSHA worker protection poster.

3.5 PREPARATION

A. Coordinate sequence of work area preparation throughout the building with other trades to properly segregate work areas from areas in which other construction is being performed.

B. Initial Preparation of Work Area: Perform disturbance of lead, cadmium, and chromium painted surfaces in accordance with the approved LWP. Personnel of other trades not engaged in the disturbance of lead painted surfaces or building components shall not be exposed at any time to airborne concentrations of lead above the action level.

C. Removal and/or Disturbance of Lead, Cadmium, and Chromium Paint

1. Remove and properly dispose of waste in accordance with the methods and procedures outlined in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, 49 CFR 171-179, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 61, and the LWP. Removal and disturbance of lead, cadmium, and chromium surfaces or lead painted building components should be done in a manner to limit the amount of lead, cadmium, and chromium dust created. At the end of each work day, time will

be set aside for daily cleanup. Daily clean up shall be performed as outlined in the approved LWP. After lead, cadmium, and chromium work is completed clean all surfaces in the work area.

a. On-site Paint Removal: When using chemical strippers, utilize equipment and procedures as required by the manufacturer's recommendations. Material Safety Data Sheets provided by the manufacturer shall be readily available to all personnel handling the chemical stripper. As required under OSHA regulations, chemically resistant clothing such as long, neoprene, nitrile, rubber, or PVC gloves, face shields and appropriate respiratory protection shall be used when handling chemical strippers. Additionally, a portable eyewash station is required for flushing chemicals from eyes and skin.

b. Chemical Paint Removers Containing Methylene Chloride: If utilized, chemical paint removers shall contain no methylene chloride products.

c. Chemical Stripping Remover: If utilized, chemical removers shall be compatible with, and not harmful to the substrate that they are applied to. Chemical removers used on masonry surfaces shall contain anti-stain formulation that inhibits discoloration of stone, granite, brick and other masonry construction. Chemical removers used on interior surfaces shall not raise or discolor the surface being abated.

d. Chemical Stripping Agent Neutralizer: If utilized, chemical stripping agent neutralizer may be used on exterior surfaces only. Neutralizers shall be compatible with and not harmful to the substrate that they are applied to. Neutralizers shall be compatible with the stripping agent that has been applied to the surface substrate.

e. Heat Guns: The use of open flame burning is prohibited. If utilized, heat removal methods are limited to electrically powered flameless heat guns with temperature setting controls to below 1,100 degrees Fahrenheit. Utilize procedures as required by the manufacturer's recommendations and as specified in the LWP.

f. HEPA Sanding: If utilized, HEPA sanders shall be equipped with specially designed shrouds or containment systems that are placed under a partial vacuum. All exhaust air must pass through a HEPA filter to reduce the amount of airborne particulate lead. Utilize procedures as required by the manufacturer's recommendations and as specified in the LWP.

g. Wet Scrapping: Dry scraping is appropriate only at surfaces near electrical outlets or when using a heat gun. Otherwise manual scrapping shall be performed utilizing wet scraping methods. Prepare lead work areas as specified in the LWP. Wet scraping can be performed by using a spray bottle or sponge attached to a paint scraper. Work a few square feet at a time, the surface should be lightly misted with water from a garden sprayer or plant mister. Damp paint chips should be cleaned up as soon as possible so that they are not tracked throughout the work area or crushed beneath the feet of workers.

h. Contained High Pressure Water Wash: Uncontained high-pressure watering is prohibited. If high pressure washing equipment is utilized, it shall be equipped with a collection system which captures all water. The water must be contained and treated as potentially hazardous waste. Utilize procedures as required by the manufacture's recommendations and as specified in the LWP.

2. Decontamination: Workers are required to perform personnel and equipment decontamination in accordance with the approved LWP.

3. Monitoring Results
   a. Sampling shall be conducted in accordance with 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127, this specification, and the approved LWP.

   b. The Owner's Project Monitor shall collect area air sampling and perform inspection of the work to ensure that the requirements of the contract have been satisfied during the lead, cadmium, and chromium work.

   c. Collect personal air samples on employees who are anticipated to have the greatest risk of exposure. In addition, collect air samples on at least twenty-five percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

   d. The Contractor's personal air sample results shall be submitted within 48 hours after the air samples are taken. Notify the Owner or Owner's Representative immediately of exposure to lead, cadmium, and chromium at or in excess of the action level.

3.5 SITE INSPECTION

A. While performing lead, cadmium, and chromium work, the Contractor shall be subject to on-site inspection by the Owner's Project Monitor and Owner's Representative. If the work is in violation of specification requirements, the Owner will issue a stop work order to be in effect immediately and until the violation is resolved. Standby time and expenses required to resolve the violation shall be at the Contractor's expense.

3.6 CLEANUP AND WORK SITE RELEASE

A. Cleanup of Work Area and Clearance Testing: Maintain surfaces of the lead, cadmium, and chromium control area free of accumulations of dust and debris. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use pressurized air to clean up the area.

B. Final Clearance: The Owner's Project Monitor shall perform final inspections and sampling as required by the approved LWP. Should any conditions exist which do not comply with the approved LWP, the Contractor shall continue to clean and take the necessary actions to meet the requirements of the approved LWP at the Contractor's expense.

C. TCLP Testing Requirements: Representative samples of all debris to be disposed of shall be tested in accordance with 40 CFR 261 for hazardous waste. It shall be unlawful for materials identified as toxic waste to be disposed of with ordinary construction debris.

3.7 DISPOSAL

A. Handle, store, transport, and dispose of debris in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 9 VAC 20-60 and 9 VAC 20-81. Comply with land disposal restriction notification requirements as required by 40 CFR 268. Disposal of debris shall be performed in accordance with all local, state and federal regulations.

END OF SECTION 028313-

HAZMAT REMOVAL PLAN - SECOND FLOOR - GROSS LAB
SCALE: 1/4" = 1'-0"

HAZARDOUS MATERIAL GENERAL NOTES (SHEET HM101)

1. A HAZARDOUS MATERIALS INSPECTION WAS PERFORMED. THE SURVEY/INSPECTION REPORT IS PROVIDED IN THE SPECIFICATIONS. THE WORK WILL REQUIRE THE REMOVAL OF KNOWN ASBESTOS–CONTAINING MATERIALS (ACM). DESTRUCTIVE ACTIVITIES SUCH AS BREAKING INTO WALLS, CEILINGS AND FLOORS WERE NOT PERFORMED IN ORDER TO LOCATE MATERIALS. THEREFORE, IF DURING THE WORK SUSPECT MATERIALS ARE UNCOVERED, THE CONTRACTOR MUST STOP WORK UNTIL THE MATERIAL IS PROPERLY IDENTIFIED AND ADDRESSED.
2. THE CONTRACT DOCUMENTS REPRESENT CONDITIONS WITHIN THE FACILITY AT THE TIME OF THE INITIAL FIELD INVESTIGATION. REFER TO REPORT TO DETERMINE THOSE CONDITIONS. SHOULD CONDITIONS EXISTS OTHER THAN THOSE INDICATED IN THE REPORT, CONSULT THE ON–SITE PRIVATE QUALIFIED PERSON AND THE DESIGNER OF RECORD FOR VERIFICATION.
3. CONTRACTOR MUST VISIT THE SITE TO ASCERTAIN THE EXACT NATURE AND LOCATION OF THE WORK INCLUDING THE WORK OR COST THEREOF.
4. CONTRACTOR MUST COORDINATE ALL ASPECTS OF THE WORK WITH OTHER TRADES. SEE ARCHITECTURAL, MECHANICAL, PLUMBING, AND ELECTRICAL DEMOLITION DRAWINGS.
5. REMOVE ACM IN ACCORDANCE WITH SPECIFICATION SECTION 02 82 13 "ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS." FOR BIDDING PURPOSES THE FOLLOWING ACM WILL BE REMOVED: (A) 12–INCH FLOOR TILE AND MASTIC IN ROOMS 2063, 2064, 2065 AND 2073D, ESTIMATED QUANTITY 1,400 SF, (B) BULLETIN BOARD MASTIC, ESTIMATED QUANTITY 20 SF.
6. EXISTING PAINT WITHIN THE STRUCTURE HAS BEEN DETERMINED TO CONTAIN CONCENTRATIONS ABOVE THE LABORATORY'S MINIMUM DETECTION LIMIT OF THE FOLLOWING METALS: LEAD, CADMIUM AND CHROMIUM. PERFORM RENOVATION WORK IN ACCORDANCE WITH SPECIFICATION SECTION 02 83 13 "LEAD, CADMIUM AND CHROMIUM IN CONSTRUCTION". CONSTRUCTION STANDARDS ESTABLISHED BY OSHA FOR CHROMIUM, CADMIUM AND LEAD ARE; CHROMIUM, 29 CFR 1926.1126; CADMIUM, 29 CFR 1926.1127 AND LEAD, 29 CFR 1926.62
7. TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) TESTING ON EXISTING PAINTED BUILDING MATERIALS, WHEN DEMOLISHED AS COMPONENTS OF AN ASSEMBLY TYPICALLY RETURN RESULTS CLASSIFYING THE WASTE AS NONHAZARDOUS. PAINTED MATERIAL REMOVED IN THE FORM OF STRIPPING, BLASTING, SCRAPING OR OTHER METHODS THAT REMOVE THE PAINT COATING FROM THE EXISTING SUBSTRATE, OR PRODUCES A WASTE RESULTING PRIMARILY OF PAINT MATERIAL, MAY RESULT IN WASTE CLASSIFIED AS HAZARDOUS. THE CONTRACTOR MUST COORDINATE THE WORK PROCEDURES TO CHARACTERIZE THE ANTICIPATED WASTE STREAM. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH CHARACTERIZATION AND DISPOSAL OF WASTE GENERATED FROM THE WORK.
8. DISASSEMBLE, REMOVE, AND INSPECT ALL BULLETIN BOARDS TO DETERMINE IF ACM MASTIC WAS USED TO ADHERE THE BOARD TO THE WALLS. REMOVE, HANDLE, AND DISPOSE OF ACM BULLETIN BOARDS IN ACCORDANCE WITH SPECIFICATION SECTION 02 82 00. NON–ASBESTOS BULLETIN BOARDS MUST BE DISPOSED OF AS REGULAR CONSTRUCTION WASTE. FOR BIDDING PURPOSES, ASSUME 3 ASBESTOS–CONTAINING BULLETIN BOARDS EXIST (TOTAL FOR PROJECT).
9. MANAGE ALL WASTE IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS INCLUDING 40 CFR 261 AND 40 CFR 262. COMPLY WITH ALL EVMS REQUIREMENTS.

KEY TO SYMBOLS (SHEET HM101)

X / XXX — PHOTO LOCATION

XX HAZMAT KEY NOTES (SHEET HM101)

1 REMOVE ACM 12–INCH FLOOR TILE AND MASTIC.
2 INSPECT BULLETIN BOARD MASTIC FOR ACM, SEE HAZMAT GENERAL NOTE #8.

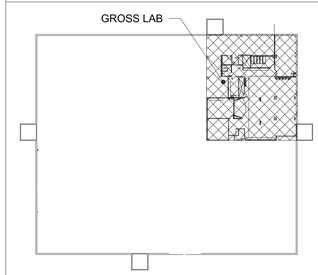
PHOTO #1 – ACM FLOOR TILE AND MASTIC IN ROOM 2063.

PHOTO #2 – ACM FLOOR TILE AND MASTIC IN ROOM 2064.

PHOTO #3 – ACM FLOOR TILE AND MASTIC IN ROOM 2065.

PHOTO #4 – BULLETIN BOARDS IN ROOM 2073.

KEY PLAN



GRAPHIC SCALES

1/4" = 1'-0" 5' 0' 5' 10'

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM
PF&A
EVMS
Eastern Virginia Medical School
7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222
1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	HNA
Drawn By:	HNA
Checked By:	BTH
Scale:	AS NOTED
Date:	05-06-2019

COMMONWEALTH OF VIRGINIA
HUGH N. ADCOCK, JR.
Lic. No. 015231
5/6/19
PROFESSIONAL ENGINEER
SEAL

No.	Date	Revisions Description
1	5/6/19	Add sheet HM101

Renovate Gross Anatomy Lab at Lewis Hall

Hazmat Removal Plan - Second Floor - Gross Lab

PROJECT NUMBER: #2671.19

HM101

GER Consulting Engineers

General Decision Number: VA190160 04/05/2019 VA160

Superseded General Decision Number: VA20180171

State: Virginia

Construction Type: Building

County: Norfolk* County in Virginia.

* INDEPENDENT CITY OF NORFOLK

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.60 for calendar year 2019 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.60 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2019. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate,if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/04/2019
1	01/11/2019
2	04/05/2019

* ASBE0024-006 10/01/2017

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 35.13	16.22+a

a. PAID HOLIDAYS: New Year's Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day,the day after Thanksgiving and Christmas Day provided the employee works the regular work day before and after the paid holiday.

BOIL0045-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 32.72	25.26

BRVA0008-001 02/01/2018

	Rates	Fringes
BRICKLAYER	$ 20.59	8.13

ELEC0080-010 06/01/2018

	Rates	Fringes
ELECTRICIAN (Includes Low Voltage Wiring and Alarm		

Installation).....$ 27.94 12.56%+6.95+a

a. Workmen shall take off 1 hour with pay, at the discretion of the employer, on State and National Election days; Tuesday following the first Monday in November, provided they are qualified and vote.

ELEV0052-005 01/01/2019

	Rates	Fringes
ELEVATOR MECHANIC	$ 41.34	33.705+a+b

a. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day and Christmas Day.

b. VACATIONS: 6% men under 5 years based on regular hourly rate and 8% men over 5 years based on regular hourly rate for all hours worked.

ENGI0147-019 11/01/2013

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Cranes 90 tons & over capacity; Tower & Climbing Cranes with Controls 100 ft. above ground	$ 28.30	8.69%+8.15
Cranes under 90 tons	$ 27.38	8.69%+8.15

IRON0079-012 05/01/2017

	Rates	Fringes
IRONWORKER, STRUCTURAL AND ORNAMENTAL	$ 25.50	14.80

IRON0079-013 05/01/2017

	Rates	Fringes
IRONWORKER, RIGGER	$ 25.50	14.80

PLUM0110-008 11/01/2018

	Rates	Fringes
PIPEFITTER (Includes HVAC Pipe, Unit and Temperature Controls Installations)	$ 28.57	16.73
PLUMBER	$ 28.57	16.73

SUVA2013-043 01/11/2016

	Rates	Fringes
CARPENTER, Includes Acoustical Ceiling Installation, Drywall Hanging, and Form Work	$ 19.80	3.98
CAULKER	$ 18.49	1.33
CEMENT MASON/CONCRETE FINISHER	$ 20.02	2.00
GLAZIER	$ 19.36	4.68
IRONWORKER, REINFORCING	$ 27.18	4.13
LABORER: Mason Tender - Brick	$ 14.82	3.34
LABORER: Mason Tender - Cement/Concrete	$ 12.96	3.12
LABORER: Pipelayer	$ 12.40	1.86
LABORER: Common or General,		

Including Demolition	$ 11.28	1.89
OPERATOR: Backhoe/Excavator/Trackhoe	$ 18.57	1.19
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 18.95	4.03
OPERATOR: Bulldozer	$ 18.07	3.50
OPERATOR: Forklift	$ 19.40	7.00
OPERATOR: Loader	$ 21.28	3.17
OPERATOR: Roller	$ 16.25	4.88
PAINTER (Brush and Roller)	$ 16.92	0.00
PAINTER: Spray	$ 18.10	5.43
ROOFER	$ 18.40	2.31
SHEET METAL WORKER, Includes HVAC Duct Installation	$ 20.98	2.62
SPRINKLER FITTER (Fire Sprinklers)	$ 18.91	4.67
TILE FINISHER	$ 23.40	0.00
TILE SETTER	$ 27.80	10.25
TRUCK DRIVER: Dump Truck	$ 15.50	0.75

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division

U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION

M-01

SHOP DRAWING TRANSMITTAL

ATTENTION: Brandon Rouse
Trane

DATE: 4/17/19

REVIEWED BY: Ben Felz

REFERENCE: EVMS Lewis Hall Lab Improvements

PACE PROJECT: 19053

WE TRANSMIT THE FOLLOWING:

Copies	Date Received	Description	Action Taken
Emailed	**4/15/19**	**Trane Submittal**	**NET**

THESE ITEMS ARE TRANSMITTED:

☒ **COMMERCIAL:**

☒ **(NET) NO EXCEPTIONS TAKEN**
☐ (MCN) MAKE CORRECTIONS NOTED
☐ (A&R) AMEND & RESUBMIT
☐ (R) REJECTED - SEE REMARKS
☐ (RA) RECEIPT ACKNOWLEDGED

☐ **GOVERNMENT:**

☐ (A) APPROVED
☐ (AN) APPROVED AS NOTED
☐ (R) REVISE & RESUBMIT
☐ (D) DISAPPROVED
☐ (RA) RECEIPT ACKNOWLEDGED

REVIEW COMMENTS:

SHOP DRAWING REVIEW

Review is for general compliance with contract documents. No responsibility is assumed for correctness of dimensions or details.

NO EXCEPTIONS TAKEN	**X**
MAKE CORRECTIONS NOTED	
AMEND & RESUBMIT	
REJECTED SEE REMARKS	
RECEIPT ACKNOWLEDGED	

PACE Collaborative, P.C.

Date: 4/17/19 **BY (P/M): BTF**

Date: N/A **BY (E): N/A**

BTF/adc

Submittal

Prepared For:
Doug Martin
EVMS

Date: ***April 15, 2019***

Job Name:
EVMS - Grossing Room
154 Colley Avenue
Norfolk, VA 23501

Consulting Engineer:
Pace Collaborative, P.C.
1277 Perimeter Parkway
Virginia Beach, VA 23454

Trane U.S. Inc. Is Pleased To Provide The Enclosed Submittal For Your Review & Approval.

Product Summary

Qty	Product
1	Performance Climate Changer

Brandon Rouse - Trane
1100 Cavalier Blvd.
Chesapeake, VA 23323-1506
Phone: (757) 558-3412
Fax: (757) 558-9715

The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

Product performance and submittal data is valid for a period of 6 months from the date of submittal generation. If six months or more has elapsed between submittal generation and equipment release, the product performance and submittal data will need to be verified. It is the customer's responsibility to obtain such verification.

Table Of Contents

Tag Data - Performance Climate Changer (Qty: 1)

Item	Tag	Qty	Description	Model Number
A1	RTU-1	1	Performance Climate Changer (CSAA)	CSAA025UB

Product Data - Performance Climate Changer

Item: A1 Qty: 1 Tag: RTU-1

Unit Level Options

Outdoor Unit
Unit Size 25
6" Integral Base Frame
UL Listed Unit
Single Metal Handle - Ganged Latches
Single Point Power (2 Fans + CDQ)

Controls & VFD / Starter

Variable Volume Control System
UC600
Right
Supply Fan VFD / Fan
Exhaust Fan VFD / Fan
CDQ Starter

Warranty

Startup / Checkout / 1st Year Parts & Labor Warranty
2 Year Parts & Labor Warranty
3rd-5th Year Parts Warranty < Parts Only - Labor Is Not Included >

Exhaust Fan Damper Module (Pos #1)

Exhaust Fan Damper Module
Access Door - Both Sides

Exhaust Fan Module (Pos #2)

Exhaust Fan Module
Access Door - Both Sides
Qty (2) 20" Direct Drive Plenum Fans, Full Width, High Pressure
Drive - Right Side
NEMA Premium Compliant TEFC Motors
460 Volt / 60 Hertz / 3 Phase
15 HP / Fan Motor x 2 Fans
1800 RPM
Inverter Balance w/ Shaft Grounding
Flow Meter - Transmitter / Fan
Marine LED Light
Motor Wiring Conduit
VFD / Fan
Backdraft Damper

Blank Module (Pos #3)

Blank Module
Small

R.A. Angled Filter Module (Pos #4)

R.A. Angled Filter Module
Access Door - Both Sides
2" Filter Frame w/ 2" MERV 13 Pleated Media Filters < 1 Set >

Return Air Intake Module (Pos #5)

Return Air Intake Module
Access Door - Left Side
Marine LED Light
Rectangular Opening - Right Side

Outside Air Intake Module (Pos #6)

Outside Air Intake Module
Access Door - Back
Marine LED Light
Right Side Damper - TRAQ O.A. AFMS
Left Side Damper - TRAQ O.A. AFMS

Spacer Module (Pos #7)
Spacer Module

Outside Air Angled Filter Module (Pos #8)
Outside Air Angled Filter Module
Access Door - Both Sides
2” Filter Frame w/ 2” MERV 13 Pleated Media Filters < 1 Set >

Air-To-Air Plate Frame HX Module (Pos #9)
Air-To-Air Plate Frame HX Module
Dual Path ATA
Full Exchanger w/ Bypass
Medium Spacing
Dimple Aluminum Epoxy Coated
Return / Exhaust Air Path Bypass
Bypass Damper
Frost Damper - Entering O.A. Face
IAQ - Stainless Steel Drain Pan - Right Side Connection
Access Doors - Both Sides
Marine LED Lights

Custom Length Blank Module (Pos #10)
Custom Length Blank Access Module

Exhaust Fan VFD Module (Pos #11)
Exhaust Fan VFD Module
Internal NEMA
High Voltage Door - Right Side

Supply Fan VFD Module (Pos #12)
Supply Fan VFD Module
Internal NEMA
High Voltage Door - Right Side

Controls Module (Pos #13)
Controls Module
Controller Door - Right Side
Access Door - Left Side

Access Module (Pos #14)
Access Module
Extended Medium
Access Door - Left Side
Marine LED Light

Pre-Heat Coil Module (Pos #15)
Horizontal Pre-Heat Coil Module
Extended Medium
IAQ - Stainless Steel Drain Pan - Right Side Connection
Coil Supply - Right Side
Service Panel - Opposite Connection Side
Unit Coil Height
Hot Water
Type "D1" Coil
6 Rows
137 FPF
Aluminum Fins
Prima Flo H (Hi Efficient)
.020" Copper Tubes
5/8” Tube Diameter
Stainless Steel Coil Casing
Turbulators

Blank Module (Pos #16)
Blank Module
Small

Access Module (Pos #17)
- Access Module
- Medium Large
- Access Door - Left Side

Blank Module (Pos #18)
- Blank Module
- Small

Supply Fan Module (Pos #19)
- Supply Fan Module
- Access Door - Both Sides
- Qty (2) 20” Direct Drive Plenum Fans, 80% Width, High Pressure
- Drive - Right Side
- NEMA Premium Compliant ODP Motors
- 460 Volt / 60 Hertz / 3 Phase
- 25 HP / Fan Motor x 2 Fans
- 1800 RPM
- Inverter Balance w/ Shaft Grounding
- Top Rectangular Discharge
- Flow Meter - Single Transmitter
- Marine LED Light
- Motor Wiring Conduit
- VFD / Fan
- Backdraft Damper

Turning Module (Pos #20)
- Turning Module
- Large
- Access Door - Both Sides
- Marine LED Light

Spacer Module (Pos #21)
- Spacer Module

Blank Module (Pos #22)
- Blank Module
- Small

Cooling Coil Module (Pos #23)
- Horizontal Cooling Coil Module
- Medium Large
- IAQ - Stainless Steel Drain Pan - Right Side Connection
- Coil Supply - Right Side
- Service Panel - Opposite Connection Side
- Unit Coil Height
- Chilled Water
- Type "5D" Coil
- 10 Rows
- 128 FPF
- Aluminum Fins
- Prima Flo H (Hi Efficient)
- .020" Copper Tubes
- 5/8” Tube Diameter
- Stainless Steel Coil Casing
- Turbulators

Cool Dry Quiet (CDQ(TM)) Desiccant Wheel Module (Pos #24)
- CDQ Wheel
- Series Application
- Supply Air Bypass Damper
- Regeneration Air Bypass Damper
- 460 Volt / 60 Hertz / 3 Phase
- Drive - Right Side
- Access Doors - Both Sides
- Marine LED Light
- Starter

Blank Module For Future Humidifier Distributor If Desired (Pos #25)

Blank Module
Small
IAQ - Stainless Steel Drain Pan - Right Side Connection

Access Module (Pos #26)

Access Module
Extended Medium
Access Door - Left Side
IAQ - Stainless Steel Drain Pan - Right Side Connection

Cooling Coil Module (Pos #27)

Horizontal Cooling Coil Module
Extended Medium
IAQ - Stainless Steel Drain Pan - Right Side Connection
Coil Supply - Right Side
Service Panel - Opposite Connection Side
Unit Coil Height
Chilled Water
Type "UW" Coil
6 Rows
105 FPF
Aluminum Fins
Delta Flo H (Hi Efficient)
.016" Copper Tubes
1/2” Tube Diameter
Stainless Steel Coil Casing
Turbulators

Final Filter Module (Pos #28)

Final Filter Module
Cartridge Filter
Access Door - Both Sides
Cartridge Filter Frame w/ 12” Cartridge - 95% Efficient Filter < 1 Set > (Fld)

Discharge Plenum Module (Pos #29)

Discharge Plenum Module
Access Door - Left Side
Rectangular Discharge Opening - Right Side

Notes:

1. **All Accessories Must Be Field Installed By The Mechanical Contractor.**
2. ***Not Included:*** **Roof Curb, External Isolation Curb & Acoustical System, Piping Packages, Smoke Detectors, Air & Water Balancing, Rigging, Maintenance Service & Installation.**

Performance Data - Performance Climate Changer

Tags	**RTU-1**					
Unit Level Options						
Position						
Rigging weight (lb)	16717.9					
Installed weight (lb)	17309.2					
Actual airflow (cfm)	10000					
Shipping split 1 weight (lb)	2057.7					
Shipping split 2 weight (lb)	420.4					
Shipping split 3 weight (lb)	909.0					
Shipping split 4 weight (lb)	1128.9					
Shipping split 5 weight (lb)	2946.0					
Shipping split 6 weight (lb)	2641.0					
Shipping split 7 weight (lb)	1750.7					
Shipping split 8 weight (lb)	2140.6					
Shipping split 9 weight (lb)	1961.6					
Shipping split 10 weight (lb)	1353.4					
Exhaust Fan Damper Module						
Position	**#1**					
Exhaust damper airflow (cfm)	10000					
Exhaust damper area (sq ft)	6.27					
Exhaust damper face velocity (ft/min)	1594					
Exhaust damper PD (in H2O)	0.488					
Exhaust hood area (sq ft)	5.19					
Exhaust hood PD (in H2O)	0.220					
Total exhaust air PD (in H2O)	0.708					
Fan Modules	**Exhaust**	**Supply**				
Position	**#2**	**#19**				
Fan airflow (cfm)	10200	10683				
Overall ESP (in H2O)	3.000	2.500				
Total static pressure (in H2O)	4.864	8.951				
Fan pressure drop (in H2O)	3.019	2.523				
Speed (rpm)	2145	2893				
Total brake horsepower (hp)	12.332	23.940				
Total brake horsepower (hp)	15 HP / Fan	25 HP / Fan				
Unit static efficiency (%)	63.43	62.97				
Motor hertz (Hz)	73	98				
Discharge 1 top - airflow (cfm)	-	10000				
Discharge 1 bottom - airflow (cfm)	-	10000				
Discharge 1 top - face velocity (ft/min)	-	433				
Discharge 1 back - face velocity (ft/min)	351	-				
Discharge 1 top - pressure drop (in H2O)	-	0.023				
Discharge 1 back - pressure drop (in H2O)	0.019	-				
Discharge 1 top - area (sq ft)	-	23.12				
Discharge 1 back - area (sq ft)	29.03	-				
Access/Blank/Turning Modules						
Position	**#3, #16**	**#14**	**#17**	**#18**	**#20**	**#22, #25**
Section length (in)	10.000	19.000	24.500	10.000	46.000	10.000

Angled Filter Modules						
Position	**#4, #8**	**#28**				
Filter airflow (cfm)	10000	10000				
Filter area (sq ft)	50.00	26.00				
Filter condition	Mid-life	Mid-life				
Filter pressure drop (in H2O)	0.559	0.725				
Filter section pressure drop (in H2O)	0.559	0.725				
Filter face velocity (ft/min)	200	385				
Air Intake Modules	**R.A. Intake**	**O.A. Intake**				
Position	**#5**	**#6**				
Opening 1 right - airflow (cfm)	10000	5000				
Opening 1 left - airflow (cfm)	-	5000				
Opening 1 right - area (sq ft)	6.50	2.79				
Opening 1 left - area (sq ft)	-	2.79				
Left side hood area (sq ft)	-	5.30				
Right side hood area (sq ft)	-	5.30				
Opening 1 right - face velocity (ft/min)	1538	1790				
Opening 1 left - face velocity (ft/min)	-	1790				
Opening 1 right - pressure drop (in H2O)	0.000	0.284				
Opening 1 left - pressure drop (in H2O)	-	0.284				
Opening 1 right side total pressure drop (in H2O)	0.000	0.284				
Opening 1 left side total pressure drop (in H2O)	-	0.284				
Left side hood pressure drop (in H2O)	-	0.355				
Right side hood pressure drop (in H2O)	-	0.355				
Right side total pressure drop (in H2O)	0.000	0.639				
Left side total pressure drop (in H2O)	0.000	0.639				
Right side inlet type	Ducted	Unducted				
Left side inlet type	-	Unducted				
Greatest entry PD (in H2O)	0.000	0.639				
Total mixing section pressure drop (in H2O)	0.000	0.639				
Custom Length Modules						
Position	**#7**	**#10**	**#21**			
Section length (in)	8.753	60.500	6.253			
Air-To-Air Plate Frame HX Module						
Position	**#9**					
Entering winter supply airflow (cfm)	10000					
Entering winter exhaust airflow (cfm)	10200					
Entering summer supply airflow (cfm)	10000					
Entering summer exhaust airflow (cfm)	10200					
Leaving winter supply airflow (cfm)	10000					
Leaving summer supply airflow (cfm)	10000					
Economizing supply airflow (cfm)	10000					
Economizing exhaust airflow (cfm)	10200					
Design winter exhaust pressure drop (in H2O)	0.574					
Design winter supply pressure drop (in H2O)	0.590					
Winter 100% Bypass pressure drop (in H2O)	0.449					
Design summer exhaust pressure drop (in H2O)	0.578					
Design summer supply pressure drop (in H2O)	0.678					
Summer 100% Bypass pressure drop (in H2O)	0.460					
Supply economizing pressure drop (in H2O)	0.554					
Exhaust economizing pressure drop (in H2O)	0.457					
Greatest exhaust PD (in H2O)	0.578					

Greatest supply PD (in H2O)	0.678					
Winter dry sensible effectiveness (%)	67.83					
Winter design sensible effectiveness (%)	50.88					
Summer dry sensible effectiveness (%)	67.61					
Summer design sensible effectiveness (%)	70.21					
Entering winter supply DB (F)	22.00					
Entering winter supply WB (F)	18.00					
Entering winter exhaust DB (F)	60.70					
Entering winter exhaust WB (F)	47.44					
Leaving winter supply DB (F)	41.69					
Leaving winter supply WB (F)	30.75					
Leaving winter supply RH (%)	21.03					
Leaving winter supply HR (gr/lb)	8					
Leaving winter exhaust DB (F)	41.44					
Leaving winter exhaust WB (F)	37.76					
Leaving winter exhaust RH (%)	71.58					
Leaving winter exhaust HR (gr/lb)	28					
Entering summer supply DB (F)	90.00					
Entering summer supply WB (F)	79.00					
Entering summer exhaust DB (F)	65.70					
Entering summer exhaust WB (F)	53.70					
Leaving summer supply DB (F)	77.13					
Leaving summer supply WB (F)	74.82					
Leaving summer supply RH (%)	89.99					
Leaving summer supply HR (gr/lb)	127					
Leaving summer exhaust DB (F)	82.43					
Leaving summer exhaust WB (F)	60.18					
Leaving summer exhaust RH (%)	25.70					
Leaving summer exhaust HR (gr/lb)	42					
Summer energy recovered (MBh)	185.36					
Winter energy recovered (MBh)	212.85					
Summer supply condensate (lb/hr)	36.25					
Controls & VFD / Starter Modules	**EF VFD**	**SF VFD**	**Controls**			
Position	**#11**	**#12**	**#13**			
Coil Modules	**Pre-Heat**	**CDQ Cooling**	**Sensible Cooling**			
Position	**#15**	**#23**	**#27**			
Coil performance airflow (cfm)	10000	10683	10000			
Total capacity (MBh)	563.94	1239.67	109.18			
Sensible capacity (MBh)	-	566.27	109.18			
Entering dry bulb (F)	50.00	95.30	60.00			
Entering wet bulb (F)	-	81.32	49.60			
Leaving dry bulb (F)	102.00	48.00	50.00			
Leaving wet bulb (F)	-	47.90	44.95			
Fluid type	Water	Water	Water			
Entering fluid temperature (F)	110.00	45.00	45.00			
Leaving fluid temperature (F)	85.00	52.00	55.00			
Fluid temperature rise (F)	-	7.00	10.00			
Fluid temperature drop (F)	25.00	-	-			
Standard fluid flow rate (gpm)	45.23	352.93	21.76			
Fluid pressure drop (ft H2O)	3.18	27.11	1.87			
Fluid velocity (ft/s)	1.47	5.74	0.91			
Fluid volume (gal)	20.97	33.12	16.69			
Coil face area (sq ft)	24.08	23.73	24.97			
Coil face velocity (ft/min)	415	450	400			
Air pressure drop (in H2O)	0.491	1.154	0.346			

Coil section pressure drop (in H2O)	0.491	1.154	0.346			
Coil rigging weight (lb)	566.5	868.3	363.0			
Coil installed weight (lb)	741.2	1145.4	502.5			
Top or single coil dry weight (lb)	566.5	868.3	363.0			
CDQ Wheel						
Position	**#24**					
Leaving supply airflow (cfm)	10000					
Mixed regeneration airflow (cfm)	10683					
Cross Leakage Airflow (cfm)	683					
Supply air wheel PD (in H2O)	0.831					
Regeneration air wheel PD (in H2O)	0.948					
Max supply level module PD (in H2O)	0.831					
Max exhaust module PD (in H2O)	0.948					
Max regeneration air module PD (in H2O)	0.948					
Entering regeneration ESP (in H2O)	1.000					
Leaving supply ESP (in H2O)	1.000					
Mixed regeneration air DB (F)	93.30					
Mixed regeneration air RH (%)	58.90					
Regeneration LDB (F)	96.39					
Regeneration EDB (F)	102.00					
Regeneration leaving RH (%)	55.85					
Regeneration entering RH (%)	43.00					
Regeneration leaving HR (gr/lb)	146					
Leaving supply air DB (F)	53.61					
Leaving supply air RH (%)	59.18					
Leaving supply air HR (gr/lb)	36					
Discharge Plenum Modules						
Position	**#29**					
Discharge 1 back - airflow (cfm)	10000					
Discharge 1 right - airflow (cfm)	10000					
Discharge 1 right - area (sq ft)	7.38					
Discharge 1 right - pressure drop (in H2O)	0.057					
Total section pressure drop (in H2O)	0.057					
Discharge 1 right - face velocity (ft/min)	1355					

Mechanical Specifications - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

GENERAL

Outdoor air handling units will be shipped with all openings covered to protect unit interior from in-transit debris.

Installing contractor is responsible for long term storage in accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07B-EN).

Unit shall be UL and C-UL Listed.

Supply fans within the scope of AHRI Standard 430 shall be certified in accordance with AHRI Standard 430.

Unit sound performance data shall be provided using AHRI Standard 260 test methods and reported as sound power. Trane, in providing this program and data, does not certify or warrant NC levels. These levels are affected by factors specific to each application and/or installation and therefore unable to be predicted or certified by Trane. *Refer to product data for specific fan footnote references*.

Manufacturer provided VFDs shall be certified to AHRI Standard 1210 "Performance Rating of Variable Frequency Drives" to ensure documented and reliable VFD efficiency.

UNIT CONSTRUCTION

Outdoor unit roofs shall incorporate a standing seam on the exterior to ensure a rigid roof construction and prevent water infiltration. Roof assembly shall overhang all walls by 1.5-inch minimum to prevent sheeting from roof to side panels. Rain gutters shall also be provided over all doors shorter than total unit height to direct rain away from the door assembly. Outdoor roofs shall be sloped, not less than 0.125 inches per foot, for water drainage. Where outdoor units are shipped in multiple sections, provide standing-seam joiners at each split with adhesive, hardware, and cover strips for field joining by the installing contractor.

All unit panels shall be 2" solid, double-wall construction to facilitate cleaning of unit interior. Unit panels shall be provided with a mid-span, no-through-metal, internal thermal break. Casing thermal performance shall be such that under 55°F supply air temperature and design conditions on the exterior of the unit of 81°F dry bulb and 73°F wet bulb, condensation shall not form on the casing exterior.

All outdoor AHU interior casing panels will be made of stainless steel.

UNIT PAINT

External surface of unit casing will be coated with water-based polyurethane paint. Color to be standard "Slate Gray". Factory-painted units will be able to withstand a salt spray test in accordance with ASTM B117 for a minimum of 500 consecutive hours and shall meet the following requirements following the salt-spray test:
- Mean scribe creepage rating of at least 6 per ASTM D1654 procedure A
- Blister size no larger than #6 per ASTM D714
- Blister density no greater than Medium per ASTM D714
- No onset of red rust

CASING DEFLECTION

The casing shall not exceed 0.0042 inch deflection per inch of panel span at 1.00 times design static pressure. Maximum design static shall not exceed +8 inches w.g. in all positive pressure sections and -8 inches w.g. in all negative pressure sections.

FLOOR CONSTRUCTION

The unit floor shall be of sufficient strength to support a 300.0 lb load during maintenance activities and shall deflect no more than 0.0042 inch per inch of panel span.

UNIT BASE

Manufacturer to provide a full perimeter integral base frame for either ceiling suspension of units or to support and raise all sections of the unit for proper trapping. All outdoor unit base frames shall be welded construction. Unit base frames not constructed of galvanized steel shall be chemically cleaned and coated with both a rust-inhibiting primer and finished coat of rust-inhibiting enamel. Unit base height to be included in total height required for proper trap height.

UNIT INSULATION

Panel insulation shall provide a minimum thermal resistance (R) value of 13 ft^2-h-ºF/Btu throughout the entire unit. Insulation shall completely fill the panel cavities in all directions so that no voids exist and settling of insulation is prevented. Panel insulation shall comply with NFPA 90A.

DRAIN PAN

In sections provided with a drain pan, the drain pan shall be designed in accordance with ASHRAE 62.1. To address indoor air quality (IAQ) the drain pan shall be sloped in two planes promoting positive drainage to eliminate stagnant water conditions. Drain pan shall be insulated, and of double wall construction. The outlet shall be the lowest point on the pan, and shall be of sufficient diameter to preclude drain pan overflow under normally expected operating conditions. All drain pans connections shall have a threaded connection, extending a minimum of 2-1/2" beyond the unit base, and shall be made from the same material as the drain pan. Drain pan located under a cooling coil shall be of sufficient size to collect all condensate produced from the coil.
Refer to Product Data for specific information on which sections are supplied with a drain pan, the drain pan material and connection location.

ACCESS DOOR CONSTRUCTION

Access doors shall be 2" double wall construction. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels respectively. All doors shall be provided with a thermal break construction of door panel and door frame. Gasketing shall be provided around the full perimeter of the doors to prevent air leakage. Surface mounted handles shall be provided to allow quick access to the interior of the functional section and to prevent through cabinet penetrations that could likely weaken the casing leakage and thermal performance. Handle hardware shall be designed to prevent unintended closure. Access doors shall be hinged and removable for quick easy access. Hinges shall be interchangeable with the door handle hardware to allow for alternating door swing in the field to minimize access interference due to unforeseen job site obstructions. Door handle hardware shall be adjustable and visually indicate locking position of door latch external to the section. Door hinges shall be stainless steel.

All doors shall be a minimum of 60" high when sufficient height is available or the maximum height allowed by the unit height.

Door handles shall be provided for each latching point of the door necessary to maintain the specified air leakage integrity of the unit. Outward swing doors are provided with a single handle linked to multiple latching points
Refer to Product Data for specific information on which sections are supplied with an access door, the door location, a single handle and a window.

FIELD SUPPLIED CURB

Outdoor AHU is to be mounted on field-supplied specialty curb. Refer to the specialty curb manufacture"s installation requirements for any curb assembly, curb mounting to roof structure, or unit-to-curb attachment. For units requiring external piping cabinet(s), the specialty curb manufacturer is to also provide a curb for external pipe chase(s).

SINGLE POINT POWER CONNECTION

For air handling units requiring both a supply and return/exhaust fan plus an energy wheel or desiccant dehumidification wheel, the unit manufacturer shall supply single point power wiring, factory installed and tested to all motors starters or variable frequency drives. Individual high voltage enclosures will be supplied for all motor starters or variable frequency drives. Single point power wiring shall include a high voltage distribution block located in the supply fan starter or variable frequency drive cabinet. Single point power wiring shall not compromise the UL or ETL certification of the unit. Single point power wiring shall also include factory installed and wired control systems if ordered.

OUTDOOR AIR INTAKE MODULE

A mixing section shall be provided to support the damper assembly for outdoor, return, and/or exhaust air.

Inlet Hoods

Inlet hoods are provided on the outside air openings and equipped with high performance moisture eliminators to minimize water carryover from the outside into the unit casing. Eliminators also perform the function of a bird screen to prevent nesting.
Refer to the unit As-Built and Product Data section for specific information on which sections are supplied with inlet hood.

Airflow Measurement Station (Std. TRAQ Dampers)

A factory-mounted airflow measurement station tested in accordance with AMCA Standard 611 and bearing the AMCA Ratings Seal for Airflow Measurement Performance shall be provided in the outdoor and/or return air opening to measure airflow. The damper blades shall be galvanized steel, housed in a galvanized steel frame and mechanically fastened to a rotating axle rod. The dampers shall be rated for a maximum leakage rate of 4 cfm/ft² at 1 in. w.g. complying with ASHRAE 90.1 maximum damper leakage. The standard airflow measurement station shall be capable of measuring from 15 percent to 100 percent of unit nominal airflow. The airflow measurement station shall adjust for temperature variations and provide a 2 to 10 Vdc signal that corresponds to actual airflow for controlling and documenting airflow. The accuracy of the airflow measurement station shall be ±5 percent.

Mixing Section Damper Actuators

Spring return actuators shall be mounted with the outside air damper linked normally closed and the return air damper linked normally open.

FILTER MODULES

A section shall be provided to support the filter rack as indicated throughout the unit. Refer to Product Data and As-Built sections of the submittal for specific locations within each unit.

Angled Filters

2 inch pleated media filters made with 100% synthetic fibers that are continuously laminated to a supported steel wire grid with water repellent adhesive shall be provided. Filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall have a MERV 13 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

Cartridge Final Filters

The filters shall be 12-inch cartridge filters constructed with a continuous sheet of fine-fiber media made into closely spaced pleats. The filters shall be capable of operating up to 625 fpm face velocity without loss of filter efficiency and holding capacity. The filters shall be sealed into a metal frame assembled in a rigid manner. A gasket material shall be installed on the metal header of the filter to prevent filter bypass where the metal headers meet on the side-access racks. All cartridge filters shall be furnished with a 2-inch prefilter to provide extended cartridge filter life. The manufacturer shall supply a side-access filter rack capable of holding cartridge filters and prefilters.

The cartridge filters shall have a MERV 15 rating when tested in accordance with the ANSI/ASHRAE Standard 52.2.

Dirty Filter Switch

A differential pressure switch piped to both sides of the filter shall indicate filter status.

COIL MODULES

The coil section shall be provided complete with coil and coil holding frame. The coils shall be installed such that headers and return bends are enclosed by unit casings. If two or more cooling coils are stacked in the unit, an intermediate drain pan shall be installed between each coil and be of the same material as the primary drain pan. Like the primary drain pan, the intermediate drain pan shall be designed being of sufficient size to collect all condensation produced from the coil and sloped to promote positive drainage to eliminate stagnant water conditions. The intermediate pan shall begin at the leading face of the water-producing device and be of sufficient length extending downstream to prevent condensate from passing through the air stream of the lower coil. Intermediate drain pan shall include downspouts to direct condensate to the primary drain pan. The outlet shall be located at the lowest point of the pan and shall be sufficient diameter to preclude drain pan overflow under any normally expected operating condition.

In lieu of a door, an easily removable service panel shall be provided in sections as specified, to facilitate access to unit for periodic servicing, or for removal and replacement of coils. Removal of service panel will not impact the structural integrity of the unit.

Hydronic coils shall be supplied with factory installed drain and vent piping to unit casing exterior. Piping is to facilitate field installation of automatic venting or drain valves on coils, which are not supplied with unit. *Refer to the Product Data section of the submittal for the units and/or coils supplied with drain and vent piping*.

Casing penetrations supplied for hydronic drain and vents. Piping contractor shall provide extended piping.

Water Coils (UW, 5D, D1)

The coils shall have aluminum fins and seamless copper tubes. Fins shall have collars drawn, belled, and firmly bonded to tubes by mechanical expansion of the tubes. The coil casing shall be stainless steel. Refer to the Product Data section of the submittal for the coil casing material.

The coils shall be proof-tested to 300 psig and leak-tested under water to 200 psig. Coils containing water or ethylene glycol are certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Coil connections are constructed of cast iron with female connections, steel block with female connections or steel pipe with male connections. All water coil types have connections that extend out beyond unit casing. Headers on downstream coil bank of staggered coil sections do not extend beyond the unit casing and must be completed by the on-site piping contractor.

Tubes are 1/2" OD 0.016" thick copper.

Tubes are 5/8" OD 0.020" thick copper.

Averaging Temperature Sensor

An averaging temperature sensor shall be serpentined across the module. All capillaries bends shall be radiused and fastened with capillary clips to prevent crimping and minimize wear.

Low Limit

A double-pole single throw (1 NO, 1 NC) low limit switch shall be wired to a momentary push-button manual reset circuit (without Trane wiring the device is auto-resetting). Low Limit Switch circuit will be wired as Normally Closed, and will trip a lockout circuit upon temperature dropping below the set point, or general failure of the circuit. Lockout circuit will be factory wired into the Fan VFDs or Starters if present. Set point is default set to 35F at factory, but is adjustable if increased set point is needed due to installation site ducting to coil causing cold spot in a unique location of the coil. Capillaries are serpentined across the entering or leaving side of the coil with routing Trane designed to maximize coil coverage and cover critical top and bottom 3 inches of the coil for any given capillary and coil area configuration (Trane designed and historically proven capillary routing does not necessarily match device manufacturer's generic installation recommendations). The bends of the capillaries shall be curved and fastened with capillary clips to prevent crimping and minimize wear. A separate low limit shall be provided for each coil in a coil stack.

A 1,000 ohm, platinum 385 curve, resistive temperature detector (RTD) is the sensor material that shall be mounted.

ACCESS / INSPECTION / BLANK / TURNING MODULES

A section shall be provided to allow additional access/inspection of unit components and space for field-installed components as needed. An access door shall be provided for easy access. All access sections shall be complete with a double-wall, removable door downstream for inspection, cleaning, and maintenance. Interior and exterior door panels shall be of the same construction as the interior and exterior wall panels, respectively. All doors downstream of cooling coils shall be provided with a thermal break construction of door panel and door frame.

DIRECT-DRIVE PLENUM FAN MODULE

The fan type shall be provided as required for stable operation and optimum energy efficiency. The fan shall be a single-width, single-inlet, multiblade-type direct-drive plenum fan. Motor bearing life of the direct-drive plenum fan shall be not less than L-10 250,000 hrs**.** *Refer to the Product Data section for fan quantity and number of blades selected within each unit*. Fans shall be certified as complying with AHRI Standard 430 for airflow performance. Fans shall be tested and rated in-accordance with AHRI Standard 260 for sound performance.

Fans that are selected with inverter balancing shall first be dynamically balanced at design RPM. The fans then will be checked in the factory from 25% to 100% of design RPM to insure they are operating within vibration tolerance specifications, and that there are no resonant frequency issues throughout this operating range. Inverter balancing that requires lockout frequencies inputted into a variable frequency drive to in order to bypass resonant frequencies shall not be acceptable. If supplied in this manner by the unit manufacturer, the contractor will be responsible for rebalancing in the field after unit installation. Fans selected with inverter balancing shall have a maintenance free grounding assembly installed on the fan motor to discharge both static and induced shaft currents to ground.

On units supplied with plenum or motorized impeller fans, expanded metal door guard(s) shall be supplied on the access door(s) to the fan and those downstream access door(s) where unintended access to the plenum or motorized impeller fan could occur. Door guard is intended to deter unauthorized entry and incidental contact with rotating components. *Refer to the Product Data section for fans with access door guard(s)*.

Motor Frame

The motor shall be mounted integral to the isolated fan assembly and furnished by the unit manufacturer. The motor is mounted inside the unit casing on an adjustable base to permit adjustment of drive belt tension (not applicable for direct drive plenum fans). The motor shall meet or exceed all NEMA Standards Publication MG 1 requirements and comply with NEMA Premium efficiency levels when applicable except for fractional horsepower motors which are not covered by the NEMA classification. The motor shall be T-frame, squirrel cage with size, type, and electrical characteristics as shown on the equipment schedule. *Refer to the Product Data section for selected fan motors within each unit.*

Two-Inch Spring Isolators

Direct-drive fan and motor assemblies shall be internally isolated from the unit casing with 2-inch deflection spring isolators. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to the current IBC seismic requirements.

Variable Frequency Drives

Multiple VFDs, on a common panel, shall be provided for each fan array to provide redundancy in case of loss of function of one of the VFDs or fan motors. Individual VFDs shall be sized based on motor FLA to reduce overall panel input current. In the event of a VFD failure, the remaining VFDs must be capable of compensating and maintaining normal fan array operation. VFD panel shall have a common disconnect that is accessible from the outside of the unit. Disconnect shall open input power to all VFDs simultaneously. Disconnect shall be lockable in the off position. Disconnect shall utilize circuit breaker to provide overcurrent and short circuit protection. VFD panel shall be provided with a single point of field connection for field input power. Each VFD shall be supplied with independent input fusing, as required. VFDs shall be capable of onboard diagnostics to monitor individual fan motor performance. Externally mounted VFDs shall be provided with independent keypad. VFD panel shall be provided with a common point connection for speed input signal, start/stop signal, and fault status. Field safety interlock relay shall be field wired and provided

The supply fan's Starter/VFD shall be mounted internal of unit casing in the supply fan VFD module. The internal enclosure shall be an integral part of the unit casing to allow for thermal venting to casing interior, but shall be accessible from unit exterior through access door. Internally mounted starters shall have doors with the same construction as other doors on unit. An external disconnect shall be mounted through the door to the starter/VFD to disconnect full power from starter/VFD.

The exhaust fan's Starter/VFD shall be mounted internal of unit casing in the exhaust fan VFD module. The internal enclosure shall be an integral part of the unit casing to allow for thermal venting to casing interior, but shall be accessible from unit exterior through access door. Internally mounted starters shall have doors with the same construction as other doors on unit. An external disconnect shall be mounted through the door to the starter/VFD to disconnect full power from starter/VFD.

