SUBMIT BID TO:
PROCUREMENT SERVICES
UNIVERSITY OF FLORIDA
971 ELMORE DRIVE
GAINESVILLE, FL 32611
Phone: (352) 392-1331 - FAX: (352) 392-8837
Web Address: https://procurement.ufl.edu/

UF UNIVERSITY of FLORIDA

INVITATION TO BID

Construction

Acknowledgment Form

Page 1 of 24 pages	BID WILL BE OPENED: **October 22, 2019 at 3:30 PM** local time and may not be withdrawn within 90 days after such date and time. Mandatory Pre-bid: **October 1, 2019 at 10:00 AM** local time at the site (section1.12).	BID NO.: **ITB20DB-118**
DATE: **09/23/19**	PROCUREMENT AGENT: **DB/jh**	BID TITLE: **HVAC Upgrades - Aquatic Pathobiology Building**
VENDOR NAME		
VENDOR MAILING ADDRESS		REASON FOR NOT SUBMITTING BID
CITY - STATE - ZIP CODE		**POSTING OF BID TABULATIONS**
AREA CODE	TELEPHONE NO.	Bid tabulations with intended award(s) will be posted electronically for review by interested parties at https://procurement.ufl.edu/ and will remain posted for a period of 72 hours excluding Saturdays, Sundays, or state holidays. Failure to file a protest in accordance with Board of Governors (BOG) Regulation 18.002 or failure to post the bond or other security as required in the BOG regulations 18.002 and 18.003(3), shall constitute a waiver of protest proceedings.
	FAX NO.	
	WEB ADDRESS EMAIL ADDRESS	

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a bid for the same materials, supplies, or equipment and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the vendor and that the vendor is in compliance with all the requirements of the Invitation to Bid, including but not limited to, certification requirements. In submitting a bid on behalf of the Board of Trustees, hereinafter known as the University, the vendor offers and agrees that if the bid is accepted the vendor will convey, sell, assign, or transfer to the University all rights, title and interest in and to all causes of action it may now or hereafter acquire under the Anti-trust laws of the United States and the University for price fixing relating to the particular commodities or services purchased or acquired by the University. At the University's discretion, such assignment shall be made and become effective at the time the purchasing agency tenders final payment to the vendor.

AUTHORIZED SIGNATURE (MANUAL)

NAME AND TITLE (TYPED)

GENERAL CONDITIONS

SEALED BIDS: All bid sheets and this form must be executed and submitted in a sealed envelope. (DO NOT INCLUDE MORE THAN ONE BID PER ENVELOPE.) The face of the envelope shall contain, in addition to the above address, the date, and time of the bid opening and the bid number. Bids not submitted on the attached bid form shall be rejected. All bids are subject to the conditions specified herein. Those which do not comply with these conditions are subject to rejection.

1. **EXECUTION OF BID**: Bid must contain an original manual signature of authorized representative in the space provided above. Bid must be typed or printed in ink. Use of erasable ink is not permitted. All corrections to prices made by vendor must be initialed.

2. **NO BID**: If not submitting a bid, respond by returning only this vendor acknowledgment form, marking it "NO BID", and explain the reason in the space provided above. Failure to respond to a procurement solicitation without giving justifiable reason for such failure, nonconformance to contract conditions, or other pertinent factors deemed reasonable and valid shall be cause for removal of the supplier's name from the bid mailing list. NOTE: To qualify as a respondent, vendor must submit a "NO BID", and it must be received no later than the stated bid opening date and hour.

3. **BID OPENING**: Shall be public, on the date, location and the time specified on the bid form. It is the vendor's responsibility to assure that the bid is delivered at the proper time and place of the bid opening. Bids which for any reason are not so delivered will not be considered. A bid may not be altered after opening of the bids. NOTE: Bid tabulations will be posted electronically at https://procurement.ufl.edu/ . Bid tabulations will not be provided by telephone.

4. **PRICES, TERMS AND PAYMENT**: Firm prices shall be bid and will include all packing, handling, shipping charges, and delivery to the destination shown herein.
(a) TAXES: The University does not pay Federal Excise and Sales taxes on direct purchases of tangible personal property or services. The Florida Tax Exempt Number is 11-06-024056-57C. This exemption does not apply to purchases of tangible personal property or services made by vendors who use the tangible personal property or services in the performance of contracts for the improvement of University-owned real property as defined in Chapter 192, F.S.
(b) DISCOUNTS: Vendors are encouraged to reflect trade discounts in the unit prices quoted; however, vendors may offer a discount for prompt payment. Prompt payment discounts will not be considered in the bid award. However, every effort will be made to take the discount within the time offered.
(c) MISTAKES: Vendors are expected to examine the specifications, delivery schedule, bid prices, extensions, and all instructions pertaining to supplies and services. Failure to do so will be at vendor's risk. In case of a mistake in extensions the unit price will govern.
(d) INVOICING AND PAYMENT: Payment will be made by the University of Florida after the items awarded to a vendor have been received, inspected, and found to comply with award specifications, free of damage or defect and properly invoiced. All invoices shall bear the purchase order number. Payment for partial shipments shall not be made unless specified. An original invoice shall be submitted. Failure to follow these instructions may result in delay in processing invoices for payment. Payment shall be made in accordance with Section 215.422 (1) (2) F.S. VENDOR OMBUDSMAN: The University's vendor ombudsman, whose duties include acting as an advocate for vendors may be experiencing problems in obtaining payment from the University, may be contacted at 352-392-1241.
(e) ANNUAL APPROPRIATIONS: The University's performance and obligation to pay under any contract awarded is contingent upon an annual appropriation by the Legislature.
(f) CONDITION AND PACKAGING: It is understood and agreed that any item offered or shipped as a result of this bid shall be a new, current standard production model available at the time of this bid. All containers shall be suitable for storage or shipment, and all prices shall include standard commercial packaging.
(g) SAFETY STANDARDS: Unless otherwise stipulated in the bid, all manufactured items and fabricated assemblies shall comply with applicable requirements of Occupational Safety and Health Act and any standards hereunder.

5. CONFLICT OF INTEREST: The award hereunder is subject to the provisions of Chapter 112, F.S. All vendors must disclose with their bid the name of any officer, director, or agent who is also an employee of the University of Florida. Further, all vendors must disclose the name of any University employee who owns, directly or indirectly, an interest of five percent (5%) or more in the vendor's firm or any of its branches.

6. AWARDS: As the best interest of the University may require, the right is reserved to make award(s) by individual item, group of items, all or none or a combination thereof; to reject any and all bids or waive any minor irregularity or technicality in bids received. When it is determined there is no competition to the lowest responsible vendor, evaluation of other bids are not required. Vendors are cautioned to make no assumptions unless their bid has been evaluated as being responsive.

7. INTERPRETATIONS/DISPUTES: Any questions concerning conditions or specifications shall be directed in writing to Procurement Services. Inquiries must reference the date of bid opening and bid number. No interpretations shall be considered binding unless provided in writing by the University in response to requests in full compliance with this provision.

8. NOTICE OF BID PROTEST BONDING REQUIREMENT; Any person or entity who files an action protesting a decision or an intended decision pertaining to a competitive solicitation shall at the time of filing the formal protest, post with the University a bond payable to the University in an amount equal to: 10% of the estimated value of the protestor's bid or proposal; 10% of the estimated expenditure during the contract term; $10,000.00; or whichever is less. The bond shall be conditioned upon the payment of all costs which may be adjudged against the person or entity filing the protest action. In lieu of a bond, the University may accept a cashier's check, bank official check or money order in the amount of the bond. FAILURE OF THE PROTESTING PERSON OR ENTITY TO FILE THE REQUIRED BOND, CASHIER'S CHECK, BANK OFFICIAL CHECK OR MONEY ORDER AT THE TIME OF THE FILING THE FORMAL PROTEST SHALL RESULT IN DENIAL OF THE PROTEST.

9. GOVERNMENTAL RESTRICTIONS: In the event any governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship or performance of the items offered in this bid prior to their delivery, it shall be the responsibility of the successful vendor to notify the purchaser at once, indicating in writing the specific regulation which requires an alteration. The University reserves the right to accept any such alteration, including any price adjustments occasioned thereby, or to cancel the contract at no expense to the University.

10. LEGAL REQUIREMENTS: Applicable provision of all Federal, State, county and local laws, and of all ordinances, rules and regulations shall govern development, submittal and evaluation of all bids received in response hereto and shall govern any and all claims and disputes which may arise between person(s) submitting a bid response hereto and the University, by and through its officers, employees and authorized representatives, or any other person, natural or otherwise: and lack of knowledge by any vendor shall not constitute a cognizable defense against the legal effect thereof.

11. LOBBYING: Vendor is prohibited from using funds provided under any contract or purchase order for the purpose of lobbying the Legislature or any official, officer, commission, board, authority, council, committee, or department of the executive branch or the judicial branch of state government.

12. ADVERTISING: In submitting a bid, the vendor agrees not to use the results therefrom as a part of any commercial advertising. Vendor may not use the names, logos, or trademarks of the University, its employees, or affiliates without the prior written consent of the University.

13. ASSIGNMENT: Any contract or purchase order issued pursuant to this Invitation to Bid and the monies which may become due hereunder are not assignable except with the prior written approval of the purchaser.

14. LIABILITY: The vendor agrees to indemnify and save the University of Florida, the State of Florida and the Florida Board of Governors, their officers, agents, and employees harmless from any and all judgments, orders, awards, costs and expenses, including attorney's fees, and also all claims on account of damages to property, including loss of use thereof, or bodily injury (including death) which may be hereafter sustained by the vendor, its employees, its subcontractors, or the University of Florida, the State of Florida and the Florida Board of Governors, their officers, agents, or employees, or third persons, arising out of or in connection with any contract awarded and which are the result of the vendor's breach of contract or of the negligent acts of the vendor, its officers, agents, and employees. This clause does not apply to contracts between government agencies.

15. FACILITIES: The University reserves the right to inspect the vendor's facilities at any time with prior notice.

16. ADDITIONAL QUANTITIES: For a period not exceeding ninety (90) days from the date of acceptance of any offer by the University of Florida, the right is reserved to acquire additional quantities up to but not exceeding those shown on bid or the bid level at the prices bid in this invitation. If additional quantities are not acceptable, the bid sheets must be noted "BID IS FOR SPECIFIED QUANTITY ONLY".

17. SERVICE AND WARRANTY: Unless otherwise specified, the vendor shall define any warranty service and replacements that will be provided during and subsequent to this contract. Vendors must explain on an attached sheet to what extent warranty and service facilities are provided.

18. SAMPLES: Samples of items, when called for, must be furnished free of expense, on or before bid opening time and date, and if not destroyed, may upon request, be returned at the vendor's expense. Each individual sample must be labeled with vendor's name, manufacturer's brand name and number, bid number and item reference. Request for return of samples shall be accompanied by instructions which include shipping authorization and name of carrier and must be received with the bid. If instructions are not received within this time, the commodities shall be disposed of by the University.

19. INSPECTION, ACCEPTANCE AND TITLE: Inspection and acceptance will be at destination unless otherwise provided. Title and risk of loss or damage of all items shall be the responsibility of the contract supplier until accepted by the University, unless loss or damage results from negligence by the University. The contract supplier shall be responsible for filing, processing and collecting all damage claims. However, to assist him in the expeditious handling of damage claims, the University will:

(a) Record any evidence of visible damage on all copies of the delivering carrier's Bill of Lading.
(b) Report damage (Visible or Concealed) to the carrier and contract supplier confirming such reports in writing within 15 days of delivery, requesting that the carrier inspect the damaged merchandise.
(c) Retain the item and its shipping container, including inner packing material until inspection is performed by the carrier, and disposition given by the contract supplier.
(d) Provide the contract supplier with a copy of the carrier's Bill of Lading and damage inspection report.

20. PATENTS, COPYRIGHTS, TRADEMARKS, ROYALTIES and other Intellectual Property: The vendor, without exception, shall indemnify and save harmless the University and its employees from liability of any nature or kind, including cost and expenses for or on account of any copyrighted, patented, or unpatented invention, process, or article manufactured or used in the performance of the contract, including its use by the University of Florida. If the vendor uses any design, device, or materials covered by letters, patent or copyright, it is mutually agreed and understood without exception that the bid prices shall include all royalties or costs arising from the use of such design, device, or materials in any way involved in the work.

21. CONFLICT BETWEEN DOCUMENTS: If any terms and conditions contained within the documents that are a part of this ITB or resulting contract are in conflict with any other terms and conditions contained therein, then the various documents comprising this ITB or resulting contract, as applicable, shall govern in the following order of precedence: change order, purchase order, addenda, special conditions, general conditions, specifications, departmental description of work, and bid.

22. MANUFACTURERS' NAMES AND APPROVED EQUIVALENTS: Any manufacturer's names, trade names, brand names, information and/or catalog numbers listed in a specification are for information and not intended to limit competition. If bids are based on equivalent products, indicate on the bid form the manufacturer's name and number. Vendor shall submit with the bid, cuts, sketches, and descriptive literature, and/or complete specifications. Reference to literature submitted with a previous bid will not satisfy this provision. The vendor shall also explain in detail the reasons why the proposed equivalent will meet the specifications and not be considered an exception thereto. The University of Florida reserves the right to determine acceptance of item(s) as an approved equivalent. Bids which do not comply with these requirements are subject to rejection. Bids lacking any written indication of intent to quote an alternate brand will be received and considered in complete compliance with the specifications as listed on the bid form.

23. NONCONFORMANCE TO CONTRACT CONDITIONS: Items may be tested and/or inspected for compliance with specifications by any appropriate testing facilities. Should the items fail, the University may require the vendor to reimburse the University for costs incurred by the University in connection with the examination or testing. The data derived from any tests for compliance with specifications are public records and open to examination thereto in accordance with Chapter 119, F.S. Items delivered not conforming to specifications may be rejected and returned at vendor's expense. These items and items not delivered as per delivery data in bid and/or purchase order may result in vendor being found in default in which event any and all reprocurement costs may be charged against the defaulting vendor. Any violation of these conditions may also result in the vendor's name being removed from the University of Florida's vendor file.

24. PUBLIC RECORDS: Any material submitted in response to this Invitation to Bid will become a public document pursuant to Section 119.07 F.S. This includes material which the responding vendor might consider to be confidential or a trade secret. Any claim of confidentiality is waived upon submission, effective after opening pursuant to Section 119.07 F.S.

25. DELIVERY: Unless actual date of delivery is specified (or if specified delivery cannot be met), show number of days required to make delivery after receipt of purchase order in space provided. Delivery time may become a basis for making an award (see Special Conditions). Delivery shall be within the normal working hours of the University of Florida, Monday through Friday, unless otherwise specified.

26. PUBLIC PRINTING - PREFERENCE GIVEN PRINTING WITHIN THE STATE: The University of Florida shall give preference to vendors located within the state when awarding contracts to have materials printed, whenever such printing can be done at no greater expense than, and at a level of quality comparable to, that obtainable from a vendor located outside of the state.

(a) CONTRACTS NOT TO BE SUBLET: In accordance with Class B Printing Laws and Regulations "Printing shall be awarded only to printing firms. No contract shall be awarded to any broker, agent, or independent contractor offering printing manufactured by other firms or persons."
(b) DISQUALIFICATION OF VENDOR: Reasonable grounds for believing that a vendor is involved in more than one bid for the same work will be cause for rejection of all bids in which such vendors are believed to be involved. Any or all bids will be rejected if there is reason to believe that collusion exists between vendors. Bids in which the prices obviously are unbalanced will be subject to rejection.
(c) TRADE CUSTOMS: Current trade customs of the printing industry are recognized unless accepted by Special Conditions or Specifications herein.
(d) COMMUNICATIONS: It is expected that all materials and proofs will be picked up and delivered by the printer or his representative, unless otherwise specified. Upon request, materials will be forwarded by registered mail.
(e) RETURN OF MATERIAL: All copy, photos, artwork, and other materials supplied by the University of Florida must be handled carefully and returned in good condition upon completion of the job. Such return is a condition of the contract and payment will not be made until return is affected.

END OF SECTION

Bid Number: ITB20DB-118

Title: HVAC Upgrades Aquatic Pathobiology Building

UF Project Number: MP04939

AUTHORIZED REPRESENTATIVES AND CONTACT INFO:

UF PROCUREMENT SERVICES

Debbie Berrier
971 Elmore Drive / PO Box 115250
Gainesville, FL 32611-5250
(352) 294-1163
dberrier@ufl.edu

UF PLANNING DESIGN AND CONSTRUCTION

Tamera Baughman
245 Gale Lemerand Drive / PO Box 115050
Gainesville, FL 32611

UF FACILITIES SERVICES

Dan Whitcraft
PO Box 100315
Gainesville, FL 32610

NON-TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS

00020 - INVITATION TO BID

The Invitation to Bid shall be in accordance with the University of Florida, Procurement Services "Invitation to Bid Acknowledgement Form" with all relevant information provided therein.

END OF SECTION

00100 - INSTRUCTIONS TO BIDDERS

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include, but are not necessarily limited to, the General Terms & Conditions and other Sections in Divisions 0 and 1 of these Specifications.

1.2 THE WORK

PROJECT TITLE: **ITB20DB-118 HVAC Upgrades Aquatic Pathobiology Building**

1.3 SECURING DOCUMENTS

Copies of the proposed Contract Documents may be obtained from:

University of Florida Procurement Services website.
https://procurement.ufl.edu/vendors/schedule-of-bids/

1.4 BID FORM

In order to be considered responsive and responsible, make bids in strict accordance with the following:

A. Make bids upon the forms provided, properly signed and with all items completed. Do not change the wording of the bid form and do not otherwise alter or add words to the bid form. Unauthorized conditions, limitations, or provisions attached to the bid may be cause for rejection of the bid.

B. Include with bid a completed and signed Invitation to Bid Construction Acknowledgment Form.

C. Include completed Section 00310 - Bid Form.

D. Include list of subcontractors as described in Section 00430 - Subcontractor Listing.

E. **Bids must be submitted no later than October 22, 2019 at 3:30 PM, local time**. No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.

F. Address bids to Debbie Berrier, Procurement Agent II, and deliver to:
University of Florida
Procurement Services
971 Elmore Drive / PO Box 115250
Gainesville, FL 32611-5250
Submit bid in a sealed envelope that includes the bid number, contractor name and date and time of the bid opening on the outside of the envelope. Submit one (1) original bid and one (1) electronic copy on flash drive or CD/DVD. It is the sole responsibility of the bidder to see that bids are received on time. Faxed and/or emailed bids will not be accepted.

1.5 PROOF OF COMPETENCY OF BIDDER

A bidder may be required to furnish evidence, satisfactory to the Owner, that the bidder and the bidder's

proposed subcontractors have sufficient means and experience in the types of work required to assure completion of the Contract in a satisfactory manner.

1.6 WITHDRAWAL OF BIDS

A. A bidder may withdraw his bid, either personally or by written request, at any time prior to the scheduled time for opening bids.

B. No bidder may withdraw his bid for a period of forty-five calendar days after the date set for opening thereof, and bids shall be subject to acceptance by the Owner during this period.

1.7 QUALIFICATION OF BIDDERS

A. A contract will be awarded only to a responsible bidder, qualified by experience and in a financial position to perform the work specified.

B. If the bidder has not been pre-qualified with UF Procurement Services within the fiscal year (July 1 through June 30), the bidder may be required to submit the following evidence of eligibility:

1. Evidence that bidder is licensed by the appropriate government agency to perform the work specified.

2. Experience record showing bidder's training and experience in similar work.

3. List a brief description of projects of similar size and/or complexity satisfactorily completed, with location, dates of contracts, names of contracts, and names and addresses of owners.

1.8 SUBCONTRACTS

If the Bidder intends to subcontract any of the Work:

A. A list of all proposed subcontractors shall be provided with the bid for scopes/packages in excess of $10,000. See Section 00430 - Subcontractor Listing.

B. Each subcontractor performing work in excess of $10,000 must present evidence of being qualified in and licensed for the applicable trade. Such proof of subcontractor licensure shall be provided by the successful bidder after award, but prior to commencement of Work.