Motor Wiring Conduit

The fan motor wiring shall be factory-wired to the unit-mounted starter/disconnect, variable frequency drive, or external motor junction box within flexible metal conduit of adequate length so that the fan vibration isolation, if applicable, will not be restricted. *Refer to the Product Data section for fans with motor wiring conduit.*

Backdraft Dampers

Each fan in the multiple-fan array shall be provided with integral back flow prevention: a backdraft damper that prohibits recirculation of air in the event a fan or multiple fans become disabled. Dampers are tested and rated based on AMCA Standard 500. Dampers to be heavy duty type capable of a maximum back pressure that exceeds the design total static pressure with minimal leakage. The dampers should have a minimal total effect on airflow performance-both pressure drop when open and system effect on the fan. The damper blades and frame shall be extruded aluminum with blade edge seals locked into the blade edge. Adhesive type seals are unacceptable. AHU manufacturer responsible for providing proper spacing upstream of dampers to ensure full, uniform airflow through upstream components. For units where the damper(s) are supplied at the jobsite, the installing contractor shall contract a certified TAB contractor to verify uniform airflow thru upstream components.
Refer to Product Data for specific information on which sections are supplied with a backdraft damper.

Fan Discharge Temperature Sensor - Supply Fan

A button or probe temperature sensor shall be mounted in the fan discharge. A 10,000 ohm, Type II thermistor is the sensor material that shall be mounted.

Single Transmitter - Supply Fan AFMS

The fan shall have an airflow measurement system to measure fan airflow directly or to measure differential pressure that can be used to calculate fan airflow. The system shall predict airflow within +/-5 percent total accuracy (device & transmitter) when operating within the stable operating region of the fan curve. On units supplied with multiple direct drive fans, one transmitter is supplied for the total array. The submitted fan airflow performance and noise levels shall not be affected by the installation of the device. Any device that provides an obstruction to the fan inlet will not be accepted. Refer to the Product Data section for fans with flow meters.

Transmitter / Fan - Exhaust Fan AFMS

The fan shall have an airflow measurement system to measure fan airflow directly or to measure differential pressure that can be used to calculate fan airflow. The system shall predict airflow within +/-5 percent total accuracy (device & transmitter) when operating within the stable operating region of the fan curve. On units supplied with multiple direct drive fans, one transmitter is supplied for each fan in the array. The submitted fan airflow performance and noise levels shall not be affected by the installation of the device. Any device that provides an obstruction to the fan inlet will not be accepted. *Refer to the Product Data section for fans with high performance flow meters*.

DISCHARGE PLENUM MODULE

Plenums shall be provided to efficiently turn air and provide sound attenuation. Discharge plenum opening types and sizes shall be scaled to meet engineering requirements.

VARIABLE VOLUME CONTROLS SYSTEM

Factory-mounted direct-digital control (DDC) systems shall be engineered, mounted, wired, and tested by the air handler manufacturer to reduce installed costs, improve reliability, and save time at unit startup. Each control system shall be fully functional in a stand-alone mode or may be tied to a building automation system with a single pair of twisted wires. All factory-mounted controls shall be covered by the air handler manufacturer's standard warranty.

Unit Mounted Control System

All factory installed end devices shall be wired and terminated to the DDC controller.

Field Programmable UC600

A dedicated programmable direct-digital controller with the appropriate point capabilities shall be unit mounted on the air handling unit. Point expansion is accomplished using expansion modules with the capacity to add points in 4 to 18 point increments. The controller will utilize the latest graphical programming methods that are easy to learn, powerful, self-documenting. Graphical programming will help minimize programming costs, aid in program troubleshooting, and save time at unit startup. Programmable controllers optimize unit control flexibility. 120V power wiring to the control system transformer, which provides 24VAC to the DDC controller and end devices, shall be customer supplied. The UC600 communicates using the BACnet protocol.

Remote Mounted Display For UC600

A portable touch-screen keypad shall be provided to facilitate local monitoring, trouble shooting, and changing of setpoints.

COOL DRY QUIET (CDQ(TM)) DESICCANT WHEEL MODULE

The air handling unit shall be provided with a CDQ desiccant wheel to control space humidity based on the specified requirements. The wheel media shall meet the flammability requirements governing this class of products and shall be a UL-recognized component in accordance with UL 1812 and UL1995. The CDQ desiccant wheel speed is not modulated for temperature control nor recommended. The CDQ wheel is for humidity control and should be turned off during winter heating. Supply temperature is controlled by the cooling coil or a reheat coil.

Wheel Construction

The CDQ desiccant wheel shall be constructed of a synthetic matrix with a type III desiccant. The wheel shall be structurally reinforced with a spoke system to minimize wheel deflection. All diameter and perimeter seals shall be provided as part of the cassette assembly. The drive system shall consist of a heavy-duty fractional horsepower A/C gear motor mounted in the cassette.

CDQ Wheel Drive System

The motor shall have permanently lubricated bearings. The bearings, which support rotation of the wheel around a center shaft, shall be provided with grease fittings for periodic lubrication.

Maintenance & Access Doors

The wheel matrix shall be cleanable. The desiccant shall not dissolve in the presence of water or high humidity. Access doors shall be provided immediately upstream and downstream of the CDQ wheel cassette. Adequate space shall be provided for cleaning, service, and maintenance of the wheel, motor, bearing, and belt.

AIR-TO-AIR HEAT EXCHANGER

Construction

Air-to-air, fixed-plate heat exchangers shall be provided as indicated on the schedule and drawings. Exchangers shall be a cross flow, plate-type with no moving parts or secondary heat transfer surfaces. Plates shall be a minimum 99.5% aluminum and formed with a plate profile for maximum efficiency and cleanability, and minimizes pressure loss. The connecting plate edges shall be double-folded and internally sealed with a silicone free elastic resin to minimize leakage. The corners of assembled exchanger packages shall also be sealed to minimize leakage. The connecting plate edges shall be double-folded and internally sealed with a silicone free elastic resin to minimize leakage. The corners of assembled exchanger packages shall also be sealed to minimize leakage. Heat exchanger assemblies shall be able to withstand temperatures of 212 ^{o}F. Access to all four faces of exchangers shall be provided for cleaning and inspection. Drain pans shall be provided under each the supply and exhaust sides of the exchanger, with drain connections extending to the exterior of the unit base. Drain pans shall be stainless steel of the same construction as provided in other unit sections.

Corrosion Coating

To provide protection for installations in mildly corrosive environments the air-to-air plate exchanger plates shall have an Epoxy-phenol lacquer applied coating. The extrusions, endplates and all sheet metal surfaces of the plate exchanger are to be epoxy coated.

Frost Damper

Heat exchangers shall meet the leaving air temperature (LAT) as shown on the schedule while operating at the specified conditions and while operating in frost prevention mode. Frost prevention systems shall provide continuous output temperatures. Defrost systems with temperature swings due to defrost cycles will not be acceptable. Frost systems shall incorporate a partial face damper factory installed on the outside air side of the exchanger.

Bypass Dampers

Opposed blade face and bypass dampers shall be provided as indicated on the schedule and drawings to modulate the plate exchanger effectiveness. Dampers shall have the same construction as the double-skin airfoil design specified in mixing sections. Bypass shall be through the center of the exchanger and shall be capable of 100% bypass. Static pressure drop through the bypass shall be calculated at the maximum economizing airflow and shall not exceed the schedule values.

Performance

The heat exchanger shall be certified to ANSI/AHRI Standard 1060 and bear the AHRI 1060 label. Performance characteristics of the heat exchanger shall be provided as defined by AHRI 1060 definitions. The heat exchangers EATR shall be less than 1% as shown by AHRI certification. Heat exchanger face velocity shall not exceed 500 fpm and not exceed specified pressure drop. Performance shall match or exceed specified effectiveness. Condensate volume at design conditions shall be predicted by the air handling unit manufacturer.

EXHAUST DAMPER MODULE

An exhaust damper section shall be provided to support damper assemblies for exhaust air.

Exhaust Hood ** To Be Removed & Disposed of By MC In The Field **

Exhaust hoods are provided on exhaust air openings and equipped with bird screens to prevent nesting.
Refer to unit As-Built and Product Data section for specific information on which sections are supplied with an exhaust hood.

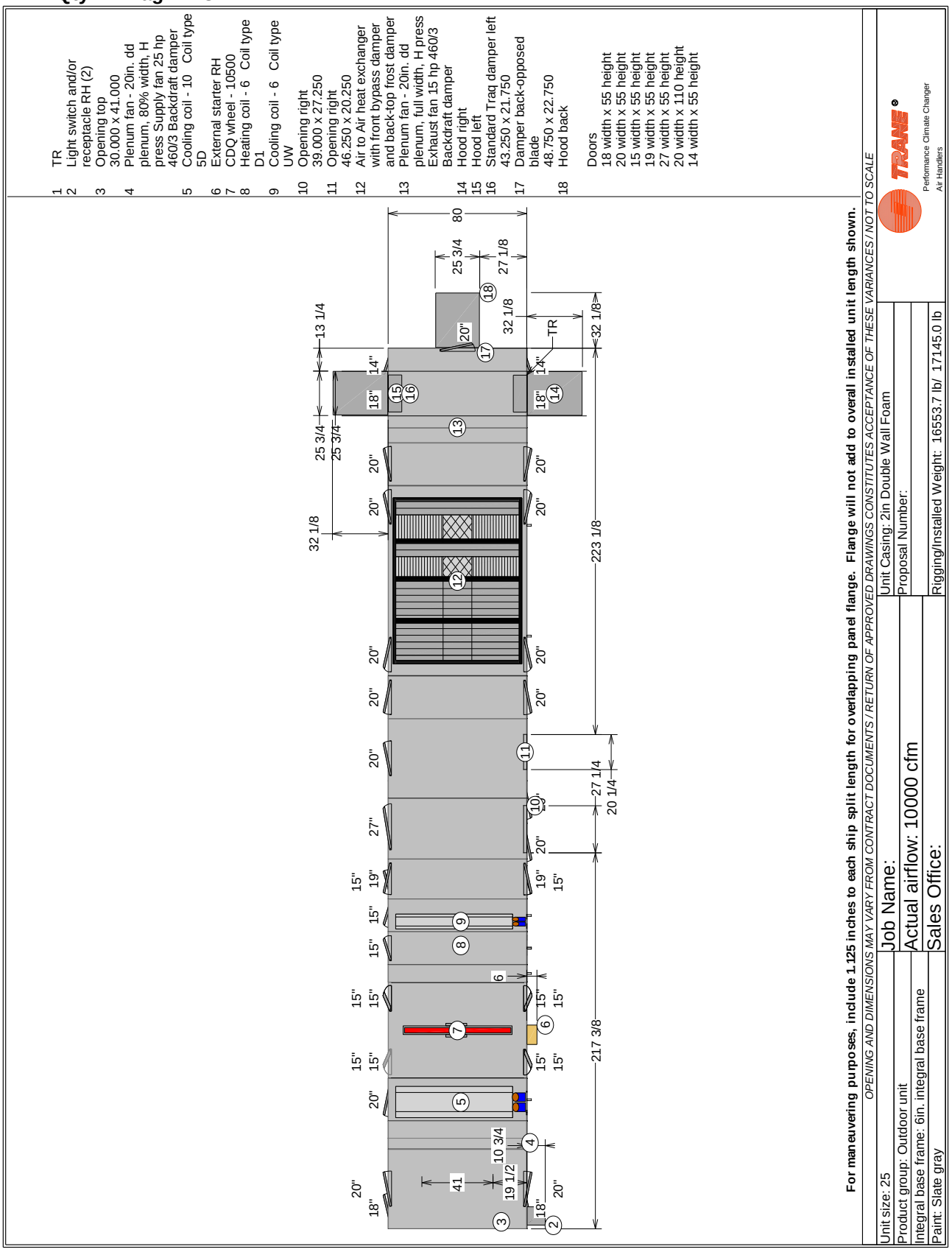
LIFTING INSTRUCTIONS

The air handling units must be rigged, lifted, and installed in strict accordance with the Installation, Operation, and Maintenance manual (CLCH-SVX07G-EN). The units are also to be installed in strict accordance with the specifications. Units may be shipped fully assembled or disassembled to the minimum functional section size in accordance with shipping and job site requirements.

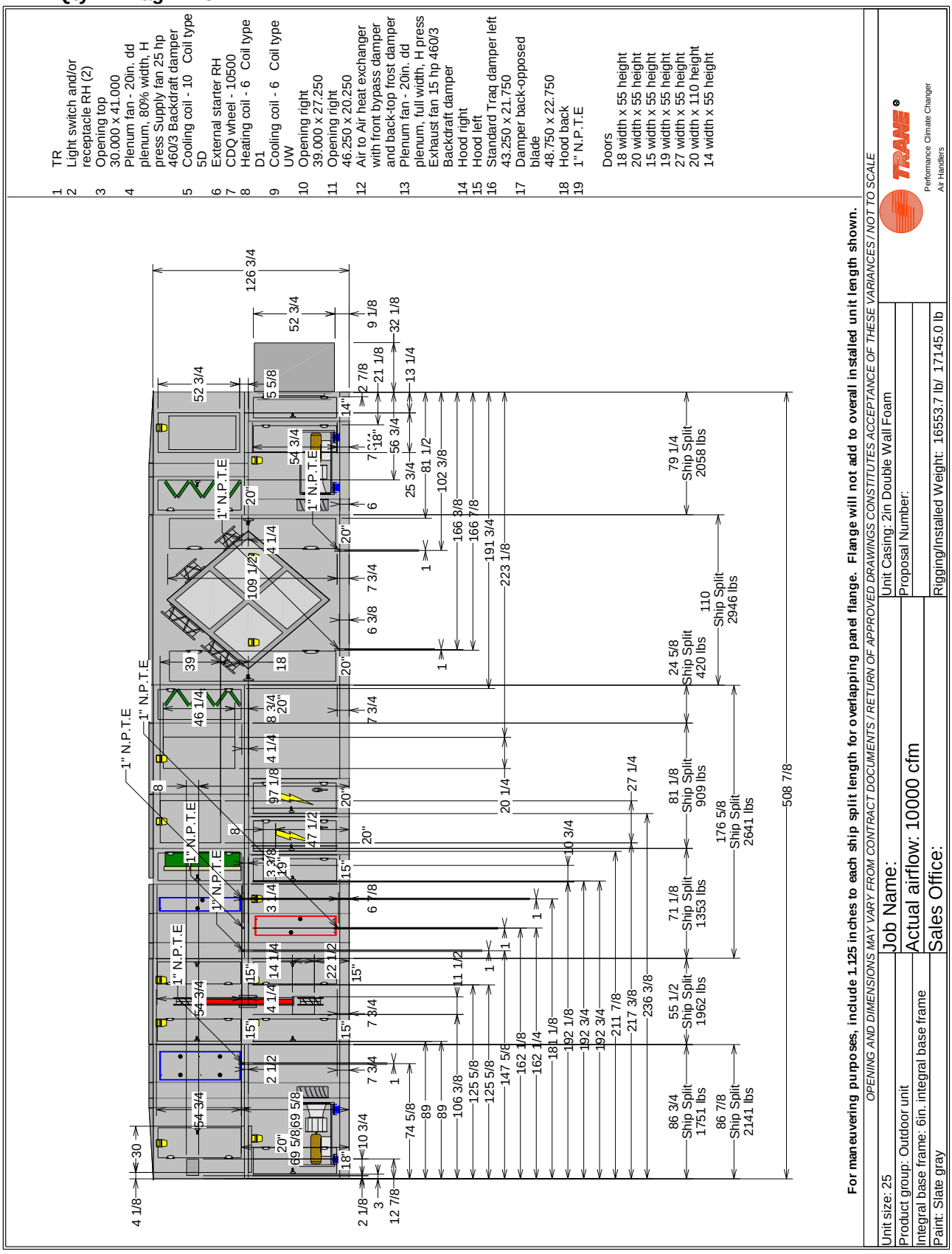
Outdoor units shall be shipped on 6" integral base frame for the purpose of mounting units on a roof curb or field-supplied pier support system. Refer to the Product Data section for type of the base frame provided (for roof curb or pier-mount).

All units will be shipped with an integral base frame designed with the necessary number of lift points for safe installation. All lifting lugs are to be utilized during lift. The lift points will be designed to accept standard rigging devices and be removable after installation. Units shipped in sections will have a minimum of four points of lift.

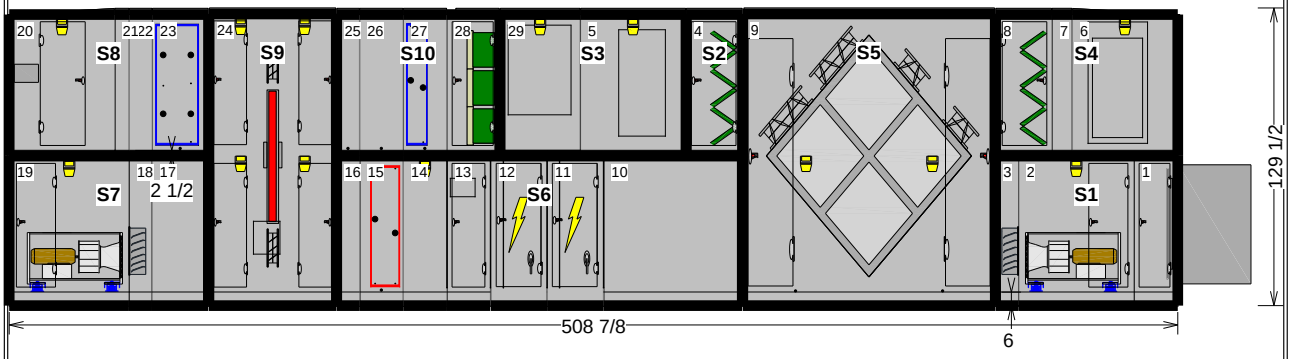
As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

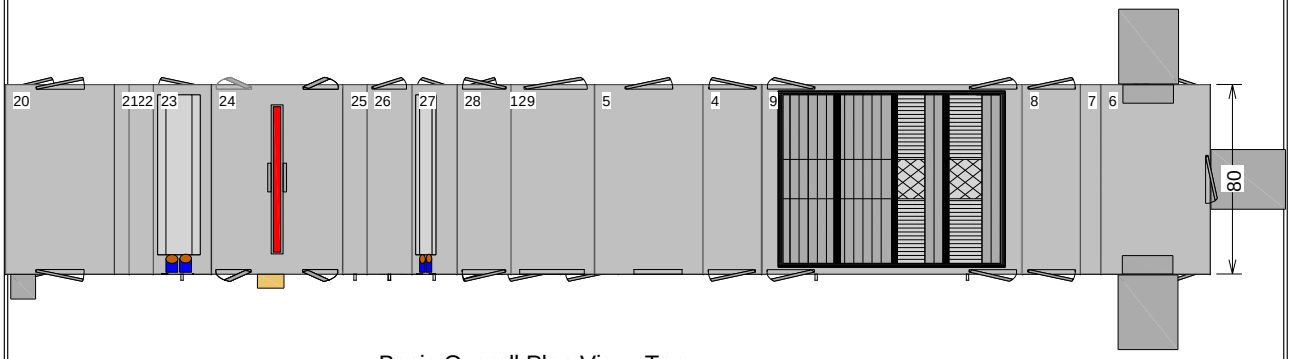


As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length sh

Pos #	Module	Length	Weight	Pos #	Module	Length	Weight
29	Discharge plenum	35 1/8	424.71	28	Filter section	23 1/8	278.84
2	Fan section	50 1/4	1632.23	5	Air mixing section	46 1/8	484.25
19	Fan section	52 1/4	1438.13	6	Air mixing section	46	622.80
3	Access section	10	116.80	11	Controls section	24 1/2	295.74
14	Access section	19	161.00	12	Controls section	24 1/2	308.38
16	Access section	10	116.80	13	Controls section	19	273.64
17	Access section	24 1/2	208.38	24	Wheel	55 1/2	1961.59
18	Access section	10	104.16	7	Custom length section	8 3/4	85.65
20	Access section	46	496.80	10	Custom length section	60 1/2	505.25
22	Access section	10	119.95	21	Custom length section	6 3/8	62.45
25	Access section	10	119.95	1	Exhaust fan damper section	19	308.67
26	Access section	19	187.03	9	Air to air section	110	2945.98
15	Coil section	19	980.20			Installed Unit Weight	17309.17 lbs
23	Coil section	24 1/2	1461.42				
27	Coil section	19	767.53				
4	Filter section	24 5/8	420.42				
8	Filter section	24 1/2	420.42				

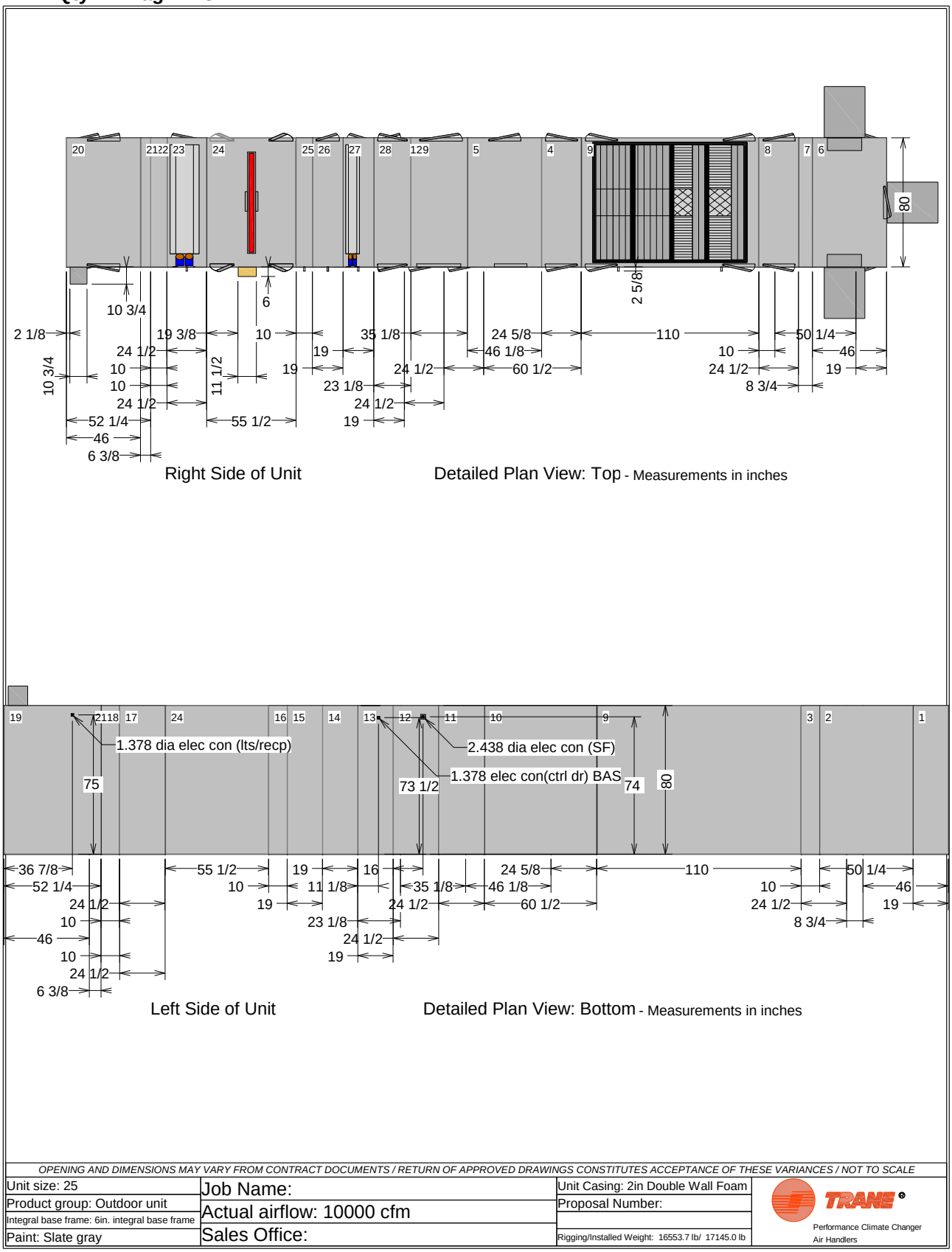


Basic Overall Plan View: Top - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 25	Job Name:	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Outdoor unit	Actual airflow: 10000 cfm	Proposal Number:	
Integral base frame: 6in. integral base frame			
Paint: Slate gray	Sales Office:	Rigging/Installed Weight: 16553.7 lb/ 17145.0 lb	

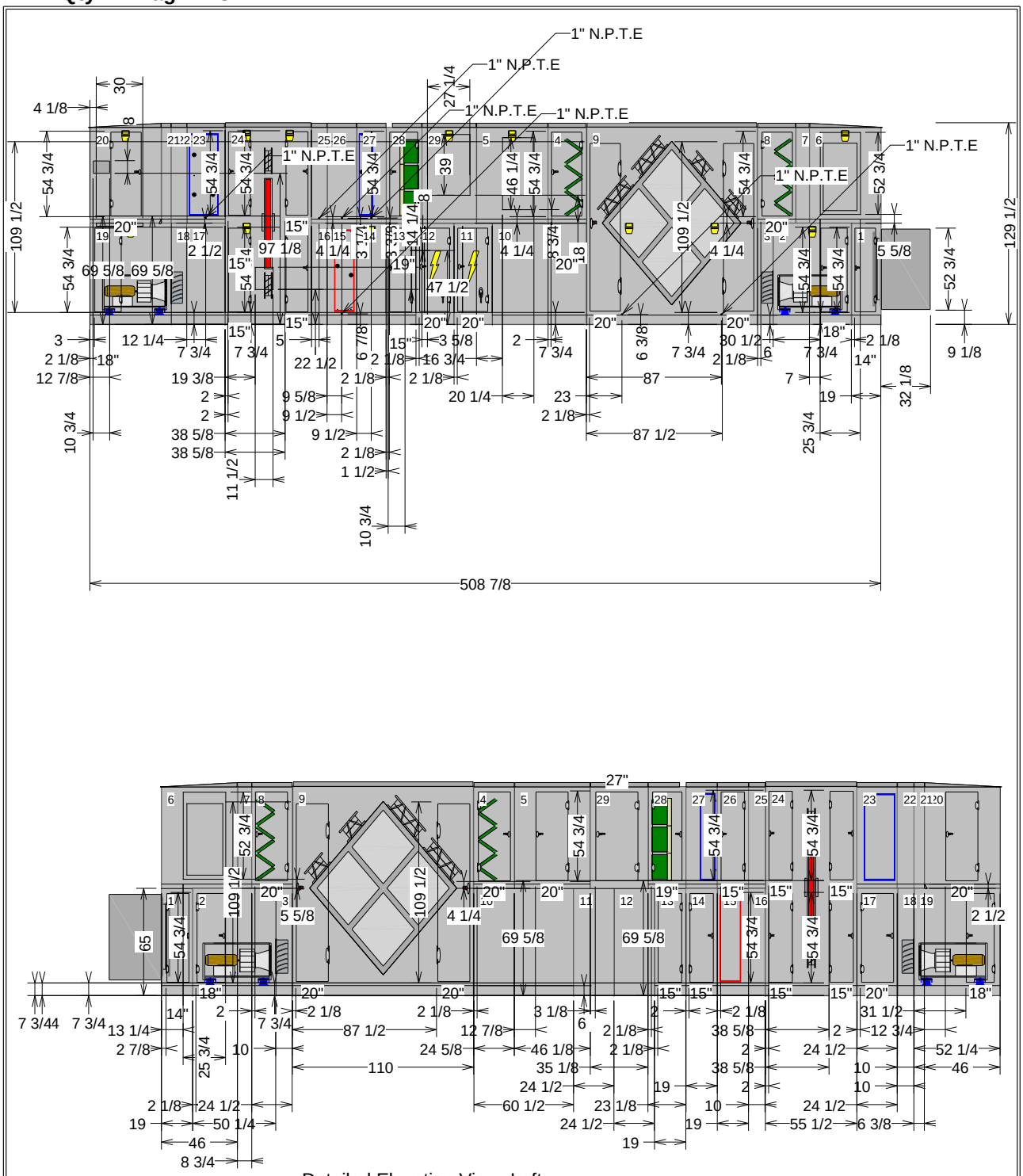
As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 25	Job Name:	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Outdoor unit	Actual airflow: 10000 cfm	Proposal Number:	
Integral base frame: 6in. integral base frame			
Paint: Slate gray	Sales Office:	Rigging/Installed Weight: 16553.7 lb/ 17145.0 lb	

As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

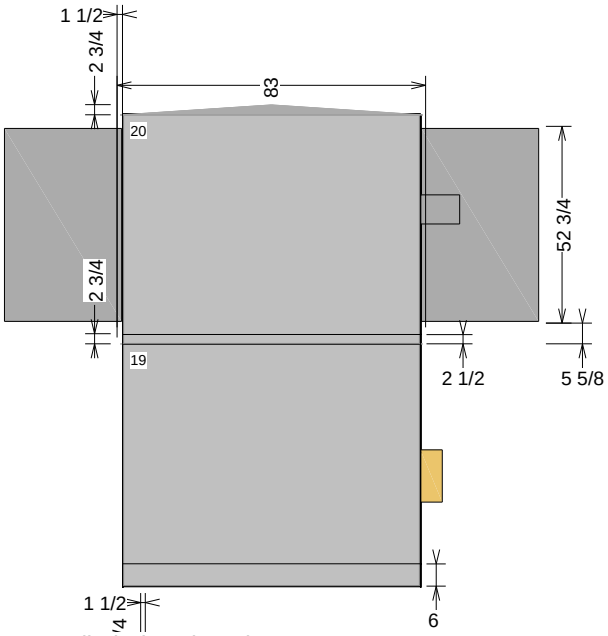


Detailed Elevation View: Left - Measurements in inches

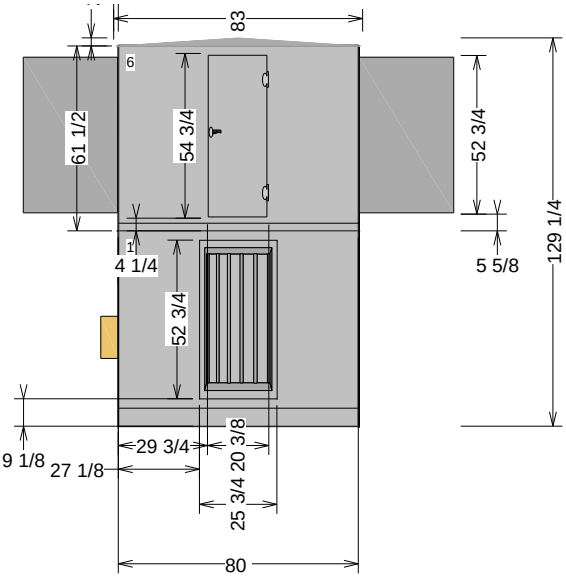
OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 25	Job Name:	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Outdoor unit	Actual airflow: 10000 cfm	Proposal Number:	
Integral base frame: 6in. integral base frame			
Paint: Slate gray	Sales Office:	Rigging/Installed Weight: 16553.7 lb/ 17145.0 lb	

As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



Detailed Elevation View: Front - Measurements in inches

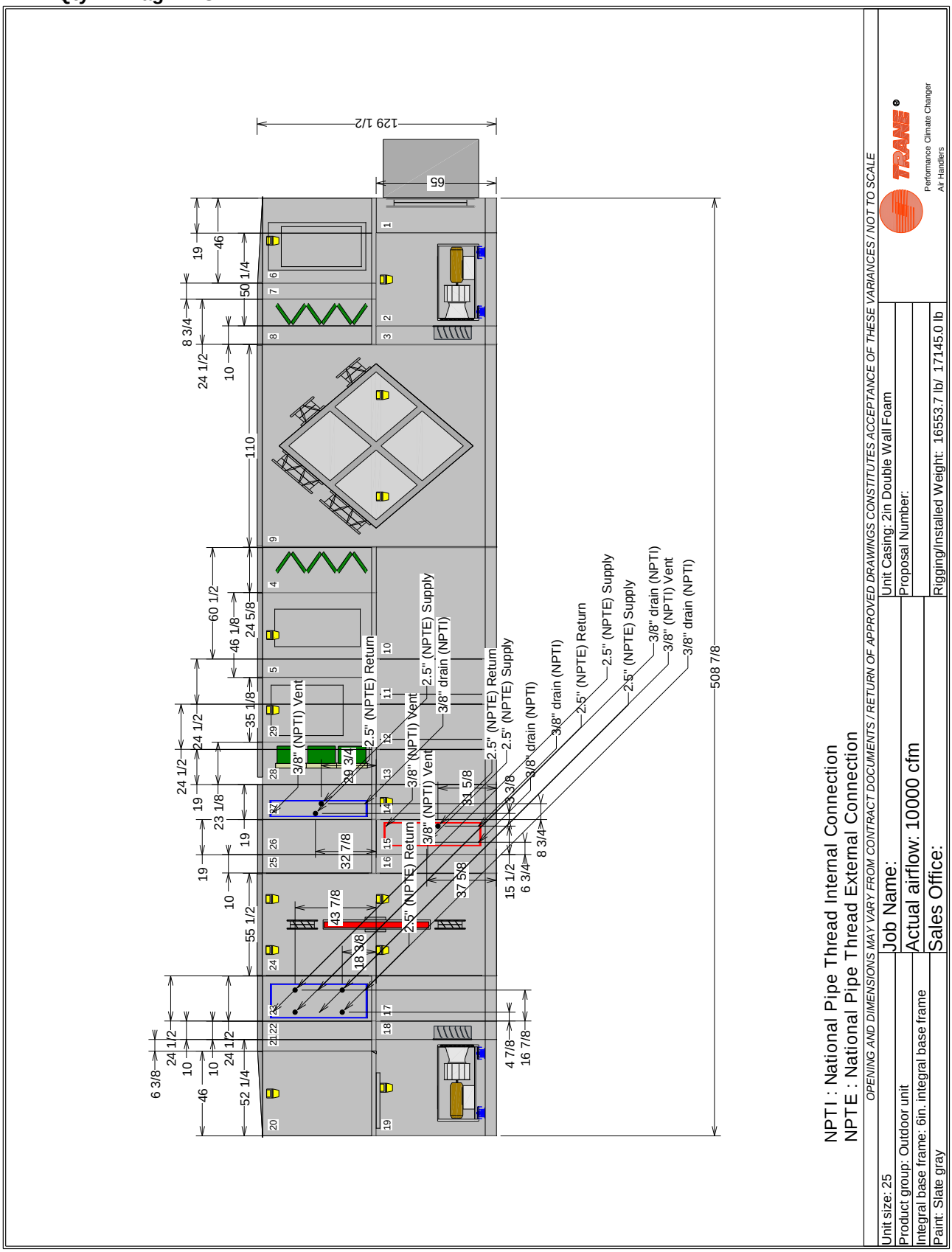


Detailed Elevation View: Back - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 25	Job Name:	Unit Casing: 2in Double Wall Foam	TRANE Performance Climate Changer Air Handlers
Product group: Outdoor unit		Proposal Number:	
Integral base frame: 6in. integral base frame	Actual airflow: 10000 cfm		
Paint: Slate gray	Sales Office:	Rigging/Installed Weight: 16553.7 lb/ 17145.0 lb	

As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

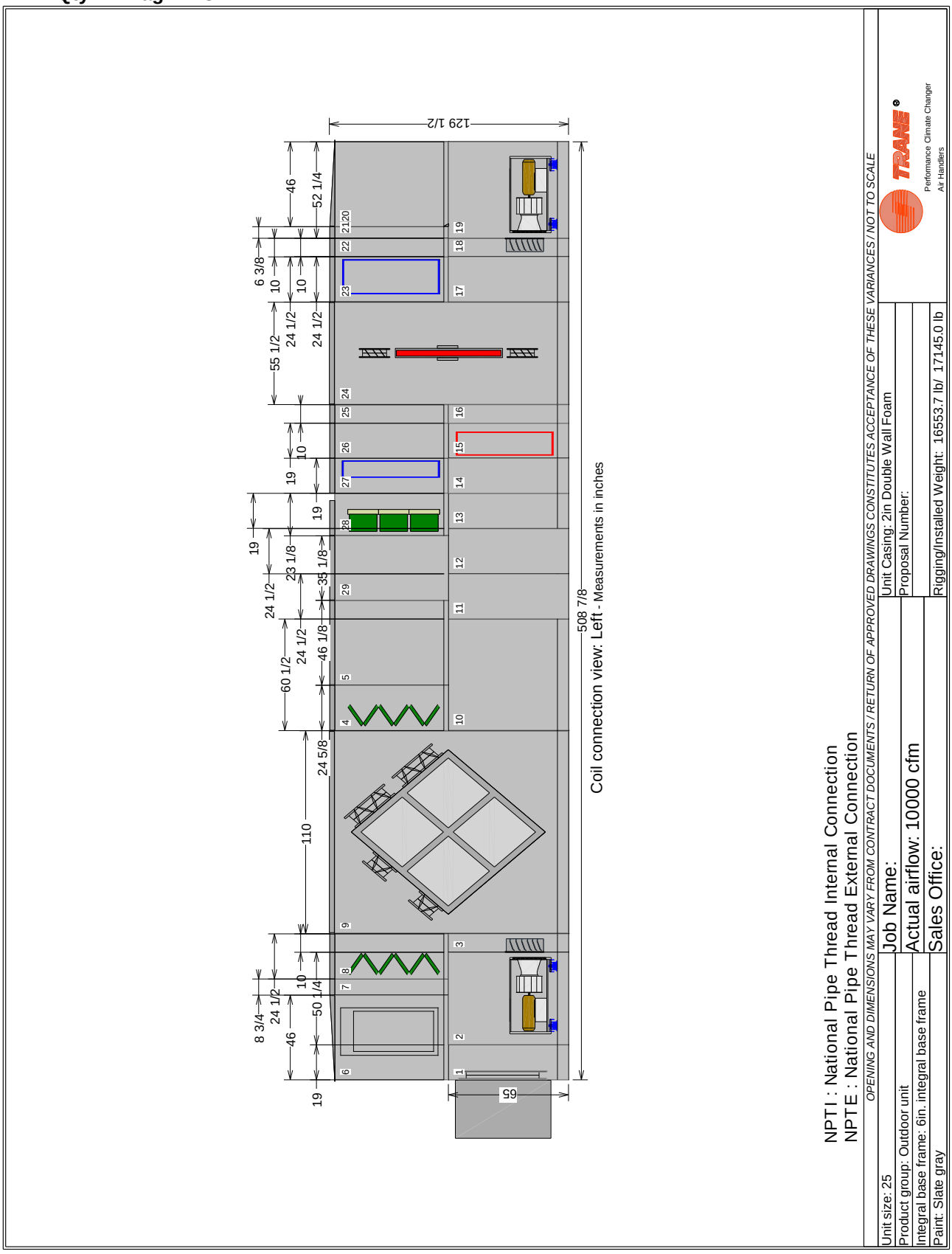
Unit size: 25
Product group: Outdoor unit
Integral base frame: 6in. integral base frame
Paint: Slate gray

Job Name:
Actual airflow: 10000 cfm
Sales Office:

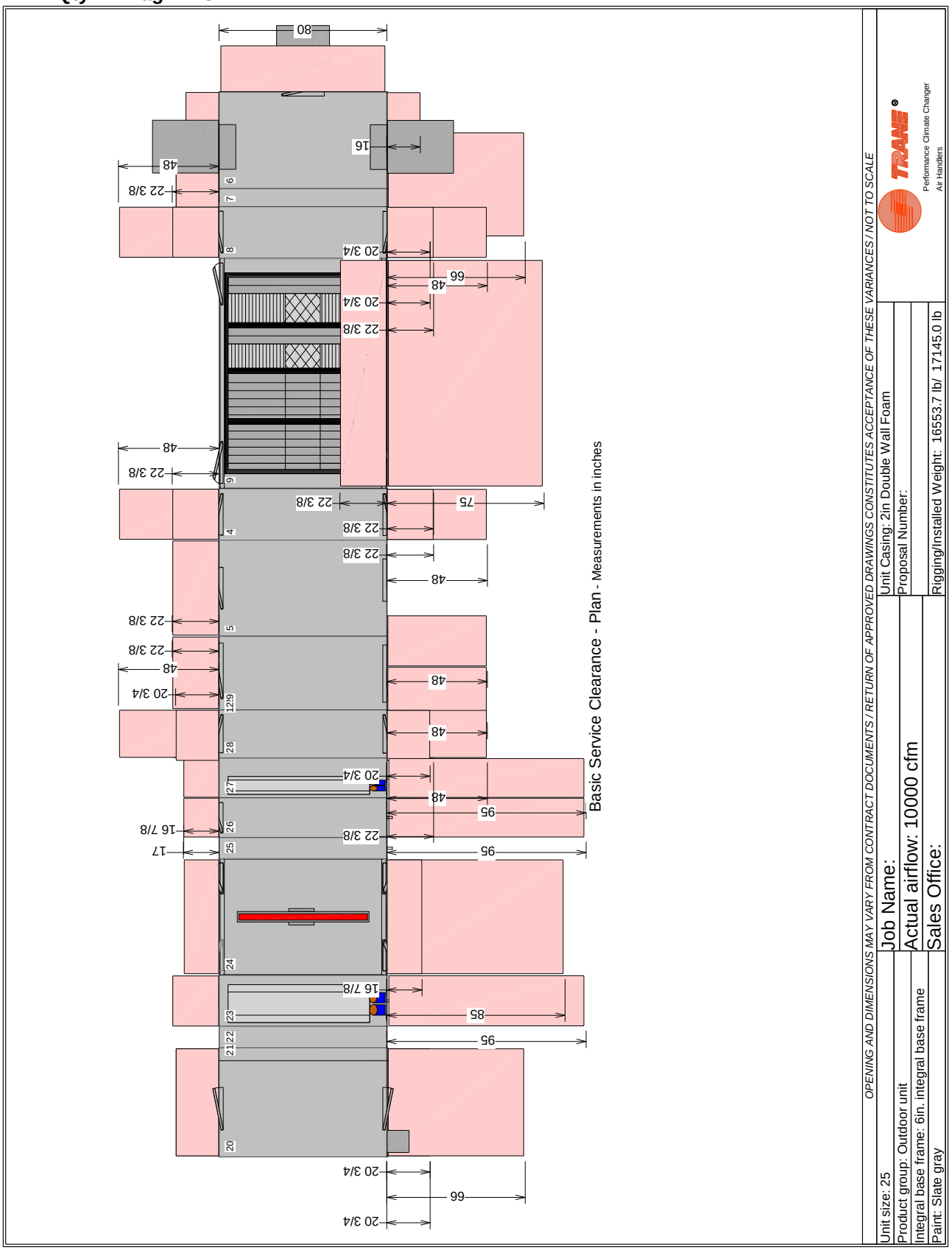
Unit Casing: 2in Double Wall Foam
Proposal Number:
Rigging/Installed Weight: 16553.7 lb/ 17145.0 lb

TRANE
Performance Climate Changer
Air Handlers

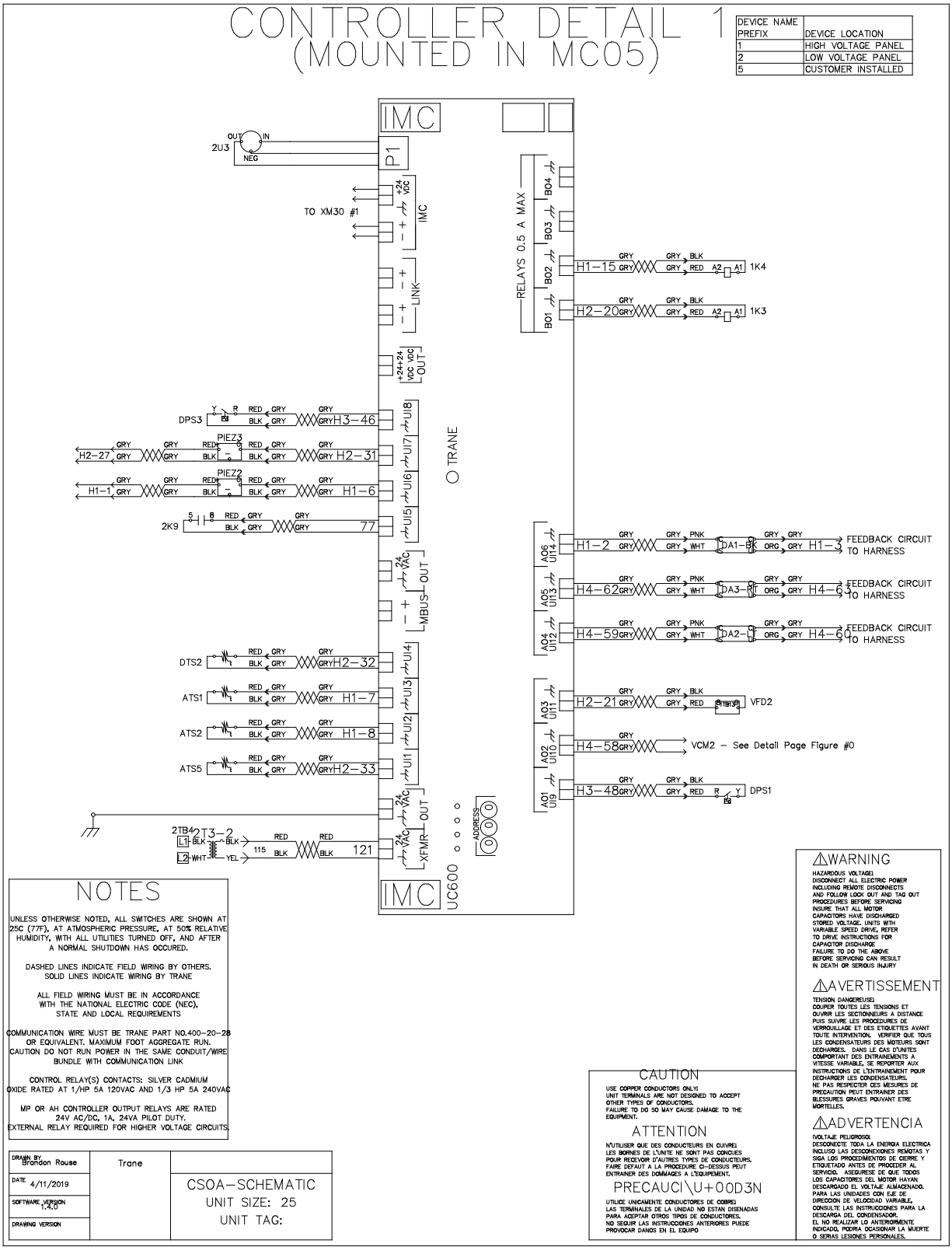
As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



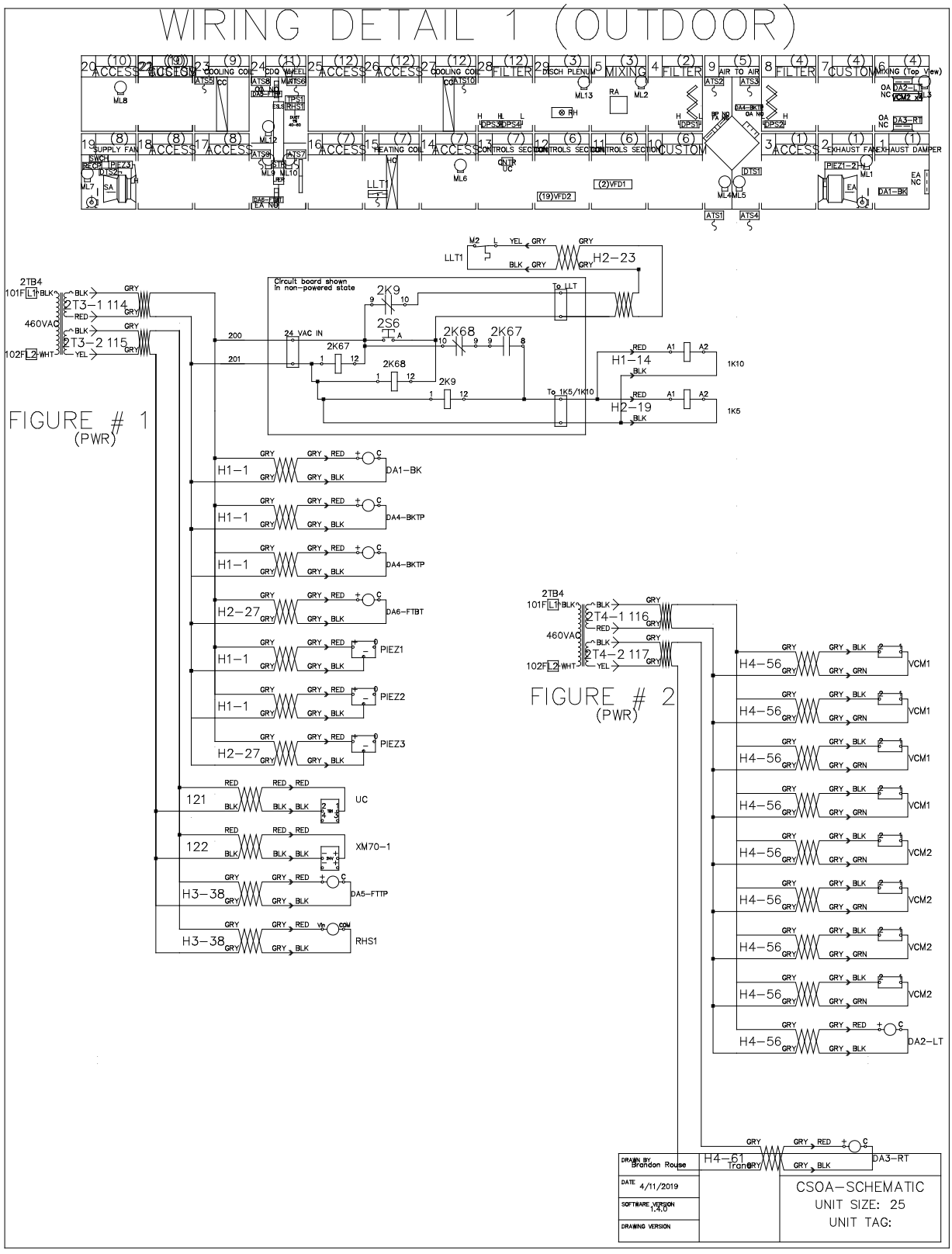
As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



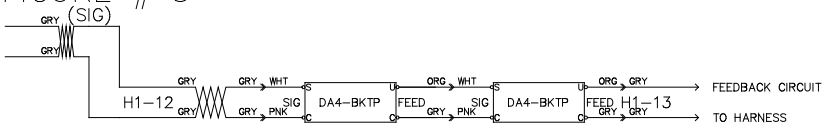
As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