1.9 PERFORMANCE AND PAYMENT BONDS

See General Terms & Conditions, Article 20.

1.10 BID DEPOSIT

Not required.

1.11 AWARD OR REJECTION OF BIDS

The Contract, if awarded, will be awarded to the responsible and responsive bidder who has proposed the lowest Contract Sum, subject to the owner's right to reject any or all bids and to waive informality and irregularity in the bids and in the bidding.

1.12 MANDATORY PRE-BID CONFERENCE:

A mandatory Pre-bid Conference will be held prior to the scheduled bid opening for the purpose of considering questions posed by bidders. The conference will be open to interested bidders, prospective subcontractors, and any other interested parties. This conference will be held **October 1, 2019 at 10:00 AM local time in/at The Aquatic Pathobiology Building 1379, 2173 Mowry Road, Gainesville, FL 32611. Please meet promptly at the buildings entrance.**

1.13 EXECUTION OF AGREEMENT

A. A Purchase Order (PO) will be issued for purposes of fiscal encumbrance and payment. The PO itself serves as the form of contract.

B. Upon notice of Bid Award, the bidder to whom the Contract is awarded shall deliver to UF those Certificates of Insurance and Payment & Performance Bonds required by the Contract Documents.

C. Bonds and Certificates of Insurance shall be approved by UF before the successful bidder may proceed with the Work.

1.14 INTERPRETATION OF CONTRACT DOCUMENTS PRIOR TO BIDDING

A. If any person contemplating submitting a bid for construction of the Work is in doubt as to the true meaning of any part of the Contract Documents, or finds discrepancies in or omissions from any part of the Contract Documents, they may submit a written request for interpretation thereof no later than **October 9, 2019 at 5:00 PM**, local time, to Debbie Berrier, Procurement Agent II at dberrier@ufl.edu. The person submitting the request shall be responsible for its prompt delivery.

B. Interpretations or corrections of proposed Contract Documents will be made only by Addendum and will be available on the Procurement Services "Schedule of Bids" webpage https://procurement.ufl.edu/vendors/schedule-of-bids/. The Owner will not be responsible for any other explanations or interpretations of the proposed Contract Documents.

1.15 TIME OF COMPLETION:

A. Date of beginning, rate of progress and time for completion of all Work for this Project are ESSENTIAL CONDITIONS of Contract. Successful Bidder hereby agrees that equipment will be ordered within ten (10) calendar days of receiving Purchase Order and/or Notice to Proceed. Successful Bidder hereby agrees that Pre-Work required by this Contract shall commence; that all insurance and permits will be obtained; that all documents and notices will be filed; that all requirements as specified will be met; and that Pre-Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure Pre-Work will be completed prior to delivery of equipment. Substantial Completion of entire Project shall be within four (4) weeks from delivery of equipment and shall be finally completed within seven (7) days after the date of Substantial Completion.

END OF SECTION

00310 - BID FORMS

BID PROPOSAL

FROM: _____

(Name of Bidder)

TO: UNIVERSITY OF FLORIDA
PROCUREMENT SERVICES
971 Elmore Drive
P.O. Box 115250
Gainesville, Florida 32611-5250

The undersigned, hereinafter called "Bidder", having reviewed the Contract Documents for the Project entitled **ITB20DB-118 HVAC Upgrades Aquatic Pathobiology Building** and having visited and thoroughly inspected the site of the proposed Project and familiarized themselves with all conditions affecting and governing the construction of said Project, hereby proposes to furnish all labor, materials, equipment and other items, facilities and services for the proper execution and completion of the Project, in strict compliance with the Contract Documents, Addenda, and all other Documents relating thereto on file in Procurement Services, and, if awarded the Contract, to complete the said Work within the time limits called for in the Documents and as stated herein, for the sums as enumerated on this and the following pages:

BASE BID:

_____Dollars

Figures: $_____

Equipment Lead Time: _____

ADDENDA:
Receipt of the following Addenda to the Construction Documents is acknowledged:

ADDENDUM #_____ Dated _____

ADDENDUM #_____ Dated _____

ADDENDUM #_____ Dated _____

COMPLETION DATE:

All Work covered by the Bidding Documents and the foregoing Base Bid shall be completed and ready for Owner's occupancy as specified in the contract documents.

SIGNATURE:

I hereby certify that for all statements and amounts herein made on behalf of

_____

(Name of Bidder)

a (Corporation) (Partnership) (Individual) organized and existing under the laws of the State of Florida, I have carefully prepared this Bid Proposal from Contract Documents described hereinbefore, I have examined Contract Documents and local conditions affecting execution of Work before submitting this Bid Proposal, I have full authority to make the statements and commitment herein and submit this Bid Proposal in (its) (their) behalf, and all statements are true and correct.

Signed and sealed this _____ day of _____, 2019.

_____
(Signature of Bidder)

_____ _____
(Print Name) (Title)

WITNESS:

_____
(Signature of Witness)

_____
(Print Name)

Address: _____

_____
(City) (State) (Zip Code)

Email: _____

END OF SECTION

00430 - SUBCONTRACTOR LISTING

1.1 RELATED SECTIONS

A. Documents affecting the work of this Section include, but are not necessarily limited to, the General Terms & Conditions and other Sections in Divisions 0 and 1 of these Specifications.

1.2 SUBCONTRACTOR LISTS

A. Each bidder shall furnish with its bid a list of all subcontractors for subcontracted scopes/packages of work valued at more than $10,000.

B. This list shall identify – for each subcontracted package in excess of $10,000 – the name and address of the proposed subcontractor and the approximate value of the subcontract.

C. If the bidder does not intend to subcontract portions of the Work in amounts greater than $10,000, then a statement to that affect shall be furnished with the bid.

D. See Section 00100 - Instruction to Bidders regarding subcontractor licensure requirements.

END OF SECTION

AQUATIC PATHOBIOLOGY BUILDING
1379
HVAC UPGRADES

FOR THE

UNIVERSITY OF FLORIDA

PLANNING DESIGN AND CONSTRUCTION

LOCATION

GAINESVILLE, FL

DRAWING SHEET INDEX

APPLICABLE CODES

THIS PROJECT WAS DESIGNED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:

UNIVERSITY OF FLORIDA DESIGN AND CONSTRUCTION STANDARD
2017 FLORIDA BUILDING CODE AND ITS SUPPLEMENTAL REFERENCES
NFPA 70 - NATIONAL ELECTRICAL CODE - 2014 EDITION
NFPA 90A - 2015 EDITION

CAMPBELL SPELLICY ENGINEERING
3720 NW 43rd Street, Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967 / Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813

JULY 9, 2019
100% CONSTRUCTION DOCUMENTS

AQUATIC PATHOBIOLOGY BUILDING 1379
HVAC UPGRADES
UNIVERSITY OF FLORIDA
PROJECT NO. MP04939
GAINESVILLE, FL

SEAL
KEVIN M. SPELLICY
PE - 0076968

19026

MECHANICAL ABBREVIATIONS

A	AMPS; AREA
AAV	AUTOMATIC AIR VENT
ABV CLG	ABOVE FINISHED CEILING
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
BD	BALANCING DAMPER
BTU	BRITISH THERMAL UNITS
BTUH	BTU PER HOUR
C	CONDENSATE
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CFM	CUBIC FEET
DB	DRY BULB
DEFL	DEFLECTION
DG	DOOR GRILLE
DIA	DIAMETER
EA	EACH
EAT	ENTERING AIR TEMPERATURE
ENT	ENTERING
ESP	EXTERNAL STATIC PRESSURE
EXH	EXHAUST
EXST	EXISTING
°F	DEGREES FAHRENHEIT
FD	FIRE DAMPER
FL DR	FLOOR DRAIN
FPM	FEET PER MINUTE
FT	FEET
FT WG	FEET OF WATER, GAUGE
GA	GAUGE
GALV	GALVANIZED
HP	HORSEPOWER
HR	HOUR
I.D.	INSIDE DIAMETER
IN.	INCHES
IN. WG	INCHES OF WATER, GAUGE
KW	KILOWATTS
KWH	KILOWATT HOUR
LAT	LEAVING AIR TEMPERATURE
LB	POUND
LVG	LEAVING
MAX	MAXIMUM
MBH	THOUSANDS OF BTU'S
MD	MOTORIZED DAMPER
MIN	MINUTE
MIN	MINIMUM
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OAL	OUTDOOR AIR LOUVER
OC	ON CENTER
OD	OUTSIDE DIAMETER
PH	PHASE
PRESS	PRESSURE
PSI	POUNDS PER SQUARE INCH
R	RADIUS
RA	RETURN AIR
RAG	RETURN AIR GRILLE
RAR	RETURN AIR REGISTER
RD	ROUND DIFFUSER
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUD
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
SA	SUPPLY AIR
SAR	SUPPLY AIR REGISTER
SF	SUPPLY FAN
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SF	SQUARE FEET
STD	STANDARD
STL	STEEL
TEMP	TEMPERATURE
TD	TRANSFER DUCT
TG	TRANSFER GRILLE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UC	UNDERCUT DOOR - 3/4"
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB
WPD	WATER PRESSURE DROP

MECHANICAL GENERAL NOTES

1. DUCT SIZES ARE CLEAR INSIDE SHEET METAL SIZES. DUCT SIZES AND LOCATIONS ARE APPROXIMATE.
2. VERIFY COLLAR SIZES ON ALL AIR TERMINALS, EQUIPMENT INLETS AND OUTLETS. TRANSITION DUCTWORK AS NECESSARY. EXTERNALLY INSULATE TRANSITIONS AT EQUIPMENT CONNECTIONS.
3. COORIDINATE FINAL LOCATION OF ALL CEILING-MOUNTED DIFFUSERS/GRILLES WITH EXISTING CONDITIONS AND ADJUST TO COORDINATE WITH SPACE AVAILABLE.
4. ALL NEW GRILLES/DIFFUSERS SHALL BE ALUMNUM CONSTRUCTION WITH BAKED WHITE ENAMEL FINISH.
5. PROVIDE DUCT FLEX CONNECTIONS AT NEW UNITS. EXTERNALLY INSULATE FLEXIBLE CONNECTIONS.
6. PROVIDE CLEAN PLEATED FILTERS PRIOR TO TEST AND BALANCE WORK. PROVIDE NEW PLEATED FILTERS AS REQUIRED PRIOR TO FINAL ACCEPTANCE BY OWNER. PROVIDE OWNER WITH ONE COMPLETE SET OF FILTERS FOR EACH A/C UNIT FOR OWNERS USE AT SUBSTANTIAL COMPLETION.
7. PROVIDE 2" EXTERNAL INSULATION FOR ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK.