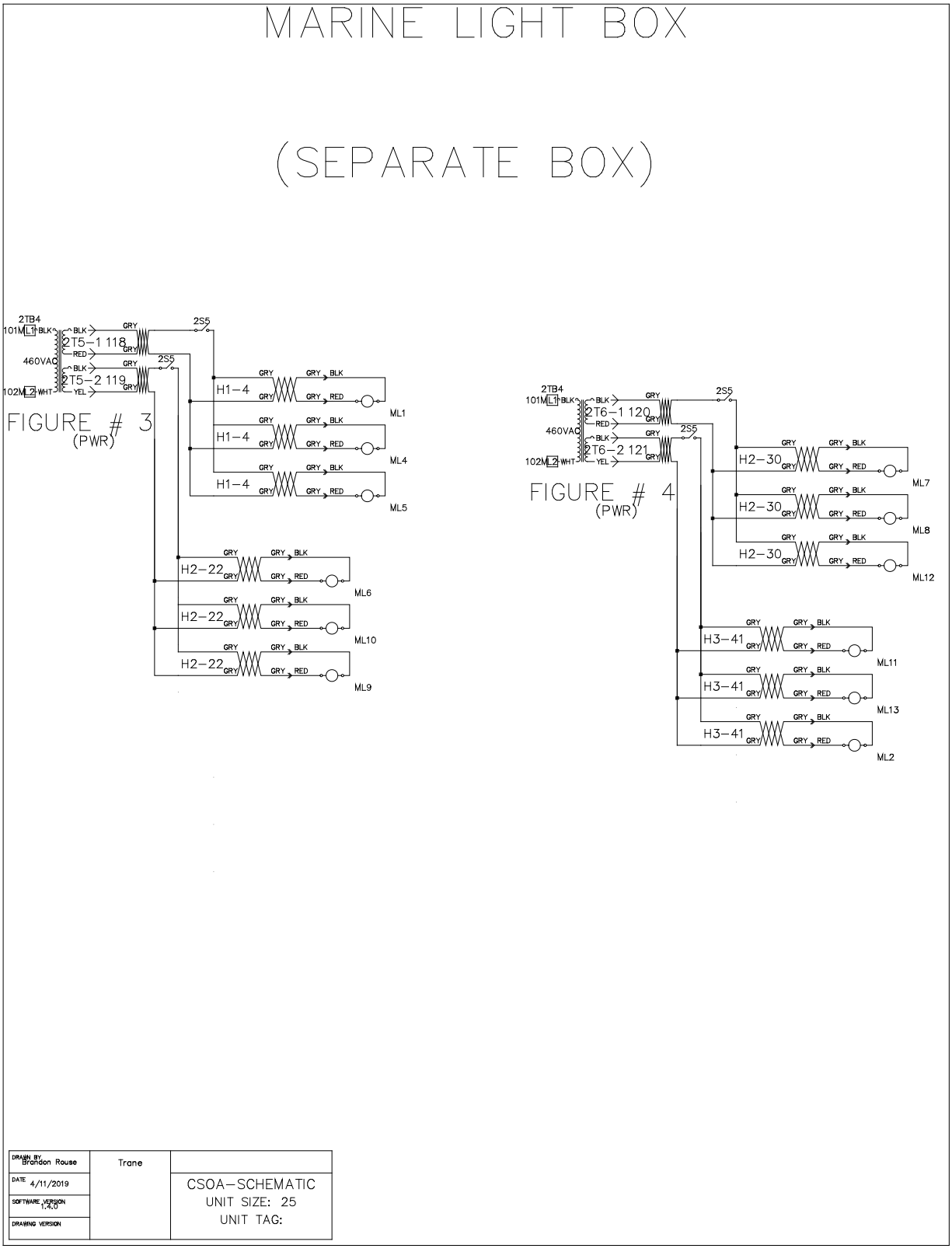
WIRING DETAIL 2 (OUTDOOR)

FIGURE # 3

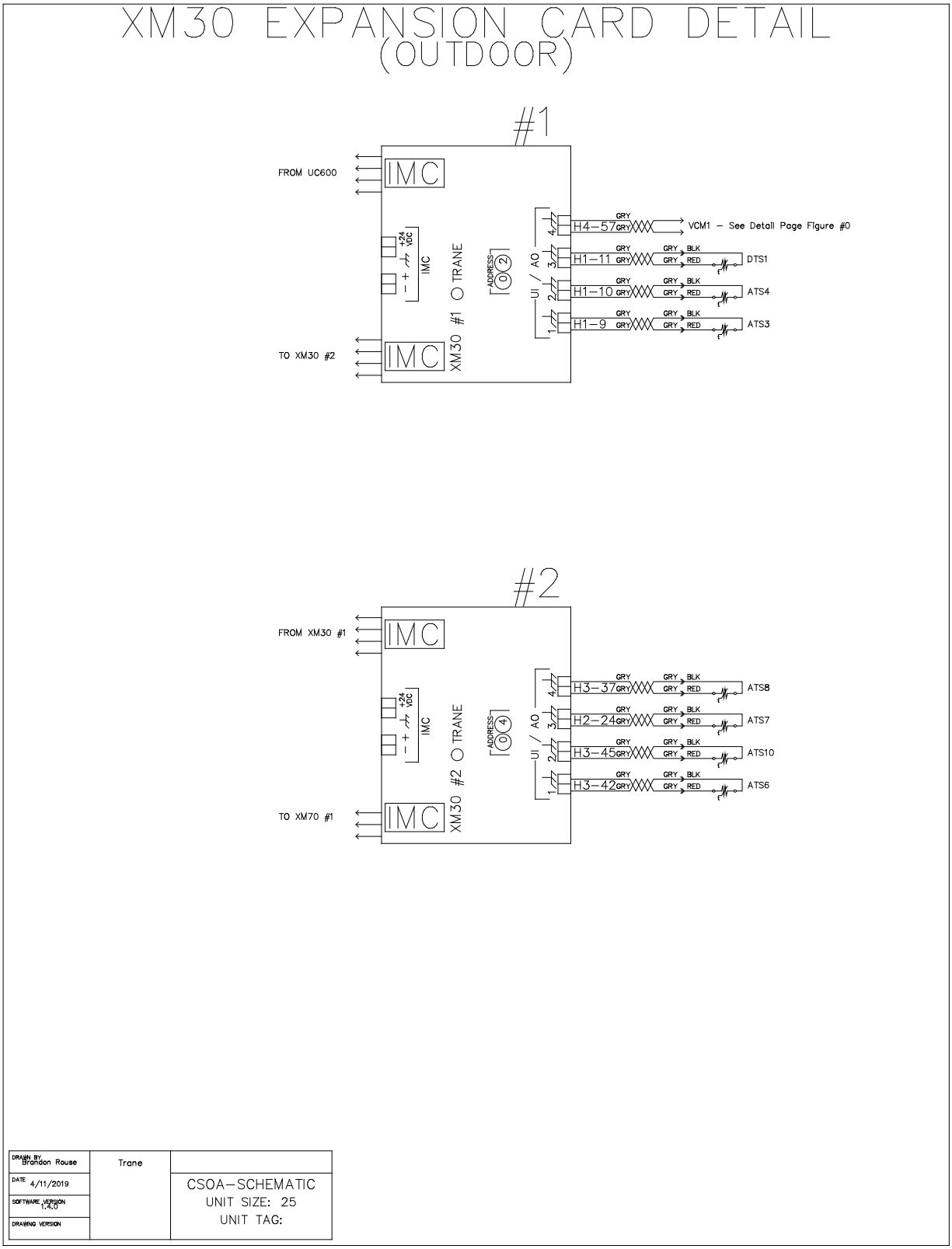


DRAWN BY Brandon Rouse	Trane	
DATE 4/11/2019		CSOA–SCHEMATIC
SOFTWARE VERSION 1.4.0		UNIT SIZE: 25
DRAWING VERSION		UNIT TAG:

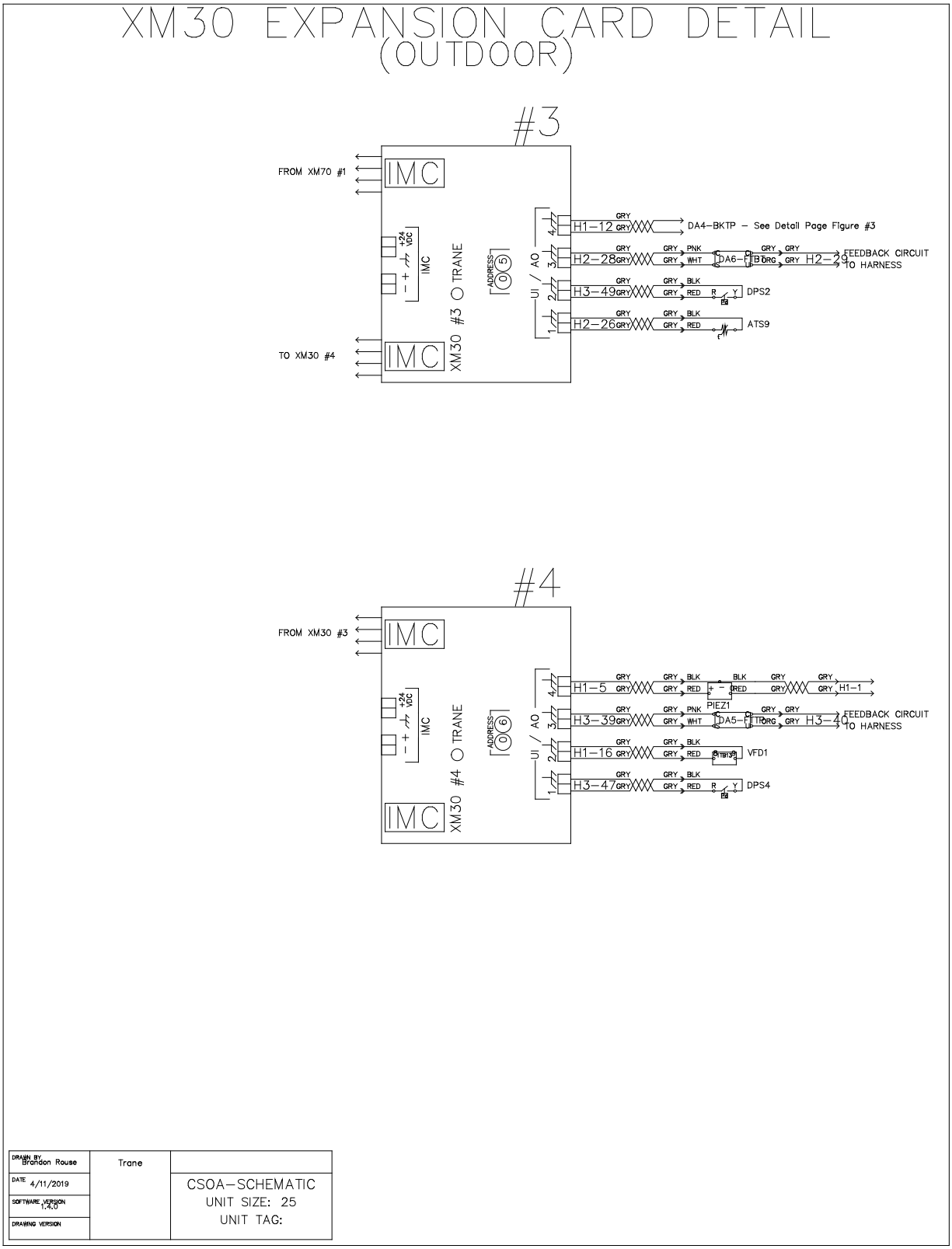
As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



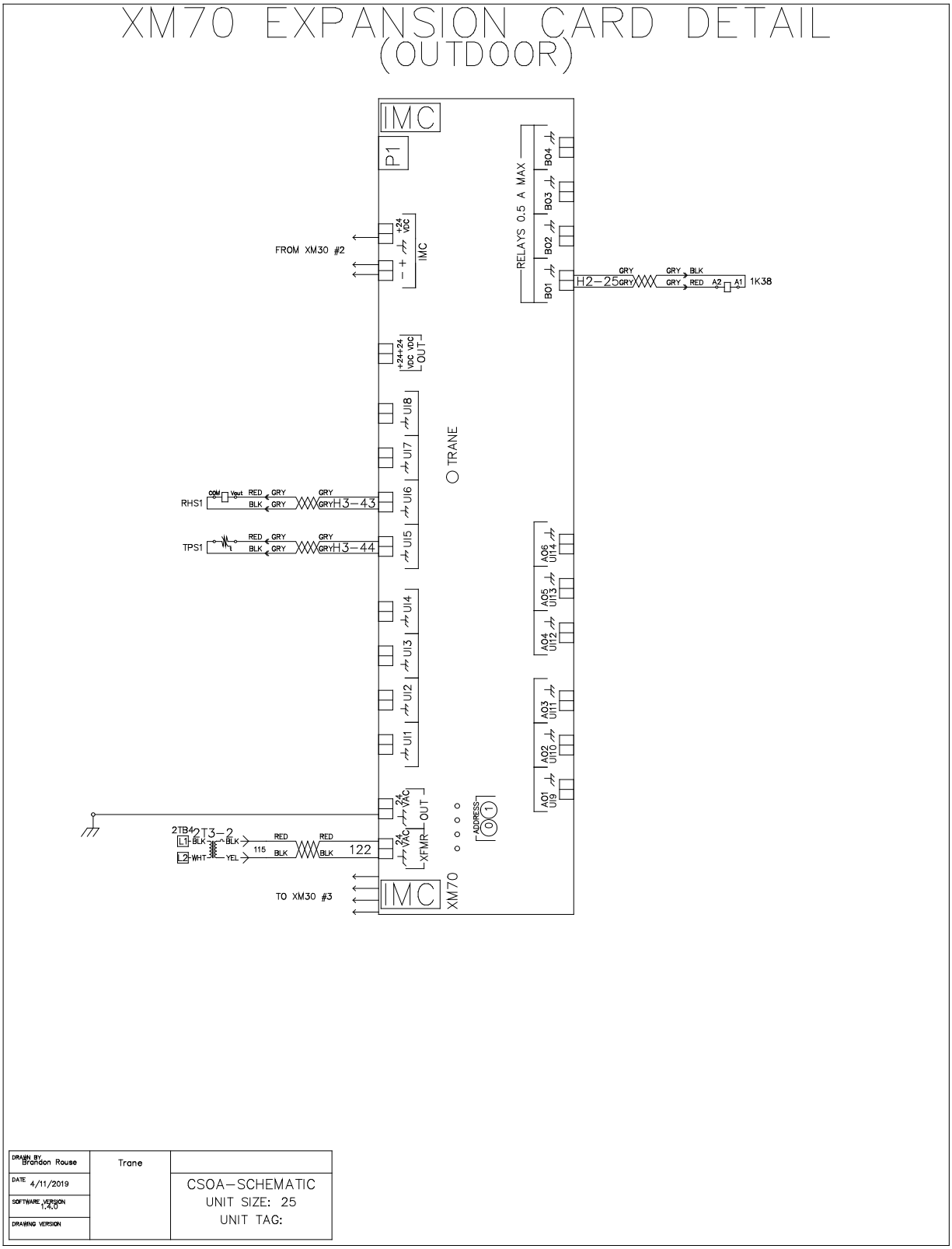
As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

LEGEND DETAIL 1 (OUTDOOR)

POS#	DESCRIPTION	PT	LABEL	PWR HR-WIRE	SIGNAL HR-WIRE	XFMR	POWER VA
0	150VA TRANSFORMER		2T3				
0	150VA TRANSFORMER		2T4				
0	150VA TRANSFORMER		2T5				
0	150VA TRANSFORMER		2T6				
0	150VA TRANSFORMER		2T7				
0	Remote Touch Screen LCD (S/W)		LCD1			2T3-1	5
0	Duct Static Pressure Local	P1	2U3				
0	UC600 Controller		UC	121		2T3-2	26
0	XM30 Expansion module		XM30-1				
0	XM30 Expansion module		XM30-2				
0	XM30 Expansion module		XM30-3				
0	XM30 Expansion module		XM30-4				
0	XM70 Expansion module		XM70-1	122		2T3-2	26
1	Fan Damper Actuator	AO6	DA1-BK	H1-1	H1-2	2T3-1	10
2	Marine Light		ML1	H1-4		2T5-1	22
2	Flow meter	UI30	PIEZ1	H1-1	H1-5	2T3-1	2
2	Flow meter	UI6	PIEZ2	H1-1	H1-6	2T3-1	2
4	Dirty Filter Switch	UI9	DPS1		H3-48		
5	Marine Light		ML2	H3-41		2T6-2	22
6	Marine Light		ML3	H4-55		2T7-1	22
6	Ventilation Control Module	UI18	VCM1	H4-56	H4-57	2T4-1	32
6	Ventilation Control Module	UI10	VCM2	H4-56	H4-58	2T4-1	32
6	Left Damper Actuator	AO4	DA2-LT	H4-56	H4-59	2T4-1	10
6	Right Damper Actuator	AO5	DA3-RT	H4-61	H4-62	2T4-2	10
8	Dirty Filter Switch	UI24	DPS2		H3-49		
9	Supply Averaging Temperature Sensor (1K PT)	UI3	ATS1		H1-7		
9	Return Averaging Temperature Sensor (1K PT)	UI2	ATS2		H1-8		
9	Outside Averaging Temperature Sensor (1K PT)	UI15	ATS3		H1-9		
9	Exhaust Averaging Temperature Sensor (1K PT)	UI16	ATS4		H1-10		
9	Frost Control Temperature Sensor (10K Type 2)	UI17	DTS1		H1-11		
9	1st Level Front Marine Light		ML4	H1-4		2T5-1	22
9	1st Level Back Marine Light		ML5	H1-4		2T5-1	22
9	Frost Damper Actuator	AO18	DA4-BKTP	H1-1	H1-12	2T3-1	20
11	Return/Exhaust Fan Low Limit Circuit Relay		1K10	H1-14		2T3-1	1
11	Return/Exhaust Fan S/S	BO2	1K4		H1-15		
11	Return/Exhaust Fan Speed	AO20	VFD1		H1-16		
12	Supply Fan Low Limit Circuit Relay		1K5	H2-19		2T3-1	1
12	Supply Fan S/S	BO1	1K3		H2-20		
12	Supply Fan Speed	AO3	VFD2		H2-21		
13	Low Limit Reset Circuit Relay	UI5	2K9		77	2T3-1	2
14	Marine Light		ML6	H2-22		2T5-2	22
15	Low Limit (Leaving)		LLT1		H2-23	2T3-1	
19	Marine Light		ML7	H2-30		2T6-1	22
19	Flow meter	UI7	PIEZ3	H2-27	H2-31	2T3-1	2
19	Discharge Air Sensor (10K Type 2)	UI4	DTS2		H2-32		
20	Marine Light		ML8	H2-30		2T6-1	22
23	Averaging Temperature Sensor (1K PT)	UI1	ATS5		H2-33		
24	Return Marine Light		ML10	H2-22		2T5-2	22
24	Return Averaging Temperature Sensor (1K PT)	UI21	ATS7		H2-24		
24	Exhaust Marine Light		ML9	H2-22		2T5-2	22

CONTINUED ON LEGEND PAGE 2

DRAWN BY Brandon Rouse	Trane	
DATE 4/11/2019		CSOA-SCHEMATIC
SOFTWARE VERSION 1.4.0		UNIT SIZE: 25
DRAWING VERSION		UNIT TAG:

As-Built - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

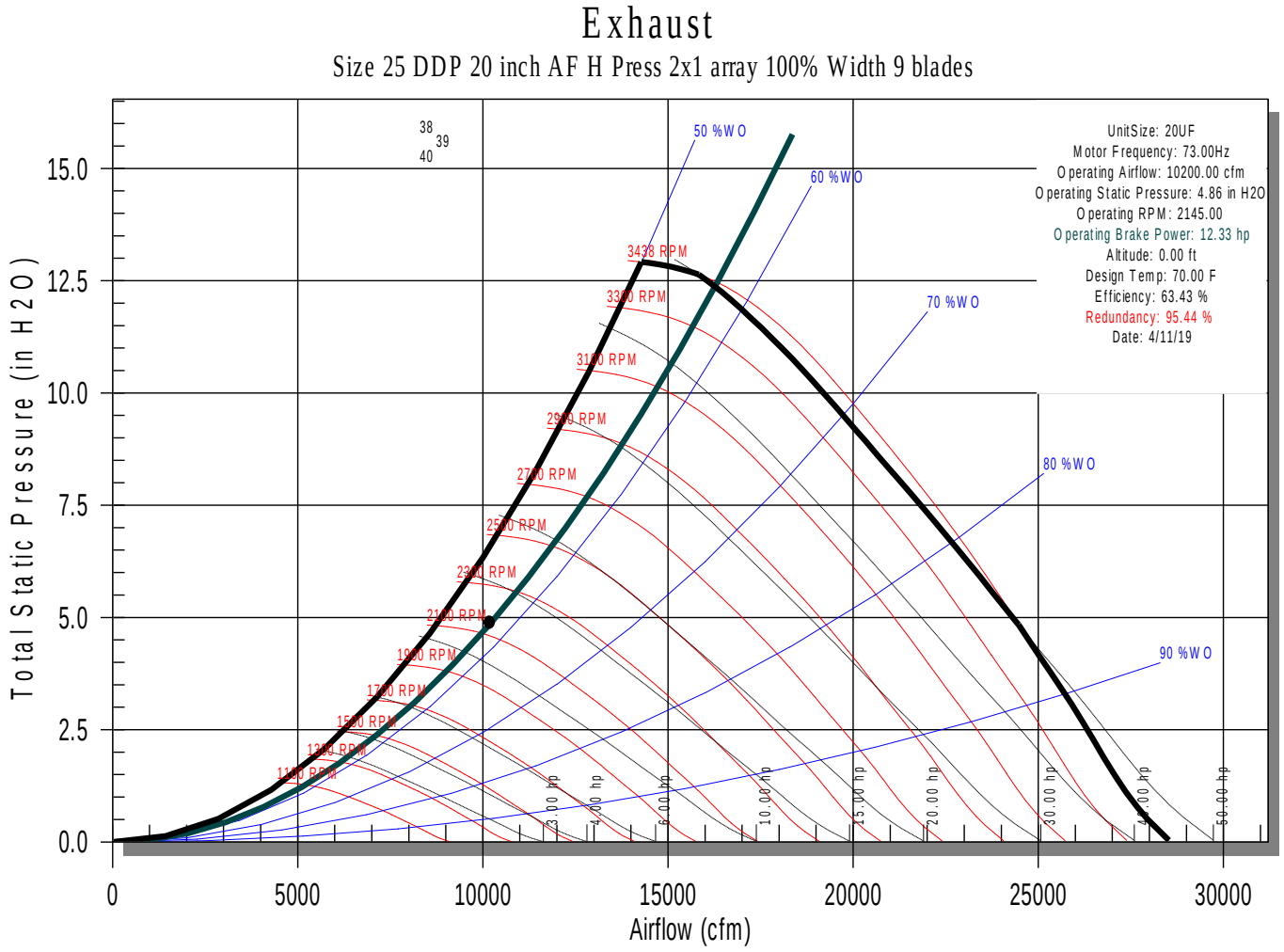
LEGEND DETAIL 2 (OUTDOOR)

CONTINUED FROM LEGEND PAGE 1

POS#	DESCRIPTION	PT	LABEL	PWR HR-WIRE	SIGNAL HR-WIRE	XFMR	POWER VA
24	CDQ S/S	BO9	1K38		H2-25		
24	Exhaust Averaging Temperature Sensor (1K PT)	UI23	ATS9		H2-26		
24	Regeneration Damper Actuator	AO17	DA6-FTBT	H2-27	H2-28	2T3-1	10
24	Outside Marine Light		ML12	H2-30		2T6-1	22
24	Outside Averaging Temperature Sensor (1K PT)	UI22	ATS8		H3-37		
24	Supply Damper Actuator	AO21	DA5-FTTP	H3-38	H3-39	2T3-2	10
24	Supply Marine Light		ML11	H3-41		2T6-2	22
24	Supply Averaging Temperature Sensor (1K PT)	UI19	ATS6		H3-42		
24	Leaving Supply Relative Humidity Sensor (RHS 1% 40-60)	UI40	RHS1	H3-38	H3-43	2T3-2	1
24	Leaving Supply Temperature Sensor (RHS)	UI39	TPS1		H3-44		
27	Averaging Temperature Sensor (1K PT)	UI20	ATS10		H3-45		
28	Dirty Filter Switch	UI8	DPS3		H3-46		
28	Dirty Filter Switch	UI27	DPS4		H3-47		
29	Marine Light		ML13	H3-41		2T6-2	22

DRAWN BY Brandon Rouse	Trane	
DATE 4/11/2019		CSOA-SCHEMATIC
SOFTWARE VERSION 1.4.0		UNIT SIZE: 25
DRAWING VERSION		UNIT TAG:

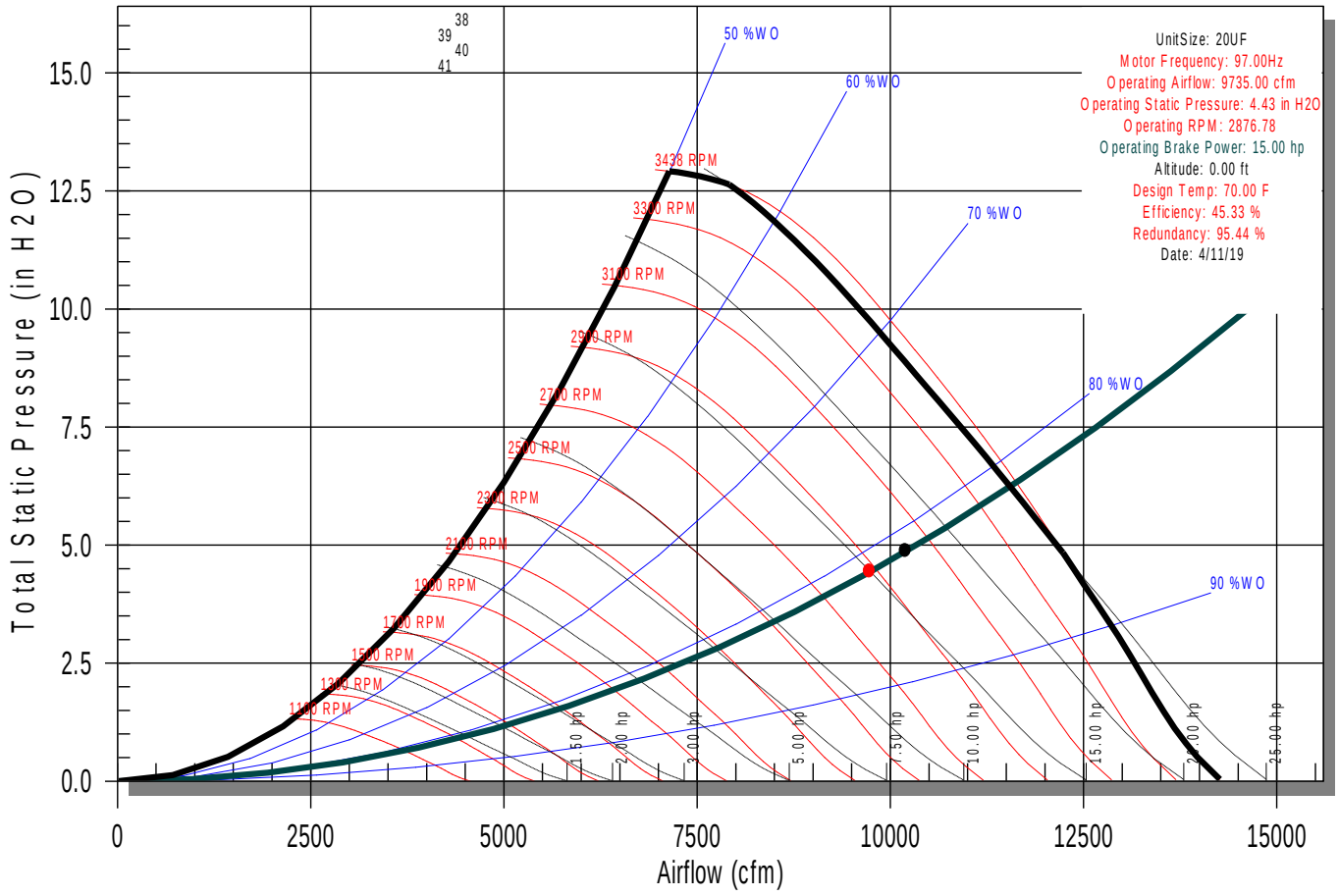
Fan Curve - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



Fan Curve - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Exhaust

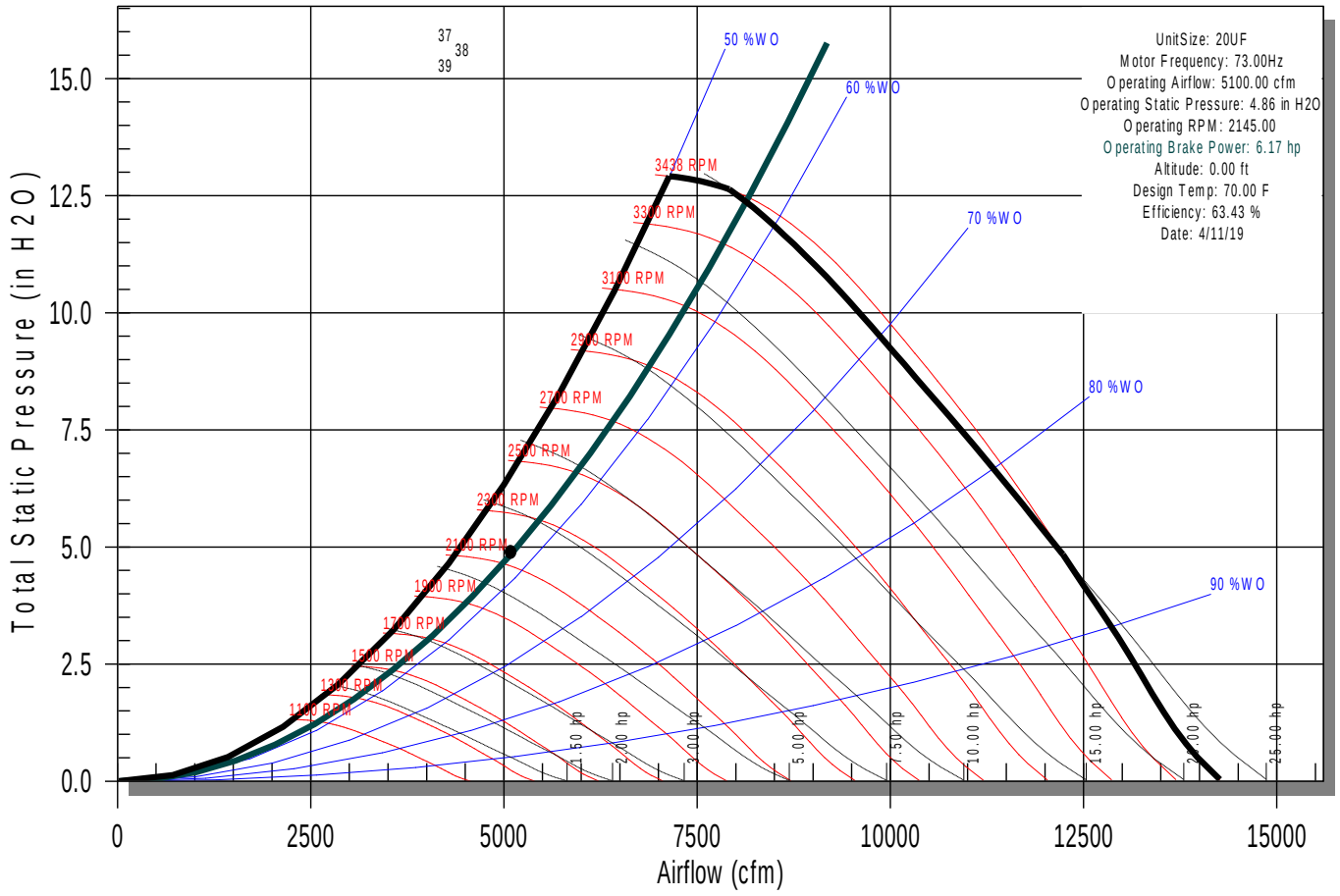
Size 25 DDP 20 inch AF H Press 2x1 array 100% Width 9 blades - 1 Fan Down



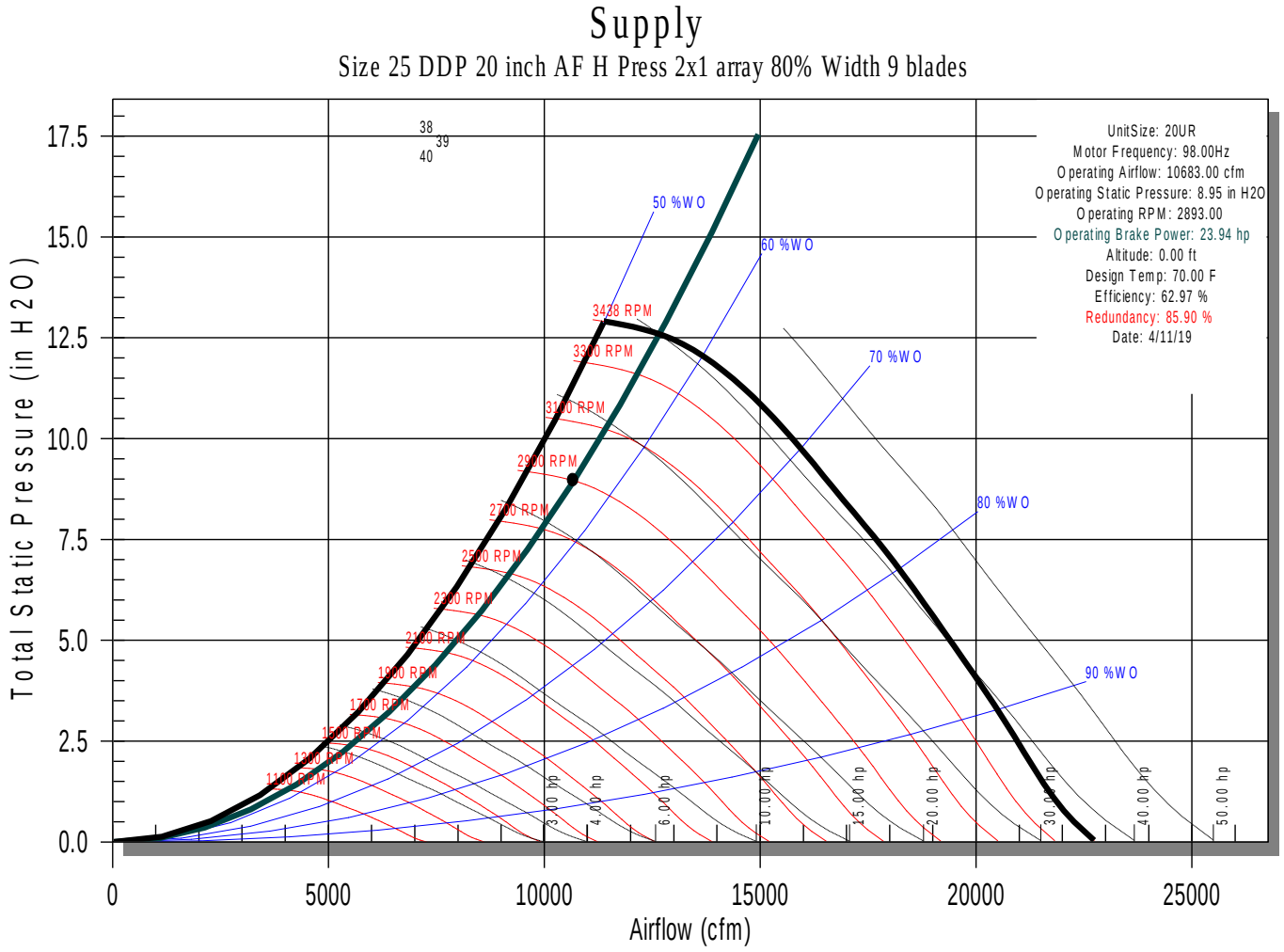
Fan Curve - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Exhaust

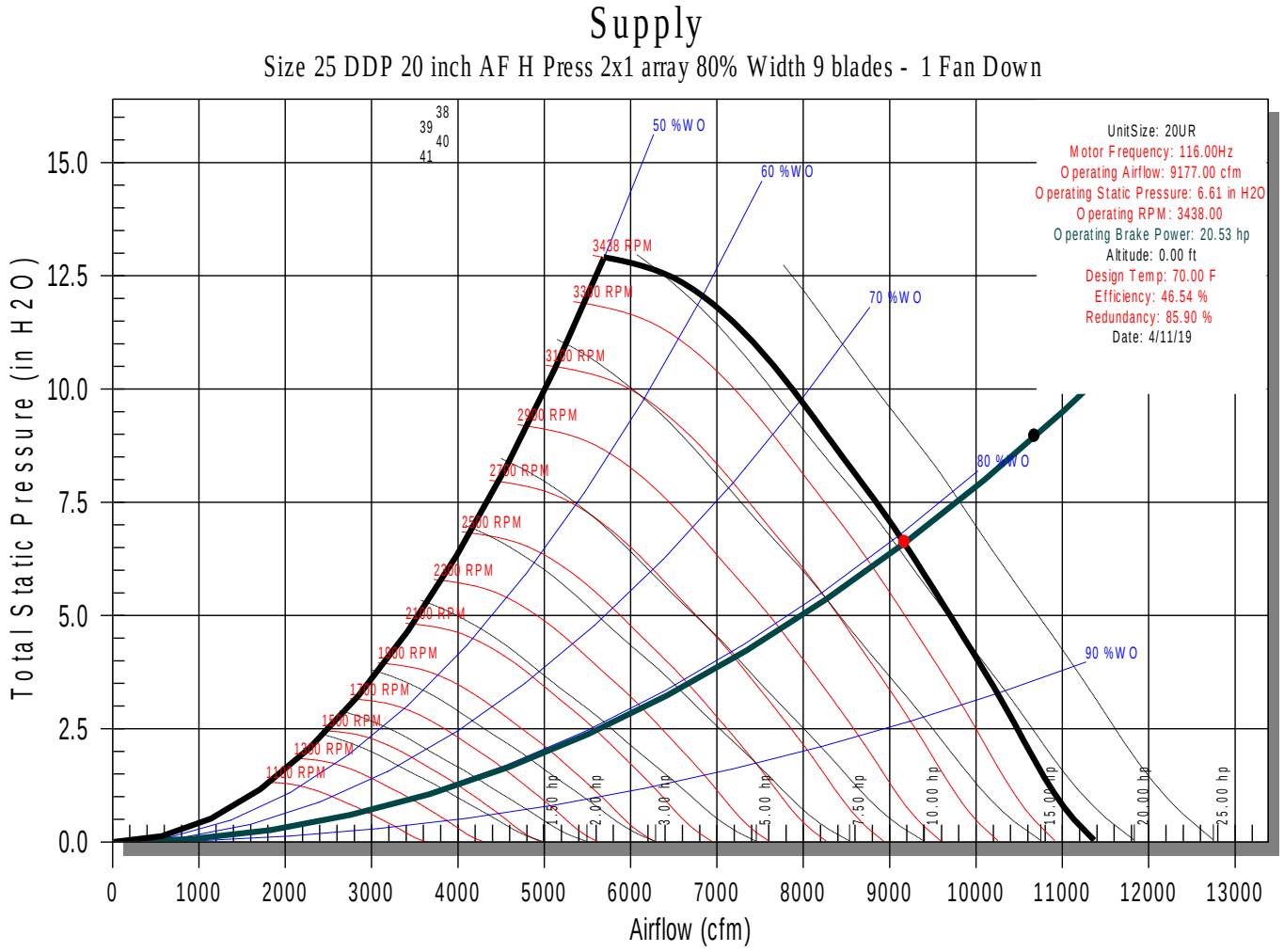
Size 25 DDP 20 inch AF H Press 2x1 array 100% Width 9 blades - Single Fan



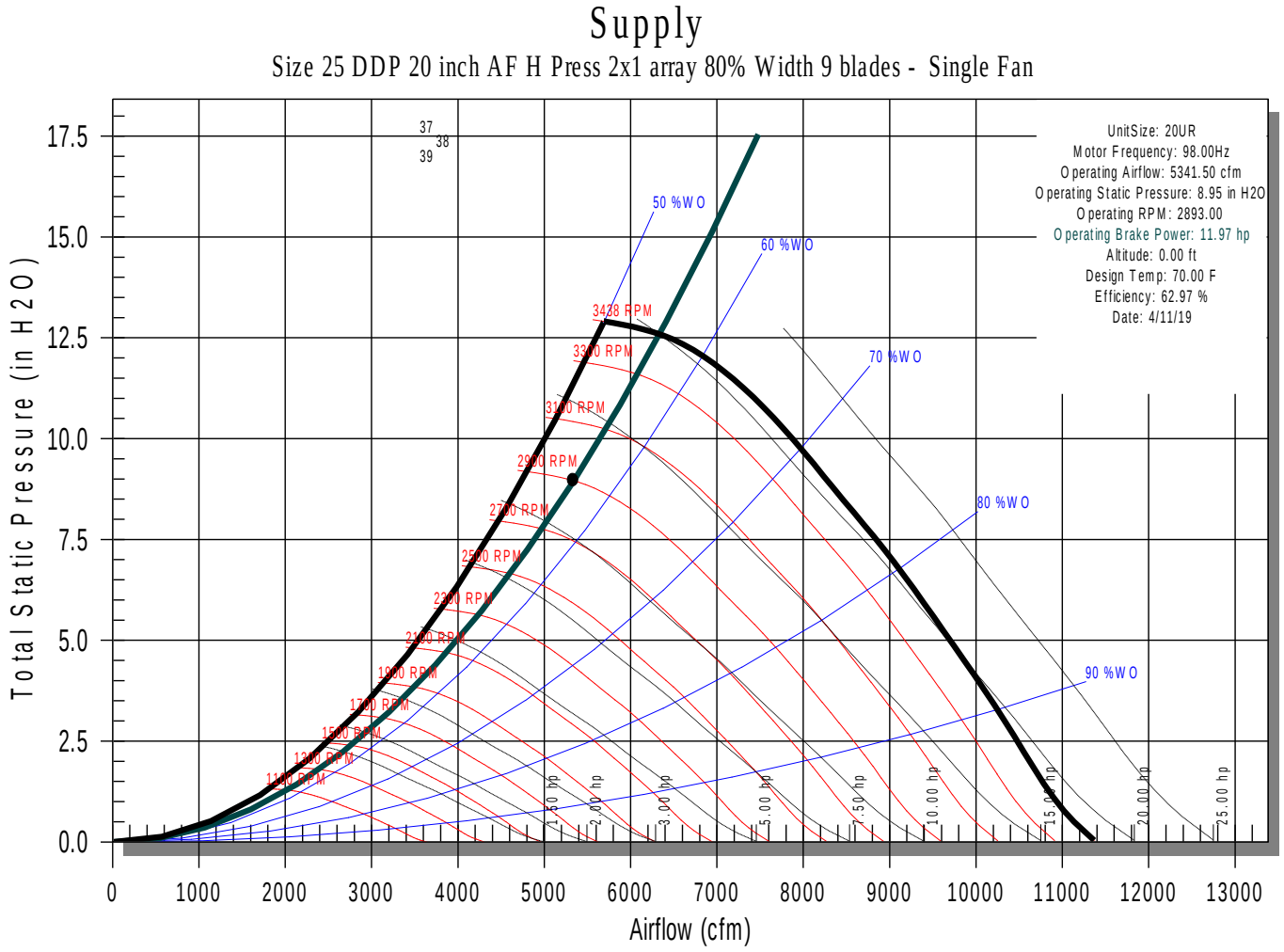
Fan Curve - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



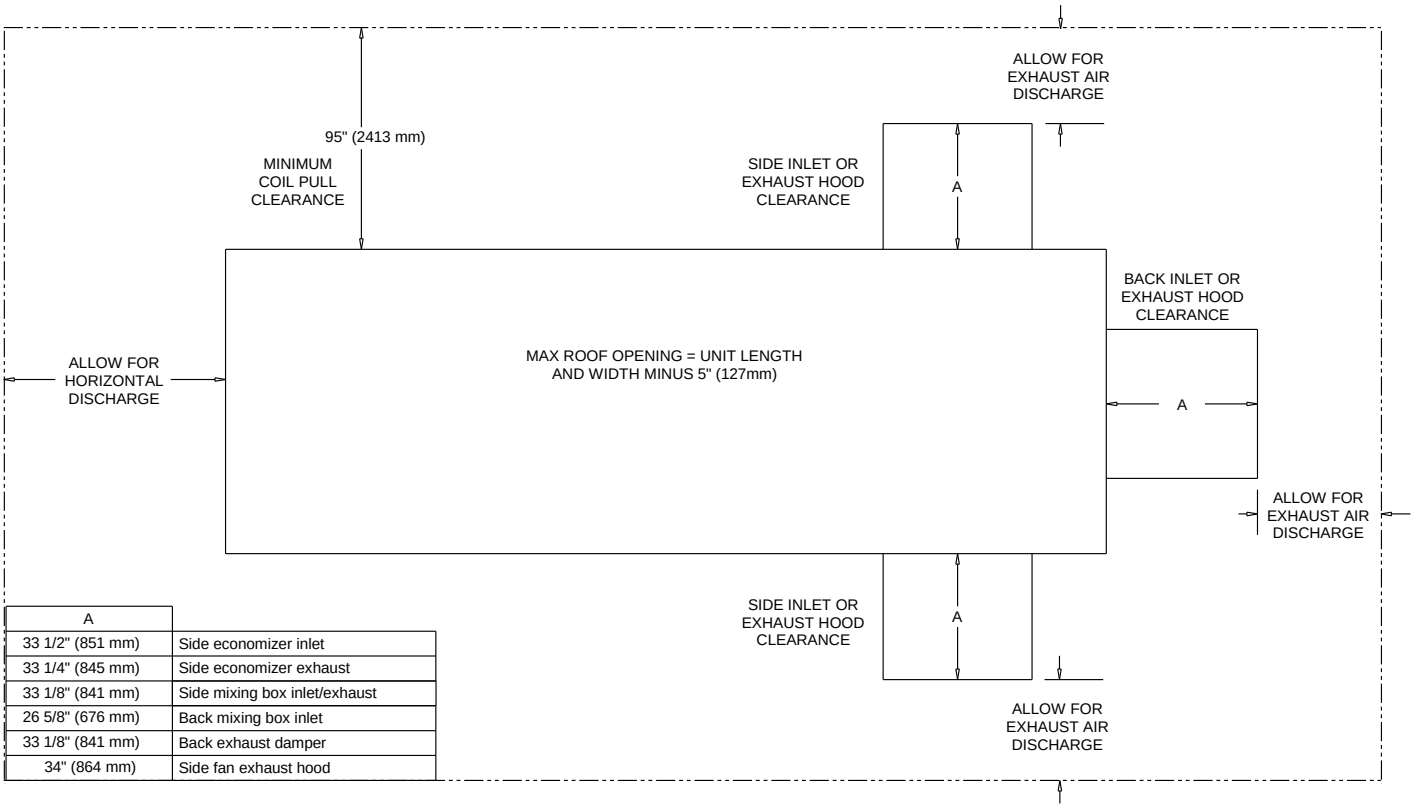
Fan Curve - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



Fan Curve - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

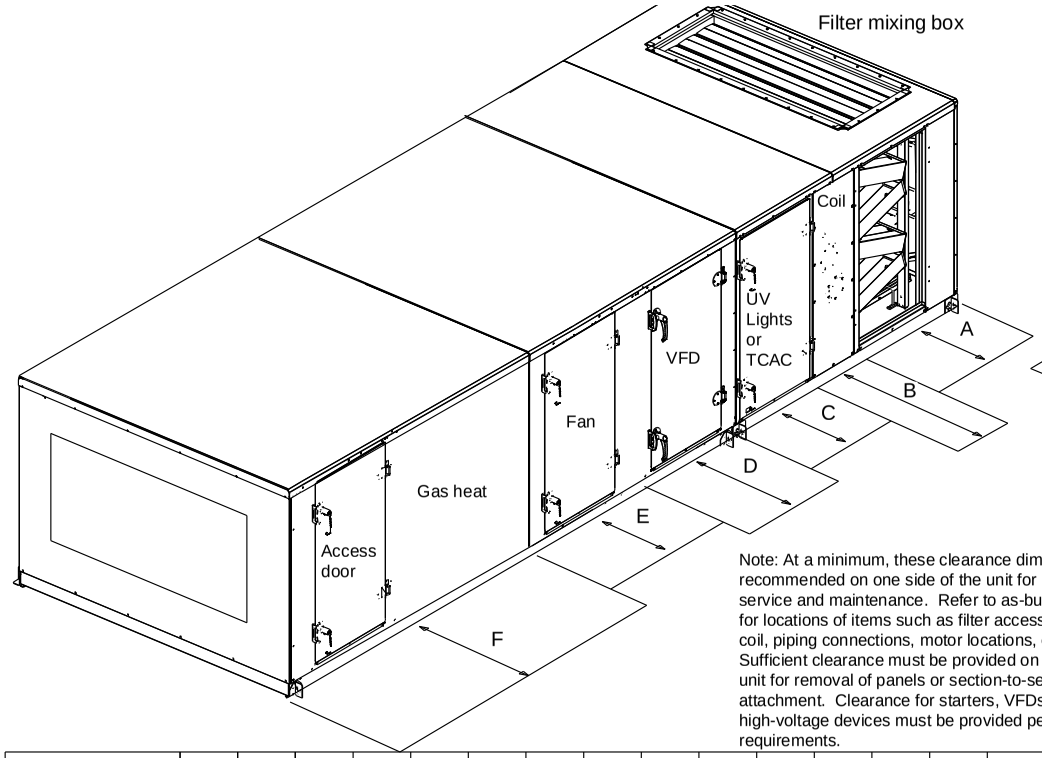


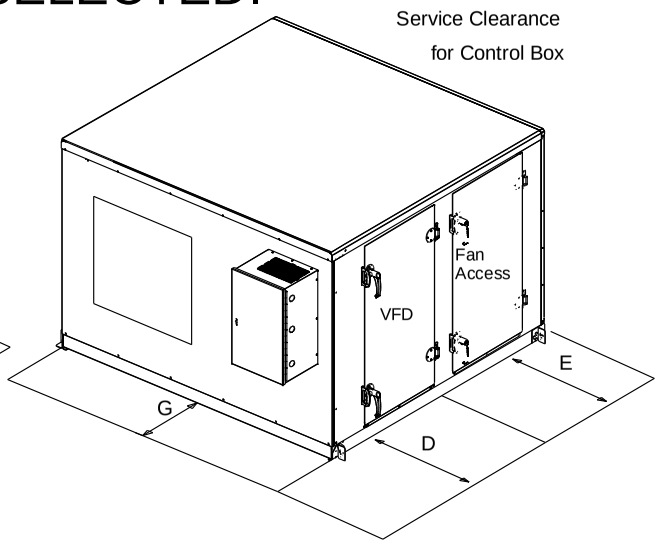
Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



A	
33 1/2" (851 mm)	Side economizer inlet
33 1/4" (845 mm)	Side economizer exhaust
33 1/8" (841 mm)	Side mixing box inlet/exhaust
26 5/8" (676 mm)	Back mixing box inlet
33 1/8" (841 mm)	Back exhaust damper
34" (864 mm)	Side fan exhaust hood

EXAMPLE UNIT - NOT CONFIGURED AS SELECTED.





Note: At a minimum, these clearance dimensions are recommended on one side of the unit for regular service and maintenance. Refer to as-built submittal for locations of items such as filter access doors, coil, piping connections, motor locations, etc. Sufficient clearance must be provided on all sides of unit for removal of panels or section-to-section attachment. Clearance for starters, VFDs, or other high-voltage devices must be provided per NEC requirements.

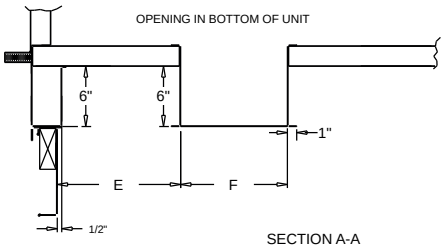
Component	All Sizes
G (Side mount LV box)	36
G (Front mount LV box)	13

Component	3	4	6	8	10	12	14	17	21	21 TALL	25	25 TALL	30	30 TALL	35	35 TALL	40	40 TALL	50	50 TALL	57	57 TALL	66	80	100	120
A (filter)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
B (coil, humidifier)	48	59	59	66	77	82	87	87	95	77	95	77	109	87	115	96	128	96	141	110	141	110	156	156	170	197
B (staggered coil)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67	N/A	67	N/A	76	N/A	80	N/A	88	N/A	96	N/A	96	N/A	105	105	113	129
C (UV Lights)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	52	56	58	58
C (TCAC)	43	59	59	63	75	81	83	83	58	75	58	75	83	83	75	59	83	83	83	83	83	83	83	83	75	83
D (External Starter, VFD, LV box or Overload box)	61	61	61	61	61	61	61	61	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
D (Internal Starter or VFD)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
E (fan)	48	48	48	48	51	54	58	61	60	51	66	51	66	58	66	60	70	60	77	66	77	66	93	93	101	101
F (Gas Heat Ext Vestible)	N/A	N/A	89	90	108	100	100	105	115	N/A	115	N/A	118	N/A	136	N/A	140	N/A	156	N/A	156	N/A	170	179	180	N/A
F (Gas Heat Int Vestible)	N/A	N/A	56	63	74	79	84	84	92	N/A	92	N/A	106	N/A	112	N/A	125	N/A	138	N/A	138	N/A	153	153	167	194

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

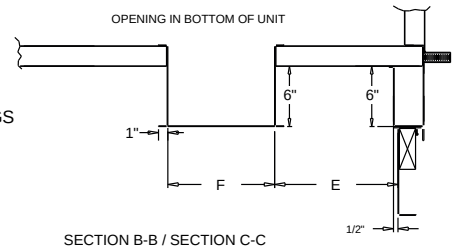
RELATIONSHIP OF CURB TO UNIT AS-BUILT

RECTANGULAR OPENINGS



SECTION A-A

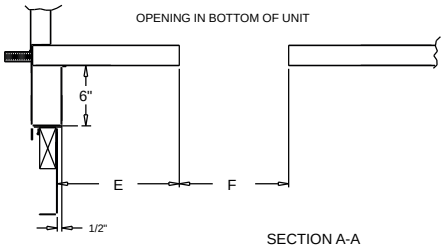
SUPPLY FAN OR DISCHARGE PLENUM (SEE NOTE 1)



SECTION B-B / SECTION C-C

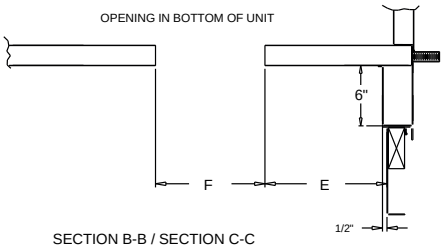
MIX BOX, RETURN FAN OR EXHAUST FAN SECTION (SEE NOTE 1)

ROUND OPENINGS



SECTION A-A

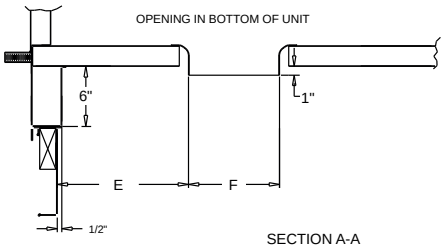
SUPPLY FAN OR DISCHARGE PLENUM (SEE NOTE 1)



SECTION B-B / SECTION C-C

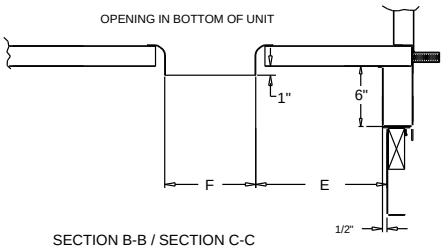
MIX BOX, RETURN FAN OR EXHAUST FAN SECTION (SEE NOTE 1)

BELLMOUTH OPENINGS



SECTION A-A

SUPPLY FAN OR DISCHARGE PLENUM (SEE NOTE 1)

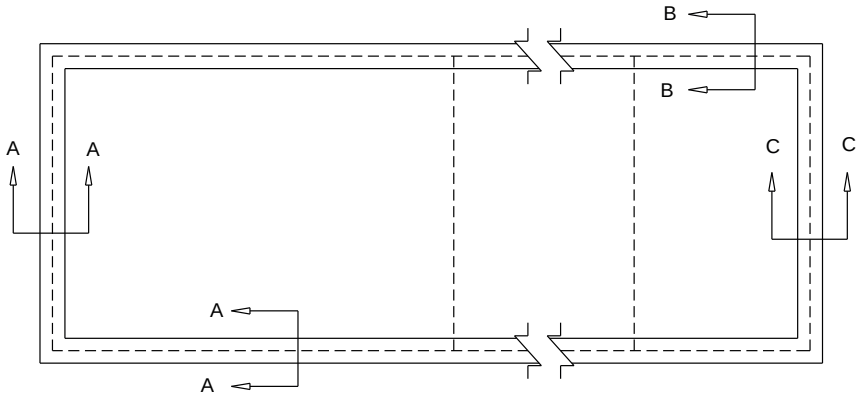


SECTION B-B / SECTION C-C

MIX BOX, RETURN FAN OR EXHAUST FAN SECTION (SEE NOTE 1)

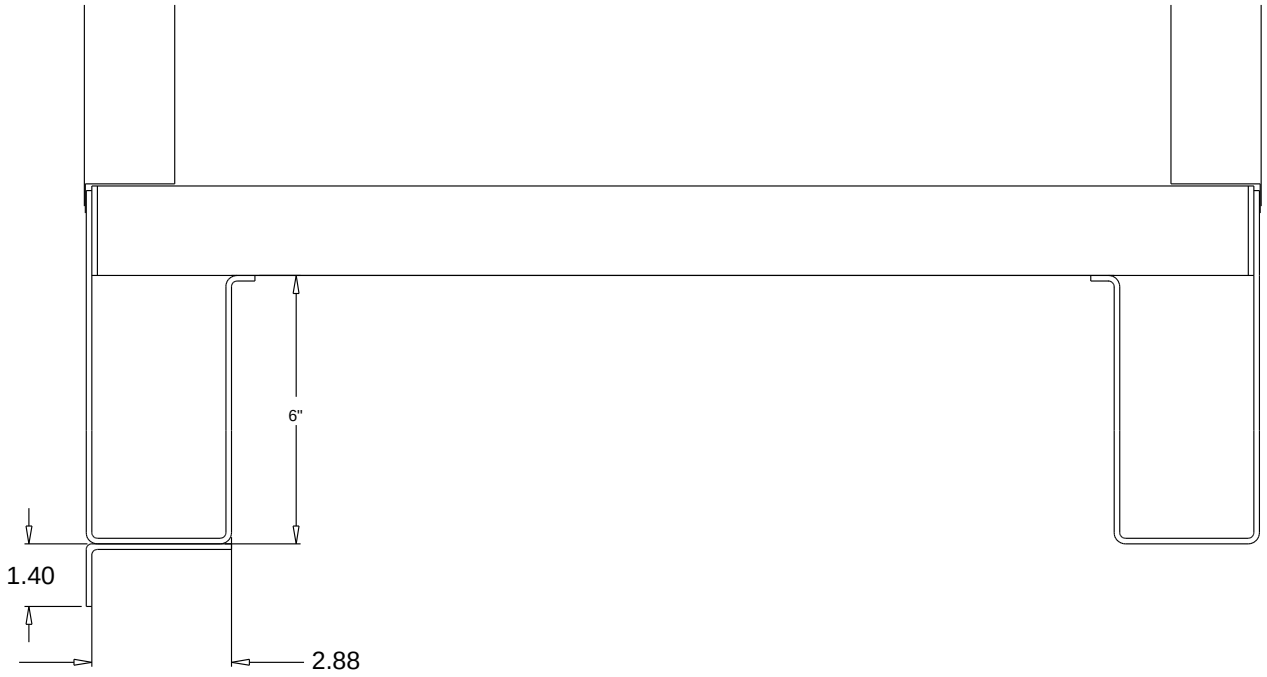
NOTE:

1. E and F are representative of dimensions on the accessory as-built used to locate opening(s) in the roof surface.



Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

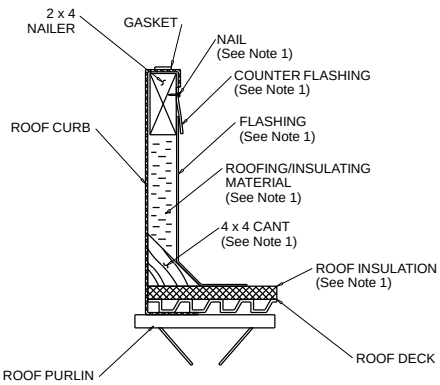
Base Detail

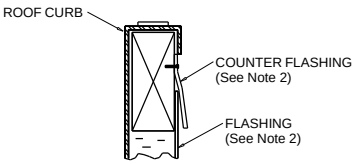


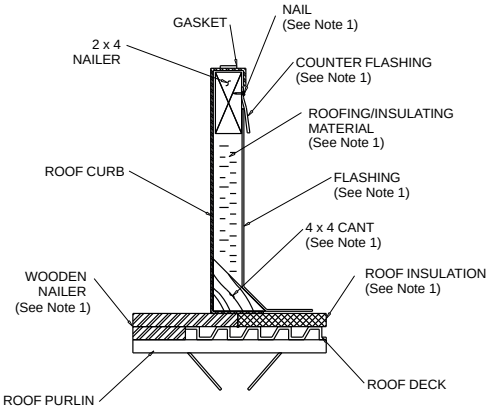
Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Recommendation for Roof Curb Installation

Refer to Performance IOM for specific installation instructions





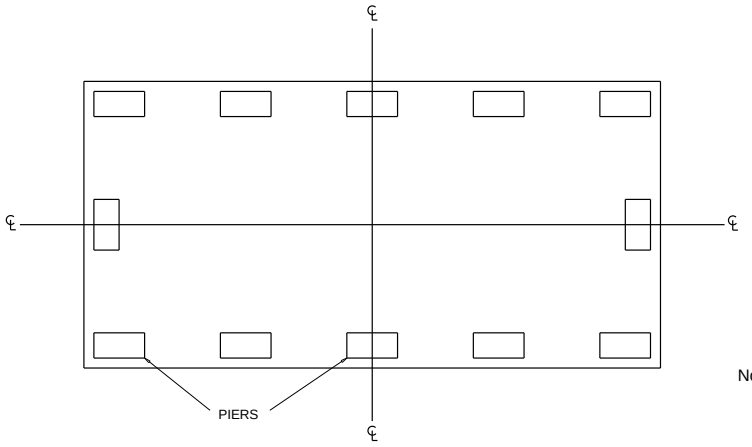


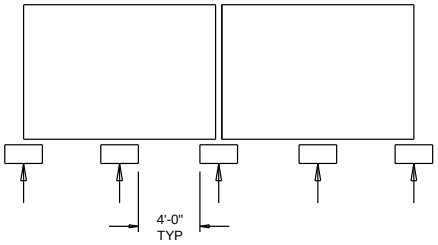
Note:

1. Materials to attach roof curb to roof are to be supplied by the installer.
2. Flashing or counter flashing should not come to or over top of curb.
3. Roof curb must be mechanically fastened to roof surface.

Recommendation for Pier Mounting

Refer to Performance IOM for specific installation instructions





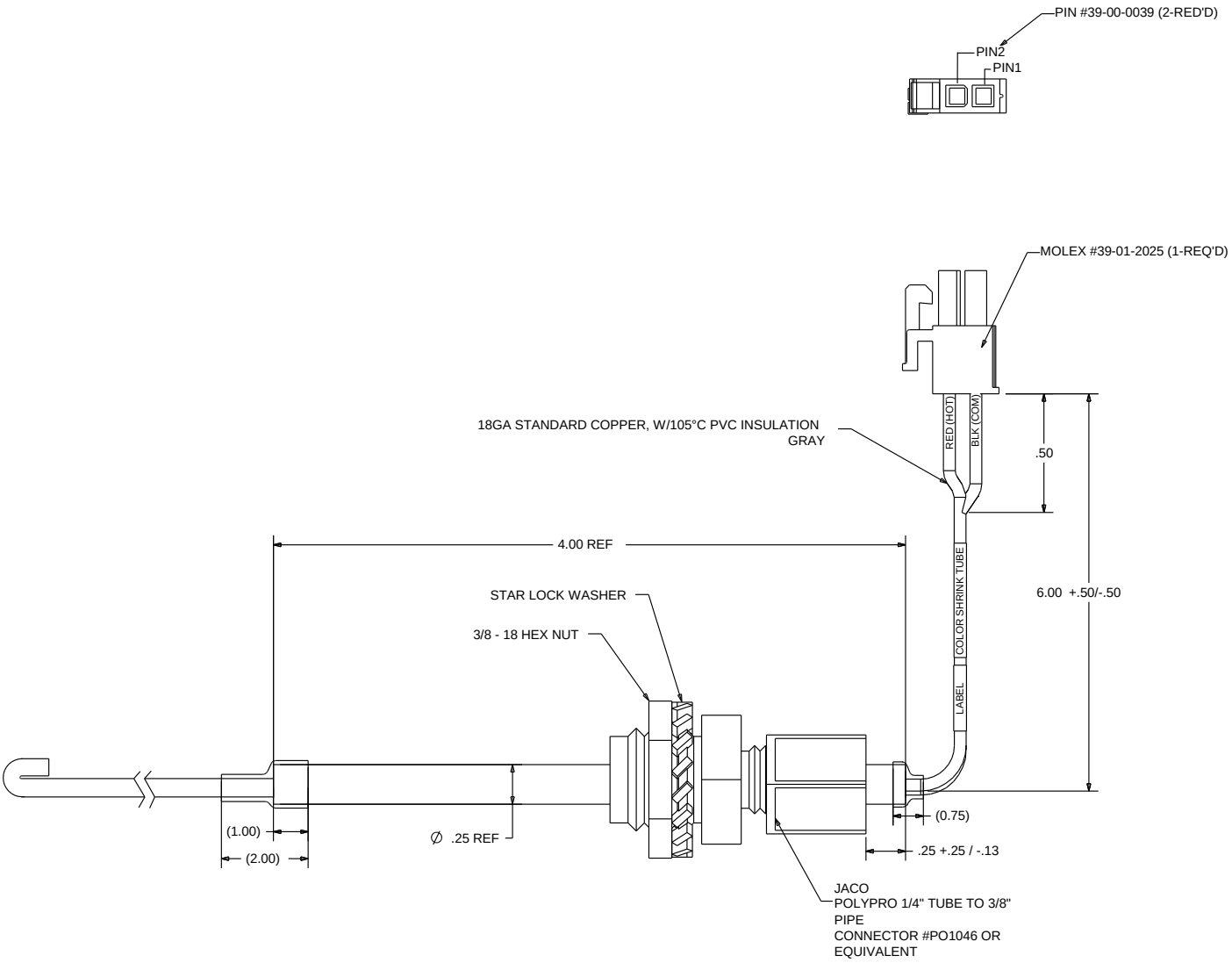
Note:

1. Pier supports should be inside 3" (3 - 50) or 4" (57 - 120) flat of unit base. Unit cannot be supported by unit base drip leg.
2. Piers beneath shipping splits must be structurally sound to support the weight of the unit.

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Averaging Temperature Sensor

SENSOR ELEMENT	SENSOR RATING	TCR	SHRINK TUBE COLOR
RTD	1,000 Ω PT 385	3850 PPM/K	WHITE



Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Low Limit Switch

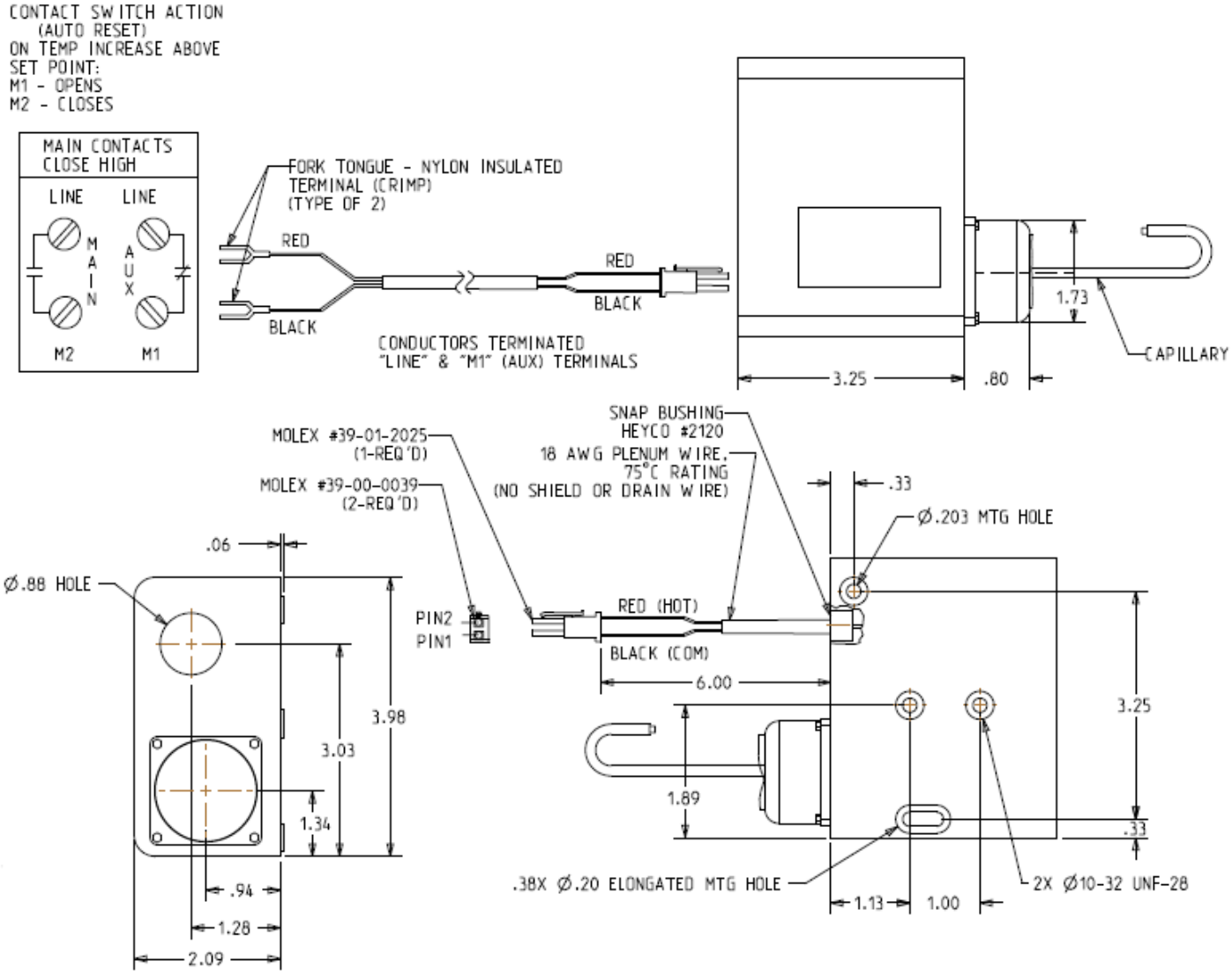
SPECIFICATIONS:
CONTACT ACTION: DPST, AUTO RESET

ELECTRICAL:

4-WIRE, 2-CIRCUIT (SEE NOTE)								
POLE NUMBER	LINE-M2 (MAIN)				LINE-M1 (AUXILIARY)			
MOTOR RATING	120V	208V	240V	277V	120V	208V	240V	277V
AC FULL LOAD AMP	16.0	9.2	8.0	--	6.0	3.3	3.0	--
AC LOCKED ROTOR AMP	96.0	55.2	48.0	--	36.0	19.8	18.0	--
AC NON-INDUCTIVE AMP	16.0	9.2	8.0	7.2	6.0	6.0	6.0	6.0
PILOT DUTY-BOTH POLES	125VA, 120 TO 600 VAC 57.5VA, 120 TO 300 VDC							

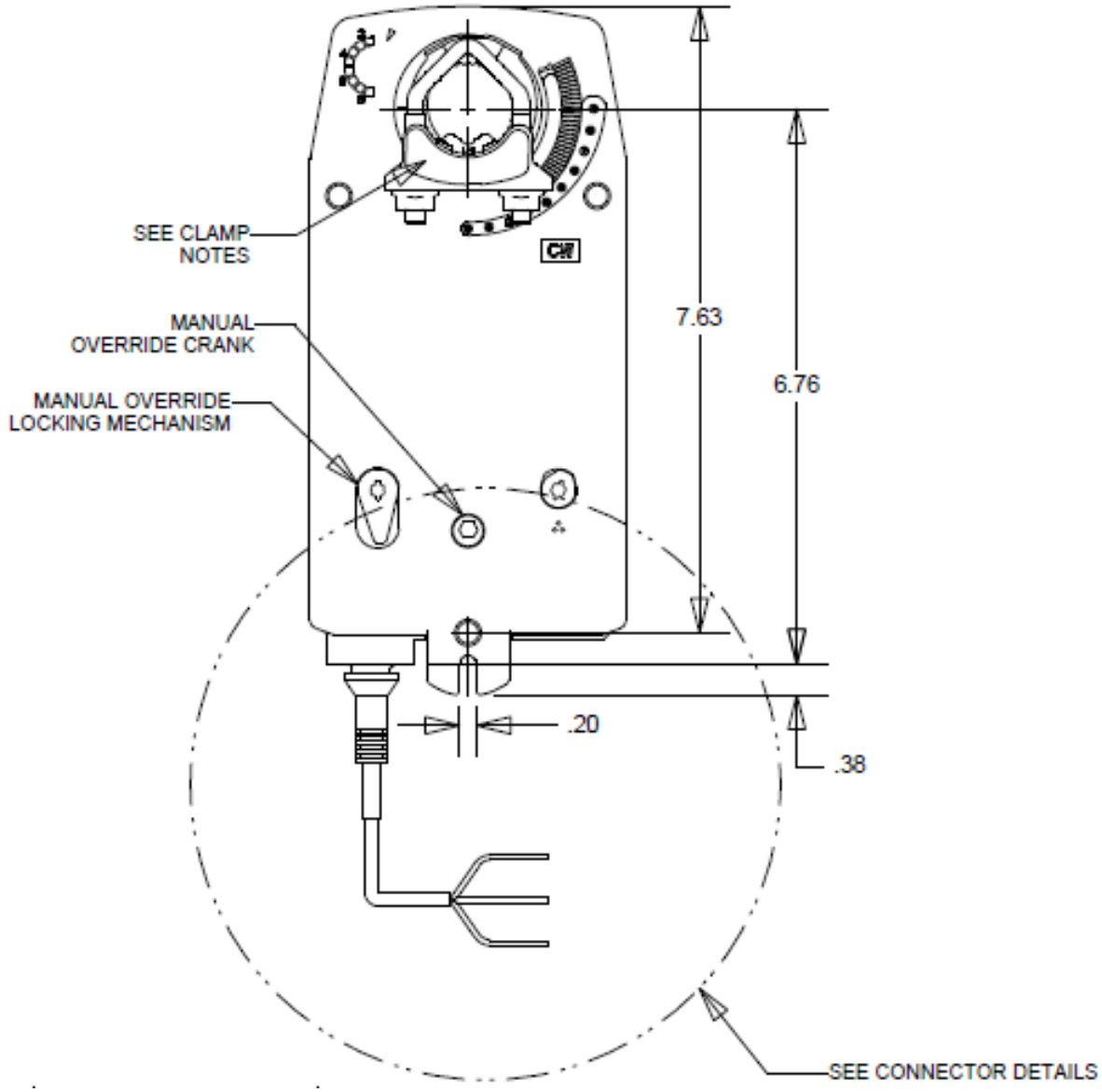
CAPILLARY: Ø.187 (STYLE 9)
MATERIAL: COLD ROLLED STEEL
FINISH: GRAY BAKED ENAMEL
MOUNTING: COME WITH MOUNTING BRACKET

NOTE: THESE ELECTRICAL CHARACTERISTICS ONLY APPLY WHEN THE WIRE ASSEMBLY IS REMOVED. THE SWITCH IS LIMITED TO 100VA @ 30VAC WITH THE WIRE ASSEMBLY ATTACHED.



Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Actuator



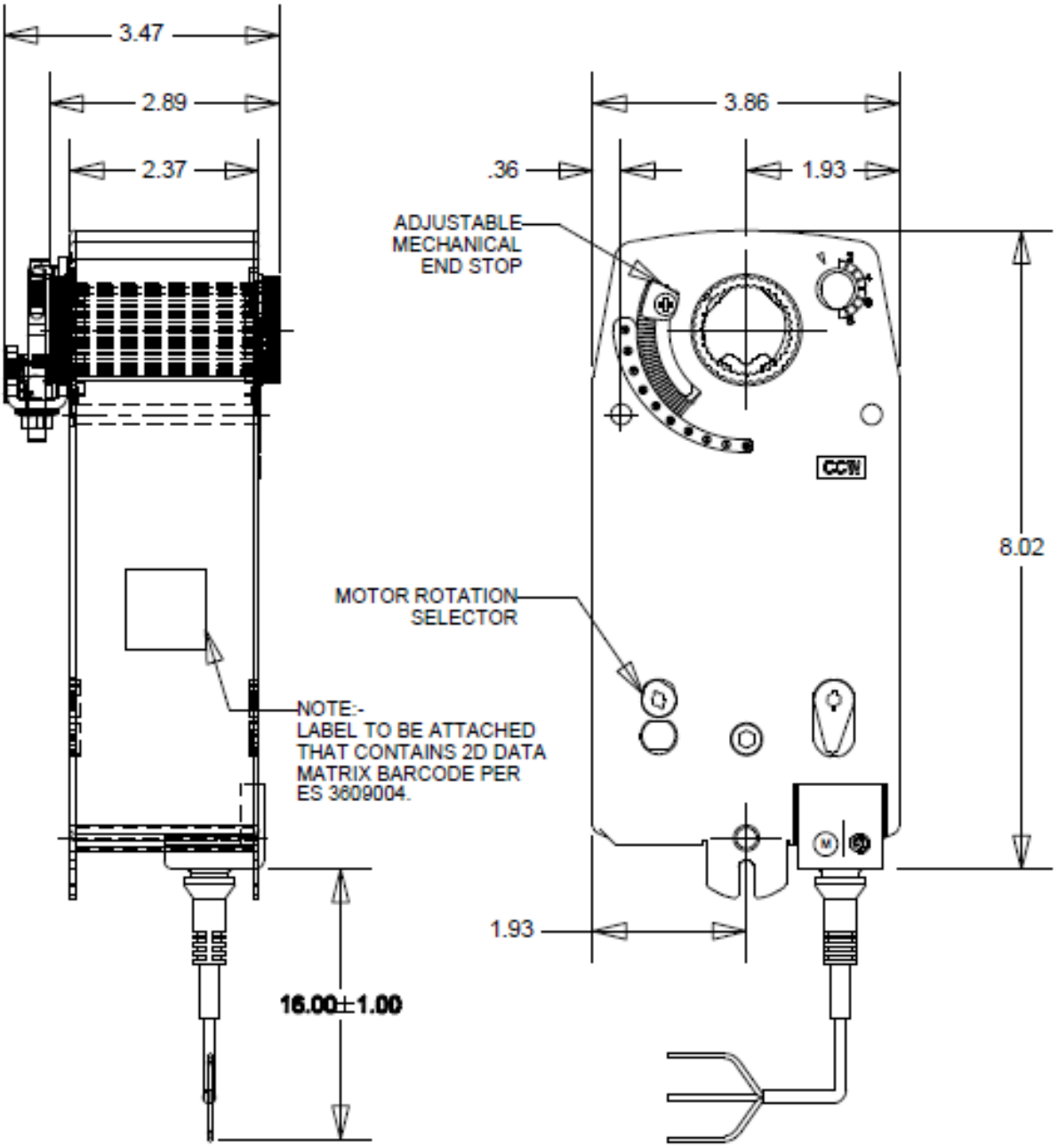
EXT 04

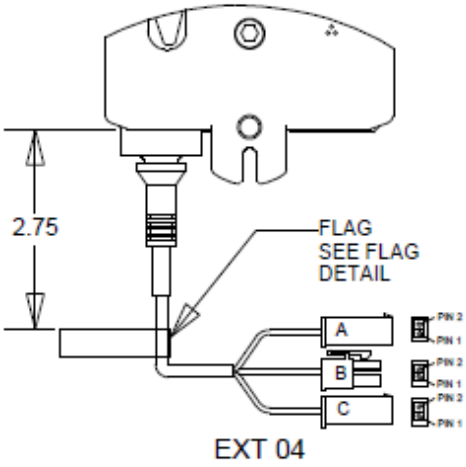
COLOR	PIN#	AWG	TYPE	A	B	C
BLACK	1	18	COM	BLK		
	2	18	HOT	RED		
WHITE	1	18	COM		PNK	
	2	18	IN		WHT	
WHITE	1	18	COM			GRY
	2	18	OUT			ORG

CONNECTOR 'A'
MOLEX#: 50-36-1678
PIN#: 39-00-0041

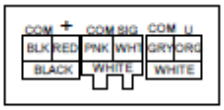
CONNECTOR 'B'
MOLEX#: 39-01-2025
PIN#: 39-00-0039

CONNECTOR 'C'
MOLEX#: 39-01-3029
PIN#: 39-00-0041

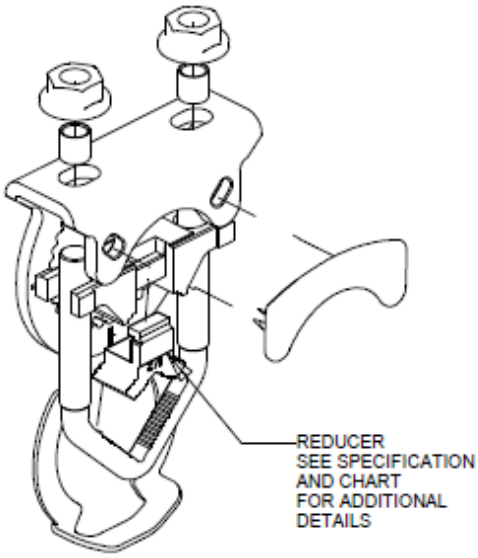

3.47
2.89
2.37
3.86
.36
1.93
ADJUSTABLE MECHANICAL END STOP
CCW
8.02
MOTOR ROTATION SELECTOR
NOTE:-
LABEL TO BE ATTACHED THAT CONTAINS 2D DATA MATRIX BARCODE PER ES 3609004.
1.93
16.00±1.00



EXT 04



FLAG DETAIL



CLAMP DETAIL

ONE CLAMP IS USED PER ACTUATOR.

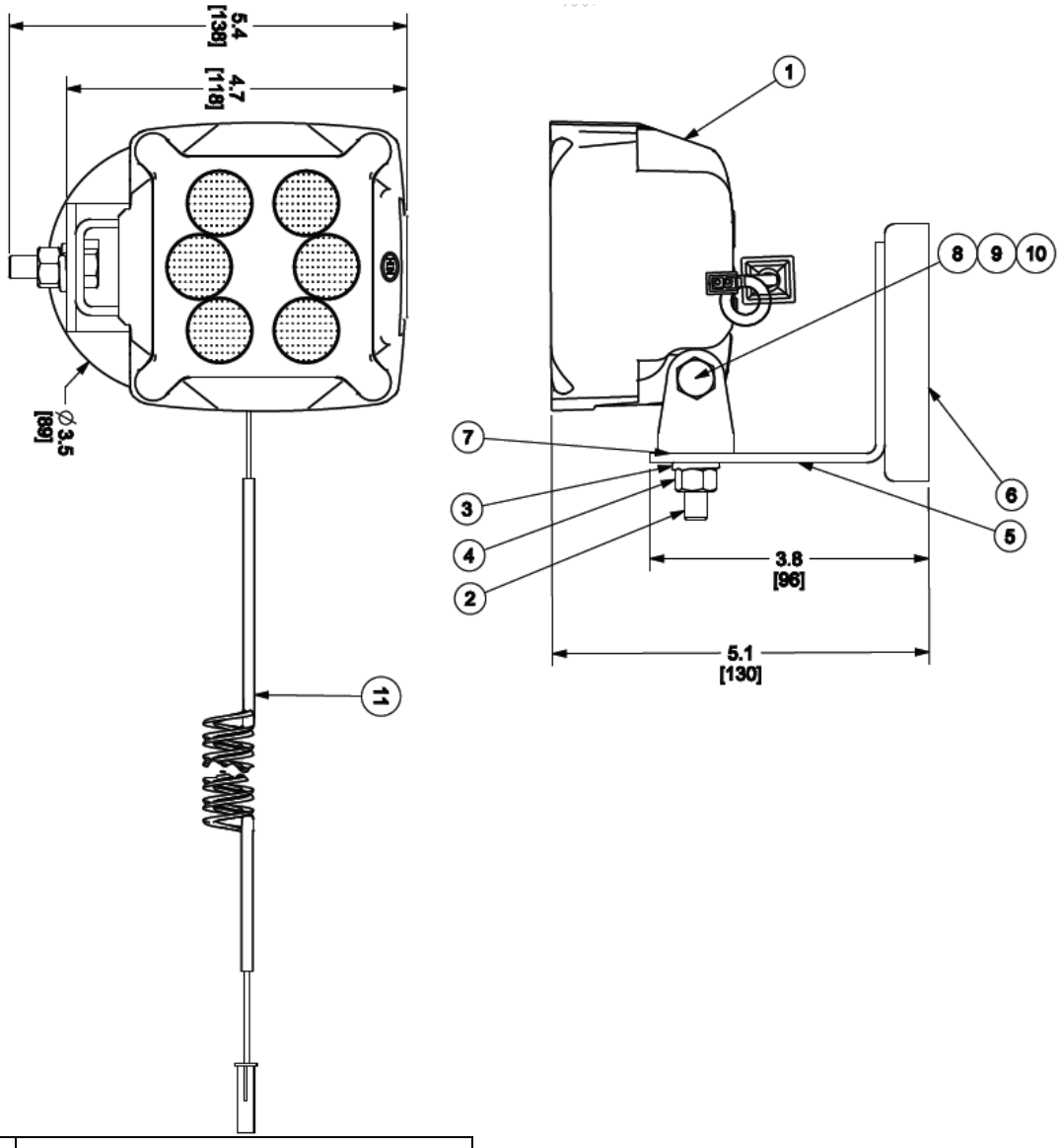
Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Marine Light

SPECIFICATIONS:

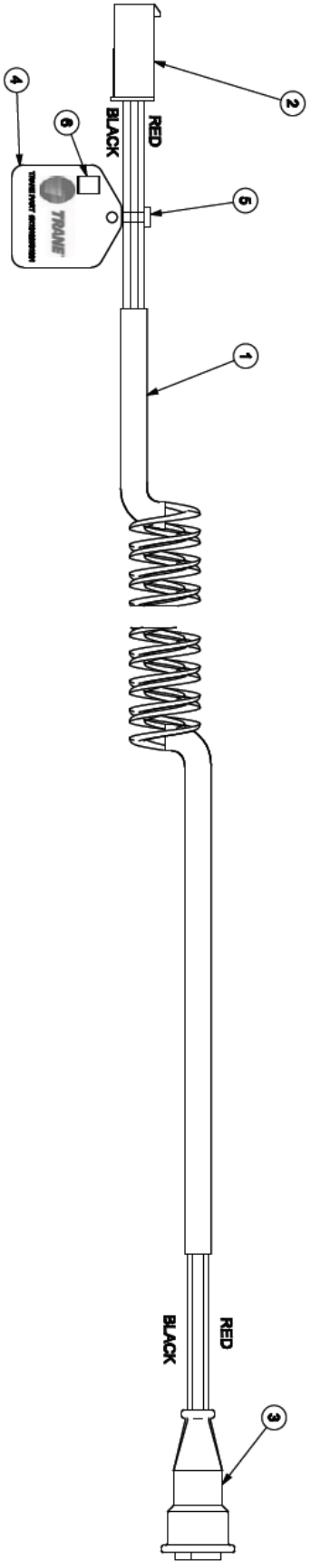
LIGHT SOURCE:	6 LED
VOLTAGE:	18-32 VAC (50-60Hz)
POWER CONSUMPTION:	~14 VA
WIRE:	16 GA, RED AND BLACK
LIFE:	50000+ HOURS
TEMPERATURE RANGE:	-40°C TO +50°C
CONNECTION:	AC SUPPLY
ENVIRONMENTAL PROTECTION:	WATER/DUST INTRUSION
IP RATING:	IP68
DIE CAST HOUSING:	AA380 (ALUMINUM)
LENS:	POLYCARBONATE (PC) UL94V-0
MS10 MAGNETIC FLUX DENSITY:	1400 GAUSS ± 100 GAUSS

ITEM	DESCRIPTION
1	LED WORKLAMP
2	5/16" x 1" HEX BOLT
3	5/16" SS WASHER
4	5/16" LOCK NUT
5	METAL BRACKET, MAGNET MOUNT
6	MAGNET ASSEMBLY (MS11) WITH DOUBLE SIDED TAPE
7	NYLON WASHER
8	5/16" x 1 1/2" HEX BOLT
9	5/16" HEX NUT
10	5/16" LOCKWASHER
11	COIL CORD



ITEM	DESCRIPTION

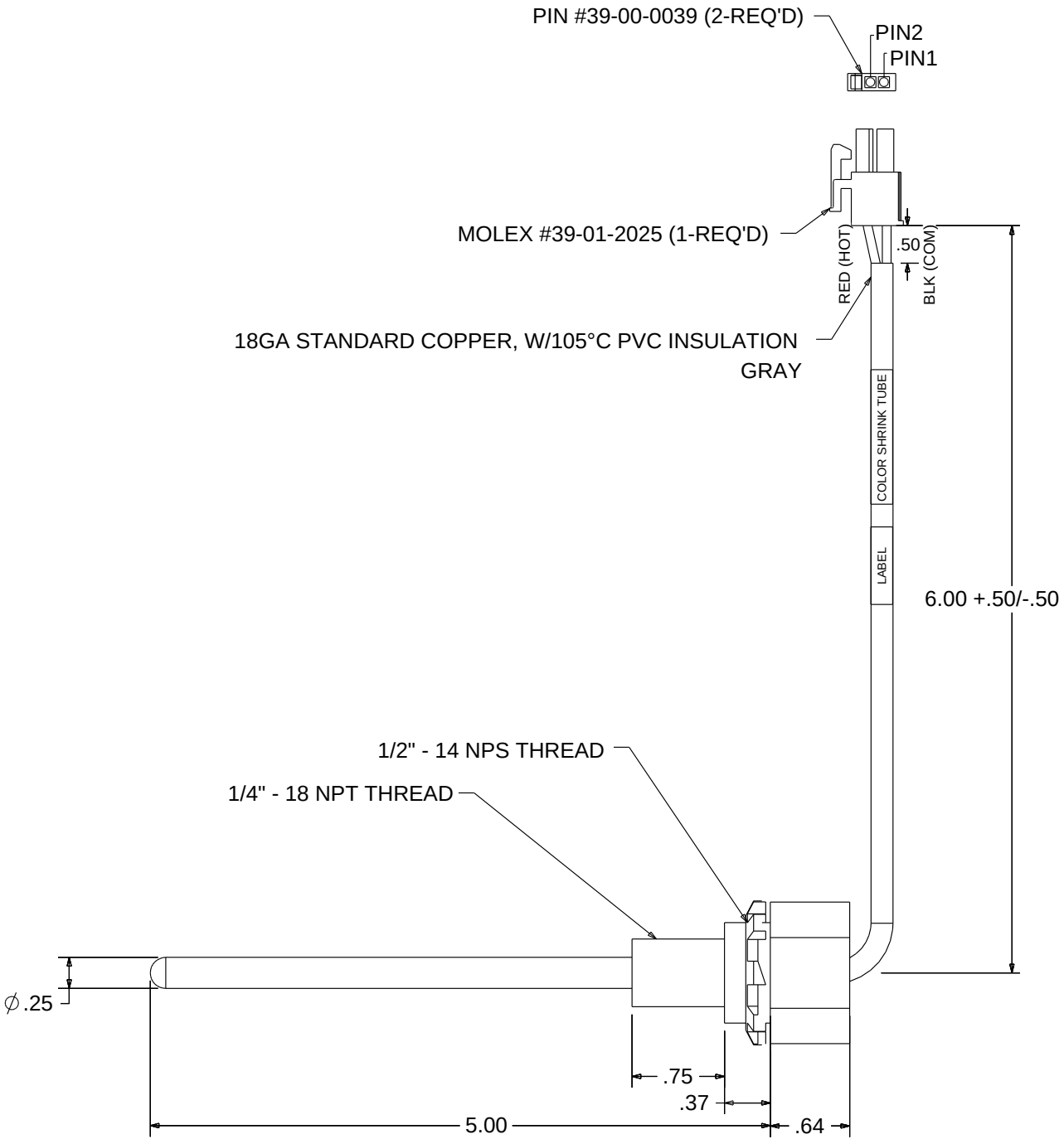
1	COILED CABLE 2-WIRE
2	CONNECTOR, 2-WAY MOLEX 50-36-1678
3	CONNECTOR, FEMALE DISCONNECT
4	LABEL TAG
5	TIE WRAP
6	LABEL 3D BAR CODE



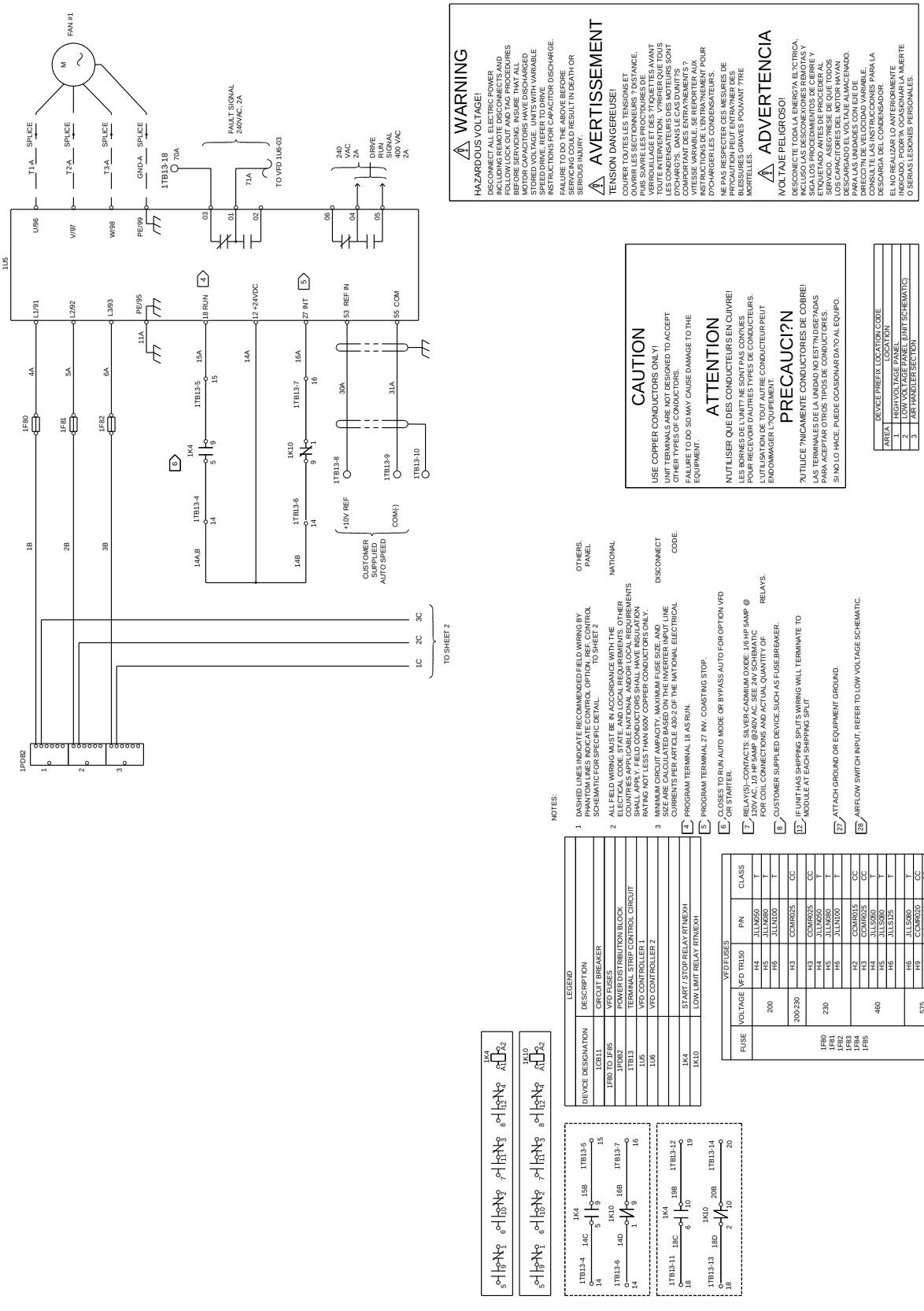
Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Discharge Temperature Sensor

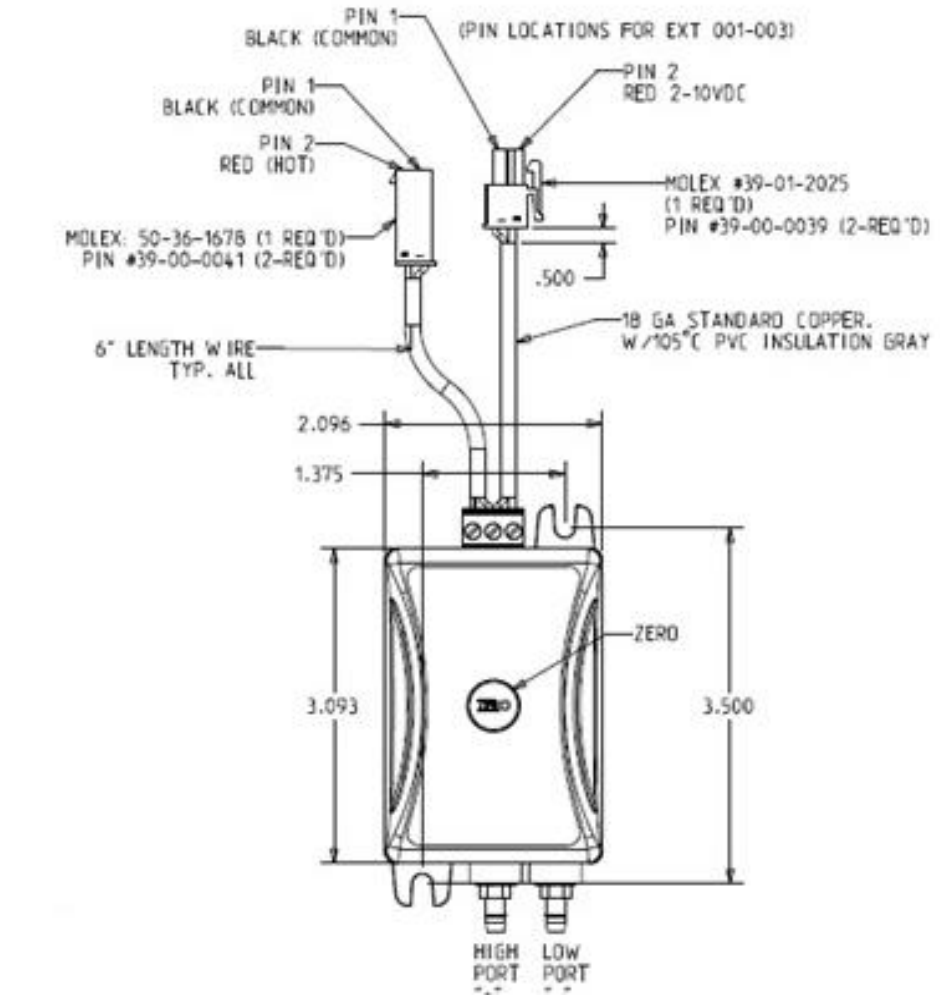
EXT	SENSOR RATING	SHRINK TUBE COLOR	SENSOR
01	10,000 ∩ TYPE II	YELLOW	THERMISTOR

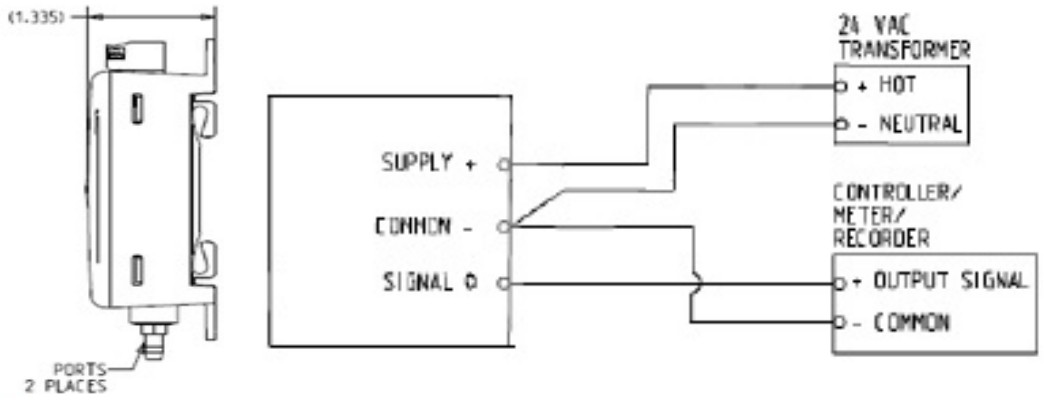


Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

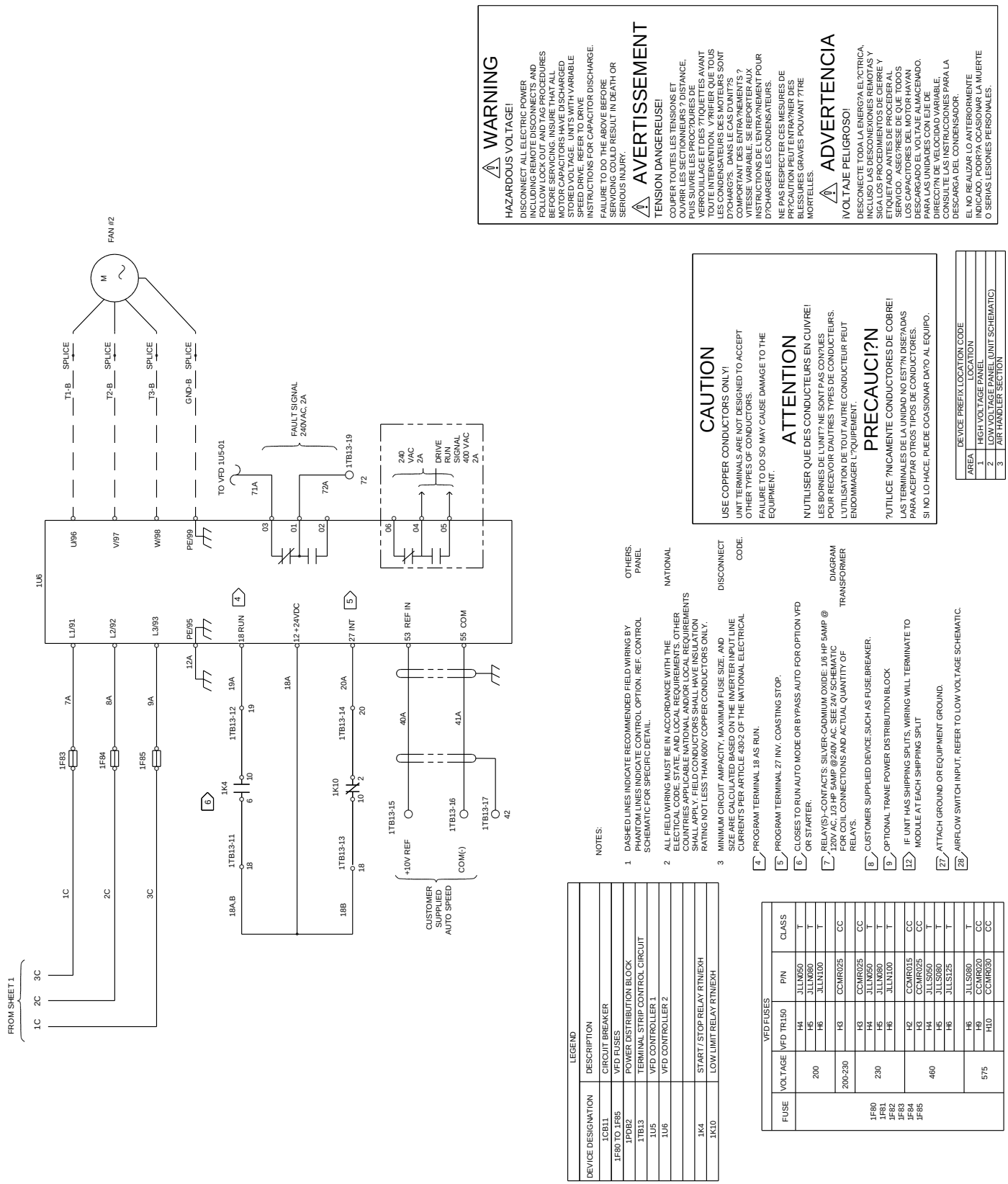




NOTE:

1. PRESSURE CONNECTIONS: 3/16" OD BARBED FITTING FOR ¼" TUBING
2. OPERATING TEMPERATURE: 0 - 85 C
3. COMPENSATED TEMPERATURE: 0 - 50 C
4. LOAD IMPEDANCE: 500 OHMS
5. TERMINATION: SCREW TERMINAL BLOCK
6. ACCURACY: 0.25%
7. INPUT VOLTAGE: 24VAC (NOMINAL)

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER, INCLUDING REMOTE DISCONNECTS, AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED. STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE. FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS ? DISTANCE, PUIS SUIVRE LES PROC?DURES DE VERROUILLAGE ET DES ?TIQUETTES AVANT TOUTE INTERVENTION. V?RIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT D?CHARG?S. DANS LE CAS D'UNIT?S COMPORTANT DES ENTRA?NEMENTS ? VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRA?NEMENT POUR D?CHARGER LES CONDENSATEURS.