EQUIPMENT NOTES

1. PROVIDE FULL SIZE COPPER CONDENSATE DRAINS FROM ALL UNITS TO DISPOSAL POINT INDICATED ON THE DRAWINGS.
2. PROVIDE A TRAP ON ALL CONDENSATE DRAIN OUTLETS. SLOPE ALL CONDENSATE DRAIN PIPING MINIMUM 1/4" INCH PER FOOT.
3. CONTRACTOR SHALL INSTALL ALL EQUIPMENT, PIPING AND DUCTWORK SUCH THAT MANUFACTURER'S RECOMMENDED CLEARANCES ARE MET FOR ALL ACCESS PANELS, MOTORS, FANS, BELTS, FILTERS,AIR INTAKES, ETC.
4. FLOOR-MOUNTED AHUs SHALL BE INSTALLED ON BASE RAILS AS INDICATED. PROVIDE NEOPRENE PADS BETWEEN RAIL AND FLOOR.
5. PROVIDE ACCESS PANELS IN ALL NON-ACCESSIBLE CONSTRUCTIONS (INCLUDING CEILING, WALLS, ETC) SIZED AND LOCATED AS REQUIRED TO PROVIDE PROPER SERVICE ACCESS IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION FOR ALL HVAC EQUIPMENT INCLUDING DAMPERS AND VALVES.

MECHANICAL LEGEND

- EXISTING DUCTWORK, EQUIPMENT, ETC TO REMAIN
- EXISTING DUCTWORK, EQUIPMENT, ETC TO BE DEMOLISHED
- NEW SUPPLY AND RETURN DUCTWORK WITH 2" EXTERNAL INSULATION
- NEW UNINSULATED EXHAUST DUCTWORK
- (T1) ZONE THERMOSTAT RTU NUMBER INDICATED.
- (H) BUILDING RELATIVE HUMIDITY SENSOR - WALL MOUNTED
- (S) DUCT MOUNTED SMOKE DETECTOR
- (SP) STATIC PRESSURE SENSOR (DUCT-MOUNTED)
- (BP) BUILDING PRESSURE SENSOR
- VOLUME BALANCING DAMPERS (BD)
- 2408 CD — SQUARE PLAQUE CEILING DIFFUSER (24x24 FACE & 8"Ø NECK) - PROVIDE BLANK OFF PLATE FOR 12"X12" FACE DIFFUSERS
- 2408 RG — RETURN GRILLE (RG) OR EXHAUST GRILLE (EG) (24x24 FACE, 8"Ø NECK) - PROVIDE BLANK OFF PLATE FOR 12"X12" FACE DIFFUSERS
- VFD — VARIABLE FREQUENCY DRIVE
- Ø — ROUND DUCT SYMBOL
- CONNECT TO EXISTING
- SPIN IN WITH DAMPER

PACKAGED 100% OUTSIDE AIR UNIT SCHEDULE

UNIT NAMES	OAU-1
NOTES	1 THROUGH 14
EER	10.3
NOMINAL TONNAGE	28
MANUFACTURER	DAIKIN
MODEL NUMBER	DPS028A
EVAPORATOR SECTION	
MAXIMUM OUTSIDE AIR FLOW (CFM)	3600
MINIMUM OUTSIDE AIR FLOW (CFM)	3600
EXTERNAL STATIC PRESSURE (IN.WG)	2.0
ELECTRIC CHAR. (V-Ø)	208-3
FAN MOTOR (HP)	3.0
MCA	115.6
MOCP	150
WEIGHT (LBS)	3632
CONDENSING UNIT SECTION	
NUMBER OF COMPRESSORS & TYPE	(2) - INVERTOR & FIXED SCROLL
RUNNING LOAD AMPS EACH (A)	47.0 & 39.1
COOLING PERFORMANCE	
DESIGN SUMMER OUTDOOR AIR TEMP DB/WB (°F)	96.0/80.0
DESIGN SUMMER INDOOR TEMP DB/WB (°F)	74.0/62.0
ENTERING AIR TEMP DB/WB (°F)	96.0/80.0
LEAVING AIR TEMP DB/WB (°F)	54.0/54.0
TOTAL COOLING CAPACITY (BTU/H)	338,770
SENSIBLE COOLING CAPACITY (BTU/H)	165,460
REHEAT COIL CAPACITY (BTU/H)	-
UNIT DISCHARGE TEMPERATURE DB/WB (°F)	55.9/54.6
ELECTRIC HEAT PERFORMANCE	
DESIGN ENTERING AIR TEMP (°F)	25
LEAVING AIR TEMP (°F)	55
HEATING CAPACITY (KW)	35
NUMBER OF STAGES	SCR

NOTES:

1. PACKAGED 100% OUTSIDE AIR UNIT WITH HEAT PIPE.
2. PROVIDE SLOPED STAINLESS-STEEL DRAIN PAN IN UNIT.
3. MAINTAIN MINIMUM 5" BETWEEN COOLING COIL AND REHEAT COIL TO PREVENT MOISTURE CARRYOVER.
4. PROVIDE SCR CONTROLLER FOR ELECTRIC HEAT.
5. PROVIDE MODULATING HOT GAS REHEAT FOR LEAVING AIR TEMPERATURE CONTROL TO +/- 2ºF.
6. PROVIDE SALT SPRAY COIL COATING ON ALL COILS.
7. PROVIDE 2" PLEATED MERV-11 FILTERS. PROVIDE 2 SETS OF SPARE FILTERS WITH UNIT.
8. UNIT MUST MEET THE AHRI 920 STANDARD FOR MOISTURE REMOVAL CAPACITY AND EFFICIENCY.
9. PROVIDE MANUFACTURER'S PLENUM CURB AS REQUIRED TO PERMIT HORIZONTAL DISCHARGE.
10. UNIT SHALL BE ANCHORED TO CURB PER MANUFACTURER'S INSTRUCTIONS AND ADDITIONAL STEEL STRAPPING SHALL BE INSTALLED AS REQUIRED TO MEET FLORIDA BUILDING CODE WIND LOADING REQUIREMENTS.
11. PROVIDE SINGLE POINT POWER FOR UNIT. PROVIDE MANUFACTURER'S VFD FOR FAN CONTROL. DISCONNECT SHALL BE PROVIDED BY DIVISION 26.
12. PROVIDE MANUFACTURER'S UNIT CONTROLLER WITH EACH UNIT. CONTROLLER SHALL BE PROVIDED WITHNECESSARY BACnet GATEWAYS FOR INTEGRATION WITH EXISTING JCI BAS.
13. SEE SHEET M3.1 FOR DEMAND CONTROL VENTILATION SEQUENCE OF OPERATION BASED ON STATIC PRESSURE CONTROL. UNIT CONTROLLER SHALL BE PREPROGRAMMED WITH SEQUENCE AND UNIT SHALL HAVE ALL REQUIRED SENSORS, TRANSMITTERS, VALVES, AND DAMPERS REQUIRED FOR EXECUTING THE SPECIFIED SEQUENCE.

AIR VALVE UNIT SCHEDULE

UNIT TAG	MAX AIR (CFM)	HTG AIR (CFM)	MANUFACTURER	MODEL NUMBER	MINIMUM STATIC AT INLET	ELECTRIC REHEAT COIL							NOTES
						UNIT TAG	MODEL NUMBER	EAT (°F)	LAT (°F)	CAPACITY (BTU/H)	NOMINAL INPUT (kW)	ELEC. CHAR. (V-Ø)	
SAV-1	480	480	PRICE (ANTEC)	VV-110	0.6	EC-1	VVEC-10	55	75	10,890	4.0	208-1	①②
SAV-2	310	310	PRICE (ANTEC)	VV-108	0.6	EC-2	VVEC-08	55	75	7,030	3.0	120-1	①②
SAV-3	1040	1040	PRICE (ANTEC)	VV-114	0.6	EC-3	VVEC-14	55	75	23,590	7.0	208-1	①②
SAV-4	260	260	PRICE (ANTEC)	VV-108	0.6	EC-4	VVEC-08	55	75	5,900	2.0	120-1	①②
SAV-5	190	190	PRICE (ANTEC)	VV-108	0.6	EC-5	VVEC-08	55	75	4,310	2.0	120-1	①②
SAV-6	190	190	PRICE (ANTEC)	VV-108	0.6	EC-6	VVEC-08	55	75	4,310	2.0	120-1	①②
SAV-7	190	190	PRICE (ANTEC)	VV-108	0.6	EC-7	VVEC-08	55	75	4,310	2.0	120-1	①②
SAV-8	750	750	PRICE (ANTEC)	VV-112	0.6	EC-8	VVEC-12	55	75	17,010	6.0	208-1	①②
SAV-9	190	190	PRICE (ANTEC)	VV-108	0.6	EC-9	VVEC-08	55	75	4,310	2.0	120-1	①②
EXV-1	580	580	PRICE (ANTEC)	VV-110	0.6	N/A	-	-	-	-	-	-	
EXV-2	410	410	PRICE (ANTEC)	VV-108	0.6	N/A	-	-	-	-	-	-	
EXV-3	NOT USED	-	-	-	-	-	-	-	-	-	-	-	
EXV-4	360	360	PRICE (ANTEC)	VV-108	0.6	N/A	-	-	-	-	-	-	
EXV-5	265	265	PRICE (ANTEC)	VV-108	0.6	N/A	-	-	-	-	-	-	
EXV-6	290	290	PRICE (ANTEC)	VV-108	0.6	N/A	-	-	-	-	-	-	
EXV-7	265	265	PRICE (ANTEC)	VV-108	0.6	N/A	-	-	-	-	-	-	
EXV-8	NOT USED	-	-	-	-	-	-	-	-	-	-	-	
EXV-9	265	265	PRICE (ANTEC)	VV-108	0.6	N/A	-	-	-	-	-	-	-

NOTES:

(1) REHEAT COIL CAPACITY AND TEMPERATURES ARE LISTED AT HEATING AIRFLOW WITH FLOOR PLANS.