NE PAS RESPECTER CES MESURES DE PR?CAUTION PEUT ENTRA?NER DES BLESSURES GRAVES POUVANT ?TRE MORTELLES.

ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERG?A EL?CTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEG?RESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON ELEMENTOS DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODR?A OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION

USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS. FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNIT? NE SONT PAS CON?UES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'?QUIPEMENT.

PRECAUCI?N

?UTILICE ?NICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO EST?N DISE?ADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. SI NO LO HACE, PUEDE OCASIONAR DA?O AL EQUIPO.

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F80 TO 1F85	VFD FUSES
1PDB2	POWER DISTRIBUTION BLOCK
1TB13	TERMINAL STRIP CONTROL CIRCUIT
1U5	VFD CONTROLLER 1
1U6	VFD CONTROLLER 2
1K4	START / STOP RELAY RTN/EXH
1K10	LOW LIMIT RELAY RTN/EXH

NOTES:

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY PHANTOM LINES INDICATE CONTROL OPTION. REF. CONTROL SCHEMATIC FOR SPECIFIC DETAIL. OTHERS; PANEL
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE ELECTICAL CODE, STATE, AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATING NOT LESS THAN 600V COPPER CONDUCTORS ONLY. NATIONAL
3. MINIMUM CIRCUIT AMPACITY, MAXIMUM FUSE SIZE, AND SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL DISCONNECT CODE.
4. PROGRAM TERMINAL 18 AS RUN.
5. PROGRAM TERMINAL 27 INV. COASTING STOP.
6. CLOSES TO RUN AUTO MODE OR BYPASS AUTO FOR OPTION VFD OR STARTER.
7. RELAY(S)-CONTACTS: SILVER-CADMIUM OXIDE: 1/6 HP 5AMP @ 120V AC, 1/3 HP 5AMP @240V AC. SEE 24V SCHEMATIC FOR COIL CONNECTIONS AND ACTUAL QUANTITY OF RELAYS. DIAGRAM TRANSFORMER
8. CUSTOMER SUPPLIED DEVICE,SUCH AS FUSE,BREAKER.
9. OPTIONAL TRANE POWER DISTRIBUTION BLOCK
12. IF UNIT HAS SHIPPING SPLITS, WIRING WILL TERMINATE TO MODULE AT EACH SHIPPING SPLIT
27. ATTACH GROUND OR EQUIPMENT GROUND.
28. AIRFLOW SWITCH INPUT, REFER TO LOW VOLTAGE SCHEMATIC.

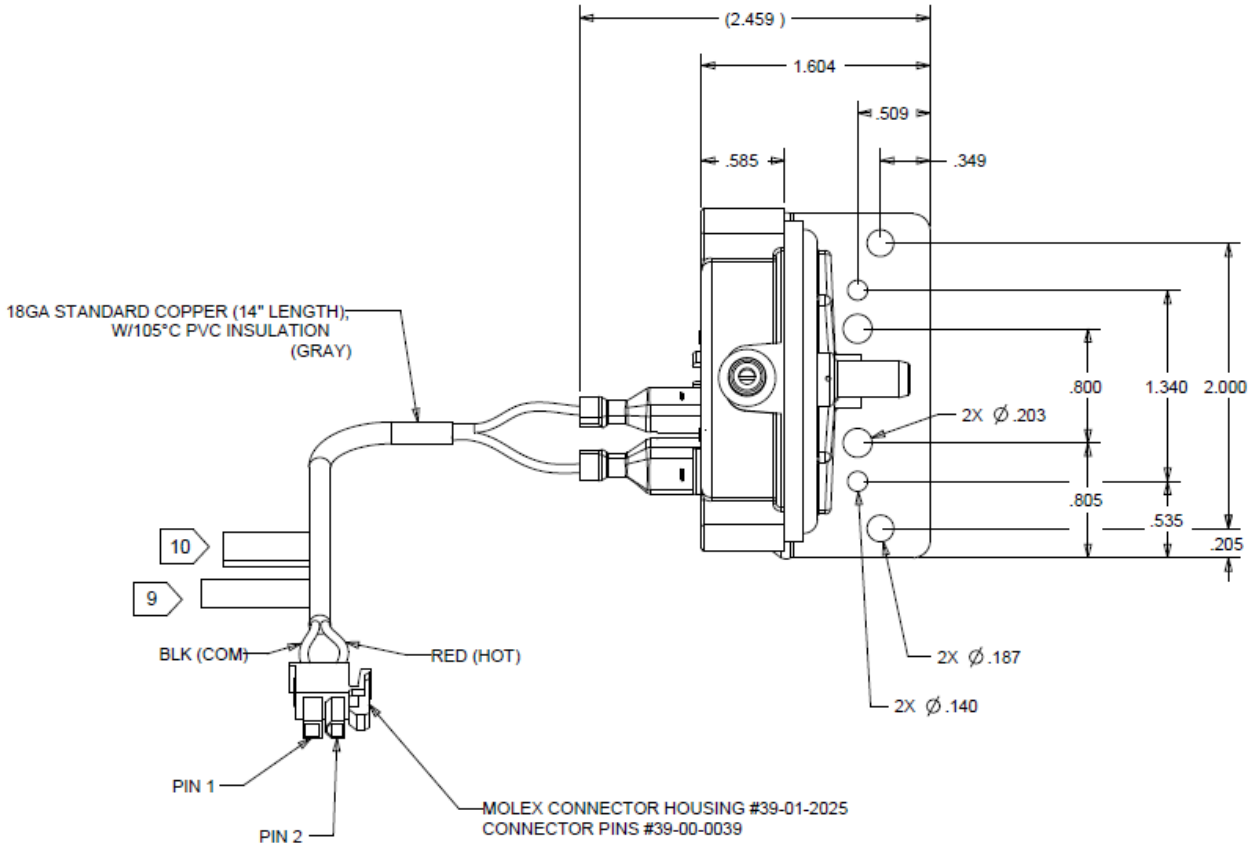
VFD FUSES				
FUSE	VOLTAGE	VFD TR150	P/N	CLASS
1F80 1F81 1F82 1F83 1F84 1F85	200	H4	JLLN050	T
		H5	JLLN080	T
		H6	JLLN100	T
	200-230	H3	CCMR025	CC
	230	H3	CCMR025	CC
		H4	JLLN050	T
		H5	JLLN080	T
		H6	JLLN100	T
	460	H2	CCMR015	CC
		H3	CCMR025	CC
		H4	JLLS050	T
		H5	JLLS080	T
		H6	JLLS125	T
	575	H6	JLLS080	T
		H9	CCMR020	CC
		H10	CCMR030	CC

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

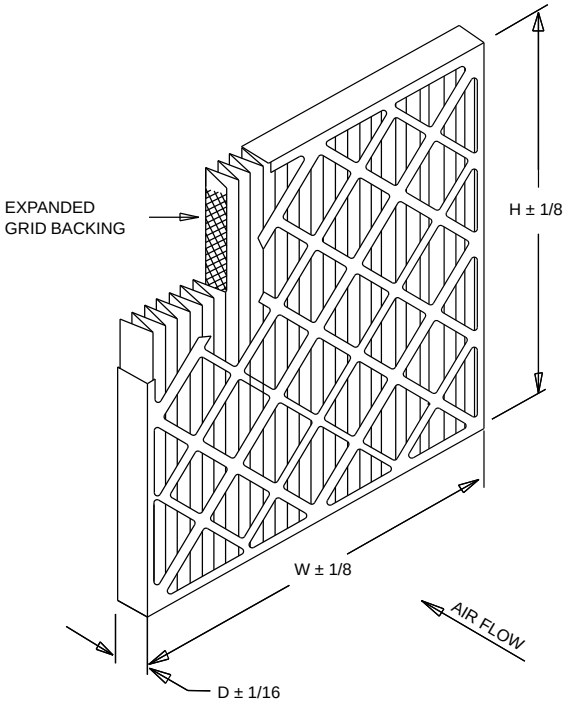
EA Pressure Differential Switch

Specifications:

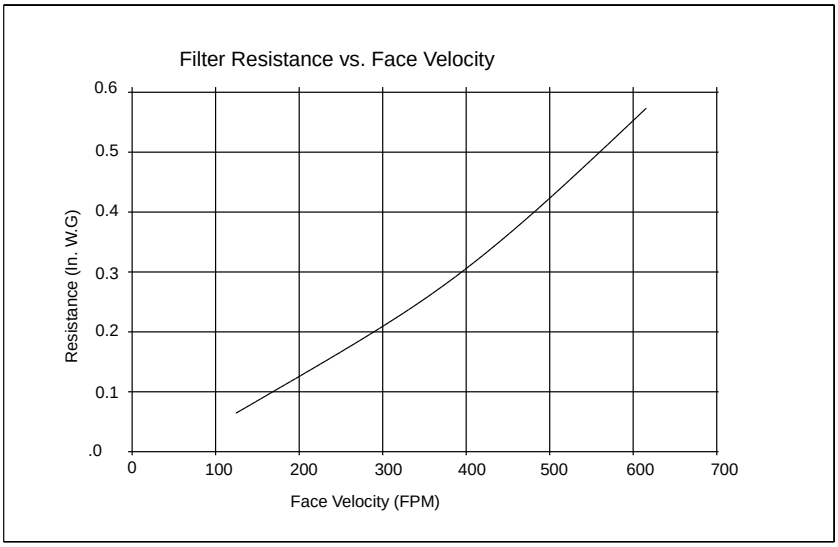
1. Body: Glass Filler Polyester.
2. Diaphragm: Post-Cured Silicon Rubber.
3. Terminals: 0.032” X 0.250” Copper Alloy.
4. Contacts: Silver Alloy, Beryllium Copper.
5. Actuator: Stainless Steel.
6. Springs: Stainless Steel, Phosphor Bronze.
7. Operating Temperature: -40°C to 85°C (-40°F to 185°F).
8. Mounting: Mount With The Diaphragm.
   Perpendicular to Level
9. Attach Trane Part Number Label
   With 2D Bar Code per ES3609004B.
   On Wire Harness
10. Place 13-0094-C-79 Spring Inside Bag and Attach
    To Wire Harness.
    Place Labels on the Bag as Follows:
    ‘Do Not Remove For Field Use Only’
    ‘Use This Spring (13-0094-C-79) For Ranges
    .44 To 1.10 W.C. Settings’



Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



NOMINAL SIZE (WxHxD)	ACTUAL SIZE (WxHxD)	RATED AIR FLOW (CFM)	INITIAL RESISTANCE (IN. W.G.)	MEDIA AREA (SQUARE FEET)	FILTER UNIT WEIGHT (LBS)
12x24x2	11-3/8 x 23-3/8 x 1-3/4	1000	0.41	10.5	0.9
16x20x2	15-1/2 x 19-1/2 x 1-3/4	1120	0.41	10.9	1.1
16x25x2	15-1/2 x 24-1/2 x 1-3/4	1400	0.41	14.9	1.3
20x20x2	19-1/2 x 19-1/2 x 1-3/4	1400	0.41	14.5	1.3
20x24x2	19-3/8 x 23-3/8 x 1-3/4	1670	0.41	17.4	1.4
20x25x2	19-1/2 x 24-1/2 x 1-3/4	1750	0.41	18.5	1.4
24x24x2	23-3/8 x 23-3/8 x 1-3/4	2000	0.41	21.1	1.6



STANDARD CONSTRUCTION
1. 100 % Synthetic White Media
2. 17.5 Pleats Per Foot
3. Expanded Metal Pleat Supports
4. Moisture Resistant Beverage Board Frame
5. Double Wall Frame

NOTES
1. MERV 13 per ASHRAE 52.2-2012
Tested at 492 FPM on 24x24x2 Nominal Size
2. Final Resistance: 1.0" W.G.
3. Rated Velocity: 500 FPM
4. Classified per U.L. Standard 900 for Flammibility
5. Maximum Operating Temperature: 200 deg. F

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Thermal Sensor

Resistance Temperature Characteristics			
Temperature	Resistance		Temp Coeff
	Min.	Max.	
-40°C	320.9K	369.0K	-6.61 % / °C
-25°C	125.6K	142.3K	-6.04% / °C
0°C	31.17K	34.6K	-5.16 % / °C
25°C	9.56K	10.44K	-4.40 % / °C
65°C	2.012K	2.158K	-3.5 % / °C

Specifications:

Probe to be permanently identified with the Trane part number.

Vendor part number and date code or lot code.

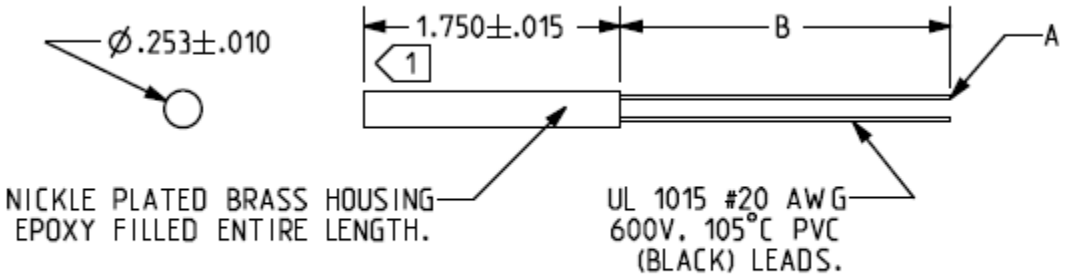


FIGURE 1

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

Thermal Sensor

Resistance Temperature Characteristics			
Temperature	Resistance		Temp Coeff
	Min.	Max.	
-40°C	320.9K	369.0K	-6.61 % / °C
-25°C	125.6K	142.3K	-6.04% / °C
0°C	31.17K	34.6K	-5.16 % / °C
25°C	9.56K	10.44K	-4.40 % / °C
65°C	2.012K	2.158K	-3.5 % / °C

Specifications:

Probe to be permanently identified with the Trane part number, vendor part number and date code or lot code.

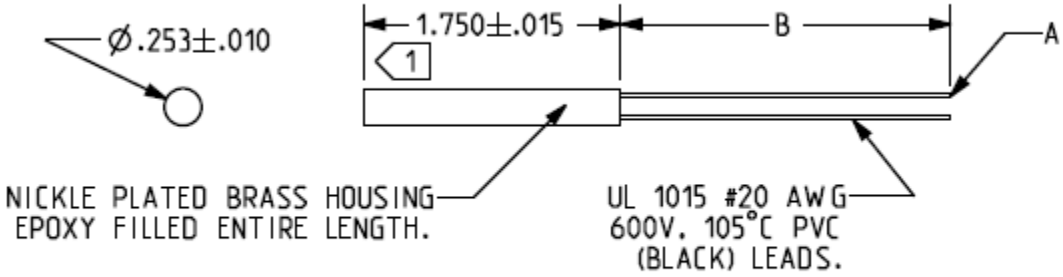
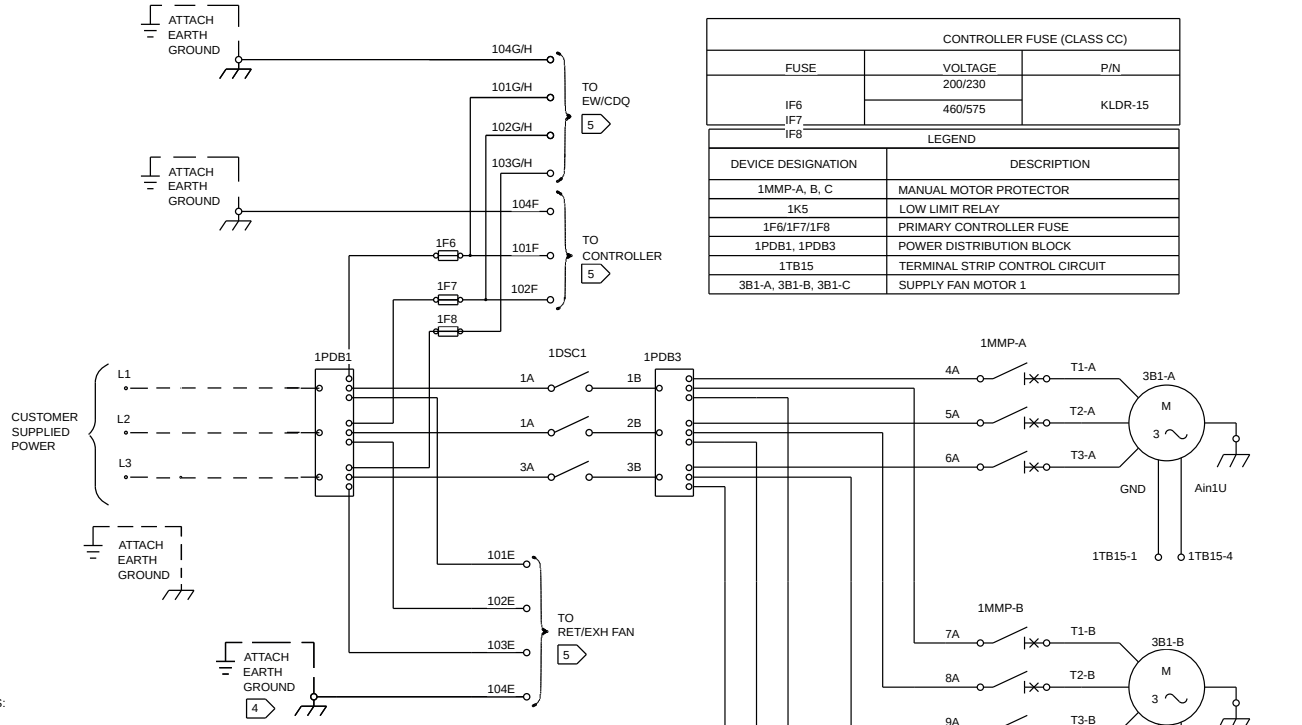


FIGURE 1

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1

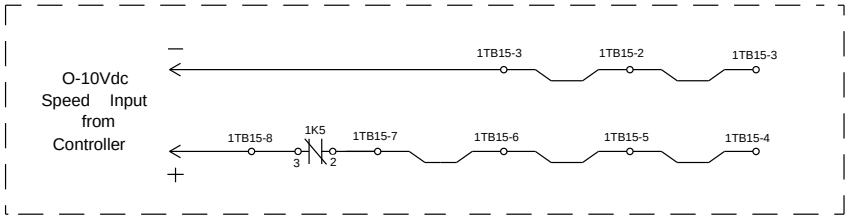


CONTROLLER FUSE (CLASS CC)		
FUSE	VOLTAGE	P/N
IF6 IF7 IF8	200/230	KLDR-15
	460/575	

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1MMP-A, B, C	MANUAL MOTOR PROTECTOR
1K5	LOW LIMIT RELAY
1F6/1F7/1F8	PRIMARY CONTROLLER FUSE
1PDB1, 1PDB3	POWER DISTRIBUTION BLOCK
1TB15	TERMINAL STRIP CONTROL CIRCUIT
3B1-A, 3B1-B, 3B1-C	SUPPLY FAN MOTOR 1

NOTES:

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE CONTROL OPTION. REF. CONTROL PANEL SCHEMATIC FOR SPECIFIC DETAIL.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), STATE AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATINGNOT LESS THAN 600V COPPER CONDUCTORS ONLY.
3. THE MINIMUM CIRCUIT AMPACITY, THE MAXIMUM FUSE SIZE, AND DISCONNECT SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL CODE.
4. ATTACH GROUND OR EQUIPMENT GROUND.
5. IF UNIT HAS SHIPPING SPLITS WIRING WILL TERMINATE TO MODULE AT EACH SHIPPING SPLIT



49513520

NOTICE
USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.

AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.

AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

NOTICE
USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.

AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

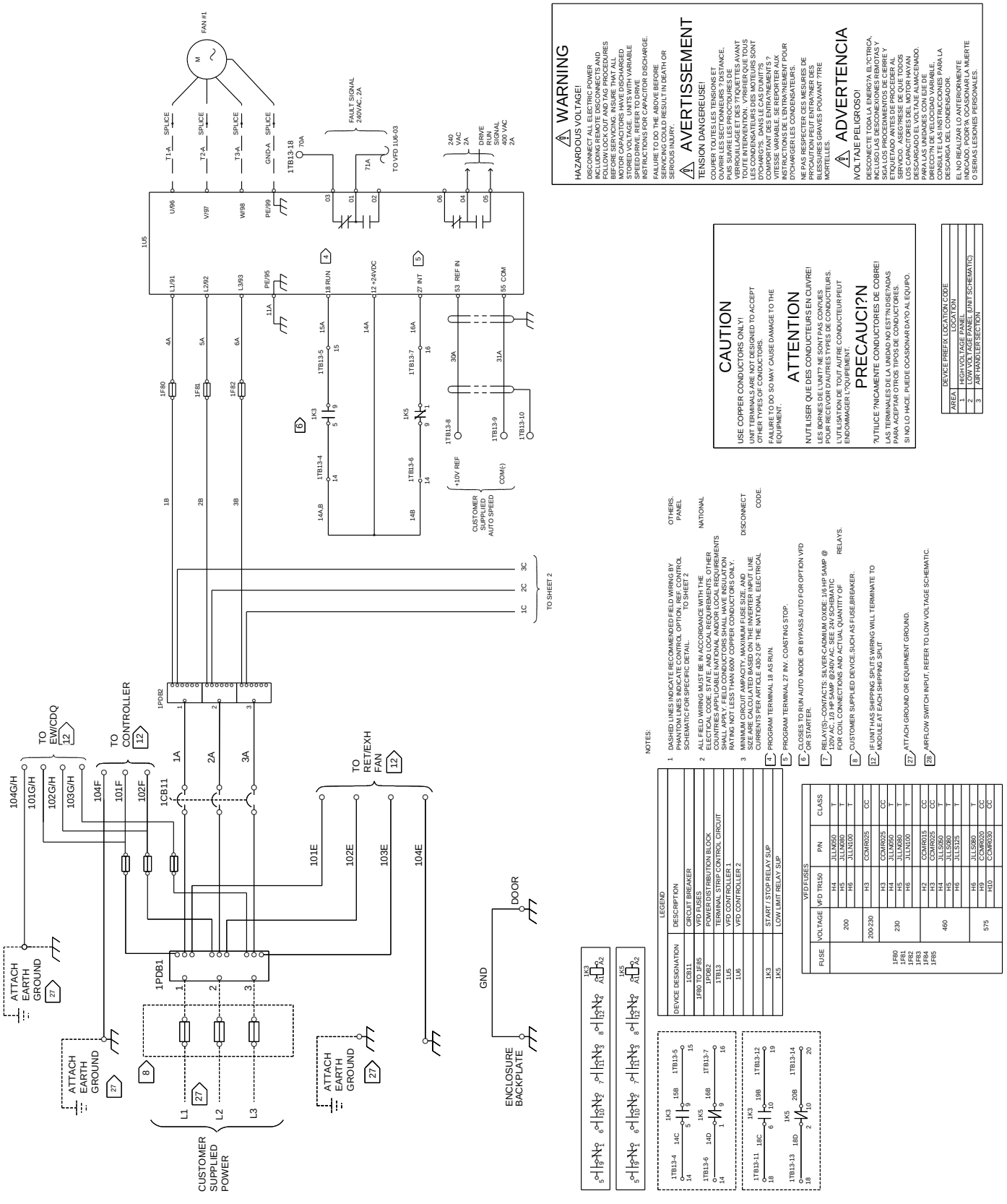
FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.

AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

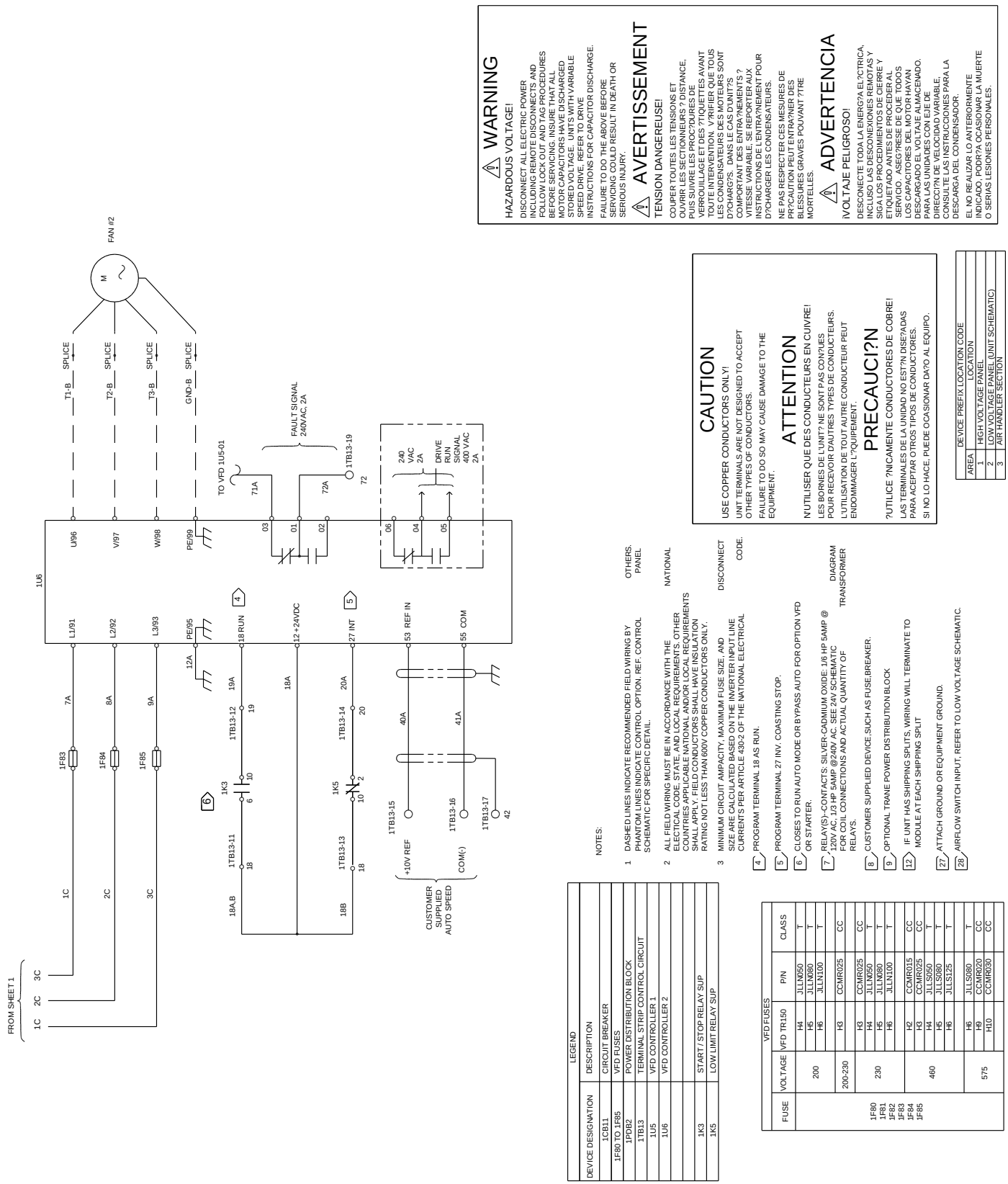
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER, INCLUDING REMOTE DISCONNECTS, AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS ? DISTANCE, PUIS SUIVRE LES PROC?DURES DE VERROUILLAGE ET DES ?TIQUETTES AVANT TOUTE INTERVENTION. V?RIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT D?CHARG?S. DANS LE CAS D'UNIT?S COMPORTANT DES ENTRA?NEMENTS ? VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRA?NEMENT POUR D?CHARGER LES CONDENSATEURS.

NE PAS RESPECTER CES MESURES DE PR?CAUTION PEUT ENTRA?NER DES BLESSURES GRAVES POUVANT ?TRE MORTELLES.

ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERG?A EL?CTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEG?RESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON ELE DE FRECUENCIA VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODR?A OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION

USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNIT? NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'?QUIPEMENT.

PRECAUCI?N

?UTILICE ?NICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO EST?N DISE?ADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

SI NO LO HACE, PUEDE OCASIONAR DA?O AL EQUIPO.

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

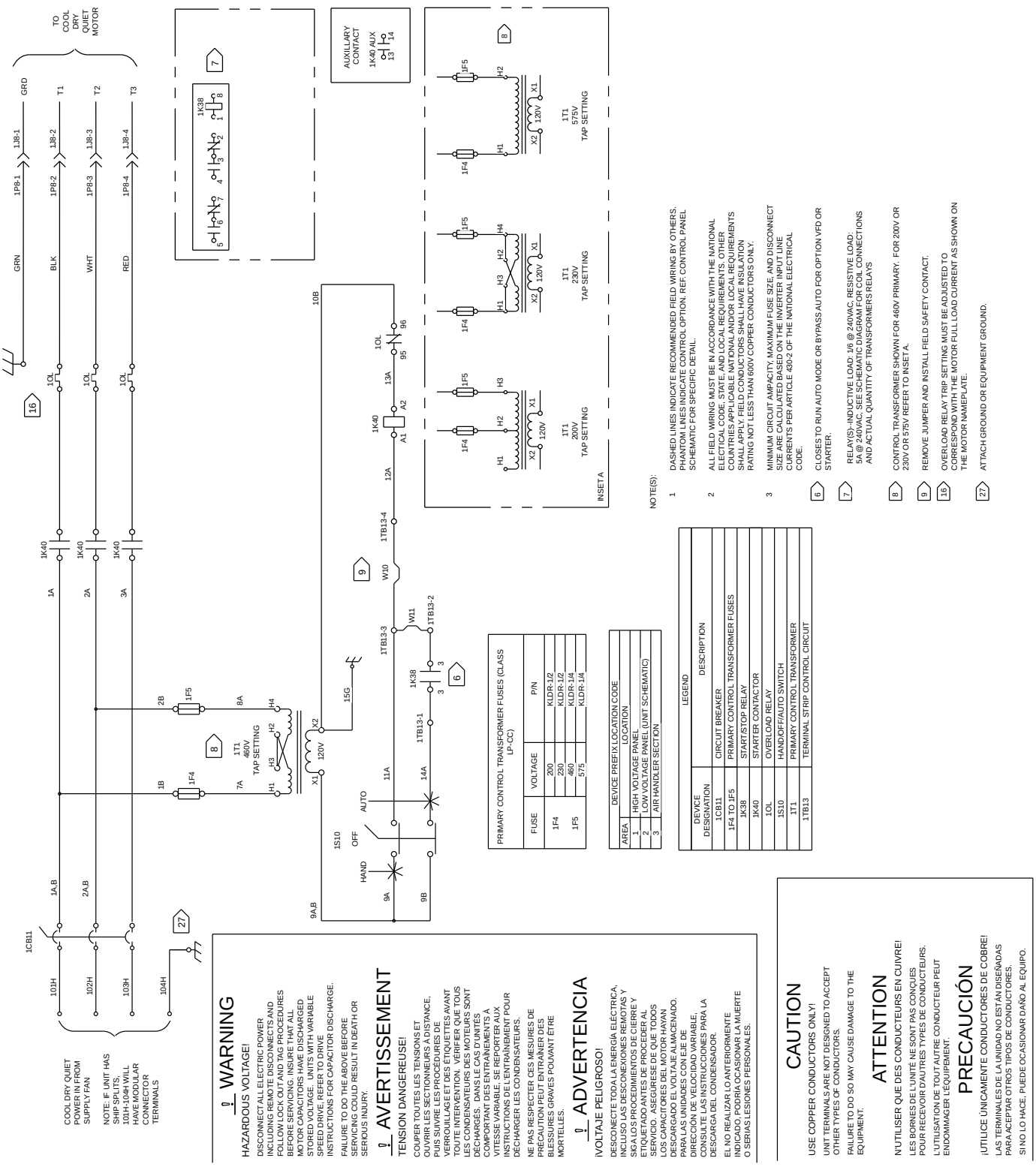
LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F80 TO 1F85	VFD FUSES
1PDB2	POWER DISTRIBUTION BLOCK
1TB13	TERMINAL STRIP CONTROL CIRCUIT
1U5	VFD CONTROLLER 1
1U6	VFD CONTROLLER 2
1K3	START / STOP RELAY SUP
1K5	LOW LIMIT RELAY SUP

NOTES:

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY PHANTOM LINES INDICATE CONTROL OPTION. REF. CONTROL SCHEMATIC FOR SPECIFIC DETAIL. OTHERS; PANEL
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE ELECTICAL CODE, STATE, AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATING NOT LESS THAN 600V COPPER CONDUCTORS ONLY. NATIONAL
3. MINIMUM CIRCUIT AMPACITY, MAXIMUM FUSE SIZE, AND SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL DISCONNECT CODE.
4. PROGRAM TERMINAL 18 AS RUN.
5. PROGRAM TERMINAL 27 INV. COASTING STOP.
6. CLOSES TO RUN AUTO MODE OR BYPASS AUTO FOR OPTION VFD OR STARTER.
7. RELAY(S)-CONTACTS: SILVER-CADMIUM OXIDE: 1/6 HP 5AMP @ 120V AC, 1/3 HP 5AMP @240V AC. SEE 24V SCHEMATIC FOR COIL CONNECTIONS AND ACTUAL QUANTITY OF RELAYS. DIAGRAM TRANSFORMER
8. CUSTOMER SUPPLIED DEVICE,SUCH AS FUSE,BREAKER.
9. OPTIONAL TRANE POWER DISTRIBUTION BLOCK
12. IF UNIT HAS SHIPPING SPLITS, WIRING WILL TERMINATE TO MODULE AT EACH SHIPPING SPLIT
27. ATTACH GROUND OR EQUIPMENT GROUND.
28. AIRFLOW SWITCH INPUT, REFER TO LOW VOLTAGE SCHEMATIC.

VFD FUSES				
FUSE	VOLTAGE	VFD TR150	P/N	CLASS
1F80 1F81 1F82 1F83 1F84 1F85	200	H4	JLLN050	T
		H5	JLLN080	T
		H6	JLLN100	T
	200-230	H3	CCMR025	CC
	230	H3	CCMR025	CC
		H4	JLLN050	T
		H5	JLLN080	T
		H6	JLLN100	T
	460	H2	CCMR015	CC
		H3	CCMR025	CC
		H4	JLLS050	T
		H5	JLLS080	T
		H6	JLLS125	T
	575	H6	JLLS080	T
		H9	CCMR020	CC
		H10	CCMR030	CC

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1



PRIMARY CONTROL TRANSFORMER FUSES (CLASS LP-CC)		
FUSE	VOLTAGE	P/N
1F4	200	KLDR-1/2
	230	KLDR-1/2
	460	KLDR-1/4
1F5	575	KLDR-1/4

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	HIGH VOLTAGE PANEL
2	LOW VOLTAGE PANEL (UNIT SCHEMATIC)
3	AIR HANDLER SECTION

LEGEND	
DEVICE DESIGNATION	DESCRIPTION
1CB11	CIRCUIT BREAKER
1F4 TO 1F5	PRIMARY CONTROL TRANSFORMER FUSES
1K38	START/STOP RELAY
1K40	STARTER CONTACTOR
1OL	OVERLOAD RELAY
1S10	HAND/OFF/AUTO SWITCH
1T1	PRIMARY CONTROL TRANSFORMER
1TB13	TERMINAL STRIP CONTROL CIRCUIT

NOTE(S):

1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE CONTROL OPTION. REF: CONTROL PANEL SCHEMATIC FOR SPECIFIC DETAIL.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTICAL CODE, STATE, AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. FIELD CONDUCTORS SHALL HAVE INSULATION RATING NOT LESS THAN 600V COPPER CONDUCTORS ONLY.
3. MINIMUM CIRCUIT AMPACITY, MAXIMUM FUSE SIZE, AND DISCONNECT SIZE ARE CALCULATED BASED ON THE INVERTER INPUT LINE CURRENTS PER ARTICLE 430-2 OF THE NATIONAL ELECTRICAL CODE.

6. CLOSES TO RUN AUTO MODE OR BYPASS AUTO FOR OPTION VFD OR STARTER.
7. RELAY(S)-INDUCTIVE LOAD: 1/6 @ 240VAC, RESISTIVE LOAD: 5A @ 240VAC. SEE SCHEMATIC DIAGRAM FOR COIL CONNECTIONS AND ACTUAL QUANTITY OF TRANSFORMERS RELAYS
8. CONTROL TRANSFORMER SHOWN FOR 460V PRIMARY. FOR 200V OR 230V OR 575V REFER TO INSET A.
9. REMOVE JUMPER AND INSTALL FIELD SAFETY CONTACT.
16. OVERLOAD RELAY TRIP SETTING MUST BE ADJUSTED TO CORRESPOND WITH THE MOTOR FULL LOAD CURRENT AS SHOWN ON THE MOTOR NAMEPLATE.
27. ATTACH GROUND OR EQUIPMENT GROUND.

⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

⚠ ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON ESTÉ INSTALADO UN VARIADOR DE FRECUENCIA VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

PRECAUCIÓN

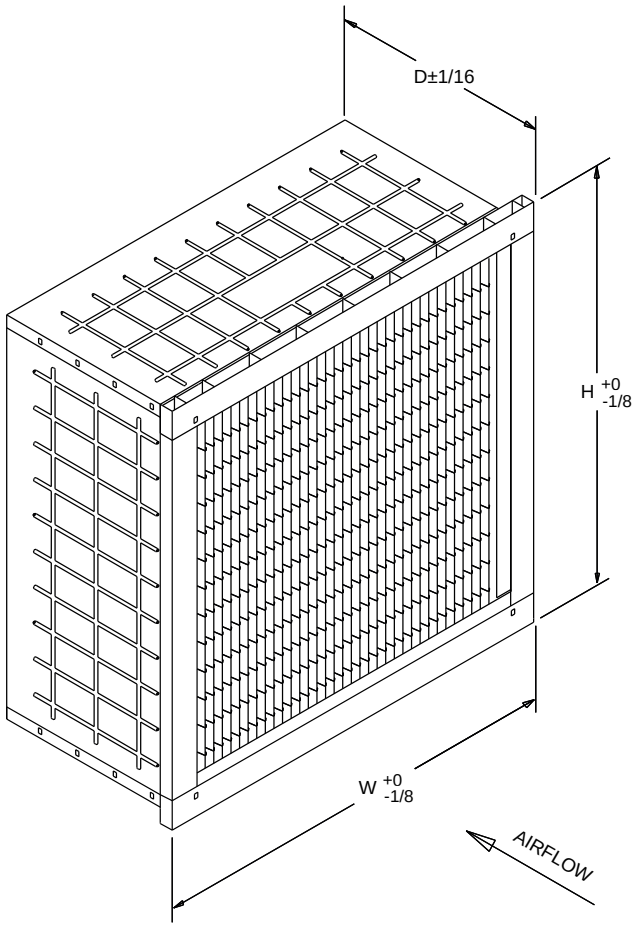
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

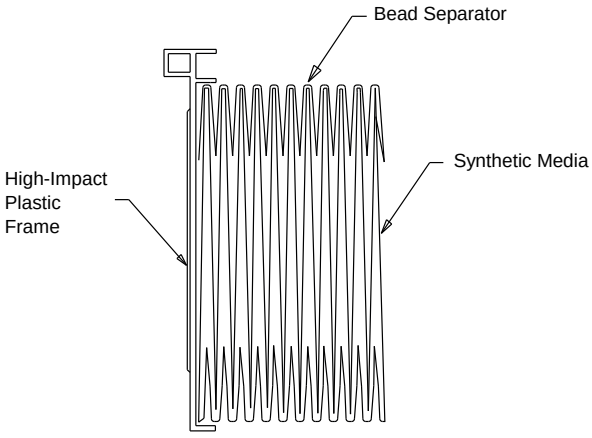
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

20087

Accessory - Performance Climate Changer
Item: A1 Qty: 1 Tag: RTU-1





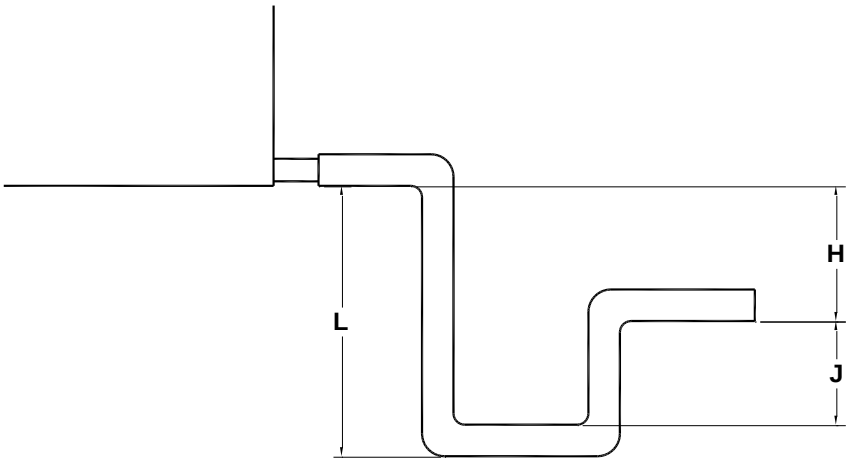
Filter Cross Section

MODEL NUMBER	NOMINAL SIZE (INCHES) HXWXD	ACTUAL SIZE (INCHES) HXWXD	RATED AIR FLOW (CFM)	INITIAL RESISTANCE (IN. w.G.)	MEDIA AREA (SQUARE FEET)	MERV RATING
LG-904	24X24X12	23-3/8X23-3/8X11-1/2	2000	.34	101.5	15
LG-915	20X24X12	19-3/8X23-3/8X11-1/2	1650	.34	83.0	15
LG-913	20X20X12	19-3/8X19-3/8X11-1/2	1400	.34	67.7	15
LG-903	12X24X12	11-3/8X23-3/8X11-1/2	1000	.34	46.1	15
LG-604	24X24X12	23-3/8X23-3/8X11-1/2	2000	.34	101.5	11
LG-615	20X24X12	19-3/8X23-3/8X11-1/2	1650	.34	83.0	11
LG-613	20X20X12	19-3/8X19-3/8X11-1/2	1400	.34	67.7	11
LG-603	12X24X12	11-3/8X23-3/8X11-1/2	1000	.34	46.1	11

USTANDARD CONSTRUCTION
1. 100 % Synthetic Media
2. Bead Separator Packs
3. High-Impact Plastic Frame Panels
4. Foamed Hot Melt Sealant
5. Reverse Air Flow Option Available
   See MKT-B-00542

UNOTES
1. Testing per ASHRAE 52.2-1999
2. Final Resistance: 1.5" W.G.
3. Rated Velocity - 500 FPM
4. Maximum Operating Temperature: 140 deg. F
5. Class 1 Filter per UL Standard 900
6. Special Sizes Not Available

Accessory - Performance Climate Changer
Trap Schedule
Item: A1 Qty: 1 Tag: RTU-1



Drain pan trapping for section under negative pressure

L = H + **J** + pipe diameter where:
H = 1 inch for each inch of negative pressure (loaded filters) plus 1 inch
J = ½ **H**

Drain pan trapping for section under positive pressure

L = H + **J** + pipe diameter where:
H = 1/2 inch (minimum)
J = ½ inch plus the unit positive static pressure at coil discharge (loaded filters)

Unit Tag(s)	Unit Size	Entering Ext. Static Pressure (in H2O)	Discharge Ext. Static Pressure (in H2O)	Drain pan Section Location	Recommended Trap Dimensions[1]			Selected Baserail Height (in)[1]
					H (in)	J (in)	L (in)	
RTU-1[2]	Unit size 25	1.250	1.250	Coil section [23]	0.500	4.301	5.801	6.000
				Coil section [27]	0.500	3.124	4.624	6.000

[1] To ensure proper condensate trapping the field installed housekeeping pad height is the responsibility of the contractor.
[2] The external static pressure used for fan selection was assumed to be divided 50% to entering duct external static pressure and 50% discharge external static pressure.

Accessory - Performance Climate Changer
Filter Schedule
Item: A1 Qty: 1 Tag: RTU-1

Unit Tag(s)	Unit Size	Filter Location	Filter Arrangement	Filter Depth	Filter Type	MERV Rating	Filter Quantity	Filter Size
RTU-1	Unit size 25	Filter section [4]	Angled filter	2in. filter frame	No prefilter		-	-
					Pleated media - run set	MERV 13	18	16in.x25in.
		Filter section [8]	Angled filter	2in. filter frame	No prefilter		-	-
					Pleated media - run set	MERV 13	18	16in.x25in.
		Filter section [28]	Cartridge filter	Bag/cartridge filter frame	No prefilter		3 6	12in.x24in. 20in.x24in.
					12in. cartridge - 95% eff - run set	MERV 15	3 6	12in.x24in. 20in.x24in.

Field Wiring - Performance Climate Changer
MCA MOP Schedule
Item: A1 Qty: 1 Tag: RTU-1

Unit Tag(s)	Circuit	Circuit Description	Voltage/Phase/Hz	MCA (A)	MOP (A)
RTU-1	1	Single Point Power	460/3/60	120.14	150.00
	2	Receptacle	115/1/60	10.00	15.00

Field Installed Options - Part/Order Number Summary
This is a report to help you locate field installed options that arrive at the jobsite. This report provides part or order numbers for each field installed option, and references it to a specific product tag. It is NOT intended as a bill of material for the job.

Product Family - Performance Climate Changer

Item	Tag	Qty	Description	Model Number
A1	RTU-1	1	Performance Climate Changer (CSAA)	CSAA025UB

Field Installed Option Description	Part/Ordering Number
Remote TD7 LCD Screen	
O.A. Pleated Media Pre-Filters	
R.A. Pleated Media Filters	
12” Cartridge - 95% Efficient Final Filters	

GENERAL NOTES

GENERAL: UNLESS SPECIFICALLY INDICATED OTHERWISE, ALL WORK SHOWN ON ELECTRICAL DRAWINGS IS NEW WORK TO BE PROVIDED UNDER THIS CONTRACT.

COORDINATION: COORDINATE AND COOPERATE WITH ALL TRADES ON THE PROJECT. THE CONTRACTOR SHALL REVIEW ALL CONTRACT DOCUMENTS INCLUDING CIVIL, STRUCTURAL, ARCHITECTURAL DRAWINGS AND SPECIFICATIONS. CONTRACTOR SHALL COORDINATE AND ADJUST ACCORDINGLY AS DIRECTED BY THE ENGINEER.

AS-BUILT DRAWINGS: SECURE AN EXTRA SET OF ELECTRICAL DRAWINGS TO BE KEPT ON SITE AND MARK, DAILY, THE DRAWINGS IN RED AS THE PROJECT PROGRESSES IN ORDER TO KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEEN THE WORK SHOWN ON THE DRAWINGS AND THE WORK WHICH IS ACTUALLY INSTALLED. THESE MARKED DRAWINGS SHALL REFLECT ANY AND ALL CHANGES AND REVISIONS TO THE ORIGINAL DESIGN WHICH EXISTS IN THE COMPLETED WORK. DELIVER THE MARKED DRAWINGS TO THE ENGINEER AT PROJECT CLOSE-OUT.

TESTS: TEST ALL WIRING FOR CONTINUITY AND GROUNDS BEFORE CONNECTING ANY FIXTURES OR DEVICES. PERFORM INSULATION RESISTANCE TESTS ON ALL WIRING #6 OR LARGER TO INSURE THAT ALL PORTIONS ARE FREE FROM SHORT-CIRCUITS AND GROUNDS.

INSPECTIONS: ARRANGE ALL NECESSARY INSPECTIONS. DELIVER ALL REQUIRED INSPECTION CERTIFICATES TO THE OWNER.

GROUNDING: PROVIDE GROUNDING IN ACCORDANCE WITH THE NEC FOR THE ENTIRE ELECTRICAL SYSTEM INCLUDING EQUIPMENT FRAMES, CONDUITS, SWITCHES, CONTROLLERS, WIRE-WAYS, NEUTRAL CONDUCTORS, AND OTHER EQUIPMENT. PROVIDE A GROUNDING CONDUCTOR IN ALL POWER CONDUITS.

LABELS: PROVIDE LABELS FOR ALL PANELBOARDS, CABINETS, SAFETY SWITCHES, MOTOR-DISCONNECT SWITCHES, AND MOTOR CONTROLLERS. LABELS SHALL BE MACHINE ENGRAVED, LAMINATED PLASTIC, PERMANENTLY ATTACHED WITH SELF-TAPPING SCREWS OR RIVETS. DO NOT USE SELF-ADHESIVE LABELS. LABEL SHALL INDICATE EQUIPMENT DESIGNATION AND ASSOCIATED PANEL AND CIRCUIT THAT SERVES IT.

J-BOX LABELING: LABEL ALL JUNCTION BOXES WITH PERMANENT MARKER IDENTIFYING CIRCUIT NUMBER AND PANELBOARD OF CIRCUITS WITHIN.

WIRING DEVICES: LABEL ALL WIRING DEVICES WITH PANELBOARD AND CIRCUIT DESIGNATION PERMANENTLY ATTACHED WITH BLACK TYPED DESIGNATION ON CLEAR TAPE.

PANEL DIRECTORY: PROVIDE TYPEWRITTEN PANELBOARD DIRECTORY CARD IN EACH PANELBOARD WITH CIRCUIT LOAD INFORMATION AND ROOM NUMBER CLEARLY IDENTIFIED. USE ACTUAL ROOM NUMBERS IN THE BUILDING, NOT THE ROOM NUMBERS SHOWN ON THE CONTRACT DRAWINGS, AS THEY ARE OFTEN DIFFERENT.

CONDUCTORS AND MATCHING LUGS: IN SITUATIONS WHERE CONDUCTOR SIZES AND/OR QUANTITIES OF PARALLEL SETS HAVE BEEN INCREASED DUE TO VOLTAGE DROP OR FOR OTHER REASONS, CONTRACTOR SHALL PROVIDE THE APPROPRIATE LUG SIZES/QUANTITIES WITHIN THE EQUIPMENT CONNECTED (SWITCHBOARD, PANELBOARD, DISCONNECT SWITCH, TRANSFER SWITCH ETC.) TO PERMIT SATISFACTORY CONNECTION OF THE INDICATED CONDUCTORS. WHERE SUFFICIENT LUG SIZES AND/OR QUANTITIES CANNOT BE PROVIDED TO ACCOMMODATE THE CONDUCTORS INDICATED, THEN PROVIDE REDUCING ADAPTERS, PIN TERMINALS, OR A JUNCTION BOX TO SPLICE LARGER CONDUCTORS TO APPROPRIATELY SIZED SMALLER CONDUCTORS TO FIT INTO THE LUGS PROVIDED. ALL CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE NEC.

MOTOR COORDINATION: MOTORS, MOTOR STARTERS, CONTROLLERS, INTEGRAL DISCONNECT SWITCHES, AND CONTACTORS SHALL BE PROVIDED WITH THEIR RESPECTIVE PIECES OF EQUIPMENT BY THE EQUIPMENT SUPPLIER. COMMUNICATE WITH THE TRADES PROVIDING THE EQUIPMENT, VERIFYING ALL REQUIREMENTS, PROVIDE ALL ELECTRICAL CONNECTIONS REQUIRED THEREIN, AND INSTALL MOTOR STARTERS.

MOTOR DISCONNECTS: ALL MOTORS SHALL HAVE DISCONNECTING MEANS.

MOTOR CONTROLLERS: ALL 3-PHASE MOTORS SHALL HAVE MAGNETIC MOTOR CONTROLLERS WITH SOLID STATE OVERLOAD RELAY PROTECTION. THE SOLID STATE OVERLOAD RELAY SHALL HAVE PHASE LOSS AND PHASE OVERCURRENT PROTECTION WITH AUTOMATIC RESET UPON RETURN OF NORMAL POWER.

MOTOR FUSE PROTECTION: WHERE FUSE PROTECTION IS SPECIFICALLY REQUIRED BY THE EQUIPMENT MANUFACTURER, PROVIDE FUSED SWITCHES IN LIEU OF NON-FUSED SWITCHES OR IN LIEU OF ENCLOSED CIRCUIT BREAKERS, OR OTHER DEVICES INDICATED.

REDUCED VOLTAGE STARTERS: REDUCED VOLTAGE STARTERS OR ELECTRONIC SOFT START CONTROLLERS OR VARIABLE FREQUENCY DRIVES (VFD) SHALL BE PROVIDED FOR ALL MOTORS 40HP AND LARGER AT 480 VOLTS, AND 20 HP AND LARGER AT 208 VOLTS.

CONNECTION DETAILS: SECURE APPROVED SHOP DRAWINGS SHOWING WIRING DIAGRAMS, ROUGH-IN AND HOOK UP DETAILS FROM OTHER INVOLVED CONTRACTORS FOR EQUIPMENT WHICH MUST BE CONNECTED ELECTRICALLY.

COORDINATION DETAILS: MECHANICAL EQUIPMENT WILL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR. THE LOCATIONS SHOWN ON THE ELECTRICAL DRAWINGS ARE APPROXIMATE. COORDINATE WITH THE MECHANICAL CONTRACTOR TO DETERMINE THE EXACT LOCATION OF EACH PIECE OF EQUIPMENT AND DETERMINE THE EXACT ROUGH-IN AND CONNECTION REQUIREMENTS.

WORKING CLEARANCE: COORDINATE FINAL LOCATIONS OF ELECTRICAL EQUIPMENT WITH MECHANICAL DUCTWORK, PIPING ETC. AND ASSURE WORKING CLEARANCE REQUIRED BY NEC WILL BE MET. SUFFICIENT ACCESS AND WORKING SPACE SHALL BE PROVIDED AND MAINTAINED AROUND ELECTRICAL EQUIPMENT AS REQUIRED BY THE NATIONAL ELECTRICAL CODE. CONTRACTOR SHALL COORDINATE FINAL LOCATION OF EQUIPMENT PROVIDED AND INSTALLED BY OTHER TRADES.

STARTER MOUNTING: WHERE AN INDIVIDUALLY MOUNTED SAFETY SWITCH, STARTER OR CIRCUIT BREAKER IS SHOWN ADJACENT TO ITS RESPECTIVE LOAD AND NOT MOUNTED ON A WALL, PROVIDE ALL SUPPORTS, BRACKETS, ANCHORING, ETC. NECESSARY TO PROPERLY SUPPORT THE DEVICE.

LIGHTING ARRANGEMENT: ARRANGE LIGHTING FIXTURES IN ACCORDANCE WITH THE ARCHITECTURAL REFLECTED CEILING PLANS.

LIGHTING COORDINATION: COORDINATE LIGHTING FIXTURES WITH GRILLES, DIFFUSERS, SPRINKLER HEADS, AND ACCESS PANELS, ETC. PROVIDE FIXTURE MOUNTING BRACKETS, ACCESSORIES, PLASTER FRAMES, ETC.. SUITABLE FOR THE CEILING TYPES INDICATED ON THE ARCHITECTURAL PLANS.

LIGHTING CONTROL TESTING: UPON COMPLETION OF THE INSTALLATION OF ALL LIGHTING SYSTEMS AND CONTROL DEVICES, CONTRACTOR SHALL CONFIRM PROPER OPERATION OF ALL LIGHTING CONTROLS, AND DEMONSTRATE PROPER OPERATION TO THE OWNER AND/OR ENGINEER.

MATERIAL COORDINATION: VERIFY CEILING AND WALL CONSTRUCTION AND MATERIAL PRIOR TO ORDERING LIGHT FIXTURES OR OTHER DEVICES TO INSURE PROPER FIXTURE OR DEVICE IS FURNISHED TO MATCH CONSTRUCTION.

MOUNTING HEIGHTS: MOUNTING HEIGHTS INDICATED ARE FROM THE FINISHED FLOOR TO THE CENTERLINE OF THE WIRING DEVICE UNLESS OTHERWISE NOTED. MOUNTING HEIGHTS OF LIGHTING FIXTURES ARE TO THE BOTTOM OF THE FIXTURE UNLESS OTHERWISE NOTED.

DEVICE LOCATIONS: COORDINATE LOCATIONS OF SWITCHES, RECEPTACLES, AND TELE/DATA OUTLETS WITH OTHER WALL MOUNTED DEVICES SUCH AS THERMOSTATS AND CONTROL STATIONS.

DEVICE COORDINATION: THOROUGHLY REVIEW AND COORDINATE ALL CASEWORK AND CABINET DRAWINGS AND ARCHITECTURAL ELEVATIONS WITH DEVICE LOCATIONS PRIOR TO ROUGH-IN OF OUTLET BOXES.

BARRIERS: WHERE A MULTIPLE-GANG BOX HAS CIRCUITS OF DIFFERENT VOLTAGES OR SYSTEMS WHICH ARE REQUIRED TO BE SEPARATED, PROVIDE THE CODE-REQUIRED SEPARATION USING A FULL HEIGHT AND DEPTH BARRIER PLATE.

FIRE STOPPING: FOR ANY WALL OR FLOOR PENETRATIONS THROUGH FIRE-RATED STRUCTURES PROVIDE FIRE-STOPPING TO SEAL ALL THE PENETRATIONS AFTER THE CONDUIT HAS BEEN INSTALLED. FIRE STOPPING FOR PENETRATIONS SHALL BE UL APPROVED PER THE PENETRATION MADE IN ORDER TO MAINTAIN FIRE-RATED INTEGRITY OF THE STRUCTURE.

CLEAN UP: ON PROJECT CLOSE-OUT CLEAN ALL ELECTRICAL DEVICES, LIGHTING FIXTURES, AND LENSES, AND REMOVE ALL PAINT SPATTERS FROM DEVICES, FIXTURES AND PLATES. REPLACE ALL INOPERATIVE FIXTURES.

GROUND FAULT PROTECTION: RECEPTACLES LOCATED WITHIN 6'-0" OF THE EDGE OF SINKS SHALL BE PROVIDED WITH GROUND FAULT PROTECTION WHETHER SHOWN OR NOT.

FIRE ALARM COORDINATION: THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE FIRE ALARM SYSTEM PROVIDER AND PROVIDE POWER CONNECTIONS TO ALL COMPONENTS WHETHER SHOWN OR NOT. MANUFACTURERS REQUIRE VARYING QUANTITIES OF POWER CONNECTIONS FOR EQUIPMENT LIKE EXPANDER PANELS AND POWER SUPPLIES. THESE DEVICES ARE DEPENDENT UPON THE SPECIFIC MANUFACTURERS SYSTEM. THE FIRE ALARM SYSTEM SUPPLIER SHALL NOTIFY THE OTHER APPROPRIATE SUB-CONTRACTORS ABOUT THESE REQUIREMENTS AND CONNECTION SHALL BE PROVIDED AS PART OF THE PROJECT.

HVAC DAMPERS, ETC: CONTRACTORS SHALL COORDINATE WITH THE EQUIPMENT AND SYSTEM BEING PROVIDED AND PROVIDE POWER CONNECTIONS ACCORDINGLY. THESE CONNECTIONS SHALL BE FOR FIRE/SMOKE DAMPERS, DDC CONTROL DEVICES, ETC. CONTRACTOR SHALL COORDINATE THE VOLTAGE REQUIREMENTS AND PROVIDE ALL NECESSARY CONNECTIONS, COMPONENTS, ETC. THIS INCLUDES TRANSFORMERS, BOXES, ETC.

FIRE ALARM EQUIPMENT SURVIVAL: ACCORDING TO APPLICABLE CODE, A SMOKE DETECTOR IS REQUIRED AT ALL CONTROL PANEL LOCATIONS (I.E. FIRE ALARM PANEL, NOTIFICATION EXTENDER PANELS, TRANSMITTERS, ETC.). CONTRACTOR SHALL PROVIDE SYSTEM SMOKE DETECTORS FOR ALL LOCATIONS OF FIRE ALARM PANELS, TO INCLUDE THOSE SHOWN AND THOSE THAT ARE ADDED BY THE CONTRACTOR FOR THEIR SPECIFIC DESIGN.

OWNER STANDARDS: ALL WORK SHALL COMPLY WITH THE OWNER'S PUBLISHED STANDARDS WHICH ARE AVAILABLE DIRECTLY FROM THE OWNER.

LEGEND

LIGHTING

- LIGHTING FIXTURE
- EMERGENCY LIGHTING FIXTURE CONNECT TO LIFE SAFETY LIGHTING CIRCUIT. SUBSCRIPT "NL", WHERE USED, INDICATES A NIGHT LIGHT (ALL DRIVERS UNSWITCHED).
- DOWNLIGHT OR PENDANT MOUNTED FIXTURE
- EXIT LIGHTING FIXTURE, WITH DIRECTIONAL ARROWS AS INDICATED - CONNECT AHEAD OF LOCAL SWITCH.
- A — LIGHTING FIXTURE TYPE SYMBOL. SEE LIGHTING FIXTURE DETAILS.
- S — SINGLE POLE SWITCH, 20A, 120/277V, 46" AFF UON
- (V) — CEILING MOUNTED DUAL TECHNOLOGY ULTRASONIC/PASSIVE INFRAREDVACANCY SENSOR.
- S_V — WALL MOUNTED DUAL TECHNOLOGY VACANCY SENSOR WITH SINGLE POLE SWITCH, 120/277V, MOUNT 46"AFF.
- S_{VD} — WALL MOUNTED DUAL TECHNOLOGY VACANCY SENSOR WITH DIMMINGCAPABILITIES, 120/277V, MOUNT 46"AFF. COORDINATE VOLTAGE AND RATINGS OF SWITCH WITH TYPE AND QUANTITY OF DRIVERS TO BE CONTROLLED.
- S_L — WALL MOUNTED LOW VOLTAGE MOMENTARY CONTACT SWITCH, 24VDC, MOUNT 46"AFF.
- S_{LD} — WALL MOUNTED LOW VOLTAGE MOMENTARY CONTACT SWITCH WITH DIMMING CAPABILITIES, 24VDC, MOUNT 46"AFF.

POWER

RECEPTACLES SHALL BE SPECIFICATION GRADE, (TYP, UON).
THE FOLLOWING SUBSCRIPTS SHALL APPLY TO RECEPTACLES WHERE USED:

- GFI: GROUND FAULT INTERRUPTING TYPE RECEPTACLE
- +XX": DEVICE MOUNTING HEIGHT DESIGNATION ABOVE FINISHED FLOOR IF OTHER THAN 18" OR 46".
- TV: TELEVISION RECEPTACLE, COORDINATE MOUNTING HEIGHT WITH TELEVISION MOUNTING BRACKET.
- C: RECEPTACLE MOUNTED FLUSH IN CEILING.
- H: RECEPTACLE MOUNTED HORIZONTALLY
- CR: CORD REEL
- XP: EXPLOSION PROOF RECEPTACLE

- DUPLEX CONVENIENCE RECEPTACLE 20A, 120V, 18" AFF, UON
- TWO DUPLEX RECEPTACLES IN COMMON BOX, EACH 20A, 120V, 18" AFF, UON
- DUPLEX CONVENIENCE RECEPTACLE 20A, 120V, 46" AFF, UON (OR 6" ABOVE COUNTER AS APPLICABLE)
- TWO DUPLEX RECEPTACLES IN COMMON BOX, EACH 20A, 120V, 46" AFF, UON (OR 6" ABOVE COUNTER OR BACKSPLASH AS APPLICABLE
- SPECIAL RECEPTACLE, AS NOTED ON PLANS
- SURFACE METAL RACEWAY WITH 20A, 120V DUPLEX RECEPTACLES AND TELE/DATA OUTLETS AT 12" ON CENTER. PROVIDE RACEWAY WITH DIVIDER TO SEPARATE 120V POWER CIRCUITING AND COMMUNICATIONS CABLING. MOUNT 1" ABOVE COUNTERTOP BACKSPLASH.
- (E) — EQUIPMENT CONNECTION
- (B) — BLANK PLATE
- (J) — JUNCTION BOX
- MOTOR CONNECTION
- SAFETY SWITCH, 60A-3P, FU @ 30A, 3R
  - SWITCH RATING
  - NUMBER OF POLES
  - FUSE RATING (NF INDICATES NON-FUSED)
  - NEMA ENCLOSURE IF OTHER THAN NEMA 1
- GFI — HEAT TAPE CONNECTION, CLASS B GFI DEVICE WITH PUSH TO TEST AND RESET BUTTONS WITH WEATHER PROOF COVER. CONNECT AHEAD OF HEAT TRACE THERMOSTAT
- VFD — VARIABLE FREQUENCY DRIVE (UNIT SUPPLIED WITH DISCONNECTING MEANS) (1)

POWER (CONT.)

- SPD — SURGE PROTECTIVE DEVICE
- ELECTRICAL PANELBOARD
- T — DRY-TYPE TRANSFORMER
- AND — ELECTRICAL CIRCUIT RUN IN CONDUIT AND CIRCUIT HOMERUN TO PANELBOARD (PANEL AND CIRCUIT DESIGNATION AS INDICATED). AS A MINIMUM CONDITION, EACH SINGLE PHASE CIRCUIT SHALL HAVE 1 #12 PHASE CONDUCTOR, 1 #12 NEUTRAL CONDUCTOR AND 1 #12 GROUNDING CONDUCTOR IN 1/2" CONDUIT. PROVIDE ADDITIONAL PHASE CONDUCTORS AS REQUIRED FOR "MULTIPLE PHASED" ELECTRICAL LOADS. PROVIDE NEUTRAL CONDUCTOR TO ALL WALL SWITCH OUTLET BOXES WHETHER REQUIRED OR NOT. PROVIDE ADDITIONAL "SWITCH LEG" CONDUCTORS TO PROVIDE THE LIGHT FIXTURE CONTROL INDICATED. MULTIPLE SINGLE PHASE CONDUCTORS MAY BE GROUPED TOGETHER IN A COMMON CONDUIT IN ACCORDANCE WITH THE NEC AND AT THE CONTRACTOR'S DISCRETION. GROUNDING CONDUCTORS MAY BE SHARED AS ALLOWED BY THE NEC. NEUTRAL CONDUCTORS SHALL NOT BE SHARED. MULTI-POLE BREAKERS SHALL BE PROVIDED IN ACCORDANCE WITH THE NEC WHERE MULTI-WIRE BRANCH CIRCUITS ARE REQUIRED. CONDUIT LARGER THAN 1/2" AND CONDUCTORS LARGER THAN #12 SHALL BE AS INDICATED.

TELECOMMUNICATIONS

- C — TELE/DATA OUTLET, 4"X4"X2 1/8"D BOX WITH SINGLE GANG PLASTER RING AND SINGLE GANG COVERPLATE TO MATCH ELECTRICAL OUTLET COVERPLATE MATERIAL AND COLOR, 18" AFF, UON, WITH 1"C WITH PULL STRING, STUBBED ABOVE ACCESSIBLE CEILING OR TO CABLE TRAY AND TERMINATED WITH BUSHING. SUBSCRIPT "C" INDICATES CEILING MOUNTED. WHERE OUTLET IS ADJACENT TO A POWER RECEPTACLE, MOUNT AT SAME ELEVATION AS POWER RECEPTACLE, UON.
- TV — TELEVISION (TV) OUTLET, 18" AFF, UON, PROVIDE 1"C WITH PULL WIRE STUBBED ABOVE ACCESSIBLE CEILING, OR TO CABLE TRAY AS APPLICABLE. WHERE OUTLET IS ADJACENT TO A POWER RECEPTACLE, MOUNT AT SAME ELEVATION AS POWER RECEPTACLE, UON.
- WIRE BASKET CABLE TRAY - 4" WIDE X 4" DEEP. SEE WIRE BASKET CABLE TRAY DETAIL SHEET E601 FOR ADDITIONAL INFORMATION
- (S) — SPEAKER, CEILING MOUNTED
- S — SPEAKER CONTROLLER, WALL MOUNTED

FIRE ALARM

- FIRE ALARM CONTROL PANEL, EXISTING SIMPLEX 4100
- (F)15 — FIRE ALARM AUDIO/VISUAL (HORN/STROBE) APPLIANCE, CEILING MOUNT. NUMBER SUBSCRIPT INDICATES MINIMUM CANDELA RATING.
- F 15 — FIRE ALARM AUDIO/VISUAL (HORN/STROBE) APPLIANCE, 80" AFF, OR 6" BELOW FINISHED CEILING, WHICHEVER IS LOWER, UON. SUBSCRIPT INDICATES MINIMUM CANDELA RATING OF STROBE.
- 15 — FIRE ALARM VISUAL (STROBE) APPLIANCE CEILING MOUNTED. SUBSCRIPT INDICATES MINIMUM CANDELA RATING OF STROBE.
- (S) — FIRE ALARM SYSTEM PHOTOELECTRIC SMOKE DETECTOR, CEILING MOUNTED
- (D) — FIRE ALARM SYSTEM DUCT DETECTOR

ACCESS CONTROL (RACEWAY INFRASTRUCTURE ONLY)

- CR — CARD READER
- DC — DOOR CONTACTS
- EH — ELECTRIFIED DOOR HARDWARE
- RTE — REQUEST TO EXIT

SEE "TYPICAL SECURITY DOOR CONFIGURATION" SHEET E601 FOR ADDITIONAL INFORMATION

SECURITY SYSTEM

- SECURITY CAMERA, CEILING MOUNTED

GENERAL

- 1 — NEW WORK NOTE SYMBOL
- 1 — DEMOLITION NOTE SYMBOL

FIRE STOPPING NOTE:

CONTRACTOR SHALL PROVIDE AN APPROPRIATE LISTED THROUGH-PENETRATION FIRE STOPPING ASSEMBLY AT EACH PENETRATION OF FIRE RATED CONSTRUCTION (I.E. WALLS AND SLABS, ETC.). FIRE STOPPING OF DUCT PENETRATIONS THROUGH RATED ASSEMBLIES ARE ONLY PERMITTED WHEN FIRE AND/ OR SMOKE DAMPERS ARE NOT REQUIRED. SLEEVES SHALL ONLY BE PERMITTED WHERE INDICATED IN THE CONTRACTOR SELECTED THROUGH-PENETRATION FIRE STOPPING ASSEMBLY. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION OF ALL RATED ASSEMBLIES AND ASSOCIATED UL DESIGNATIONS. DEVICES INSTALLED RECESSED WITHIN FIRE RATED CONSTRUCTION (I.E. LIGHT SWITCHES, RECEPTACLES, ICE MAKER BOXES, ETC.) ARE ONLY PERMITTED WHEN AN APPROVED LISTED FIRE STOPPING SYSTEM EXISTS FOR THE APPLICATION. IF AN APPROVED LISTED FIRE STOPPING SYSTEM IS NOT AVAILABLE, THE CONTRACTOR SHALL BRING THE CONDITION TO THE ATTENTION OF THE A/E FOR RESOLUTION PRIOR TO PROCEEDING WITH WORK.

ENERGY CODE COMPLIANCE PATH:

- ☐ ASHRAE 90.1
- ■ VECC CHAPTER 4 - PRESCRIPTIVE
- ☐ VECC CHAPTER 4 - PERFORMANCE

LIGHTING CONTROLS:

CONTRACTOR SHALL PROVIDE ALL LIGHTING CONTROL WIRING REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONING SYSTEM. CONTROL WIRING SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPTING CAPACITY
AV	AUDIO VISUAL
C	CONDUIT
CCTV	CLOSED CIRCUIT TELEVISION
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CKT	CIRCUIT
CB	CIRCUIT BREAKER
DDC	DIRECT DIGITAL CONTROL
EBU	EMERGENCY BATTERY UNIT
EC	EMPTY CONDUIT
EF	EXHAUST FAN
EQUIP	EQUIPMENT
ETR	EXISTING TO REMAIN
EXIST	EXISTING
FHP	FRACTIONAL AC HORSEPOWER
FLA	FULL LOAD AMPS
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
HP	HORSE POWER/HEAT PUMP
KAIC	THOUSAND AMPERE INTERRUPTING CAPACITY
KVA	KILO-VOLT-AMPERES
KW	KILO-WATTS
LPW	LUMENS PER WATT
LTG	LIGHTING
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MFR	MANUFACTURER
MLO	MAIN LUGS ONLY
MTD	MOUNTED
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
P	POLE
PNL	PANEL
PNLBD	PANELBOARD
Ø	PHASE
PRI	PRIMARY
RECEPT	RECEPTACLE
RTU	ROOF TOP UNIT
SEC	SECONDARY
TBB	TELEPHONE BACKBOARD
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLT
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS/WIRE
WP	WEATHERPROOF

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM
PF&A
7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222
1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

EVMS
Eastern Virginia Medical School

Designed By:	KPM
Drawn By:	JEB
Checked By:	ADR
Scale:	AS NOTED
Date:	04-25-2019

COMMONWEALTH OF VIRGINIA
JAMES E. BARKLEY, JR.
Lic. No. 043854
4/25/19
PROFESSIONAL ENGINEER
SEAL

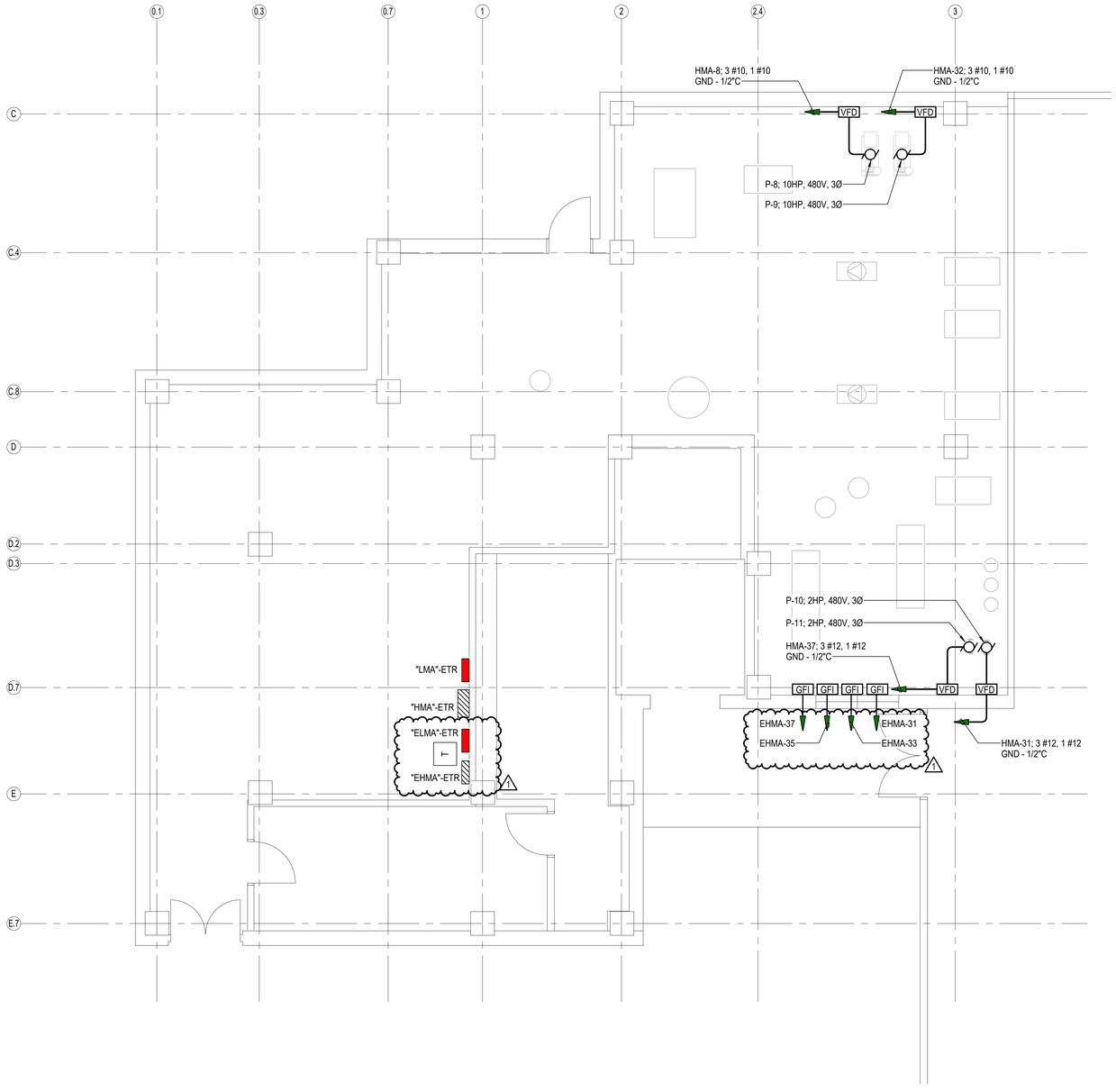
Revisions		
No.	Date	Description
1	05/06/2019	ADDENDUM 1

Renovate Gross Anatomy Lab at Lewis Hall

Legend, Notes and Abbreviations

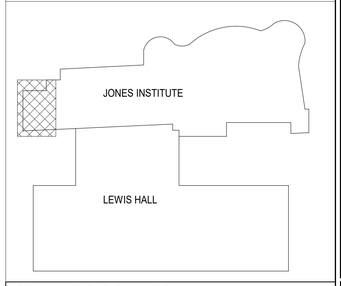
PROJECT NUMBER: #19053

E001



NEW WORK PLAN - MECHANICAL ROOM JONES INSTITUTE
SCALE: 1/4" = 1'-0"

KEY PLAN



GRAPHIC SCALES

1/4" = 1'-0"
5' 0' 5' 10'

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM

PF&A

EVMS
Eastern Virginia Medical School

7814 CAROUSEL LANE,
SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222

1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA
23454
(757) 499-7223

Designed By:	KPM
Drawn By:	JEB
Checked By:	ADR
Scale:	AS NOTED
Date:	04-25-2019

COMMONWEALTH OF VIRGINIA
JAMES E. BARKLEY, JR.
Lic. No. 043854
4/25/19
PROFESSIONAL ENGINEER
SEAL

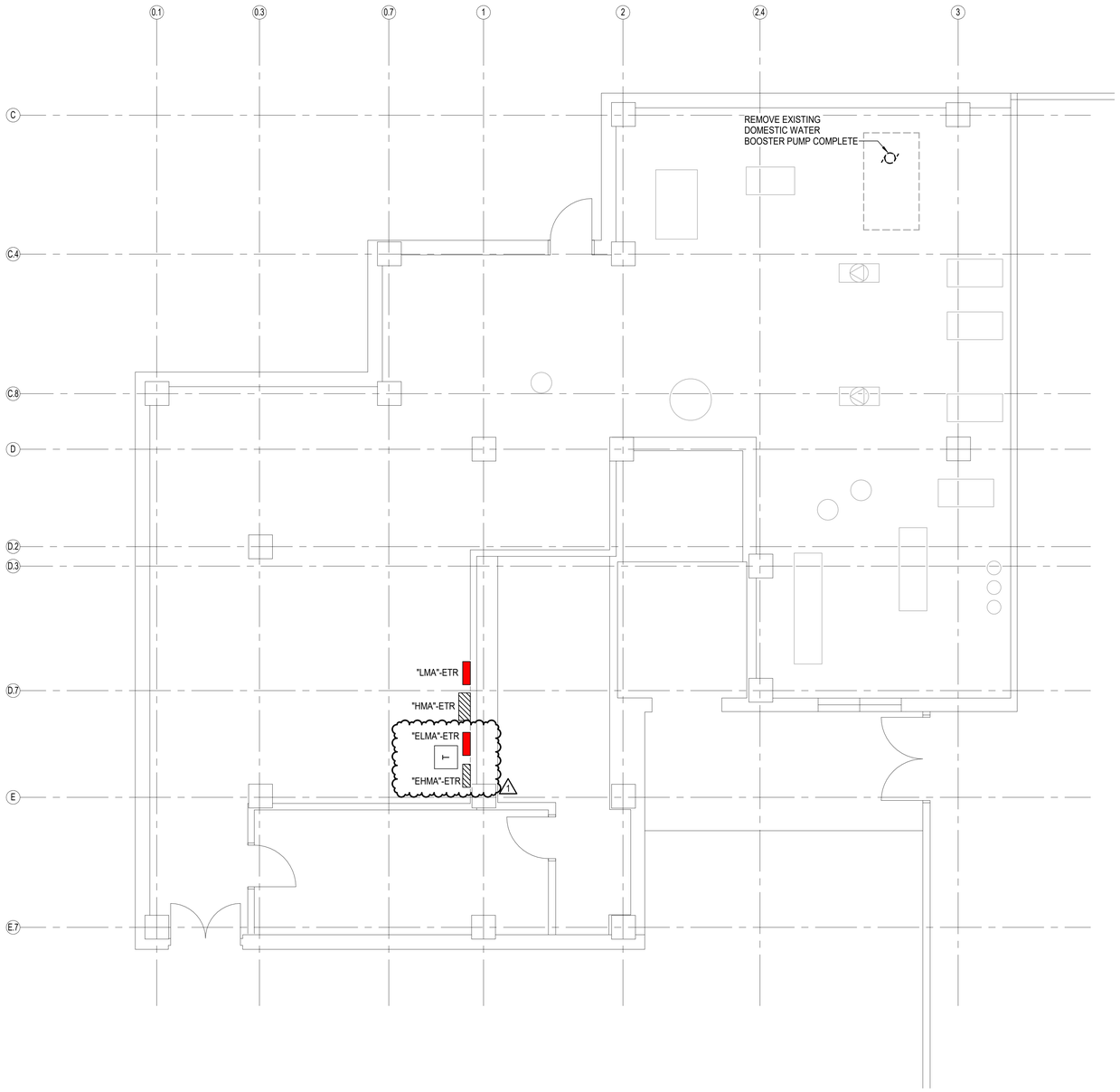
Revisions		
No.	Date	Description
1	05/06/2019	ADDENDUM 1

Renovate Gross Anatomy Lab at Lewis Hall

New Work Plan - Mechanical Room Jones Institute

PROJECT NUMBER: #19053

E202



DEMOLITION PLAN - MECHANICAL ROOM JONES INSTITUTE
SCALE: 1/4" = 1'-0"

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM

PF&A

EVMS
Eastern Virginia Medical School

7814 CAROUSEL LANE,
SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222

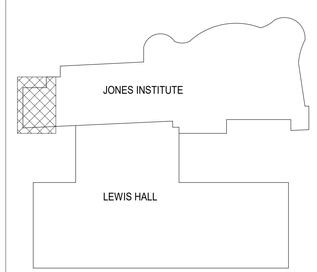
1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA
23454
(757) 499-7223

Designed By:	KPM
Drawn By:	JEB
Checked By:	ADR
Scale:	AS NOTED
Date:	04-25-2019

COMMONWEALTH OF VIRGINIA
JAMES E. BARKLEY, JR.
Lic. No. 043854
4/25/19
PROFESSIONAL ENGINEER
SEAL

Revisions		
No.	Date	Description
1	05/06/2019	ADDENDUM 1

KEY PLAN



GRAPHIC SCALES

1/4" = 1'-0" 5' 0' 5' 10'

Renovate Gross Anatomy Lab at Lewis Hall

Demolition Plan - Mechanical Room Jones Institute

PROJECT NUMBER: #19053

ED202

2ND FLOOR ROOM SCHEDULE

ROOM #	ROOM NAME
2058B	STOR
2063	STOR
2063A	MORGUE
2064	STOR
2064C	OFFICE
2065	STOR
2073	ANATOMICAL LAB
2073C	PLASTINATES TESTING ROOM

NOTES THIS SHEET

1. PROVIDE DIFFUSER/GRILLE AS SCHEDULED. PROVIDE RUNOUT, HANGERS, SUPPORTS AND ALL APPURTENANCES REQUIRED. FIELD COORDINATE EXACT LOCATION AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
2. PROVIDE INSULATED LOW PRESSURE DUCTWORK AS HIGH AS POSSIBLE AND TIGHT TO STRUCTURE. PROVIDE HANGERS, SUPPORTS AND ALL APPURTENANCES REQUIRED. ROUTE AS INDICATED. LOW PRESSURE DUCTWORK IS DOWN STREAM OF AIR TERMINAL UNITS OR RETURN DUCT. FIELD COORDINATE EXACT LOCATION, ROUTING AND REQUIREMENTS WITH OTHER CEILING MOUNTED DEVICES PRIOR TO BEGINNING ANY WORK.
3. ACCEPT DELIVERY, PROVIDE CRANE, RIGGING AND INSTALL AIR HANDLING UNIT AS SCHEDULED. PROVIDE HANGERS, SUPPORTS AND ALL APPURTENANCES REQUIRED TO MAKE A COMPLETE OPERABLE SYSTEM. PROVIDE ACOUSTICAL ROOF CURB WITH ESR ISOLATION SPRINGS FOR OWNER FURNISHED UNIT. COORDINATE ELECTRICAL CONNECTION WITH ELECTRICAL CONTRACTOR. FIELD COORDINATE EXACT LOCATION AND STRUCTURAL STEEL REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
4. PROVIDE UNINSULATED LOW PRESSURE EXHAUST DUCTWORK AS HIGH AS POSSIBLE AND TIGHT TO STRUCTURE. PROVIDE HANGERS, SUPPORTS AND ALL APPURTENANCES REQUIRED. ROUTE AS INDICATED. FIELD COORDINATE EXACT LOCATION, ROUTING AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
5. PROVIDE SHUT-OFF VAV BOX AS SCHEDULED. PROVIDE RUNOUT, HANGERS, SUPPORTS AND ALL APPURTENANCES REQUIRED TO MAKE A COMPLETE OPERABLE SYSTEM. FIELD COORDINATE EXACT LOCATION AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
6. PROVIDE INSULATED MEDIUM PRESSURE DUCTWORK AS HIGH AS POSSIBLE AND TIGHT TO STRUCTURE. PROVIDE HANGERS, SUPPORTS AND ALL APPURTENANCES REQUIRED. MEDIUM PRESSURE DUCTWORK IS UP STREAM OF AIR TERMINAL BOXES. FIELD COORDINATE EXACT LOCATION, ROUTING AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
7. PROVIDE THERMOSTAT AT 46" ON WALL ABOVE FINISHED FLOOR, CONNECT TO UNIT INDICATED. PROVIDE SUPPORTS, WIRING, AND ALL APPURTENANCES REQUIRED.
8. CONTRACTOR TO COORDINATE EXTERIOR WALL PENETRATION POINTS WITH EXISTING STEEL FRAMING ABOVE AND BELOW WINDOW BAND. STEEL FRAMING CANNOT BE CUT. SAWCUT MASONRY WALL AND SEAL WEATHERTIGHT. WALL FRAMING OPENING IS APPROXIMATELY 2'-0" WIDE BY 1'-2" TALL.
9. SPACE ABOVE CEILING CLOSE TO EXTERIOR WALL CONTAINS PIPING AND WIRING ASSOCIATED WITH FAN COILS AND MISCELLANEOUS ITEMS FOR FLOOR ABOVE. CONTRACTOR TO PROVIDE OFFSETS FOR PIPING TO ACCOMMODATE NEW DUCTWORK ROUTING IN ABOVE CEILING SPACE. EXISTING WIRING AND CONDUITS TO BE RESUPPLIED AS TIGHT TO DECK AS POSSIBLE TO ACCOMMODATE NEW DUCTWORK. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
10. PROVIDE PREMANUFACTURED EXTERIOR RATED INSULATED DUCTWORK SIMILAR TO THERMADUCT ON ROOF WITH AN INSULATION R VALUE OF R-12 OR HIGHER. PROVIDE SUPPORTS, SECUREMENT, AND APPURTENANCES REQUIRED. SUPPORT DUCTWORK EVERY 6'-0" ON CENTER AND AT ALL FITTINGS. SUPPLY AND EXHAUST DUCT TO BE STACKED AND UTILIZE SUPPORTS. PROVIDE FLASHING AND SEAL PENETRATIONS WEATHER TIGHT. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
11. PROVIDE HOT DIPPED GALVANIZED STEEL DUCT SUPPORTS AND CURB ATTACHED TO ROOF. SECURE TO ROOF IN ACCORDANCE WITH ROOF MANUFACTURER'S WARRANTY. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
12. PROVIDE EXTERIOR RATED DUCT AND CONNECT TO EXHAUST DISCHARGE AND ROUTE UP ALONG STAIR WELL TO ABOVE ROOF LINE. PROVIDE DUCT SUPPORT EVERY 10'-0" ON CENTER ON ROOF PROVIDE SUPPORTS, SECUREMENT, AND APPURTENANCES REQUIRED. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
13. PROVIDE FUME HOOD DUCTWORK ABOVE CEILING. CONNECT TO EXISTING DUCTWORK AND RELOCATED FUME HOOD. PROVIDE HANGERS, SUPPORTS, AND APPURTENANCES REQUIRED. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
14. PROVIDE EXTERIOR RATED DUCT AND ROUTE UP ALONG STAIR WELL TO APPROXIMATELY 40'-0" ABOVE ROOF. PROVIDE DRIP LEG WITH 3/4" DRAIN VALVE AT BOTTOM OF STACK. PROVIDE SIDEWALL DUCT SUPPORT EVERY 10'-0" ON CENTER VERTICALLY. PROVIDE ZERO LOSS CONICAL NOZZLE ON TOP END OF DUCTWORK. PROVIDE SUPPORTS, SECUREMENT, AND APPURTENANCES REQUIRED. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
15. PROVIDE 4"ø DRYER DUCT VENT AND SIDEWALL CAP AT 12" ABOVE FINISHED FLOOR. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
16. DEGREASE AND PASSOVATE EXTERIOR DUCTWORK AND SUPPORTS. PRIME AND PAINT WITH TWO PART EPOXY FINISH SYSTEM, COLOR TO MATCH ADJACENT BRICK.
17. CLEAN AND REINSTALL STORED DIFFUSER/GRILLE SALVAGED DURING DEMOLITION. CONNECT TO MAINTAINED DUCTWORK. EXTEND AND MODIFY DUCTWORK AS REQUIRED. BALANCE TO CFM INDICATED. FIELD COORDINATE EXACT LOCATION, ROUTING, AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
18. CLEAN AND REINSTALL LAY-IN CEILING TILES SALVAGED DURING DEMOLITION. FIELD COORDINATE EXACT LOCATION AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.
19. PROVIDE FIRE DAMPER AND INSTALL IN DUCTWORK AT RATED WALL. PROVIDE SUPPORTS AND APPURTENANCES REQUIRED. FIELD COORDINATE EXACT LOCATION AND REQUIREMENTS PRIOR TO BEGINNING ANY WORK.

INSTALL EXHAUST GRILL AS LOW AS POSSIBLE WITHOUT DISTURBING ROOFING (TYP. U.O.N)

ROOF EDGE

CLEARANCE, TYP.

PROVIDE DRIP LEG WITH 3/4" DRAIN VALVE AT BOTTOM OF STACK.

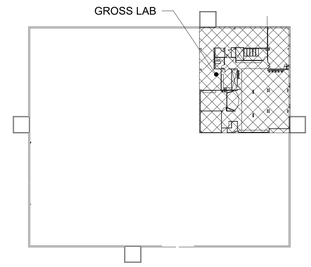
SAWCUT MASONRY WALL AND SEAL WEATHERTIGHT PROVIDE LINTEL PER STRUCTURAL DETAIL. (TYP FOR ALL DUCTWORK PENETRATIONS.)

MOUNT GRILLE AT 6" AFF (TYP OF 2)

FUME HOOD EXHAUST AT 860 CFM

MOUNT GRILLE AT 1250 AT 6" AFF

KEY PLAN



GRAPHIC SCALES

1/4" = 1'-0" 5' 0' 5' 10'

NEW WORK PLAN - SECOND FLOOR - GROSS LAB - DUCTWORK
SCALE: 1/4" = 1'-0"

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM

PF&A

EVMS
Eastern Virginia Medical School

7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222

1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	BTF
Drawn By:	TMC
Checked By:	BKW
Scale:	AS NOTED
Date:	04/25/19

COMMONWEALTH OF VIRGINIA
BRIAN K. WALL
Lic. No. 30432
04/25/19
PROFESSIONAL ENGINEER
SEAL

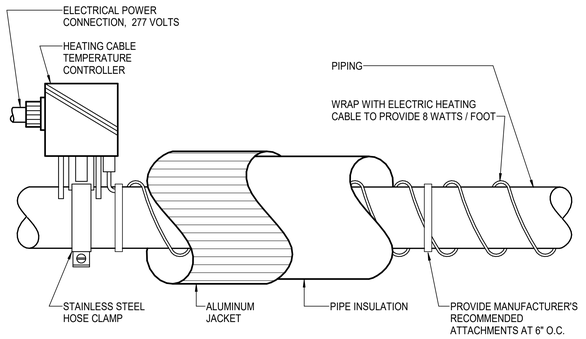
Revisions		
No.	Date	Description
1	05/06/19	Addendum 1

Renovate Gross Anatomy Lab at Lewis Hall

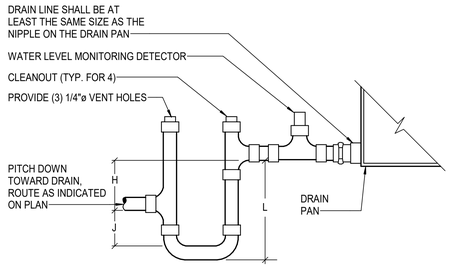
New Work Plan - Second Floor - Gross Lab - Ductwork

PROJECT NUMBER: #19053

M101



HEAT TRACE CABLE DETAIL
NO SCALE



DRAIN PAN TRAPPING FOR SECTION UNDER NEGATIVE PRESSURE:

L = H + J + PIPE DIAMETER WHERE:

H = 1 INCH FOR EACH INCH OF NEGATIVE PRESSURE PLUS 1 INCH

J = 1/2 H

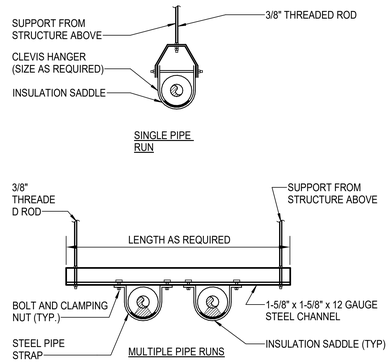
DRAIN PAN TRAPPING FOR SECTION UNDER POSITIVE PRESSURE:

L = H + J + PIPE DIAMETER WHERE:

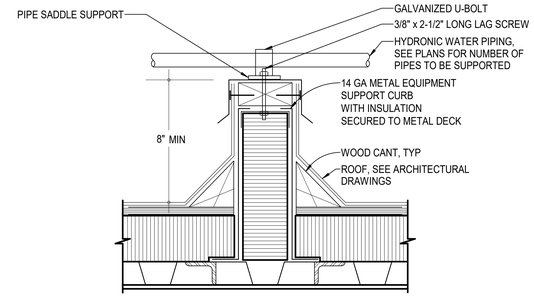
H = 1/2 INCH (MINIMUM)

J = 1/2 INCH PLUS THE UNIT POSITIVE STATIC PRESSURE AT COIL DISCHARGE (LOADED FILTERS)

CONDENSATE DRAIN TRAP
NO SCALE



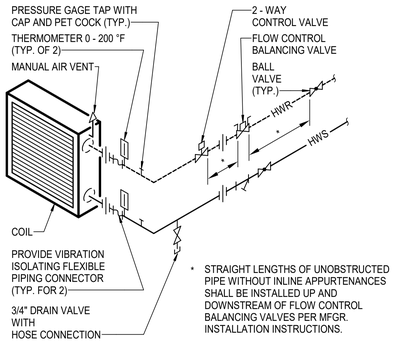
PIPE SUPPORT DETAILS
NO SCALE



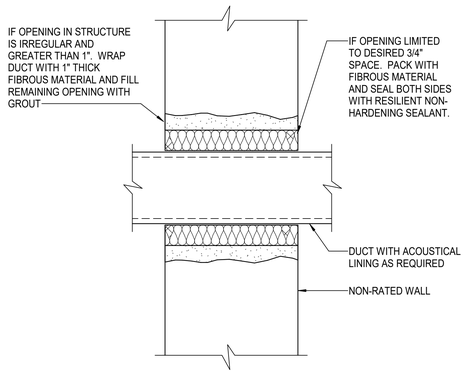
NOTES:
CONTRACTOR SHALL COORDINATE CURB/SUPPORT DETAILS WITH EXISTING ROOF MANUFACTURER'S REQUIREMENTS SO AS TO MAINTAIN WARRANTIES.

PROVIDE SUPPORT CURBS WITH AMINIMUM OF 6' LONG SPAN TWO BAR JOIST (4'-0" O.C.)

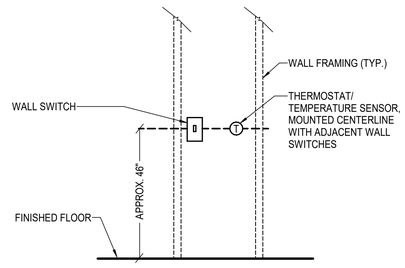
ROOFTOP PIPING CURB SUPPORT DETAIL
NO SCALE



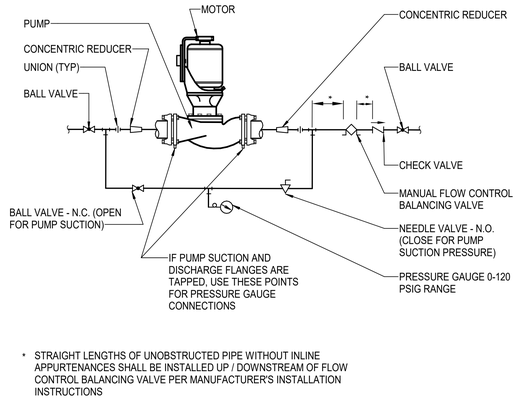
HOT WATER COIL PIPING FOR VAV DETAIL
NO SCALE



WALL PENETRATION DETAIL - DUCTWORK
NO SCALE

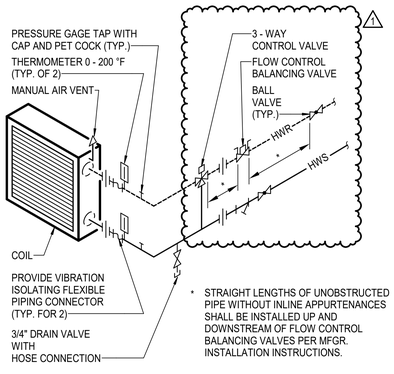


SWITCH/THERMOSTAT MOUNTING HEIGHT DETAIL
NO SCALE

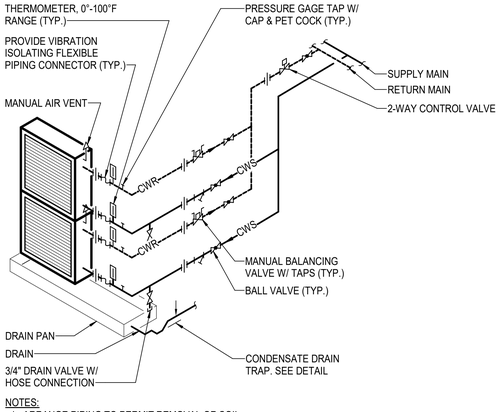


* STRAIGHT LENGTHS OF UNOBSTRUCTED PIPE WITHOUT INLINE APPURTENANCES SHALL BE INSTALLED UP / DOWNSTREAM OF FLOW CONTROL BALANCING VALVE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS

INLINE CENTRIFUGAL PUMP DETAIL
NO SCALE

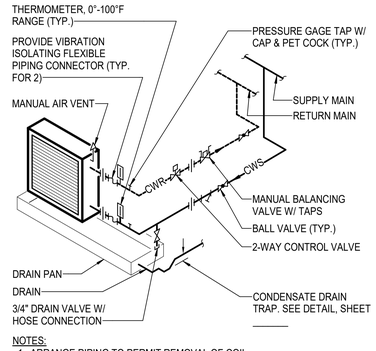


HOT WATER COIL PIPING FOR AHU DETAIL
NO SCALE



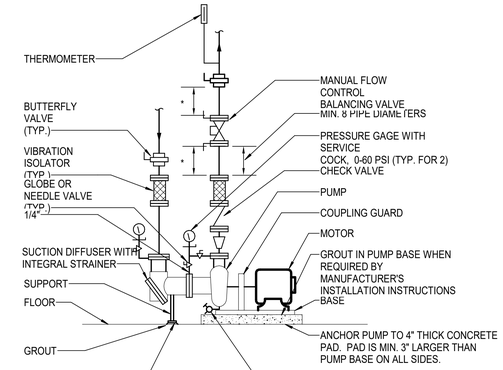
NOTES:
1. ARRANGE PIPING TO PERMIT REMOVAL OF COIL.
2. THE MANUAL BALANCING VALVES SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MANUFACTURER'S RECOMMENDED SPACING UP AND DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES AND COMPONENTS IN THE PIPING.