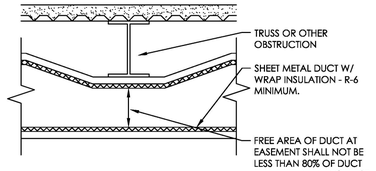
(2) PROVIDE FACTORY ELECTRICAL DISCONNECT FOR ELECTRIC REHEAT COIL.

EXHAUST FAN SCHEDULE

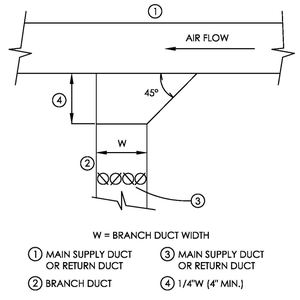
AREA SERVED	MARK	TYPE	AIR QUANTITY (CFM)	STATIC PRESSURE IN H20	SPEED (RPM)	MOTOR (HP)	ELEC. CHAR (V-Ø)	MANUFACTURER	MODEL NUMBER	SONES	NOTES
WEST BLDG	EF-4	LAB EXHAUST	2,435	2.6	2,011	2	208-3	GREENHECK	VK-CH-15-12	19.8	①②③④⑤⑥⑦⑧

NOTES:

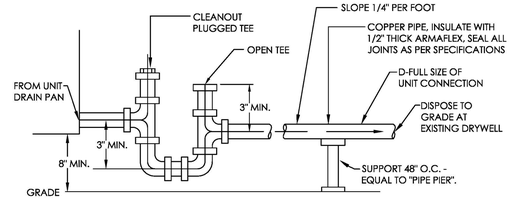
1. PROVIDE MANUFACTURER'S ELECTRICAL DISCONNECT AND MOTOR STARTER WITH FAN.
2. PROVIDE FACTORY INLET PLENUM WITH INTEGRAL BYPASS AIR INTAKE AND MOTORIZED DAMPER. DAMPER ACTUATOR SHALL BE PROVIDED BY CONTROLS CONTRACTOR.
3. PROVIDE BACK-DRAFT DAMPER.
4. PROVIDE MANUFACTURER'S AIRFLOW MEASUREMENT RING AND PRESSURE TRANSDUCER WITH LOCAL READOUT OF CFM. CONTROLS CONTRACTOR SHALL LAND THIS READING TO THE BAS.
5. PROVIDE THERMAL OVERLOAD.
6. FAN SHALL RUN CONTINUOUSLY HOURS BY BAS START/STOP.
7. PROVIDE FIELD-FABRICATED STACK EXTENSION PER DETAIL SHEET M3.1. PROVIDE GUY WIRE SUPPORTS (MINIMUM THREE POINTS). FIELD VERIFY ANCHOR LOCATIONS WITH SURROUNDINGS.
8. FAN OUTLET SPEED SHALL NOT BE LESS THAN 3000 FPM RESULTING IN A MINIMUM EFFECTIVE PLUME HEIGHT OF 26 FEET.



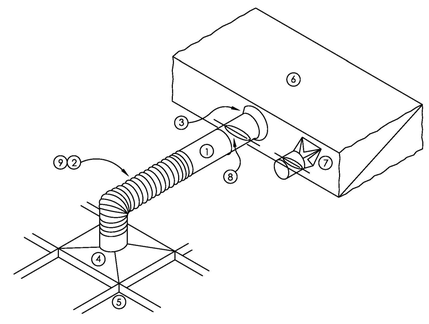
DUCT EASEMENT DETAIL
NOT TO SCALE



BRANCH DUCT TAKEOFF DETAIL - TYPICAL
NOT TO SCALE



CONDENSATE DRAIN DETAIL - NEW OAU-1
NOT TO SCALE



1. RIGID SHEET METAL BRANCH DUCT ABOVE FINISHED CEILING MAY BE SHOWN SINGLE LINE ON PLANS
2. FLEXIBLE DUCT SIZE TO MATCH DIFFUSER (GRILLE) NECK SIZE (LAY-IN CEILINGS ONLY. PROVIDE RIGID ELBOW FOR HARD CEILING OR NO CEILING).
3. CONICAL TEE WITH VOLUME DAMPER FOR SA DUCT. STRAIGHT TEE WITH VOLUME DAMPER FOR RETURN OR EXHAUST DUCT
4. DIFFUSER (GRILLE, REGISTER) WITH 1" BLANKET INSULATION COVER.
5. FINISHED CEILING
6. SHEET METAL MAIN DUCT WITH EXTERNAL INSULATION
7. IF CONICAL SPIN-IN WILL NOT FIT, USE SMACNA 45° RECTANGULAR TO ROUND TRANSITION
8. MANUAL BALANCING DAMPER - PROVIDE AT EVERY BRANCH RUNOUT.
9. 6'-0" MAX. LENGTH OF FLEXIBLE DUCTWORK - PROVIDE FULL RADIUS ELBOWS.

DUCT RUNOUT TO DIFFUSER (GRILLE) DETAIL - TYPICAL
NOT TO SCALE

CAMPBELL SPELLICY ENGINEERING
3720 NW 43rd Street
Suite 106
Gainesville, Florida 32606
Phone: 352-372-6967
Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813

PROJECT NAME:
AQUATIC PATHOBIOLOGY
BLDG 1379 - HVAC UPGRADES
UNIVERSITY OF FLORIDA
GAINESVILLE, FL

SEAL
KEVIN M. SPELLICY
PE - 0076968

REVISIONS		
NO.	DATE	REFERENCE
1		
2		
3		
4		
5		
6		

19026

100% CONSTRUCTION DOCUMENTS

DATE ISSUED
JULY 9, 2019

DRAWN BY
DAD

APPROVED BY
KMS

M0.1

MECHANICAL SPECIFICATIONS

230005 / MECHANICAL GENERAL

GENERAL
The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.

Review all other contract documents to be aware of conditions affecting work herein.

Coordinate work in this division with all other trades in proper sequence to ensure that the total work is completed within contract time schedule and with a minimum cutting and patching.

Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval. Provide sleeves at all concrete penetrations.

Carefully examine any existing conditions, piping, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.

Approval Submittals:

Submittals shall not include items from more than one specification section in the same submittal package.

Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.

Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date.

Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.

Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 23. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.

Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.

Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

Test and Balance Report: The Report shall be submitted for review prior to the Substantial Completion. Testing and balancing shall be provided by NEBB certified contractor.

Record Drawings:

During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.

Operation and Maintenance Manuals: Furnish complete manuals in PDF format.

Detailed operating instructions
Complete wiring and control diagrams.
Routine maintenance operations.
Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
Copies of approved submittals.
Copies of all manufacturer's warranties.
Copies of test reports and verification submittals.

230020 / CODES AND STANDARDS

CODES

All work under Division 23 shall be constructed in accordance with the codes listed herein.

Comply with regulations and codes of utility suppliers.

Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.

Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.

Additional codes or standards applying to a specific part of the work may be included in that section.

The following codes govern the work
VERIFY FLORIDA BUILDING CODE VERSION WITH APPLICABLE AGENCY.
Florida Building Code, 2017 with all Supplements.

National Electrical Code (NFPA 70) - 2014 ed.

Florida Fire Prevention Code 2017

Installation of Air Conditioning and Ventilation Systems (NFPA 90A), 2015 edition.

STANDARDS

All mechanical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

Underwriters' Laboratories (UL)

American National Standards Institution (ANSI)

American Society of Testing Materials (ASTM)

National Fire Protection Association (NFPA)

National Electrical Manufacturers Association (NEMA)

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

Air Movement and Control Association (AMCA)

Standards of the Hydronic Institute (IBR)

University of Florida Design & Construction Standards

230105 / PIPES AND PIPE FITTINGS

Submit welding/brazing certification for all welding and brazing installers.
Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by installer for installation requirements, and comply with governing regulations and industry standards.

Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

Piping Materials/Products:

Soldering Materials: Solders for domestic water service shall be NSF approved or tested to contain no impurities of lead.

Pipe Thread Tape: Teflon tape.

Protective Coating: Koppers Bitumastic No. 505 or equal.

Gaskets for Flanged Joints: ANSI B16.21; full-faced for Cast-Iron flanges; raised-face for steel flanges, unless otherwise noted.

Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials. Materials shall be determined by installer to comply with installation requirements.

Brazing Materials: B cup with silver content of not less than 5%, ASTM B-32, Grade 96TS. Materials shall be determined by installer to comply with installation requirements.

Copper Tube and Fittings:

ACR Copper Tube: ASTM B280.

DWV Copper Tube: ASTM B306.

Fittings:

Wrought-Copper Solder-Joint Fittings: ANSI B16.22.

Copper Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.

Wrought-Copper Solder-Joint Drainage Fittings: ANSI B16.29.

Cast-Copper Flared Tube Fittings: ANSI B16.26.

Steel Pipes and Pipe Fittings

Pipes:

Black Steel Pipe: ASTM A-53 or A795E, Grade B, Standard Weight, Type ERW or seamless, Schedule 40.

Galvanized Steel Pipe: ASTM A-53 or A-120, seamless.

Pipe Fittings:

Threaded Cast Iron: ANSI B16.4.

Threaded Malleable Iron: ANSI B16.3; plain or galvanized as indicated.

Malleable Iron Threaded Unions: ANSI B16.39; selected by installer for proper piping fabrication and service requirements including style, end connections, and metal-to-metal seats (iron, bronze or brass); plain or galvanized as indicated.

Threaded Pipe Plugs: ANSI B16.14.

Steel Flanges/Fittings: ANSI B16.5, including bolting and gasketing.

Wrought-Steel Buttwelding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns, rated to match connected pipe.

Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than schedule 80 pipe where length remaining unthreaded is less than 1 inches, and where pipe size is less than 1 inches, and do not thread nipples full length (no close-nipples).

Installation

General: Install pipes and pipe fittings in accordance with recog\hichnized industry practices which will achieve permanently-leakproof piping systems, capable of performing each indicated service without piping failure.

Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment.