CHILLED WATER COIL (CW-1) PIPING DETAIL
NO SCALE



NOTES:
1. ARRANGE PIPING TO PERMIT REMOVAL OF COIL.
2. THE MANUAL BALANCING VALVES SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MANUFACTURER'S RECOMMENDED SPACING UP AND DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES AND COMPONENTS IN THE PIPING.

CHILLED WATER COIL (CW-2) PIPING DETAIL
NO SCALE



* STRAIGHT LENGTHS OF UNOBSTRUCTED PIPE WITHOUT INLINE APPURTENANCES SHALL BE INSTALLED UP / DOWNSTREAM OF FLOW CONTROL BALANCING VALVE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

BASE MOUNTED CENTRIFUGAL PUMP DETAIL
NO SCALE

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM

PF&A

EVMS
Eastern Virginia Medical School

7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222

1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	BTF
Drawn By:	TMC
Checked By:	BKW
Scale:	AS NOTED
Date:	04/25/19

COMMONWEALTH OF VIRGINIA
BRIAN K. WALL
Lic. No. 30432
04/25/19
PROFESSIONAL ENGINEER
SEAL

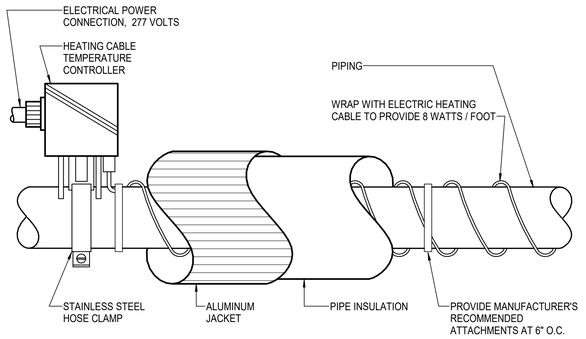
Revisions		
No.	Date	Description
1	05/06/19	Addendum 1

Renovate Gross Anatomy Lab at Lewis Hall

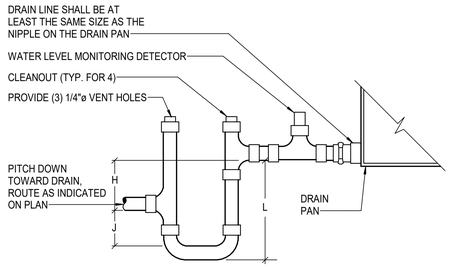
Details

PROJECT NUMBER: #19053

M502



HEAT TRACE CABLE DETAIL
NO SCALE



DRAIN PAN TRAPPING FOR SECTION UNDER NEGATIVE PRESSURE:

L = H + J + PIPE DIAMETER WHERE:

H = 1 INCH FOR EACH INCH OF NEGATIVE PRESSURE PLUS 1 INCH

J = 1/2 H

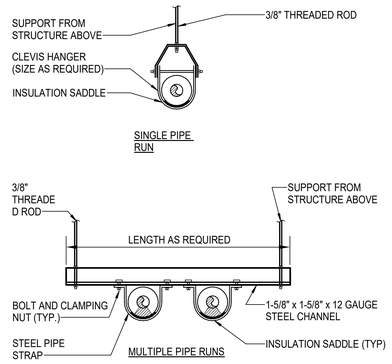
DRAIN PAN TRAPPING FOR SECTION UNDER POSITIVE PRESSURE:

L = H + J + PIPE DIAMETER WHERE:

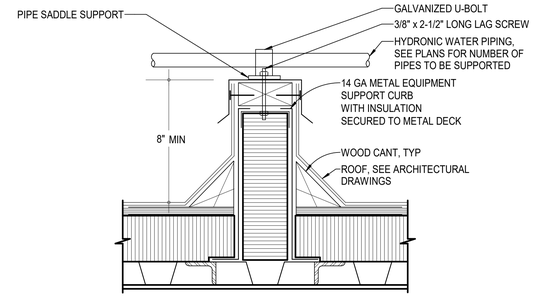
H = 1/2 INCH (MINIMUM)

J = 1/2 INCH PLUS THE UNIT POSITIVE STATIC PRESSURE AT COIL DISCHARGE (LOADED FILTERS)

CONDENSATE DRAIN TRAP
NO SCALE



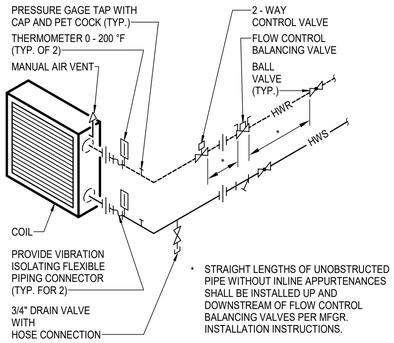
PIPE SUPPORT DETAILS
NO SCALE



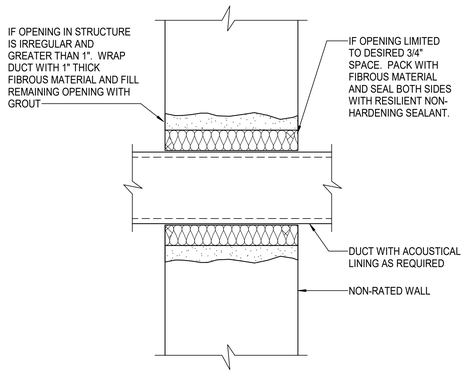
NOTES:
CONTRACTOR SHALL COORDINATE CURB/SUPPORT DETAILS WITH EXISTING ROOF MANUFACTURER'S REQUIREMENTS SO AS TO MAINTAIN WARRANTIES.

PROVIDE SUPPORT CURBS WITH AMINIMUM OF 6' LONG SPAN TWO BAR JOIST (4'-0" O.C.)

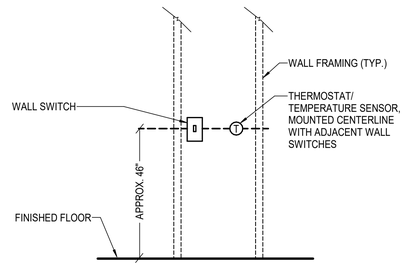
ROOFTOP PIPING CURB SUPPORT DETAIL
NO SCALE



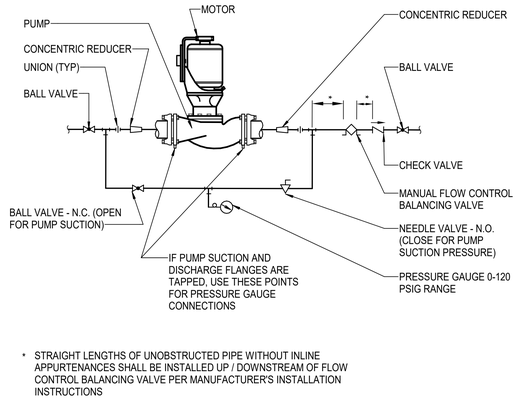
HOT WATER COIL PIPING FOR VAV DETAIL
NO SCALE



WALL PENETRATION DETAIL - DUCTWORK
NO SCALE

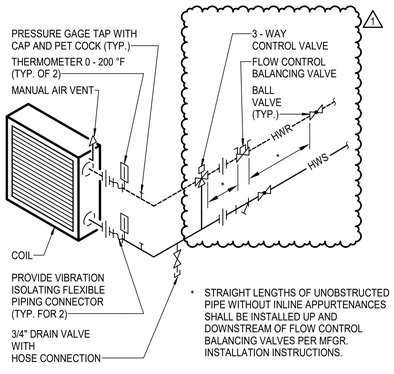


SWITCH/THERMOSTAT MOUNTING HEIGHT DETAIL
NO SCALE

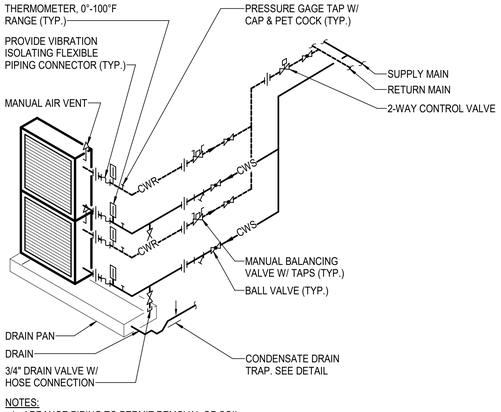


* STRAIGHT LENGTHS OF UNOBSTRUCTED PIPE WITHOUT INLINE APPURTENANCES SHALL BE INSTALLED UP / DOWNSTREAM OF FLOW CONTROL BALANCING VALVE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS

INLINE CENTRIFUGAL PUMP DETAIL
NO SCALE

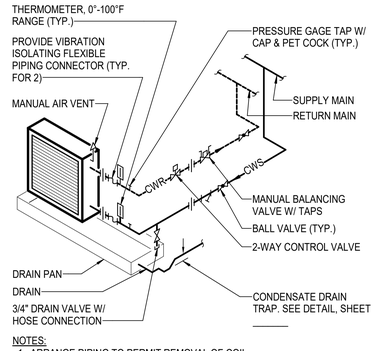


HOT WATER COIL PIPING FOR AHU DETAIL
NO SCALE



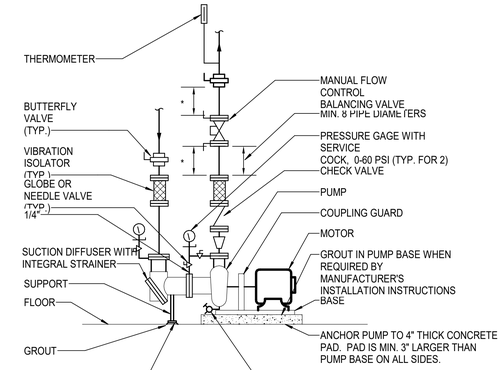
NOTES:
1. ARRANGE PIPING TO PERMIT REMOVAL OF COIL.
2. THE MANUAL BALANCING VALVES SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MANUFACTURER'S RECOMMENDED SPACING UP AND DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES AND COMPONENTS IN THE PIPING.

CHILLED WATER COIL (CW-1) PIPING DETAIL
NO SCALE



NOTES:
1. ARRANGE PIPING TO PERMIT REMOVAL OF COIL.
2. THE MANUAL BALANCING VALVES SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MANUFACTURER'S RECOMMENDED SPACING UP AND DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES AND COMPONENTS IN THE PIPING.

CHILLED WATER COIL (CW-2) PIPING DETAIL
NO SCALE



* STRAIGHT LENGTHS OF UNOBSTRUCTED PIPE WITHOUT INLINE APPURTENANCES SHALL BE INSTALLED UP / DOWNSTREAM OF FLOW CONTROL BALANCING VALVE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

BASE MOUNTED CENTRIFUGAL PUMP DETAIL
NO SCALE

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM

PF&A

EVMS
Eastern Virginia Medical School

7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222

1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	BTF
Drawn By:	TMC
Checked By:	BKW
Scale:	AS NOTED
Date:	04/25/19

COMMONWEALTH OF VIRGINIA
BRIAN K. WALL
Lic. No. 30432
04/25/19
PROFESSIONAL ENGINEER
SEAL

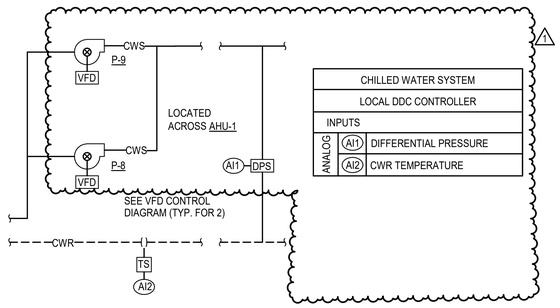
Revisions		
No.	Date	Description
1	05/06/19	Addendum 1

Renovate Gross Anatomy Lab at Lewis Hall

Details

PROJECT NUMBER: #19053

M502



CHILLED WATER SYSTEM CONTROL SEQUENCE

NO SCALE

CHILLED WATER PUMP CONTROL SEQUENCE

CHILLED WATER PUMPS, P-8 & P-9

GENERAL: THE CONTROL STRATEGY IS TO OPERATE A VARIABLE SPEED PUMP IN ORDER TO MINIMIZE PUMPING POWER REQUIREMENTS. THE SPEED DRIVE OF THE VARIABLE SPEED PUMP IS CONTROLLED TO MAINTAIN A SETPOINT DIFFERENTIAL PRESSURE ACROSS THE AIR HANDLING UNIT COIL FURTHEST FROM THE PUMP.

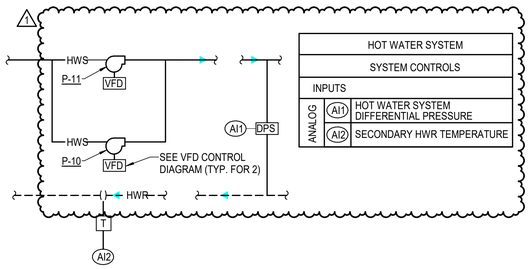
THE DDC CONTROLLER SHALL BE DESIGNED TO START AND STOP THE PUMP AND MODULATE SPEED AS REQUIRED TO MEET THE SYSTEM DEMANDS. THE SYSTEM SHALL BE DESIGNED TO MAINTAIN A DIFFERENTIAL PRESSURE SETPOINT AT AHU-1 (LOCATED ON THE LEWIS HALL AUITORIUM ROOF).

THE LEAD PUMP SHALL BE STARTED AND STOPPED BY THE DDC CONTROLLER. THE LEAD PUMP SPEED SHALL BE MODULATED AS REQUIRED TO MAINTAIN THE SYSTEM DIFFERENTIAL SETPOINT. THE DDC CONTROLLER SHALL ALTERNATE PUMPS WEEKLY BY SELECTING THE PUMP WITH THE LEAST TOTAL ACCUMULATED RUN TIME AS CALCULATED AND STORED AT THE DDC CONTROLLER. IF EITHER SELECTED LEAD PUMP'S PROOF SWITCH DOES NOT DETECT FLOW WITHIN 30 SECONDS FROM THE START SIGNAL, THE DDC CONTROLLER SHALL DE-ENERGIZE THE FAILED PUMP, START THE STANDBY PUMP, AND TRANSMIT A PUMP FAILURE ALARM. A PROGRAMMED ANTI-RECYCLE TIMER SHALL PREVENT PUMP SHORT CYCLING. THE DDC CONTROLLER SHALL AUTOMATICALLY ATTEMPT A RESTART OF THE CIRCULATING PUMPS ON A PERIODIC BASIS TO ACCOMMODATE SERVICE SHUTDOWNS AND EXTENDED POWER OUTAGES.

COOLING: ON A CALL FOR COOLING, LEAD SECONDARY CHILLED WATER PUMP WILL BE ENERGIZED AND RUN CONTINUOUSLY.

ALARMS: ALARM IF PUMP P-8 OR P-9 FAIL TO START OR FAIL DURING OPERATION.

DDC/EMCS SIGNAL-FUNCTION:
PUMP P-8 VFD - START/STOP, STATUS, RUNTIME, ALARM
PUMP P-9 VFD - START/STOP, STATUS, RUNTIME, ALARM
DIFFERENTIAL PRESSURE SENSOR - PUMP P-8 & P-9 VFD CONTROL



HOT WATER SYSTEM

NO SCALE

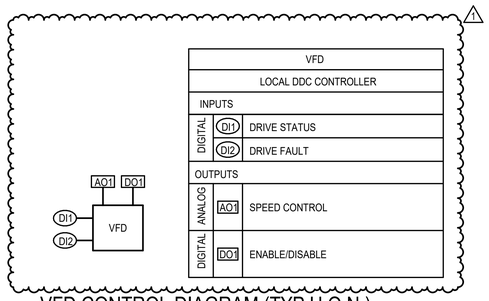
SEQUENCE OF OPERATION

BOILER AND HOT WATER PUMP CONTROL: WHEN THE DDC CONTROL SYSTEM RECEIVES A CALL FOR HEATING, THE BOILER CONTROL SYSTEMS SHALL BE ENGAGED AND THE DDC CONTROL SYSTEM SHALL ENABLE THE LEAD BOILER, ASSOCIATED BOILER CIRCULATION PUMP P-X AND THE LEAD SECONDARY HOT WATER PUMP P-X. THE LEAD AND LAG STATUS SHALL BE DETERMINED BY RUN TIME OPERATION OR AVAILABILITY. BOILER CONTROLS SHALL MAINTAIN 180°F LWT. THE HOT WATER RESET VALVE SHALL MODULATE TO MAINTAIN SECONDARY HWS SCHEDULED SETPOINT, BUT SHALL NOT ALLOW PRIMARY HWR TEMPERATURE TO FALL BELOW 140°F. ON A FALL IN SUPPLY WATER TEMPERATURE BELOW SETPOINT AS MEASURED BY THE HOT WATER SUPPLY TEMPERATURE SENSOR, ADDITIONAL BOILERS AND THEIR RESPECTIVE CIRCULATING PUMPS SHALL BE STAGED ON AS REQUIRED TO MAINTAIN HEATING HOT WATER SUPPLY TEMPERATURE SETPOINT. THE DDC CONTROL PANEL SHALL ENABLE ADDITIONAL BOILERS AND CIRCULATING PUMPS BASED ON RUN TIME OR AVAILABILITY. ON A RISE IN HEATING HOT WATER SUPPLY TEMPERATURE ABOVE SETPOINT, THE REVERSE SEQUENCE SHALL OCCUR.

HOT WATER RESET CONTROL: THE SECONDARY HOT WATER SUPPLY TEMPERATURE SETPOINT SHALL BE DETERMINED BY THE OUTSIDE AIR TEMPERATURE. THE HOT WATER SUPPLY TEMPERATURE SETPOINT SHALL BE RESET PROPORTIONALLY AS FOLLOWS: AS AIR TEMPERATURE RISES FROM 20°F TO 60°F, RESET SECONDARY HWS FROM 180°F DOWN TO 120°F.

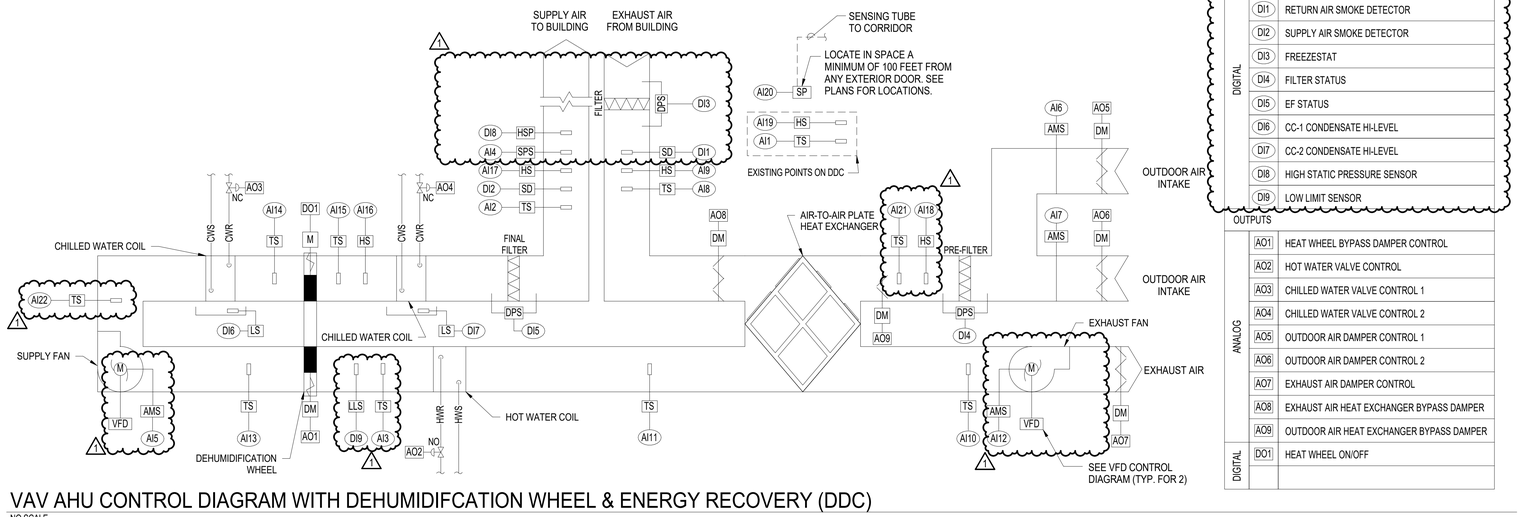
BOILER EMERGENCY SHUT-OFF CONTROL: PROVIDE A TWO POSITION "ON-OFF" SWITCH WITH LOCK-OUT CAPABILITY LABELED "BOILER EMERGENCY SHUT-OFF" LOCATED AS INDICATED WHICH SHALL BE HARDWIRE INTERLOCKED WITH THE BOILER CONTROL PANEL. WHEN INDEXED TO THE "ON" POSITION THE BOILERS SHALL OPERATE UNDER NORMAL CONTROL OF THE DDC CONTROL SYSTEM. WHEN INDEXED TO THE "OFF" POSITION, THE BOILERS SHALL BE DISABLED. MANUAL RESET SHALL BE REQUIRED.

ALARMS: ALARM FOR LEAVING WATER TEMPERATURE EXCEEDING 200°F OR FALLING 10°F BELOW THE SCHEDULED RESET TEMPERATURE. ALARM IF ANY BOILER OR PUMP FAILS TO START OR FAILS DURING OPERATION.



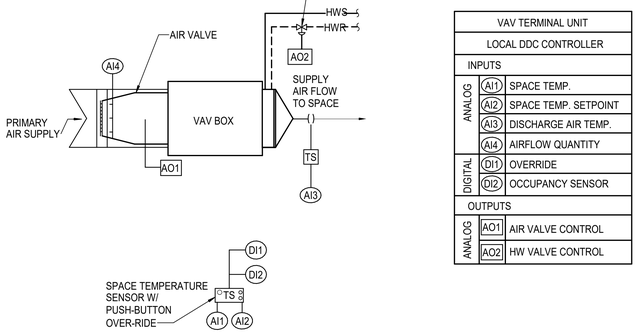
VFD CONTROL DIAGRAM (TYP U.O.N.)

NO SCALE



VAV AHU CONTROL DIAGRAM WITH DEHUMIDIFCATION WHEEL & ENERGY RECOVERY (DDC)

NO SCALE



SHUT OFF VAV CONTROLS (HOT WATER)

NO SCALE

SEQUENCE OF OPERATION

GENERAL: THIS SEQUENCE TYPICAL FOR ALL VAV BOXES. AN OVERRIDE SWITCH INTEGRAL TO EACH ZONE TEMPERATURE SENSOR SHALL RETURN THE RESPECTIVE RTU FROM UNOCCUPIED TO OCCUPIED BUT ONLY THE ZONE OVERRIDDEN SHALL RETURN TO OCCUPIED MODE. WHEN ANY OVERRIDE SWITCH IS ENERGIZED, RTU AND ALL VAV BOXES ASSOCIATED WITH THE ZONE OVERRIDDEN SHALL BE ENERGIZED THROUGH DDC CONTROL BUT ONLY THE ZONE OVERRIDDEN SHALL RETURN TO OCCUPIED MODE TEMPERATURE SETPOINTS. AFTER TWO HOURS, THE ZONE SHALL RETURN TO UNOCCUPIED MODE. ENERGIZED RTU AND ALL ASSOCIATED VAV BOXES SHALL BE DE-ENERGIZED UNLESS RTU IS UNDER CONTROL OF ANOTHER ZONE IN OVERRIDE POSITION.

COOLING-OCCUPIED: THE ZONE TEMPERATURE SENSOR THROUGH DDC CONTROL SHALL MODULATE THE PRIMARY AIR VALVE IN THE VAV BOX TO MAINTAIN ZONE TEMPERATURE SETPOINT OF 65°F, OPENING THE AIR VALVE ON A RISE IN SPACE TEMPERATURE, OR CLOSING IT ON A FALL IN SPACE TEMPERATURE, (NOT TO FALL BELOW MINIMUM SCHEDULED PRIMARY AIR QUANTITY).

HEATING-OCCUPIED: THE PRIMARY AIR VALVE SHALL START IN ITS MINIMUM SCHEDULED POSITION THRU DDC CONTROL. THE ZONE TEMPERATURE SENSOR THROUGH DDC CONTROL SHALL MODULATE THE HOT WATER CONTROL VALVE TO MAINTAIN ZONE TEMPERATURE SETPOINT (70°F). ON A RISE IN ZONE TEMPERATURE, THE OPPOSITE SHALL OCCUR. IF SPACE TEMPERATURE IS SLOW TO RESPOND, CONTROLLER SHALL MODULATE PRIMARY AIR VALVE OPEN TO A MAX OF 80%. ON A RISE IN ZONE TEMPERATURE, THE OPPOSITE SHALL OCCUR.

COOLING-UNOCCUPIED: THE VAV BOX PRIMARY AIR VALVE SHALL BE FULLY CLOSED UNLESS THE ASSOCIATED RTU SUPPLY FAN IS ENERGIZED. ON A RISE IN ZONE TEMPERATURE ABOVE SETBACK SETPOINT (68°F), THE VAV BOX PRIMARY AIR VALVE MODULATE TO MAINTAIN SETPOINT. DDC CONTROLLER SHALL MAINTAIN 54°F SUPPLY AIR TEMPERATURE. RTU SHALL REMAIN ENERGIZED UNTIL ZONE SETBACK TEMPERATURE SETPOINT IS ACHIEVED. IF ZONE TEMPERATURE FALLS BELOW SETBACK SETPOINT, VAV BOX SHALL CLOSE AIR VALVE TO MIN. POSITION.

HEATING-UNOCCUPIED: THE VAV BOX PRIMARY AIR VALVE SHALL BE FULLY CLOSED UNLESS THE ASSOCIATED RTU SUPPLY FAN IS ENERGIZED. ON A FALL IN ZONE TEMPERATURE BELOW SETBACK SETPOINT (60°F), THE PRIMARY AIR VALVE SHALL OPEN TO 80%. DDC CONTROLLER SHALL MODULATE VAV BOX HOT WATER CONTROL VALVE TO MAINTAIN ZONE SETBACK TEMPERATURE SETPOINT. IF ZONE TEMPERATURE RISES ABOVE SETBACK SETPOINT, THE OPPOSITE SHALL OCCUR.

DDC/EMCS SIGNAL-FUNCTION:

ZONE TEMPERATURE SENSOR - AIR VALVE CONTROL, HOT WATER VALVE CONTROL, STATUS, ALARM
OVERRIDE SWITCH - OCCUPIED CONTROL, STATUS
HOT WATER CONTROL VALVE - ZONE TEMPERATURE CONTROL, STATUS
AIR VALVE - ZONE TEMPERATURE CONTROL, STATUS (AIRFLOW)

SEQUENCE OF OPERATION

GENERAL: THE BUILDING AUTOMATION SYSTEM (BAS) SHALL SEND THE CONTROLLER OCCUPIED/UNOCCUPIED AND HEAT/COOL MODES. THE BAS SHALL ALSO SEND THE DISCHARGE AIR DEW POINT TEMPERATURE SETPOINT, DISCHARGE AIR DRY BULB SETPOINT AND THE DUCT STATIC PRESSURE SETPOINT. IF A BAS IS NOT PRESENT, OR COMMUNICATION IS LOST WITH THE BAS THE CONTROLLER SHALL OPERATE USING DEFAULT MODES AND SETPOINTS.

OCCUPIED: DURING OCCUPIED PERIODS, THE OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL BE INDEXED OPEN. ONCE THE OUTSIDE AIR DAMPER IS PROVEN OPEN BY AN END-SWITCH, THE END-SWITCH SHALL ENABLE THE SUPPLY FANS TO RUN CONTINUOUSLY, THE EXHAUST AIR DAMPER ONCE PROVEN OPEN BY AN END-SWITCH, THE EXHAUST FANS SHALL RUN CONTINUOUSLY. THE CHILLED WATER AND HOT WATER VALVES SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AND DEW POINT SETPOINT AS DESCRIBED IN THE SUPPLY AIR TEMPERATURE CONTROL. IF THE DISCHARGE AIR TEMPERATURE SENSOR FAILS, THE CHILLED WATER AND HOT WATER VALVES SHALL CLOSE, AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.
DESICCANT WHEEL OPERATION: THE DESICCANT WHEEL SHALL BE ENABLED ANYTIME THE OUTDOOR AIR DEWPOINT IS GREATER THAN 37°F. WHEN THE DESICCANT WHEEL IS ENABLED THE BYPASS DAMPERS SHALL BE INDEXED CLOSED. IF THE OUTDOOR AIR DEWPOINT FALLS BELOW 32°F THE DESICCANT WHEEL SHALL BE DISABLED, AND THE DESICCANT WHEEL BYPASS DAMPERS SHALL BE INDEXED OPEN.

SUPPLY AIR TEMPERATURE CONTROL: THE SUPPLY AIR DEWPOINT TEMPERATURE SETPOINT SHALL BE COMMUNICATED BY THE BAS. WHEN THE RETURN AIR RELATIVE HUMIDITY IS GREATER THAN 45% (ADJUSTABLE), THE DISCHARGE AIR DEWPOINT TEMPERATURE SETPOINT SHALL BE DYNAMICALLY RESET BASED ON THE DEVIATION OF ACTUAL RETURN AIR HUMIDITY FROM THE ACTIVE RETURN AIR HUMIDITY SETPOINT. THE SUPPLY DEWPOINT SHALL BE RESET DOWNWARD FROM INITIAL SETPOINT OF 41°F IN INCREMENTS OF 1°F (ADJUSTABLE). AFTER A PERIOD OF 10 MINUTES (ADJUSTABLE) IF THE RETURN AIR HUMIDITY IS GREATER THAN SETPOINT, THE SUPPLY DEWPOINT SETPOINT SHALL BE REDUCED BY ANOTHER 1°F. THE SYSTEM SHALL CONTINUE THIS PROCESS UNTIL THE SUPPLY AIR DEWPOINT HAS REACHED 38°F (ADJUSTABLE). IF THE RETURN AIR HUMIDITY SENSOR FAILS, THE SUPPLY AIR DEWPOINT SETPOINT SHALL BE SET TO 41°F (ADJUSTABLE). IF AT THE LOWEST ALLOWABLE COOLING LEAVING AIR TEMPERATURE SETPOINT (53°F) AND THE RETURN AIR HUMIDITY IS STILL GREATER THAN SETPOINT. THE CHILLED WATER VALVE SHALL BE LOCKED AT 100% AND THE PREHEAT VALVE SHALL BEGIN TO SLOWLY MODULATE OPEN TO MAINTAIN SUPPLY AIR DEWPOINT SETPOINT. THE UNIT SHALL OPERATE IN THE MODE UNTIL THE PRE-HEAT COIL HAS BEEN CLOSED FOR A MINIMUM OF 10 MINUTES (ADJUSTABLE).

IF THE MAIN COOLING COIL IS AT FULL FLOW AND THERE IS FURTHER DEMAND FOR COOLING IN THE SPACE AS SENSED BY THE UNIT'S RESPECTIVE CONSTANT VOLUME BOXES, THE FINAL COOLING VALVE SHALL MODULATE TO PROVIDE ADDITIONAL COOLING.

IF THE OUTSIDE AIR DEW POINT TEMPERATURE IS BELOW THE SUPPLY AIR DEW POINT TEMPERATURE THE BAS SHALL MODULATE EITHER THE COOLING COIL VALVE OR THE PRE-HEAT VALVE TO MEET THE TARGET SUPPLY AIR DRY BULB SETPOINT.

SUPPLY FAN: THE SUPPLY FANS SHALL BE OFF IN THE UNOCCUPIED MODE. WHEN THE UNIT CONTROLLER IS IN THE OCCUPIED MODE, THE SUPPLY FAN SHALL BE MODULATED TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. THE DUCT STATIC PRESSURE SETPOINT SHALL BE SENT BY THE BAS AND SHALL BE RESET BETWEEN THE MINIMUM AND MAXIMUM STATIC PRESSURE LIMITS TO MAINTAIN THE CRITICAL ZONE VAV AIR DAMPER IN A POSITION BETWEEN 75% AND 85% OPEN.

IF THE SUPPLY FAN FAILS TO PROVE STATUS FOR 30 SECONDS (ADJUSTABLE), THE FAN SHALL BE COMMANDED OFF, THE OUTSIDE AIR DAMPER SHALL CLOSE, ALL VALVES WILL CLOSE AND AN ALARM WILL BE ANNUNCIATED AT THE BAS. A MANUAL RESET SHALL BE REQUIRED TO RESTART THE FAN. A HARDWIRED, HIGH STATIC PRESSURE CUT-OFF SWITCH SHALL BE ELECTRICALLY INTERLOCKED WITH THE VARIABLE SPEED DRIVE. IF THE HIGH STATIC PRESSURE CUT-OFF SWITCH IS TRIPPED THE FAN SHALL STOP, THE OUTSIDE AIR DAMPER SHALL CLOSE, ALL VALVES WILL CLOSE AND AN ALARM WILL BE ANNUNCIATED AT THE BAS. A MANUAL RESET OF THE HIGH STATIC PRESSURE CUT-OFF SWITCH SHALL BE REQUIRED TO RESTART THE FAN.

EXHAUST FAN CONTROL: THE EXHAUST FAN SHALL BE OFF ANYTIME THE SUPPLY FAN IS DISABLED. WHEN THE SUPPLY FAN IS ENABLED THE EXHAUST FAN SHALL BE ENABLED AND SHALL MODULATE TO MAINTAIN SPACE PRESSURE. (ADJUSTABLE). THE EXHAUST FAN SHALL MAINTAIN NEGATIVE PRESSURE RELATIONSHIP TO THE SURROUNDING SPACES. DIFFERENTIAL PRESSURE SENSORS LOCATED AT THREE REMOTE LOCATIONS AS INDICATED ON THE PLANS WILL BE UTILIZED TO CONTROL THE EXHAUST FAN SPEED.

FIXED PLATE HEAT EXCHANGER CONTROL: WHEN THE OUTDOOR AIR DRY BULB TEMPERATURE IS HIGHER THAN THE EXHAUST AIR DRY-BULB TEMPERATURE, THE FIXED PLATE HEAT EXCHANGER FACE-AND BYPASS DAMPERS WILL BE POSITIONED FOR 0% BYPASS. WHEN THE OUTSIDE AIR DRY-BULB TEMPERATURE IS LESS THAN THE EXHAUST AIR DRY-BULB TEMPERATURE AND THE AIR HANDLING UNIT IS COOLING, THE FACE-AND-BYPASS DAMPERS WILL BE POSITIONED FOR 100% BYPASS. WHEN THE AIR HANDLING UNIT IS HEATING, THE FIXED PLATE HEAT EXCHANGER FACE-AND-BYPASS DAMPERS WILL MODULATE (AS NECESSARY) TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT (ADJUSTABLE) IF THE TEMPERATURE LEAVING THE EXHAUST SIDE OF THE FIXED PLATE HEAT EXCHANGER DROPS BELOW THE FROST THRESHOLD SETPOINT (ADJUSTABLE), THE FROST PREVENTION DAMPER WILL CLOSE.

FREEZE PROTECTION: A HARDWIRED, LOW LIMIT TEMPERATURE SWITCH SHALL BE ELECTRICALLY INTERLOCKED WITH THE SUPPLY, AND EXHAUST FAN VARIABLE SPEED DRIVES. IF THE LOW LIMIT TEMPERATURE SWITCH IS TRIPPED 38.0 °F (ADJUSTABLE), THE HEAT EXCHANGER BYPASS OUTSIDE AIR DAMPER SHALL CLOSE, ALL VALVES SHALL OPEN TO 100% AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS. A MANUAL RESET OF THE LOW LIMIT TEMPERATURE SWITCH SHALL BE REQUIRED TO RESTART THE FAN.

SMOKE DETECTOR: A HARDWIRED, SMOKE DETECTOR CONTACT (PROVIDED BY OTHERS) SHALL BE ELECTRICALLY INTERLOCKED WITH THE SUPPLY AND EXHAUST FAN VARIABLE SPEED DRIVES AND THE DDC CONTROLLER SHALL CLOSE THE OUTSIDE AIR DAMPER AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.

CONDENSATE OVERFLOW: A CONDENSATE SWITCH FOR EACH DRAIN PAN SHALL BE MONITORED BY THE DDC CONTROLLER. IF A CONDENSATE SWITCH IS TRIPPED THE DDC CONTROLLER SHALL DISABLE THE SUPPLY AND EXHAUST FAN VARIABLE SPEED DRIVES, CLOSE THE OUTSIDE AIR DAMPER, AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.

ALARMS: ALARM FOR DIRTY FILTER: WHEN PRESSURE DROP EXCEEDS 0.5" WG ABOVE INITIAL PRESSURE DROP. ALARM IF LEAVING AIR TEMPERATURE EXCEEDS 60°F IN COOLING MODE OR DROPS BELOW 40°F IN HEATING MODE. ALARM IF AHU SUPPLY OR EXHAUST AIR FAN FAILS TO START OR FAILS DURING OPERATION. ALARM IF UNIT DISCHARGE STATIC PRESSURE EXCEEDS 5" W.G. ALARM IF CONDENSATE REACHES HIGH LEVEL. ALARM UPON SMOKE DETECTOR ACTIVATION. ALARM UPON HEAT WHEEL ROTATION FAILURE WHEN WHEEL IS TO BE ENERGIZED.

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM
PF&A
EVMS
Eastern Virginia Medical School
7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222
1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	BTF
Drawn By:	TMC
Checked By:	BKW
Scale:	AS NOTED
Date:	04/25/19

COMMONWEALTH OF VIRGINIA
BRIAN K. WALL
Lic. No. 30432
04/25/19
PROFESSIONAL ENGINEER
SEAL

Revisions

No.	Date	Description
1	05/06/19	Addendum 1

Renovate Gross Anatomy Lab at Lewis Hall

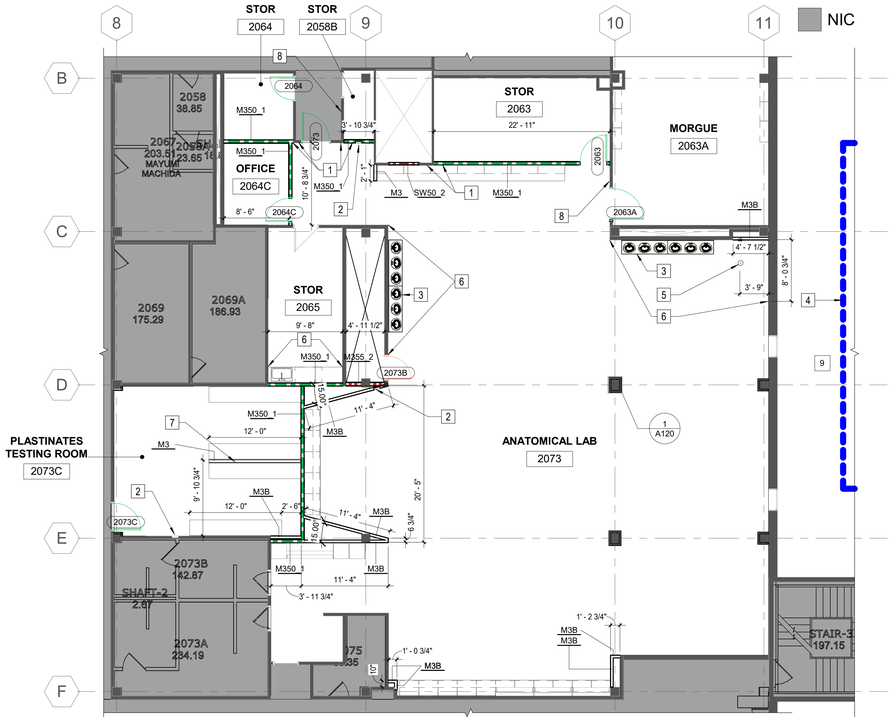
Controls

PROJECT NUMBER: #19053

M701

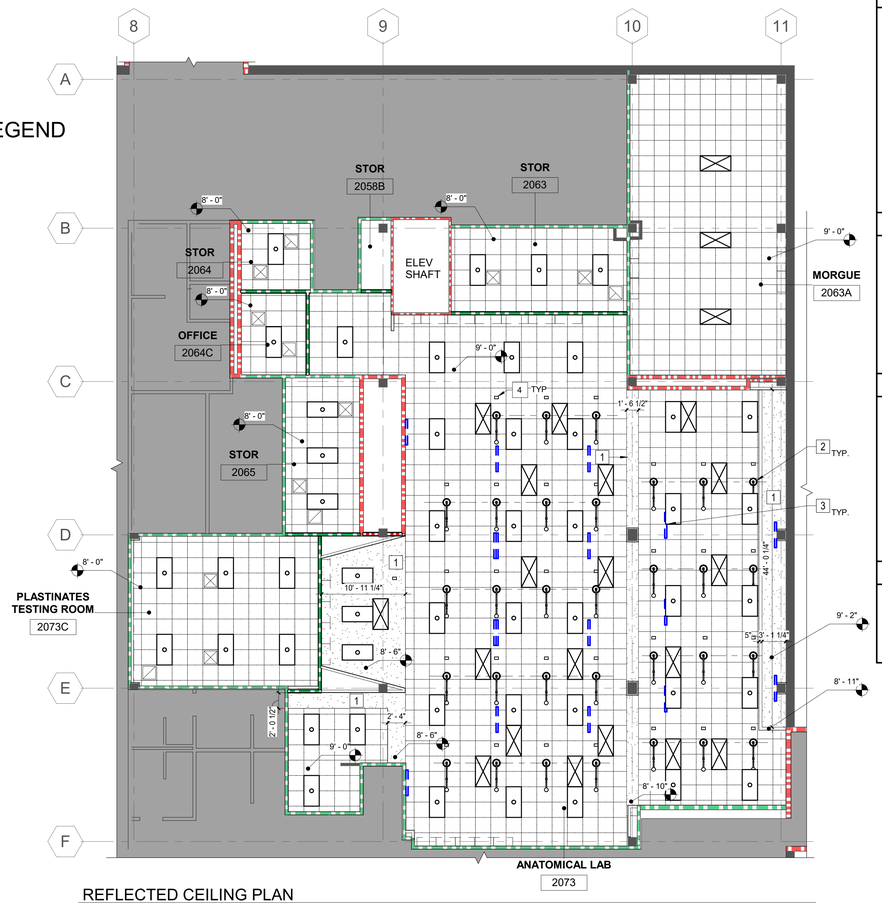
COLOR LEGEND

NIC



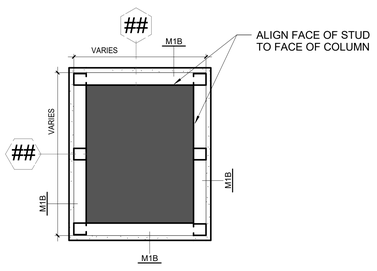
GROSS LAB - NEW WORK PLAN

1/8" = 1'-0"



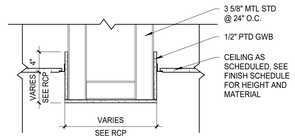
REFLECTED CEILING PLAN

1/8" = 1'-0"



1 A120 COLUMN DETAIL - TYP

1 1/2" = 1'-0"



SOFFIT DETAIL - TYP

1" = 1'-0"

ABV.	ABOVE
ACT.	ACOUSTICAL TILE
A.F.F.	ABOVE FINISH FLOOR
ALUM.	ALUMINUM
ATH.	ALUMINUM THRESHOLD
BD	BOARD
BLKG	BLOCKING
CC	CUBICLE CURTAIN
CG	CORNER GUARD
CLG	CEILING
COL	COLUMN
CONC.	CONCRETE
CONT.	CONTINUOUS
CORR	CORRIDOR
CT	CERAMIC TILE
DR	DOOR
ELEC	ELECTRIC(AL)
EL	ELEVATION
ELEV	ELEVATOR
ESRROI	EXISTING SALVAGED, RECONDITIONED, RELOCATED, OWNER INSTALLED
ESRRCI	EXISTING SALVAGED, RECONDITIONED, RELOCATED, CONTRACTOR INSTALLED
ESROI	EXISTING SALVAGED, RELOCATED, OWNER INSTALLED
ESRCI	EXISTING SALVAGED, RELOCATED, CONTRACTOR INSTALLED
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
EXIST.	EXISTING
EXST	EXISTING
FOF	FACE OF FINISH
F.O.S.	FACE OF STUD
FIN	FINISH(ED)
F.F.	FINISHED FACE
FIN FL	FINISHED FLOOR
FLR	FLOOR
GALV.	GALVANIZED
GL	GLAZING
GWB	GYPSUM WALLBOARD
GYP	GYPSUM
HDWR	HARDWARE
HDW	HARDWARE
HCW	HOLLOW CORE WOOD
HM.	HOLLOW METAL
HR	HOUR
HT.	HEIGHT
LAM.	LAMINATED
L	LENGTH
LVT	LUXURY VINYL TILE
MAX	MAXIMUM
MECH	MECHANICAL
MTG	MOUNTING
MTL	METAL
NIC.	NOT IN CONTRACT
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED OWNER INSTALLED
CFCI	CONTRACTOR FURNISHED CONTRACTOR INSTALLED
CFOI	CONTRACTOR FURNISHED OWNER INSTALLED
PL	PLASTIC
PLAM	PLASTIC LAMINATE
PNT	PAINT
PTD	PAINTED
R.	RISER
RA	RETURN AIR
RB	RESILIENT BASE
SC	SEALED CONCRETE
SG	SAFETY GLASS
SCW	SOLID CORE WOOD
SS	SOLID SURFACE
S.S.	STAINLESS STEEL
SV	SHEET VINYL
SIM	SIMILAR
STOR	STORAGE
SUSP.	SUSPENDED
TERR	TERRAZZO
TG	TEMPERED GLASS
TME	TO MATCH EXISTING
T.O.G.	TOP OF GRADE
TP	TEMPERED
TR.	TREAD
TRTD	TREATED
TYP	TYPICAL
VERT	VERTICAL
VB	VINYL BASE
VWC	VINYL WALL COVERING
WIN	WINDOW
@	AT
∠	ANGLE
℄	CENTER LINE
Ø	DIAMETER

ARCHITECTURAL ABBREVIATIONS

12" = 1'-0"

EXISTING DOOR

NEW WALL

EXISTING WALL

DEMO WALL OR ITEMS ABOVE OR BELOW

101 DEMO ROOM NUMBER

101 ROOM NUMBER

M349 WALL TAG

101 DOOR TAG

1 REVISION TAG

A CASEWORK TAG (REFERS TO CASEWORK SECTIONS)

1 A101 SIM SECTION OR WALL SECTION NUMBER

1 A120 INTERIOR ELEVATION MARKER

DEMO DOOR

NEW DOOR

1 NEW WORK NOTE

1 TYP. DEMOLITION NOTE

XXX TOILET ACCESSORY TAG

WWW EQUIPMENT TAG

1i CURTAIN WALL AND WINDOW MARKER

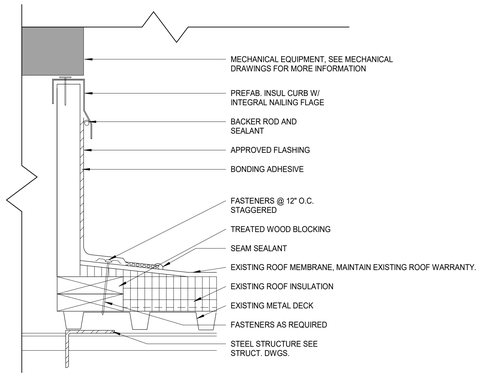
0 EXISTING COLUMN GRID NUMBER

0 COLUMN GRID NUMBER

1 A810 DETAIL MARKER

ARCHITECTURAL LEGEND

1/4" = 1'-0"



MECHANICAL CURB DETAIL - TYPICAL

3" = 1'-0"

GENERAL NEW WORK NOTES

- CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT FOR A RESOLUTION. ADJUSTMENTS TO DIMENSIONS AND CONDITIONS SHOWN MAY BE REQUIRED.
- ALL DIMENSIONS ARE REFERENCED FROM FACE OF STUD AT NEW CONSTRUCTION UNLESS OTHERWISE NOTED. DIMENSIONS ARE REFERENCED FROM FACE OF FINISH AT EXISTING CONSTRUCTION.
- ALL DIMENSIONS INDICATED +/- ARE APPROXIMATE AND MUST BE FIELD VERIFIED PRIOR TO THE START OF CONSTRUCTION.
- PROVIDE SHALL MEAN TO SUPPLY, TO FURNISH AND TO INSTALL COMPLETE WITH ALL ACCESSORIES, PARTS AND/OR SERVICES TO BE READY FOR ITS INTENDED USE.
- WHERE WORK ABUTS OR ADJOINS EXISTING SURFACES WHICH WILL REMAIN EXPOSED, ALIGN NEW WORK FLUSH WITH EXISTING ADJACENT SURFACES.
- THE CONTRACTOR SHALL MAINTAIN THE EXISTING BUILDING IN A WATER TIGHT CONDITION THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD. REPAIR DAMAGE CAUSED BY CONSTRUCTION OPERATIONS. TAKE ALL PRECAUTIONS NECESSARY TO PROTECT THE BUILDING AND ITS OCCUPANTS DURING THE CONSTRUCTION PERIOD.
- CONTRACTOR SHALL PROVIDE BARRIERS TO PREVENT ENTRY TO THE CONSTRUCTION AREA. BARRIERS SHALL NOT INTERFERE WITH THE OWNERS USE OF THE SITE.
- THE CONTRACTOR SHALL PROVIDE NEGATIVE PRESSURE IN THE AREA OF RENOVATION TO PREVENT THE SPREAD OF DUST TO OCCUPIED AREAS OF THE BUILDING.
- ALL NOTES, REMARKS AND/OR SCHEDULES ON THIS SHEET ARE FOR THIS ONLY UNLESS OTHERWISE NOTED.