Concealed Piping: Unless specifically noted as Exposed on the drawings, conceal piping from view in finished and occupied spaces, by locating in column enclosures, chases, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical, communications, or data equipment spaces and enclosures unless shown. Install drip pan under piping that must run through electrical spaces.

Cut pipe from measurements taken at the site, not from drawings. Keep pipes free of contact with building construction and installed work.

Install piping to allow for expansion and contraction.

Isolate all copper tubing from steel and concrete by wrapping the pipe at the contact point, and for one inch on each side, with at least two layers of plastic electrical tape. Isolate all copper tubing installed in block walls with a continuous plastic sleeve.

230160 / MECHANICAL IDENTIFICATION

Painted Identification Materials

Stencils: Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-" high letters for ductwork and not less than " high letters for access door signs and similar operational instructions.

Engraved Plastic-Laminate Signs:

General: Provide engraving stock melamine plastic laminate, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

Thickness: 1/16" for units up to 20 sq. in. or 8" length; " for larger units.

Fasteners: Self-tapping stainless-steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

Stamped Nameplates: Provide equipment manufacturer's standard stamped nameplates for motors, AHUs, pumps, etc.

Ductwork Identification: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures, and at 50' spacing along exposed runs.

Access Doors: Provide stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate and procedural information.

230230 / EXTERIOR INSULATION FOR DUCTWORK

Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Knauf, Owens-Corning, Schuller, Certainteed.

Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, coverings, sealers, mastic, and adhesive) with a flame spread rating of 25 or less, and a smoke-developed rating of 50 or less as tested by ANSI/ASTM 84.
RETAIN OR DELETE PRODUCTS
Rigid Fiberglass Insulation Board: ASTM C612, Class 1 (non load bearing). Boards shall be 3 pcf density R-6 with UL rated aluminum foil vapor barrier (FSK).

Flexible Fiberglass Insulation: ASTM C553, Type I, Class B-3 (temperature less than 350F). Duct wrap shall be 1 pcf density R-6 with UL rated aluminum foil vapor barrier (FSK).

Duct Cement (General Purpose Mastic): Duct cement shall be non-hardening, fiber-reinforced and recommended specifically for cementing fittings, components, and longitudinal seams in ductwork insulation. Duct Cement shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Cement shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B.

Duct Sealant (Vapor Barrier Mastic): Duct sealer shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Sealer shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B.

Adhesives: Adhesive shall be water based and designed for adhering insulation to ductwork. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall meet the requirements of NFPA 90-A & 90-B.

Fiber-Glas Mesh: 10x10 Mesh. Foster Mastafab or equal.

Kitchen Duct Fire-Rated Flexible Wrap Insulation: 1" thick fire-rated insulation complying with NFPA 96.

EXECUTION

Insulate all supply, return and outdoor air ductwork exposed in mechanical rooms, mezzanines, fan lofts or in any finished spaces with 1" thick rigid fiberglass insulation with vapor barrier.

Installation of Rigid Insulation: Clean and dry ductwork prior to insulating. Butt insulation firmly together to ensure complete and tight fit over surfaces to be covered. Install insulation materials with smooth and even surfaces. Maintain integrity of aluminum vapor barrier wherever possible. Extend insulation without interruption through walls, floors and similar ductwork penetrations except where otherwise indicated.

Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally, secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw. Space on 12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

Apply open mesh glass fabric embedded in vapor barrier mastic. Then apply a second coat of general purpose mastic with aluminum grey color. This finish shall be complete over all rigid insulation.

Insulate all supply, return and outdoor air ductwork concealed above ceilings, in chases, or elsewhere, and the backs of all ceiling supply outlets with 2" thick fiberglass blanket insulation with vapor barrier.

Installation of Flexible Insulation:

Insulate round elbows and fittings with wrap such that thickness is equal to adjoining duct covering. Clean and dry ductwork prior to insulating.

Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw or by welded cup head pins. Space on 12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

Lap all joints 2 inches and seal joints with 4-inch wide strips of open mesh glass fabric embedded in two coats of general purpose mastic.

Seal all punctures and breaks in aluminum vapor barrier with open mesh glass fabric and vapor barrier sealant.

Insulate all existing hood exhaust duct with two (2) layers of 1" thick fire-rated flexible blanket insulation. Seal joints in the insulation and attach to ductwork in accordance with the Manufacturers recommendations.

Installation of Insulation on Exterior Ducts:

Install 3" thick rigid insulation. Provide weatherproof finish.Pitch the upper surface of the duct insulation to drain by installing a 6" wide insulation board (or equal) down the center of the duct prior to applying the insulation.

Clean and dry ductwork prior to insulating. Butt insulation firmly together to ensure complete and tight fit over surfaces to be covered. Install insulation materials with smooth and even surfaces. Maintain integrity of aluminum vapor barrier wherever possible. Extend insulation without interruption through walls, floors and similar ductwork penetrations except where otherwise indicated.

Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw. Space on 12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

Apply open mesh glass fabric embedded in vapor barrier mastic. Then apply a second coat of general purpose mastic with aluminum grey color.

Provide a 0.016" aluminum jacket with seams positioned to shed water.

230840 / HVAC METAL DUCTWORK

SMACNA Standards: Comply with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible" 1985 Edition for fabrication and installation of metal ductwork, unless otherwise noted.

NFPA 90A Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting.

Galvanized Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality; with G 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations. Stamp gauge and manufacturer's identification on each sheet. Break sheets so that identification is exposed.

General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

Duct Sealant (Vapor Barrier Mastic): Duct sealer shall be flexible, water based, designed for use in pressure duct systems listed as SMACNA classes A, B, & C. Sealer shall seal water and air and provide a vapor barrier. Product shall be suitable for both interior and exterior use with UV inhibitors. Product shall be non-flammable ASTM E-84 tested with a flame spread of less than 5 and smoke spread of less than 5. Product shall be UL listed 181A-M and 181-B.
Fosters 32-17, 32-19

Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.

Flexible Ducts: Provide CPE inner liner with galvanized steel helix with factory applied 2" thick external insulation (R-6) and vapor barrier. Provide fire retardant reinforced metalized polyester jacket, complying with UL 181. Provide conical fittings with damper and without scoop for all flexible duct take offs. Provide 1" standoff for damper. Use flexible ducts only where shown on the drawings. Flexmaster 8MR6 or Thermaflex MKF R-6, ATCO 36, Gemflex SR-6A.

Connections:

Return air grille connections shall be straight sided with damper and one inch high insulation standoff equipment to Crown 724-DS or Flexmaster FLD-BO.

Exhaust air grille connections shall be straight sided with damper equal to Crown 724 or Flexmaster FLD.

Where duct height does not permit the use of conical spin-in fittings, use low profile side take-off fittings equal to Crown 3300-DS or Flexmaster STOD-BO.

Spin-In and Side Take-Off Fittings: Provide round branch run-outs as follows.

Supply air diffuser connections shall be conical with damper and one inch high insulation stand-off equal to Crown 3200 DS or Flexmaster CBD-BO.

VAV/air valve inlet connections shall be conical with no damper equal to Crown 3200 or Flexmaster C.

Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15 change of direction per section. Unless specifically detailed otherwise, use 45 laterals and 45 elbows for branch takeoff connections. Where 90 branches are indicated, provide conical type tees.

Fabrication:

Shop fabricate ductwork in 4, 8, 10 or 12-ft lengths, unless otherwise indicated or required to complete runs. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.

Shop fabricate ductwork of gauges and reinforcement complying with SMACNA "HVAC Duct Construction Standards". [Supply duct between AHU discharge and terminal units shall be minimum 4" pressure class. Duct downstream of terminal units all return and exhaust duct shall be minimum 2" pressure class unless otherwise noted.

Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1 times associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30 for contracting tapers and 20 for expanding tapers.

EXECUTION

General: Examine areas and conditions under which HVAC metal ductwork is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.

Installation Of Metal Ductwork:

General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within " misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor. Seal all duct joints and seams with sealant.

Supports: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in work. Install self-drilling screw anchors in prestressed concrete or existing work.

Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally. Avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to " where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. In finished and occupied spaces, conceal ductwork from view by locating in mechanical shafts, hollow wall construction or above suspended ceilings, unless specifically noted as "Exposed". Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

Electrical Equipment Spaces: Do not route ductwork through transformer vaults or other electrical equipment spaces and enclosures.

Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge as duct. Overlap opening on 4 sides by at least 1". Fasten to duct and substrate. Where ducts pass through fire-rated floors, walls, or partitions, provide firestopping between duct and substrate.

Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.

Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards. Fan discharge outlet ducts shall be installed correctly with regard to "system effect" per AMCA Publication 201.

Installation of Flexible Ducts:
Maximum Length: For any duct run using flexible ductwork, do not exceed 6'-0" extended length. Flexible duct shall only be allowed as detailed on the drawings.

Installation: Install in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible". Support flexible ducts to eliminate pinching and kinking which would restrict flow with cloth or plastic hanging straps at least 1" wide spaced not more than 5 feet apart.

Upstream of VAV boxes use stainless steel worm gear clamps.

Seal inside of flexible duct connections to sheet metal ducts, boots and terminals. Additionally secure connection with strap clamp. Provide outer coat of sealant and insulate joint with foamed rubber insulation to avoid condensation.
RETAIN IF REQUIRED

Equipment Connections: Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.

Clean ductwork internally free of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Keep ducts closed with poly during construction to prevent contamination by construction dust and debris.

230855 / DUCTWORK ACCESSORIES

Low Pressure Manual Dampers: Provide 16 gauge dampers of single-blade type (12" maximum blade width) or multiblade type. Damper blades to be gang-operated from a single shaft with nylon or ball bearings on each end. Provide indexed locking quadrant. Parallel or opposed blade style is acceptable. Provide 2" standoff on locking quadrant for externally insulated duct. Final damper settings shall be marked in indelible ink or paint.
SHOW DETAILS ON DRAWINGS. SPECIAL FOR AHCA.
Turning Vanes: Provide manufactured or fabricated single wall turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards".

Duct Access Doors: Construct of same or greater gauge as ductwork served. Provide insulated doors for insulated ductwork. Provide flush frames for uninsulated ductwork, extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12" high and smaller, 2 handle-type latches for larger doors.

Flexible Connections: Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Flexible connections shall comply with NFPA 90A, 90B, and Specification Form DDFCD-11.

Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

Install balancing dampers at all main ducts adjacent to units in return air, outside air and where indicated.
EDIT. THERE MAY BE OPEN/CLOSE DAMPERS IN RA OR MODULATING DAMPERS IN RA OR OA.
Install control dampers in the [outside air duct // and return air duct] for each air handler. Damper operator provided by control contractor.

Install turning vanes in square or rectangular 90 elbows in supply, return, and exhaust air systems, and elsewhere as indicated.EDIT

Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter. [Install on entering air side of reheat coils. Install at fire dampers and smoke dampers.] [Opening size shall be per NFPA 90A for servicing fire and smoke dampers. Provide label with 1-1/2" letters to indicate location of fire protection devices.]

Install flexible connections in ductwork such that the clear length of the connector is approximately two inches. Provide thrust restraints as required. Flexible material shall not be so slack as to take a definite concave or convex shape during fan operation.

Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.
RETAIN IF REQUIRED. SHOW DETAILS ON DRAWINGS.
Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.

Adjusting: Adjust ductwork accessories for proper settings. [Install fusible links in fire dampers and adjust for proper action.]

Final positioning of manual dampers is specified in Division-23 section "Testing, Adjusting, and Balancing". However, the system shall be left functional with all dampers open or throttled.

230840 / GRILLES, REGISTERS AND CEILING DIFFUSERS

Performance: Provide grilles, registers and ceiling diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device equal to the basis of design.

Ceiling and Wall Compatibility: Provide grilles, registers and diffusers with border styles that are compatible with adjacent wall and ceiling systems, and that are specifically manufactured to fit into ceiling module or wall with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems and walls which will contain each type of ceiling diffuser, grille, or register. All ceiling and wall-mounted grilles, registers and diffusers shall be provided with gaskets to seal them with the building envelope.
EDIT AS DESIRED
Appearance: All grilles and registers shall be [aluminum] construction and all diffusers shall be [steel or aluminum] construction, unless otherwise noted, with uniform matching appearance for each type of outlet. Ceiling mounted grilles and registers shall be set to be sight tight from the predominant exposure.
COORDINATE WITH ARCHITECT & EDIT
Finish: All ceiling mounted grilles, registers, and diffusers shall be finished with baked white enamel. Wall and door mounted grilles and registers shall be finished with [clear anodized finish // baked white enamel] .

Acceptable Manufacturers: Subject to compliance with requirements, provide products by Titus, Price, or Metal Aire.
RETAIN, EDIT OR DELETE TYPES AS REQUIRED. NO DAMPERS AT OUTLETS. INSTALL IN RUNOUTS. EDIT SECTIONS IF NARROW TEE CEILING GRID IS USED. COORDINATE WITH ARCHITECT. DELETE - A AND -AA IF ALUMINUM IS NOT REQUIRED. INDICATE TYPE CD-1, ER-1 ETC.) ON DRAWINGS TO COORDINATE WITH SPEC.
Square Plaque Ceiling Diffusers (CD): Provide square face, adjustable, 360 degree pattern diffusers with one-piece stamped cones, no corner joints, round necks. Inner plaque assembly shall be fully removable. Provide lay-in panel as required. Provide trim ring for diffusers in hard ceilings to allow opening to be used for access. Provide square to round duct boot adaptors for ceiling-mounted air devices. Price Model SPD or equal.

Exhaust [Grilles // Registers] [[EG //]]: Provide exhaust [grilles // with one set of 45 degree fixed louvers, parallel to the long dimension. [Provide mounting frame for all wall and plaster ceiling installations. Titus 350 FL or Metalaire RHE.

Coordinate installation with ceiling and light fixture installation. Locate ceiling outlets as indicated on architectural Reflected Ceiling Plans. Unless otherwise indicated, locate ceiling outlets in the center of acoustical ceiling modules with sides parallel to the grid.

Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of air outlets and inlets with other work.

Set air volumes to values shown on the drawings so that the system is functional. Leave ready for test and balance contractor.

230985 / TESTING AND BALANCING OF MECHANICAL SYSTEMS

Extent of testing, adjusting, and balancing work (TAB) is indicated by requirements of this section, and also by drawings and schedules, and is defined to include, but is not necessarily limited to, air distribution systems and associated equipment and apparatus of mechanical work. The work consists of setting speed and volume (flow) adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required.

Coordination: Coordinate with the General Contractor and Mechanical Contractor responsible for the HVAC system installation as required to complete the TAB work.

Tolerances:

Air Handling: The supply air, return air and outdoor air quantities shall be balanced within 5% of design values.

Exhaust Fans: The exhaust fan quantities shall be set as required to maintain the design exhaust terminal flows within 5% of design values.

Terminal Units: The air quantities associated with [VAV boxes, fan coil units, self-regulating air valves, unit heaters] and other similar devices shall be balanced within [5%] of design values.

Ceiling Diffusers, Supply Registers, Return and Exhaust Inlets: Balance to an air quantity within 10% of the design values.

Air Handling Temperatures: The controlled temperatures at AHUs shall be verified to be under control within 1F of design values.
Room Temperatures: Balance systems and controls within 2F of indicated settings.
Laboratory Systems: In addition to demonstrating proper airflow and temperature control, verify that all [setback // VAV] systems operate correctly and maintain pressure relationships at reduced air flows.
Quality Assurance: The TAB Contractor shall be certified as follows:
Tester: A firm certified by National Environmental Balancing Bureau (NEBB) in those testing and balancing disciplines required for this project, who is not the Installer of the systems to be tested and is otherwise independent of the project. Comply with NEBB's "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems" as applicable to this work.
Industry Standards: Comply with ASHRAE recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

Test, adjust and balance systems during summer season for air conditioning systems and during winter season for heating systems, including at least a period of operation at outside conditions within 5F wet bulb temperature of maximum summer design condition, and within 10F dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit. The Contractor shall return for a change of seasons test at no additional cost to the Owner and submit the revised TAB report.

Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.

Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.

Include in the TAB report recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

Check all HVAC controls for proper location, calibration and sequence of operation.
Check operation of all controllers and controlled devices to verify proper action and direction. Check the operation of all interlocks.
Check all control valves for complete closure and correct action under all operating conditions.
Check all labs supply and exhaust system controls. [Check setback functions.]

Air Balancing:

Leakage tests on ductwork must have been completed before air balancing.

Set dampers, volume controls and fan speeds to obtain specified air delivery with minimum noise level. Rebalance as required to accomplish this.

Record air terminal velocity after completion of balance work.

Record all fan speeds.

Variable Volume Systems: Measure static pressure at all major branches. Adjust fan controllers for minimum required static pressure at the end of each branch. Report the value of the minimum static pressure that will provide proper air flow in the TAB Report and set the static pressue controller for this value.

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PROJECT NAME:
AQUATIC PATHOBIOLOGY
BLDG 1379 - HVAC UPGRADES
UNIVERSITY OF FLORIDA
GAINESVILLE, FL

SEAL
KEVIN M. SPELLICY
PE - 0076968

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100% CONSTRUCTION DOCUMENTS

DATE ISSUED
JULY 9, 2019
DRAWN BY
DAD
APPROVED BY
KMS

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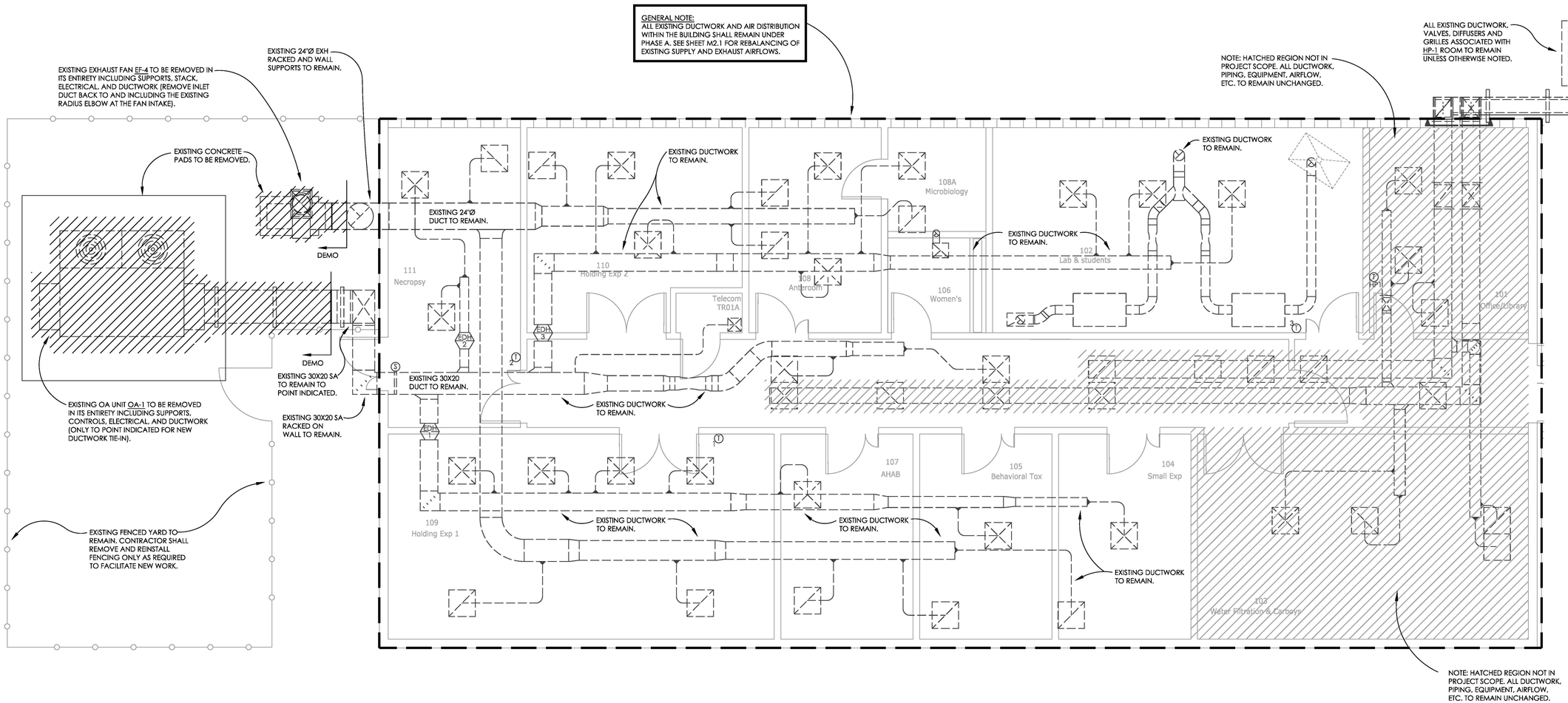