NEW WORK NOTES

1 ALIGN GWB OF NEW WALL WITH GWB OF EXISTING WALL.
2 PROVIDE SEMI-RECESSED FIRE EXTINGUISHER AS SPECIFIED.
3 STAINLESS STEEL HANDWASHING SINKS. PROVIDE EYEWASH AT THIS SINK LOCATION. SEE PLUMBING DRAWINGS.
4 AIR HANDLING UNIT, OFCI. SEE TYPICAL CURB DETAIL, THIS SHEET. SEE MECH DWGS FOR MORE INFORMATION.
5 EMERGENCY SHOWER WITH FLOOR DRAIN. SCAN FLOOR TO AVOID REBAR WHEN INSTALLING THE FLOOR DRAIN. SEE PLUMBING DRAWINGS.
6 PROVIDE GWB BACKER BOARD FOR EXTENT SHOWN. RUN ABOVE CEILING, 4" MIN.
7 PARTIAL HEIGHT WALL. SEE CASEWORK SECTION FOR MORE INFORMATION.
8 PUSH BUTTON FOR AUTOMATIC DOOR. SEE ELEC FOR MORE INFORMATION.
9 MAINTAIN EXISTING ROOF WARRANTY. INSTALL/PATCH ROOF MEMBRANE AS NEEDED PER MANUFACTURERS INSTRUCTIONS. THE MANUFACTURER IS SOPREMA. THE PRODUCT REPRESENTATIVE IS RICK DALNIS, PHONE NUMBER 757-288-9363

GENERAL CEILING NOTES

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT FOR A RESOLUTION.
- EACH SUB CONTRACTOR SHALL REVIEW THE CONSTRUCTION DOCUMENTS AND EVALUATE THE SCOPE OF WORK REQUIRED BY THEIR RESPECTIVE TRADE AND ANY CONFLICTS WITH OTHER TRADES. ANY CONFLICTS WILL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT FOR A RESOLUTION.
- PROVIDE SHALL MEAN TO SUPPLY, TO FURNISH AND TO INSTALL COMPLETE WITH ALL ACCESSORIES, PARTS AND/OR SERVICES TO BE READY FOR ITS INTENDED USE.
- CONTRACTOR SHALL COORDINATE ALL REQUIRED CONDUIT, PIPING AND CHASES FOR OWNER FURNISHED OWNER INSTALLED EQUIPMENT WITH THE OWNER.
- CONTRACTOR SHALL COORDINATE WITH WORK BEING PERFORMED UNDER SEPARATE CONTRACT BY OWNER.
- SEE LIFE SAFETY PLAN FOR FIRE WALL AND SMOKE PARTITION LOCATIONS.
- ALL ABUTTING DISSIMILAR MATERIALS ARE TO BE SEALED. COLOR TO MATCH ADJACENT MATERIALS.
- ALL NOTES, REMARKS AND/OR SCHEDULES ON THIS SHEET ARE FOR THIS SHEET ONLY UNLESS OTHERWISE NOTED.

NEW WORK CEILING NOTES

1 PROVIDE EPOXY PTD GWB [PNT#1] SOFFIT.
2 ARTICULATING CEILING MOUNTED LIGHT FIXTURE. SECURE TO STRUCTURE ABOVE. COORDINATE INSTALLATION OF ACT AROUND BASE PLATE AS NEEDED. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION. ALIGN EACH LIGHT IN ITS ROW WITHIN ITS GROUPING.
3 CEILING MOUNTED MONITOR. MONITORS AND STRUCTURAL BRACKET OFCI. STRUCTURAL PLATE, TYPE CHIEF CPA330, AND PIPE TO BE MOUNTED DIRECTLY TO THE CONCRETE SLAB ABOVE. SEE ELECTRICAL DWGS FOR MORE INFORMATION.
4 RETRACTABLE POWER CORD, MOUNTED TO STRUCTURE ABOVE. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.

ROOM LEGEND

NUMBER	NAME	Area
2058B	STOR	34 SF
2063	STOR	247 SF
2063A	MORGUE	789 SF
2064	STOR	78 SF
2064C	OFFICE	90 SF
2065	STOR	195 SF
2073	ANATOMICAL LAB	3622 SF
2073C	PLASTINATES TESTING ROOM	470 SF

CEILING LEGEND

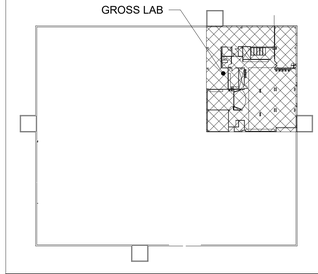
** ITEMS ON THIS SHEET ARE SHOWN FOR LOCATION ONLY. COORDINATE WITH MECHANICAL AND ELECTRICAL SHEETS. CONTRACTOR TO VERIFY HOUSING TO WORK WITH CEILING TYPE.**

- EXHAUST AIR DIFFUSER
- RETURN AIR DIFFUSER
- SUPPLY AIR DIFFUSER
- 2 X 2 LIGHT FIXTURE
- 2 X 4 LIGHT FIXTURE
- 2'-0" x 2'-0" ACT SYSTEM
- GWB CEILING
- CEILING MOUNTED POWER REEL

WALL TYPE SCHEDULE

TYPE	STC	DESCRIPTION	FIRE RATING	UL	REMARKS
M1B	N/A	1 5/8" METAL STUDS AT 16" O.C. MAX. 5/8" GWB ONE SIDE. EXTEND WALL ASSEMBLY TO 4" ABOVE FINISHED CEILING.	N/A	-	
M3	N/A	3 5/8" METAL STUDS AT 16" O.C. MAX. 5/8" GWB BOTH SIDES. EXTEND WALL ASSEMBLY TO 4" ABOVE FINISHED CEILING.	N/A	N/A	
M3B	N/A	3 5/8" METAL STUDS AT 16" O.C. MAX. 5/8" GWB ONE SIDE. EXTEND WALL ASSEMBLY TO 4" ABOVE FINISHED CEILING.	N/A	N/A	
M350_1	50	3 5/8" METAL STUDS AT 16" O.C, 5/8" FIRE RATED GWB EACH SIDE. RC-1 ON SIDE SPACED 24" OC, 3" CREASED MINERAL WOOL INSULATION, EXTEND WALL ASSEMBLY TO UNDERSIDE OF DECK ABOVE.	1 HR	U419	PROVIDE 3" STENCILED WITH 3/8" STROKE TEXT EVERY 8' O.C. READING "1 HR FIRE RATED BARRIER" AS REQUIRED BY BUILDING CODE.PROVIDE FIRE SAFING AT ALL VOIDS.
M355_2	55	3 5/8" METAL STUDS AT 16" O.C, 2 LAYERS 5/8" FIRE RATED GWB ONE SIDE. 1 LAYER 5/8" FIRE RATED GWB. RC-1 CHANNEL ONE SIDE 24" OC, 3" CREASED MINERAL WOOL INSULATION, EXTEND WALL ASSEMBLY TO UNDERSIDE OF DECK ABOVE.	2 HR	U419	PROVIDE 3" STENCILED WITH 3/8" STROKE TEXT EVERY 8' O.C. READING "2 HR FIRE RATED BARRIER" AS REQUIRED BY BUILDING CODE.PROVIDE FIRE SAFING AT ALL VOIDS.
SW450_2	50	4" METAL C-H STUDS AT 24" O.C. MAX. ,1 LAYER OF 1/2" FIRE RATED GWB ON ONE SIDE , 1 LAYER OF 1" FIRE RATED GWB ON ONE SIDE, 3" MINERAL WOOL INSULATION. EXTEND WALL ASSEMBLY TO UNDERSIDE OF DECK ABOVE.	2 HR	U415	PROVIDE 6" STENCILED WITH 3/8" STROKE TEXT EVERY 8' O.C. READING "2 HR FIRE RATED BARRIER" AS REQUIRED BY BUILDING CODE. PROVIDE INSULATION WHERE COMPONENTS MEET DECK ABOVE.

KEY PLAN



GRAPHIC SCALES

1/8" = 1'-0" 5' 0' 5' 10' 20'

1/4" = 1'-0" 5' 0' 5' 10'

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM
PF&A
EVMS Eastern Virginia Medical School
7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222
1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	SAH
Drawn By:	SAH
Checked By:	KJB
Scale:	AS NOTED
Date:	04-25-2019

COMMONWEALTH OF VIRGINIA SHARON A. HALEY 3434 4-25-19 ARCHITECT SEAL

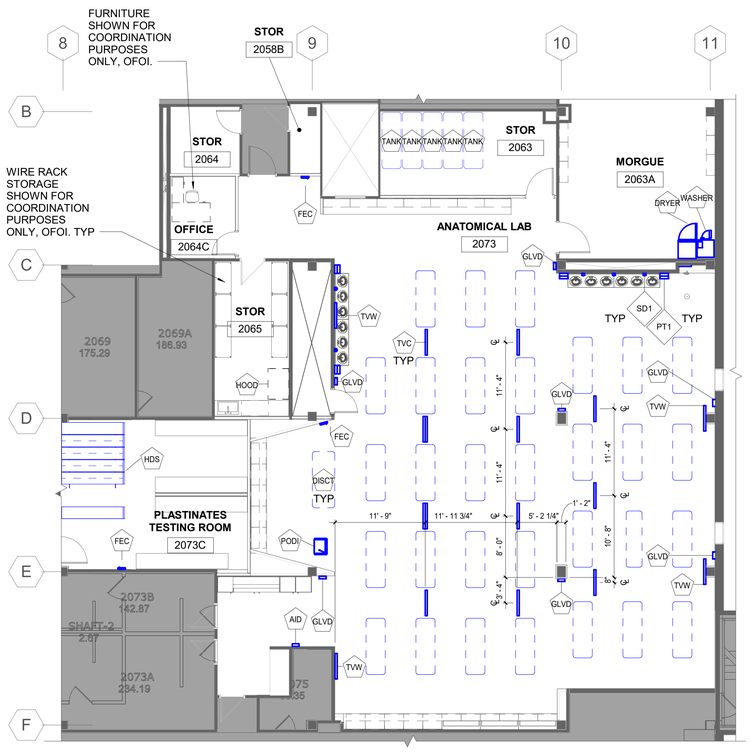
Revisions		
No.	Date	Description
1	5/6/19	Addendum #1

Renovate Gross Anatomy Lab at Lewis Hall

Abbreviations, Legend, New Work and Reflected Ceiling Plans - Second Floor

PROJECT NUMBER: #2671.19

A120

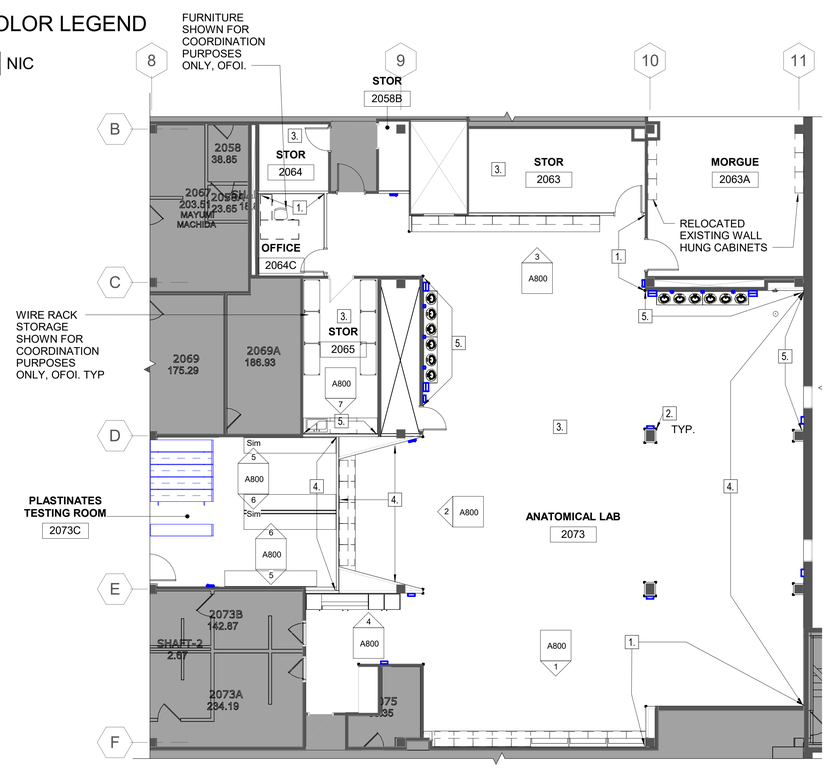


GROSS LAB - EQUIPMENT PLAN

1/8" = 1'-0"

COLOR LEGEND

NIC



GROSS LAB - FINISH FLOOR PLAN

1/8" = 1'-0"

GENERAL FINISH NOTES

- PROVIDE METAL TRANSITION STRIP AT ALL FLOOR FINISH TRANSITIONS.
- ALL FLOOR FINISH TRANSITIONS SHALL BE CONCEALED BY A CLOSED DOOR.
- ALL FINISHES LISTED ARE NEW UNLESS SPECIFICALLY NOTED AS EXISTING.
- WALL BASE SHALL BE RUBBER ROLL GOODS. UON
- WHERE PAINTED GWB ARE INDICATED, PAINTING INCLUDES ALL PREVIOUSLY PAINTED SURFACES AND TRIM.
- HATCH PATTERNS ON FINISH PLANS ARE REPRESENTATIONAL ONLY TO DISTINGUISH COLOR CHANGES, UNLESS OTHERWISE NOTED.
- ALL WALLS TO BE PAINTED PNT #1, EGGSHELL, UNLESS OTHERWISE NOTED. SEE FINISH COLORS FOR INFORMATION.
- ALL TRIM TO BE PAINTED PNT#2, SEMI-GLOSS, UNLESS OTHERWISE NOTED. SEE FINISH COLORS FOR INFORMATION.
- ALL CEILING PAINT TO BE PAINTED, FLAT, UNLESS OTHERWISE NOTED. SEE FINISH COLORS FOR INFORMATION.
- ALL VINYL TILE TO BE INSTALLED MONOLITHIC, UNLESS OTHERWISE NOTED. SEE FINISH COLORS FOR MORE INFORMATION.

FINISH COLORS

VERIFY ALL FINISH MANUFACTURERS AND COLORS W/ OWNER PRIOR TO PURCHASE

FLOOR

EPOXY#1	DUR-A-FLEX; ACCELERA HC "SHALE" W/ SELF LEVELING AND MOISTURE MITIGATION SYSTEM RECOMMENDED BY THE MANUFACTURER
VCT#1	ARMSTRONG: STANDARD EXCELON: #51901: "TAUPE" 12" X12"

WALL AND CEILING

PNT#1	[WHITE/FIELD] SHERWIN WILLIAMS; #SW7627; "WHITE HERON"
PNT#2	[TRIM] SHERWIN WILLIAMS; #SW9165; "GOSSAMER VEIL"
PNT#3	[ACCENT] SHERWIN WILLIAMS; #SW6780; "NAUTILUS"
PNT#4	[ACCENT] SHERWIN WILLIAMS; #SW6783; "AMALFI"
ACT#1	ARMSTRONG: CORTEGA - TEGULAR #816A; 15/16" GRID
ACT#2	NUDO ELEMENTS: PM1-120BC 24" X 24", WHITE, IN ARMSTRONG 15/16" GRID, WHITE.
ACT#3	[SCRUBBABLE] ARMSTRONG: ULTIMA HEALTH ZONE 24"X24"; 15/16" GRID, WHITE
RB#1	JOHNSONITE: 4" COVE BASE; #121 "CEMENT"

CASEWORK AND ACCESSORIES

CG#1	CS ACROVYN: CORNER GUARD FULL HEIGHT; STAINLESS STEEL; CO-8
PLAM#1	[COUNTER] NEVAMAR: #S6054T; "WROUGHT IRON"
PLAM#2	[CASEWORK] PIONITE: #WA110-SD; "CATCHING FIREFLIES"
PH#1	[PHENOLIC RESIN] DURCON; COLOR: BLACK; MATTE FINISH
WP#1	CS ACROVYN: HIGH IMPACT WALL PROTECTION: .040" THICK; #262 "DRIFTWOOD"; 48" HIGH
WS#1	CS ACROVYN: HIGH IMPACT WALL PROTECTION: .040" THICK; "DRIFTWOOD"; FULL HEIGHT

FINISH NOTES

1. PROVIDE ACCENT WALL PAINT [PNT #3]. SEE FINISH COLORS FOR MORE INFORMATION.
2. PROVIDE FULL HEIGHT CORNER GUARD [CG #1]. SEE FINISH COLORS FOR MORE INFORMATION. TYPICAL AT ALL OUTSIDE CORNERS.
3. PROVIDE WAINSCOT [WS#1] TO 48" A.F.F. WITH TOP CAP AND COLOR MATCH CAULK AT SEAMS.
4. PROVIDE ACCENT WALL PAINT [PNT #3]. SEE FINISH COLORS FOR MORE INFORMATION.
5. PROVIDE WALL PROTECTION (WP#1) FULL HEIGHT. SEE FINISH COLORS FOR MORE INFORMATION.

FINISH REMARKS

1. PROVIDE ACCENT WALL PAINT. SEE WALL FINISH PLAN AND FINISH COLORS FOR MORE INFORMATION.
2. PROVIDE EPOXY COVE BASE. SEE DETAIL 1/A610, THIS SHEET, FOR MORE INFORMATION.

EQUIPMENT SCHEDULE

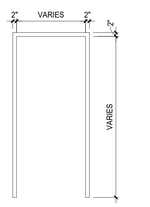
MARK	DESCRIPTION	NEW EQUIPMENT OFOI	NEW EQUIPMENT OFCI	NEW EQUIPMENT CFCI	EXISTING SALVAGED EQUIPMENT RECONDITIONED / RELOCATED ESRROI	EXISTING SALVAGED EQUIPMENT RECONDITIONED / RELOCATED ESRRCI	EXISTING SALVAGED EQUIPMENT RELOCATED ESROI	EXISTING SALVAGED EQUIPMENT RELOCATED ESRCI	NIC	COMMENTS
AID	Wall mounted First Aid Kit.							*		PROVIDE FIRE TREATED BLOCKING
DISCT	Dissection table, stainless steel. Approximately 36"H x 84"L x 30"W	*					*			COMBINATION OF EXISTING AND NEW TABLES. ALL ARE THE RESPONSIBILITY OF THE OWNER.
DRYER	Commercial dryer. See MEP drawings for more information.							*		PROVIDE POWER AND VENT
FEC	Semi-Recessed Fire Extinguishing Cabinet			*						PROVIDE FIRE TREATED BLOCKING
GLVD	Glove dispenser, wall mounted. Mount 48" AFF to the center of the rack.		*							FIRE TREATED BLOCKING AS NEEDED.
HDS	Manually operated mobile shelving unit array			*						
HOOD	Equipment hood. See mechanical drawings for more information.						*			PROVIDE POWER, EXHAUST
POD1	Portable floor lectern with built-in public address system.	*								PROVIDE POWER AND DATA
TANK	Storage tanks.						*			
TVC	Ceiling mounted monitor. Monitor bracket to attached directly to the concrete slab above. Follow manufacturer installation instructions. Mount as tight to the ceiling as possible. Maintain minimum 6'-10" clear below underside of monitor.		*							PROVIDE POWER AND SECURE TO STRUCTURE
TVW	Wall mounted monitor. Provide fire treated blocking as needed. Coordinate installation height with owner.		*							PROVIDE POWER AND FIRE TREATED BLOCKING
WASHER	Commercial washing machine. See MEP drawings for more information.							*		PROVIDE POWER, WATER, AND DRAIN

FINISH SCHEDULE

NUMBER	ROOM NAME	FLOOR MTL / COLOR	BASE MTL / COLOR	WALL MTL / COLOR	CEILING MTL / COLOR	FINISH REMARKS
2058B	STOR	ETR	ETR	ETR	ETR	-
2063	STOR	EPOXY#1	EPOXY#1	PTD GWB / PNT#1; WS#1	ACT#1	2
2063A	MORGUE	ETR	ETR	ETR	ACT#3	-
2064	STOR	VCT#1	RB#1	PTD GWB / PNT#1 / WS#1	ACT#1	-
2064C	OFFICE	EPOXY#1	EPOXY#1	PTD GWB / PNT#1,#3	ACT#1	1,2
2065	STOR	EPOXY#1	EPOXY#1	PNT#1 / WS#1 / WP#1	ACT#1	2
2073	ANATOMICAL LAB	EPOXY#1	EPOXY#1	PNT#1, #3, #4 / WP#1 / WS#1	ACT#3, PNT#1 (EPOXY)	1,2
2073C	PLASTINATES TESTING ROOM	VCT#1	RB#1	PTD GWB	ACT#1	1

TOILET ACCESSORY SCHEDULE

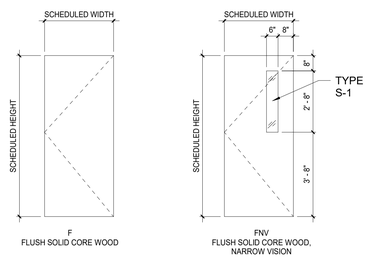
MARK	DESCRIPTION	MOUNTING HEIGHT	OFCI	OFOI	CFCI	REMARKS
PT1	AUTOMATIC PAPER TOWEL DISPENSER	48" A.F.F. TO BOTTOM OF OPENING				
SD1	VERTICAL MOUNT SOAP DISPENSER	40" TO BOTTOM OF CONTROLS				



1

FRAME TYPES

3/8" = 1'-0"

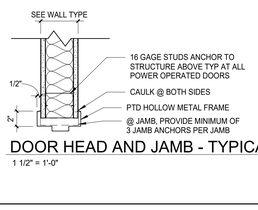


DOOR TYPES

3/8" = 1'-0"

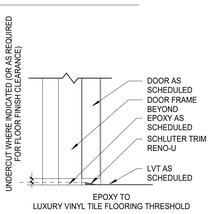
DOOR SCHEDULE

MARK	DOOR TYPE	DOOR WIDTH	DOOR HEIGHT	DOOR THICKNESS	DOOR FIRE RATING	FRAME TYPE	FRAME HEAD	FRAME JAMB	FRAME SILL	HARDWARE	COMMENTS
2063	F	3' - 6"	7' - 0"	1 3/4"	3/4 HR	1	TYP	TYP	NA	2.0	
2063A	F	4' - 0"	7' - 0"	1 3/4"	3/4 HR	1	TYP	TYP	S1	6.0	AUTOMATIC OPERATOR PUSH BOTTON. CARD ACCESS
2064	F	3' - 0"	7' - 0"	1 3/4"	3/4 HR	1	TYP	TYP	S1	2.0	
2064C	FNV	3' - 0"	7' - 0"	1 3/4"	3/4 HR	1	TYP	TYP	NA	4.0	
2073	FNV	3' - 6"	7' - 0"	1 3/4"	3/4 HR	1	TYP	TYP	S1	6.0	AUTOMATIC OPERATOR PUSH BOTTON. CARD ACCESS
2073B	F	3' - 0"	7' - 0"	1 3/4"	1 1/2 HR	1	TYP	TYP	S1	3.0	
2073C	FNV	3' - 6"	7' - 0"	1 3/4"	3/4 HR	1	TYP	TYP	S1	1.0	CARD ACCESS



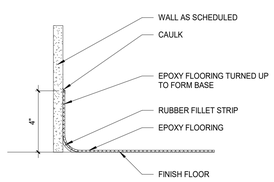
DOOR HEAD AND JAMB - TYPICAL

1 1/2" = 1'-0"



S1 - SILL DETAIL

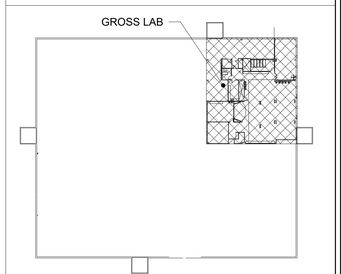
1" = 1'-0"



Epoxy Base Detail

3" = 1'-0"

KEY PLAN



GRAPHIC SCALES

1/8" = 1'-0" 5' 0' 5' 10' 20'

1/4" = 1'-0" 5' 0' 5' 10'

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM
PF&A
EVMS
Eastern Virginia Medical School
7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222
1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	BMW / SAH
Drawn By:	BMW / PLH
Checked By:	KJB
Scale:	AS NOTED
Date:	04-25-2019

COMMONWEALTH OF VIRGINIA SHARON LEE HALEY 9434 4-25-19 ARCHITECT

SEAL

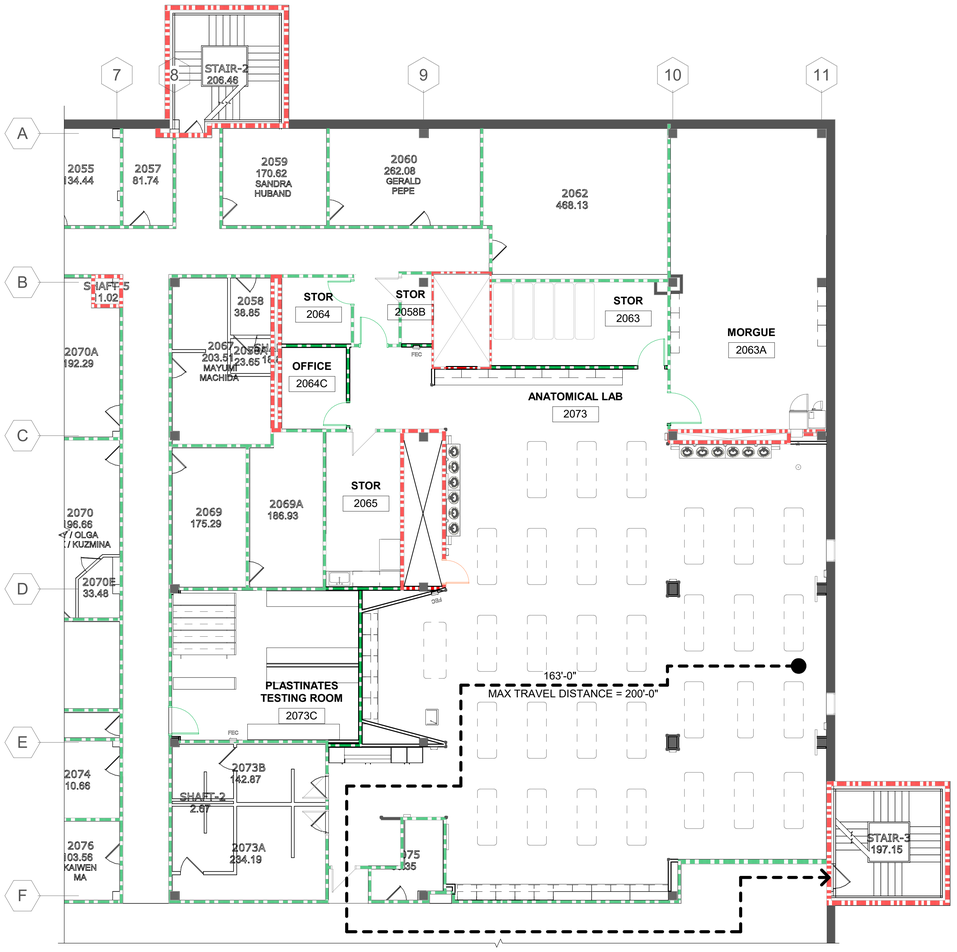
Revisions		
No.	Date	Description
1	5/6/19	Addendum #1

Renovate Gross Anatomy Lab at Lewis Hall

Door Schedule, Door Details, Finish and Equipment Plans

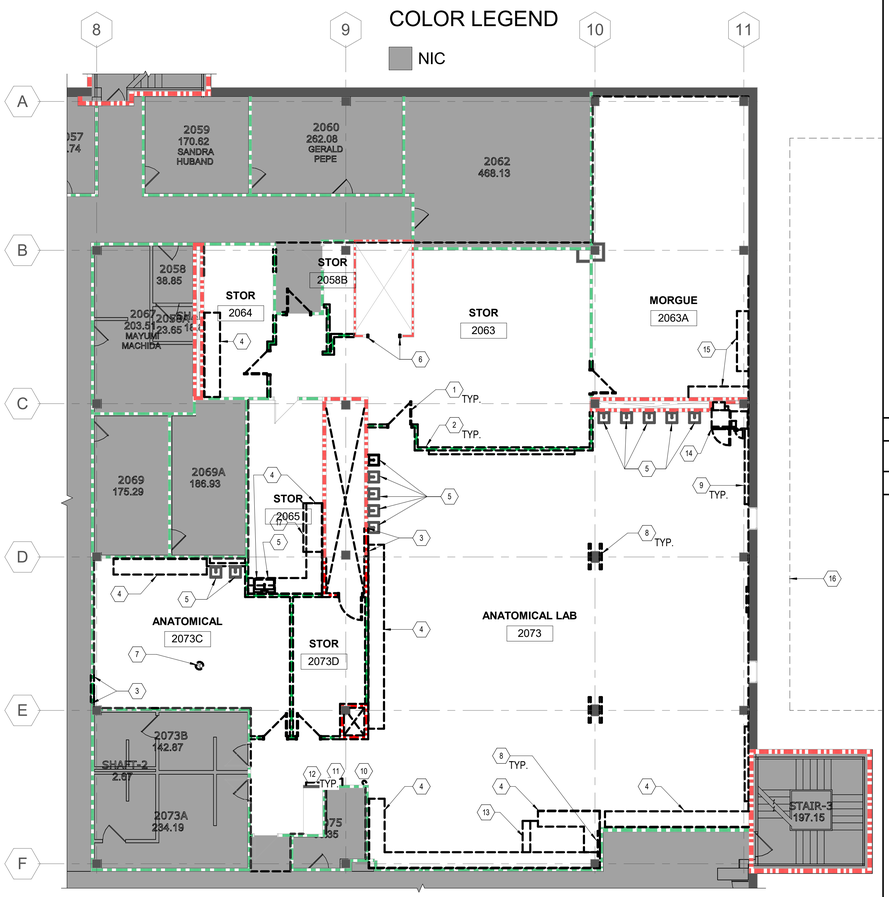
PROJECT NUMBER: #2671.19

A610



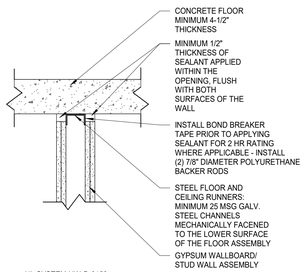
LIFE SAFETY PLAN - SECOND FLOOR

1/8" = 1'-0"



DEMOLITION PLAN - SECOND FLOOR

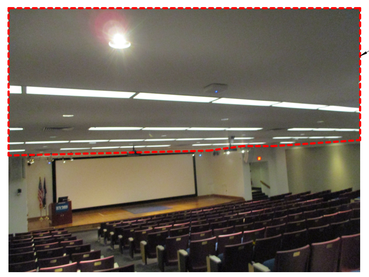
1/8" = 1'-0"



UL SYSTEM HW-D-0158
FOR CONCRETE FLOOR AND
GYPSUM WALLBOARD WALL
1 &2 HR. RATING
JOINT WIDTH: 1" MAXIMUM

1 / LS120 FIRE STOPPING DETAIL CONCRETE - TYP

1 1/2" = 1'-0"



REMOVE THE CEILING AS NEEDED TO INSTALL NEW STRUCTURE. SALVAGE ALL CEILING EQUIPMENT AND SYSTEMS TO BE REINSTALLED. REPLACED DAMAGED AREAS OF THE CEILING TO MATCH EXISTING. THOROUGHLY DOCUMENT AREAS TO BE DISTURBED IN ORDER TO MATCH EXISTING CONDITIONS.

CEILING REMOVAL WILL BE REQUIRED AT AREAS WHERE STRUCTURAL REINFORCEMENT IS INDICATED. THIS INCLUDES THE AHU-1 ROOF CURB AND THE PIPE SUPPORT CURBS.

1

DEMOLITION VIEW - AUDITORIUM CEILING

LIFE SAFETY LEGEND

TRAVEL DISTANCE — X' - X" — MAX TRAVEL DISTANCE X' - X"

FIRE EXTINGUISHER CABINET — FEC

WALL LEGEND

SMOKE PARTITION

1 HR. SMOKE BARRIER

1 HR. FIRE BARRIER

1 HR. FIRE BARRIER AND SMOKE BARRIER (BOTH WALL TYPES APPLY)

2 HR.FIRE BARRIER

2 HR. FIRE AND SMOKE BARRIER (BOTH WALL TYPES APPLY)

BUILDING DATA

NAME OF PROJECT: EVMS GROSS LAB RENOVATION

ADDRESS: 700 W ONLEY RD #1147, NORFOLK, VA 23507

OWNER: EASTERN VIRGINIA MEDICAL SCHOOL

PROPOSED USE: EXISTING BUILDING

USE GROUP: BUSINESS, B

CONSTRUCTION CLASSIFICATION: RENOVATION

TOTAL OCCUPANT LOAD: EXISTING

RENOVATION GROSS SQUARE FOOTAGE: 5,497 SF

ZONING: EXISTING

PARKING SPACES: EXISTING

APPLICABLE CODES / GUIDELINES:

VIRGINIA UNIFORM STATEWIDE BUILDING CODE 2015 EDITION

NFPA 101, LIFE SAFETY CODE - 2012 EDITION

NFPA 220, TYPES OF BUILDING CONSTRUCTION - 2012 EDITION

BUILDING REGULATION DATA

VUSBC 2015

1. BUSINESS USE GROUP B. SCOPE INCLUDES RENOVATION OF A SINGLE LABORATORY SUITE WITHIN AN EXISTING HIGHER EDUCATION LABORATORY BUILDING.

2. EXISTING BUILDING IS NOT SPRINKLERED.

3. TABLE 430.3 - LAB SUITES TO BE SEPARATED BY 1 HOUR FIRE BARRIER.

4. TRAVEL DISTANCE TABLE 1017.2. OCCUPANCY TYPE B WITHOUT A SPRINLER SYSTEM SHALL HAVE A TRAVEL DISTANCE NO GREATER THAN 200'-0".

NFPA 101, 2012

CHAPTER 39: EXISTING BUSINESS OCCUPANCIES
39.2 MEANS OF EGRESS REQUIREMENTS

39.2.6.2 TRAVEL DISTANCE TO AN EXIT SHALL NOT EXCEED 200 FT FROM ANY POINT IN A BUILDING, UNLESS OTHERWISE PERMITTED BY 39.2.6.3.

GENERAL NOTES

1. PROVIDE FIRE STOP DETAIL 1/LS120 AT HEAD OF WALL JOINT SYSTEM FOR ALL RATED WALLS THIS AREA.

GENERAL DEMOLITION NOTES

- DEMOLITION DRAWINGS INDICATE IN GENERAL, THE EXTENT OF DEMOLITION. REMOVE ALL ASSOCIATED APPURTENANCES NOT REQUIRED IN THE NEW WORK, ALL ABANDONED ITEMS, AND ALL ITEMS REQUIRED FOR THE INSTALLATION OF NEW WORK, TO PROVIDE FOR A COMPLETE PROJECT. ITEMS NOT SPECIFICALLY INDICATED THAT ARE QUESTIONABLE FOR REMOVAL SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR A DECISION.
- THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS PRIOR TO THE START OF CONSTRUCTION.
- THE CONTRACTOR SHALL PATCH ALL EXISTING SURFACES TO MATCH EXISTING WHERE AFFECTED BY CONSTRUCTION OPERATIONS, INCLUDING BUT NOT LIMITED TO PLUMBING, MECHANICAL AND ELECTRICAL WORK.
- THE CONTRACTOR SHALL PATCH NAIL HOLES, ETC, AND REMOVE MISCELLANEOUS APPURTENANCES ON EXISTING WALLS TO BE PAINTED OR COVERED WITH WALL COVERING.
- ALL NEW WORK SHALL ALIGN WITH EXISTING WHERE THEY INTERSECT UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL PATCH AND REPAIR ALL EXISTING SURFACES WHICH WERE PREVIOUSLY DAMAGED PRIOR TO CONSTRUCTION OPERATION, REGARDLESS IF THE ITEM WAS SPECIFICALLY NOTED OR NOT.
- THE CONTRACTOR SHALL REMOVE AND PATCH ANY AREAS UNCOVERED WHERE WOOD NAILERS OR GROUNDS ARE FOUND TO EXIST BEHIND ANY TRIM ITEMS OR EQUIPMENT REMOVED. WALLS SHALL BE MADE FLUSH WITH EXISTING ADJACENT SURFACES AND READY TO RECEIVE NEW FINISHES.
- IF ANY ASBESTOS CONTAINING MATERIAL IS ENCOUNTERED DURING THE COURSE OF CONSTRUCTION OPERATIONS WHICH IS NOT INDICATED ON THE CONTRACT DOCUMENTS THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IMMEDIATELY.
- ALL SIGNAGE WHICH OCCURS ON WALL OR ON DOORS TO BE REMOVED SHALL BE REMOVED BY THE CONTRACTOR AND TURNED OVER TO THE OWNER.
- ALL FINISHES LISTED IN THE DEMOLITION SCHEDULE SHALL BE REMOVED COMPLETELY UNLESS INDICATED OTHERWISE. DEMOTION SHALL INCLUDE BACKINGS, MASTIC AND GLUES, SETTING BEDS, AND SUBSTRATE AS REQUIRED TO PREPARE THE MATERIAL FOR NEW WORK AND/OR FINISHES.
- ALL NOTES, REMARKS AND/OR SCHEDULES ON THIS SHEET ARE FOR THIS SHEET ONLY UNLESS OTHERWISE NOTED.
- ALL EXISTING SMOKE DETECTORS AND SPEAKERS TO REMAIN AND REWORKED WITH NEW CEILING SYSTEM UON.
- EXISTING WALL FINISHES TO BE VERIFIED AND PREPPED ACCORDINGLY FOR NEW FINISHES SCHEDULES - BY CONTRACTOR.
- COORDINATE REMOVAL OF ALL WALL MOUNTED EQUIPMENT AND CASEWORK WITH OWNER TO VERIFY WHETHER IT SHOULD BE SALVAGED OR DEMOLISHED. UON
- CAULK AND SEAL TOP OF EXISTING WALLS TO BE AIR TIGHT.
- ALL EXISTING WALLS TO BE PATCHED AND REPAIRED TO MAINTAIN WALL ASSEMBLY TYPE.

DEMOLITION NOTES

1 REMOVE DOOR, FRAME, AND HARDWARE AND TURN OVER TO OWNER.
2 REMOVE EXISTING GWB AND METAL STUD IN ITS ENTIRETY AS DENOTED BY DASHED LINE, INCLUDING BUT NOT LIMITED TO ALL FINISHES AND BRACING.
3 REMOVE PORTION OF WALL TO INSTALL NEW DOOR. COORDINATE WITH NEW WORK.
4 REMOVE CASEWORK IN ITS ENTIRETY INCLUDING BUT NOT LIMITED TO BASE CABINETS, WALL CABINETS, SINK, BRACING AND HARDWARE. SEE PLUMBING DRAWINGS.
5 REMOVE PLUMBING FIXTURES IN ITS ENTIRETY. SEE PLUMBING DRAWINGS.
6 REMOVE ELEVATOR DOOR AND FRAME IN ITS ENTIRETY. COORDINATE WITH OWNER REP TO REPROGRAM ELEVATOR STOPS AS NEEDED.
7 REMOVE AND INFILL EXISTING FLOOR DRAIN. SEE PLUMBING DRAWINGS FOR MORE INFORMATION.
8 REMOVE WALL MOUNTED TV AND TURN OVER TO OWNER.
9 REMOVE WALL MOUNTED CHALKBOARD AND TURN OVER TO OWNER.
10 REMOVE WALL MOUNTED FIRE EXTINGUISHER AND TURN OVER TO OWNER.
11 REMOVE WALL MOUNTED FIRST AID KIT AND TURN OVER TO OWNER.
12 REMOVE WALL MOUNTED WHITE BOARD AND TURN OVER TO OWNER.
13 REMOVE RAISED PLATFORM AREA IN ITS ENTIRETY.
14 SALVAGE AND RELOCATE WASHER AND DRYER. SEE PLUMBING DRAWINGS.
15 SALVAGE AND RELOCATE WALL MOUNTED CASEWORK IN ITS ENTIRETY.
16 ADDITIONAL STRUCTURE IS REQUIRED TO SUPPORT THE HVAC. REMOVAL OF PORTIONS OF THE AUDITORIUM CEILING IS REQUIRED TO INSTALL THE STRUCTURE. SEE PICTURES ON SHEET LS120 FOR MORE INFORMATION.
17 REMOVE PLUMBING FIXTURES IN ITS ENTIRETY. SEE PLUMBING DRAWINGS.

DEMOLITION REMARKS

1 1. FLOOR TILE CONTAINS ASBESTOS AND SHALL BE ABATED I.A.W. PROJECT SPECIFICATIONS.

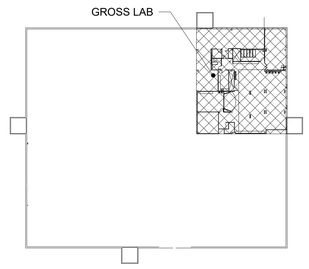
DEMOLITION SCHEDULE

*** ALL FINISHES LISTED IN SCHEDULE ARE TO BE REMOVED COMPLETELY UNLESS OTHERWISE NOTED ***

NUMBER	FLOOR	BASE	WALL	CEILING	REMARKS
2058B	ETR	ETR	ETR	ETR	
2063	VCT	RB	PTD GWB	ACT	1
2063A	ETR	ETR	ETR	ACT	
2064	VCT	RB	PTD GWB	ACT	1
2065	VCT	RB	PTD GWB	ACT	1
2073	SV	RB	PTD GWB	ACT	
2073C	EPOXY	EPOXY	PTD GWB	ACT / GWB	
2073D	VCT	RB	PTD GWB	ACT	1

1 1

KEY PLAN



GRAPHIC SCALES

1/8" = 1'-0" 5' 0' 5' 10' 20'

1/4" = 1'-0" 5' 0' 5' 10'

PACE COLLABORATIVE
MECHANICAL ELECTRICAL ENGINEERS
WWW.PACE-ENGINEERING.COM
PF&A
EVMS
Eastern Virginia Medical School
7814 CAROUSEL LANE, SUITE 200
RICHMOND, VIRGINIA 23294
(804) 270-7222
1277 PERIMETER PARKWAY
VIRGINIA BEACH, VIRGINIA 23454
(757) 499-7223

Designed By:	SAH
Drawn By:	SAH
Checked By:	KJB
Scale:	AS NOTED
Date:	04-25-2019

COMMONWEALTH OF VIRGINIA
SHARON A. HUBAND
3434
4-25-19
ARCHITECT
SEAL

Revisions		
No.	Date	Description
1	5/6/19	Addendum #1

Renovate Gross Anatomy Lab at Lewis Hall

Life Safety & Demolition Plans - Second Floor

PROJECT NUMBER: #2671.19

LS120

Virtexco

Project Name: Renovate Gross Anatomy Lab at Lewis Hall
Project Location: Norfolk, VA
RFI Due to Owner: 5/6/2019

RFI #	Date	Drawing or Specification Number	Question	Answer	Answered By	Answered Date
001	4/26/2019	General	Please verify if builder's risk insurance will be a requirement for this project and if the contractor is to carry this cost.	Refer to contract documents A101 and A201 for specific insurance requirements		
002	4/26/2019	General	Please provide the latest copy of the Davis-Bacon wage scale as it applies to this project.	Page 24, section (12.0)(E.)(5.) of RFP - See attached for Archived wage determination (VA160v2) from www.wdol.gov		
003	4/30/2019	General	Please verify if items 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1l, 2a, 2b, 2c, 3 and 4 are required for this proposal as each contractor has been prequalified to work at EVMS.	Pages 10 and 11 of RFP, sections (8.0)(D.)(1d through 1l, 2.a through 2.c, 3., and 4.) - Offerors have not been prequalified. All but section 3. "*Proposed Price broken down by line items categories, as applicable*" are required		
004	4/26/2019	General	Please provide a bid form as it refers to the relates to item "Specific Proposal Instructions" item 3 in the RFP. Please verify if this item can be provided after award.	Page 11 of RFP, section (8.0)(D.)(3.) *"Proposed Price broken down by line items categories, as applicable"* - Item not applicable to this RFP		
005	4/30/2019	General	Please provide a little more description or a form that needs to be filled out for the requirement "Address each item in the statement of work." What specifically is the owner looking for the contractor to address? Safety concerns, schedule concerns, material concerns, etc.	Page 10, section (8.0)(D.)(1d.) of RFP - These are the requirements of the scope of work. Owner needs Offeror's acknowledgement and concurrence for each item		
006	4/26/2019	General	Please provide a form or an example of item 2 "Specific Plans for Providing the proposed goods/services" under the proposal instructions in the RFP. Please verify if a bid schedule will suffice for this item.	Page 11, section (8.0)(D.)(2.) of RFP - form/example is not available. A Bid Schedule will suffice for this item.		
007	4/26/2019	011000 1.5 C	Please provide a cut sheet including weights for the roof mounted HVAC unit that the contractor is to install.	Provided as an attachment in Addendum 1		
008	4/26/2019	011000 1.7 A	Please verify if any night/weekend work will be required. Is so, please verify the scope that will need to take place during off hours.	See Core Drill note addition, Drawing P001, in Addendum 1 and Pre-Proposal meeting notes. Utility outages shall require advance notice to EVMS, (minimum 24 hrs) and must occur between 7 PM and 7 AM or weekends.		
009	4/26/2019	233113 1.2 B	Please verify that duct design as shown on the drawings is adequate and that the specification for delegated design is not required.	The duct design *shown* on the drawings is adequate. Design of Duct construction, hangers and supports is delegated as indicated.		
010	4/26/2019	070150.19	Please provide the contractor's contact information who currently holds the roof warranty.	See Sheet A120, New Work note "9"		
011	4/30/2019	A120	Please verify the floor to deck height.	According to our fieldwork the floor to deck height is 12' and the floor to beam height is 11'		
012	4/30/2019	A610	Please verify the veneer type for the wood doors as it is not indicated on the drawings or in the specifications.	All doors on project are to be hollow metal. The specification is correct.		
013	4/30/2019	A610	Please note that the drawings are calling for the doors to be solid wood core doors but the only specifications that were provided are for hollow metal doors and frames. Please verify if solid core doors are required and if so, please provide a specification for the doors.	All doors on project are to be hollow metal. The specification is correct.		
014	5/1/2019	LS120	Please refer to the 6th bullet under the general demolition notes. Please provide quantities and locations of patching surfaces that are previously damaged as a quantities will need to be required to give an accurate estimate. If quantities and locations cannot be provided, please specify an allowance that the contractor will need to carry to repair existing surfaces.	Quantities to be established either during the prebid walk through or during demo. There will be some demolition of the MEP systems that will require the existing walls to be patched and repaired. It is the contractor's responsibility to estimate an appropriate allowance for the amount of work as a part of the unforeseen conditions during construction.		
015	5/1/2019	LS120	Please verify if any flooring needs to be removed or if new epoxy flooring will need to be placed on top of the existing floor.	All floors to be demolished are listed in the demolition schedule on LS120.		
016	5/1/2019	A120	Please verify that the negative pressure machines will be required for use during all construction activities.	The contractor shall provide negative pressure in the area of renovation to prevent the spread of dust to occupied areas of the building. How this is accomplished is a means and methods decision, and therefore up to the discretion of the contractor.		
017	5/1/2019	A120	Please refer to A120. There is a wall section that is labeled SW50_2 located by the elevator shaft. Please verify	The wall type schedule on A120 has been updated to include wall type SW50_2. Included in Addendum #1.		
018	5/1/2019	A120	Please verify if any ceiling demolition will need to take place in rooms 2073, 2063A, 2063, 2058B, 2064, 2065, 2073D or 2073C. If so, is the ceiling to go back in new or are we storing and reinstalling the existing ceilings.	All ceiling to be demolished are listed in the demolition schedule on LS120.		

019	5/1/2019	A120	Please verify the ceiling type under the new floor drain that is to tie into the drain line as the contractor will need to remove this ceiling to tie into the existing drain line. Please provide a list of any FF&E need to be protected as well.	ACT/GWB. Verify in field. Area below will need to be protected from water damage during construction activites.		
020	5/2/2019	A120	Please refer to note 3 under new work ceiling notes. This notes states to "refer to electrical drawings for more information" for the ceiling mounted monitors, however there is not a detail shown for this item. Please provide the details required for mounting the monitors	The monitors and mounts are being provided by the owner to be installed by the contractor. The mounts purchased will be installed directly into the structural slab above. See installation drawings for the equipment provided by the owner. The note to see electrical drawings is meant to coordinate the conduits for power and data needed at each monitor.		
021	5/2/2019	A610	Please verify who is to supply and install the toilet accessories shown on the toilet accessory schedule.	Owner furnished, contractor installed.		
022	5/2/2019	A610	Please note that GC#1 are scheduled to be full height. Please verify that this is the ceiling height and not required to go to the deck.	CG#1 is full height to the finished ceiling.		
023	5/2/2019	A610	Please verify if the full height high impact wall protection will be required behind the cabinets. Please also verify that the high impact wall protection will not be required where note 4 is shown on the Gross Lab Finish Floor Plan.	No, there is no wall protection behind the casework.		
024	5/2/2019	S100	Please provide the location of the loose lintel locations.	See Sheet M101, ductwork wall penetrations		
025	5/2/2019	M101	Please verify the wall types Along column line 11.	See New Work note "8". Site visits are encouraged		
026	5/3/2019	A610	Please refer to the finish plan on A610. Please note that the Floor Finish plan calls out Dur-A-Flex's Hybri-Flex EC Flooring System. However the specifications calls out Dur-A-Flex's Accelera HC Flooring System. Pleas verify which is preferred.	Dur-A-Flex Accelera HC is preferred. This has been corrected on Addendum #1 Drawing Sheet A610.		
027	5/6/2019	260500	Please provide a manufacturer and type of bus duct and panel for panels HMA and LMA.	Existing bus duct is GE "Armor-Clad", existing panel HMA is Westinghouse "PRL2", and existing panel LMA is Westinghouse "PRL1."		
028	5/6/2019	283100	Please confirm the existing fire alarm system as Simplex.	The existing fire alarm system is a Simplex system.		
029	5/6/2019	E201	Sheet E201 shows location of FBO new AHU-1. Please provide the columns lines as the contractor is to provide a new feeder. Also, please verify the height of the roof.	Columns are shown on E201 and the roof where the AHU-1 is being installed is at the same elevation as the second floor finished floor.		
030	5/6/2019	E202	Please note that M601 shows (5) new VAV boxes, however E202 shows (4) new VAV boxes. Please verify which is correct.	E202 does not show any VAV boxes. A transformer is shown on E201 to provide power to the VAV boxes shown on the mechanical plans. The connection from the transformer to the VAV boxes shall be made by the controls contractor.		