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PARTIAL MECHANICAL FLOOR PLAN - PHASE A DEMOLITION

SCALE 1/4" = 1'-0"

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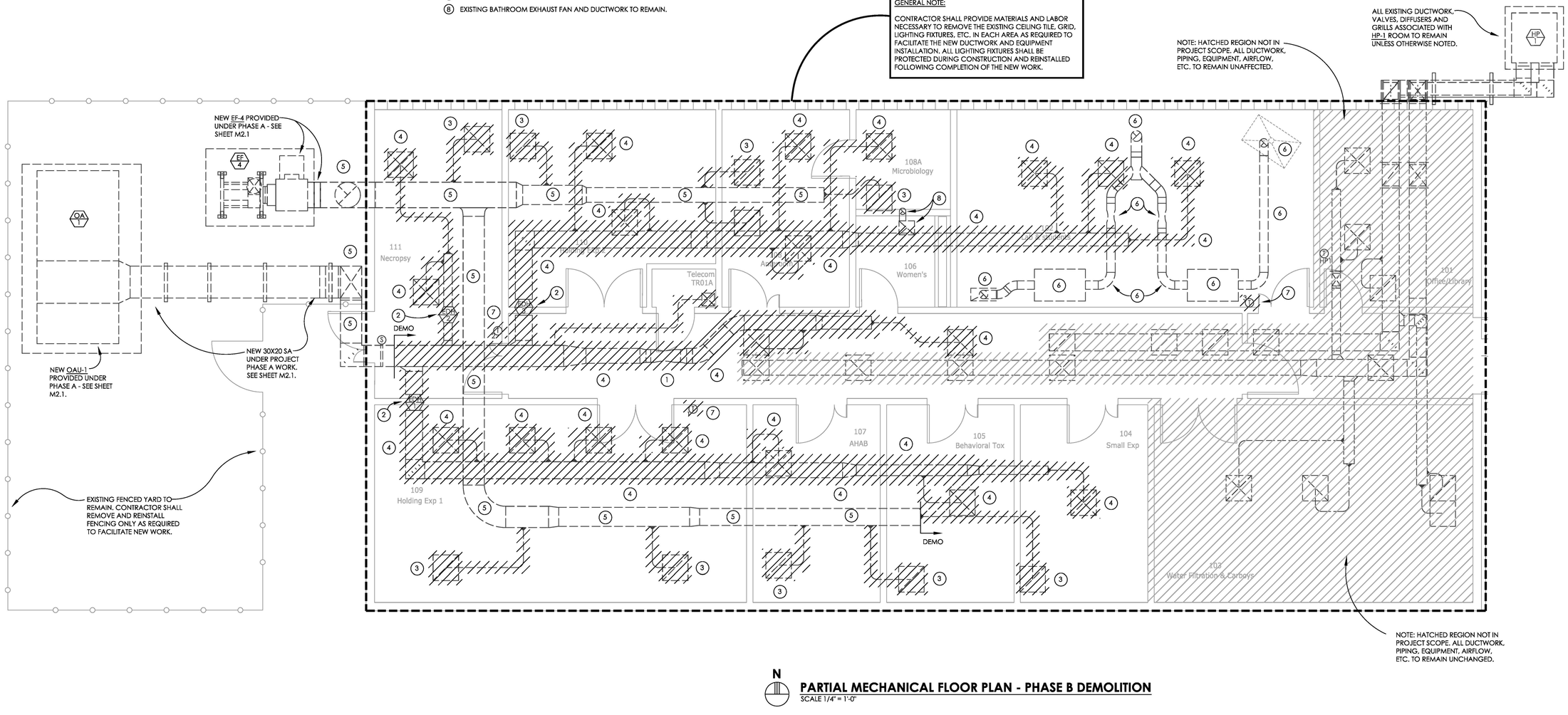
M1.1

DEMOLITON NOTES:

1. REMOVE EXISTING SUPPLY AIR VALVE AND ASSOCIATED DOWNSTREAM DUCTWORK. REMOVE BRANCH SA DUCT BACK TO POINT INDICATED.
2. REMOVE EXISTING ELECTRIC DUCT HEATER (EDH) AND ASSOCIATED DOWNSTREAM DUCTWORK, DEVICES, ELECTRICAL, ETC. REMOVE BRANCH DUCT BACK TO POINT INDICATED.
3. REMOVE EXHAUST AIR GRILLE AND DUCT BACK TO MAIN DUCT AND CAP.
4. REMOVE EXISTING DIFFUSER, BRANCH TAP, AND UPSTREAM DUCT BACK TO POINT INDICATED.
5. EXISTING DUCT TO REMAIN TO INDICATED DEMOLITION POINT. SEE NEW PLAN SHEET M2.2 FOR NEW DUCTWORK TO BE RECONNECTED AT THIS POINT..
6. ALL EXISTING EXHAUST DUCTWORK, SOUND ATTENUATOR, VAVLES, GRILLES AND FAN SERVING LAB 102 SHALL REMAIN UNAFFECTED BY THIS PROJECT.
7. EXISTING THERMOSTAT TO BE REMOVED.
8. EXISTING BATHROOM EXHAUST FAN AND DUCTWORK TO REMAIN.

GENERAL NOTE:

CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR NECESSARY TO REMOVE THE EXISTING CEILING TILE, GRID, LIGHTING FIXTURES, ETC. IN EACH AREA AS REQUIRED TO FACILITATE THE NEW DUCTWORK AND EQUIPMENT INSTALLATION. ALL LIGHTING FIXTURES SHALL BE PROTECTED DURING CONSTRUCTION AND REINSTALLED FOLLOWING COMPLETION OF THE NEW WORK.



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PARTIAL MECHANICAL FLOOR PLAN - PHASE B DEMOLITION

SCALE 1/4" = 1'-0"

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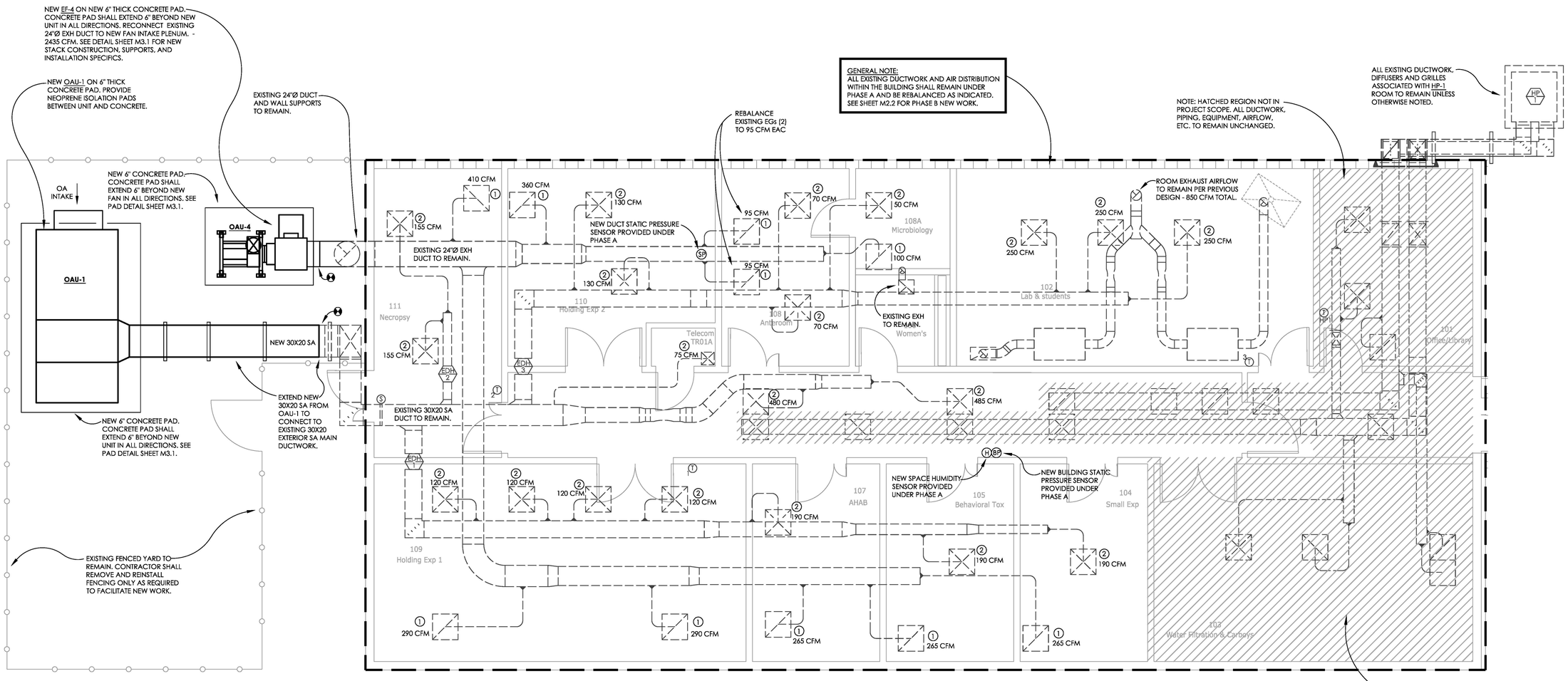

NEW CONSTRUCTION NOTES:

1. EXISTING EXHAUST GRILLE TO REMAIN - REABALANCE TO AIRFLOW INDICATED.
2. EXISTING SUPPLY DIFFUSER TO REMAIN - REBALANCE TO AIRFLOW INDICATED.

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PARTIAL MECHANICAL FLOOR PLAN - PHASE A NEW WORK

SCALE 1/4" = 1'-0"

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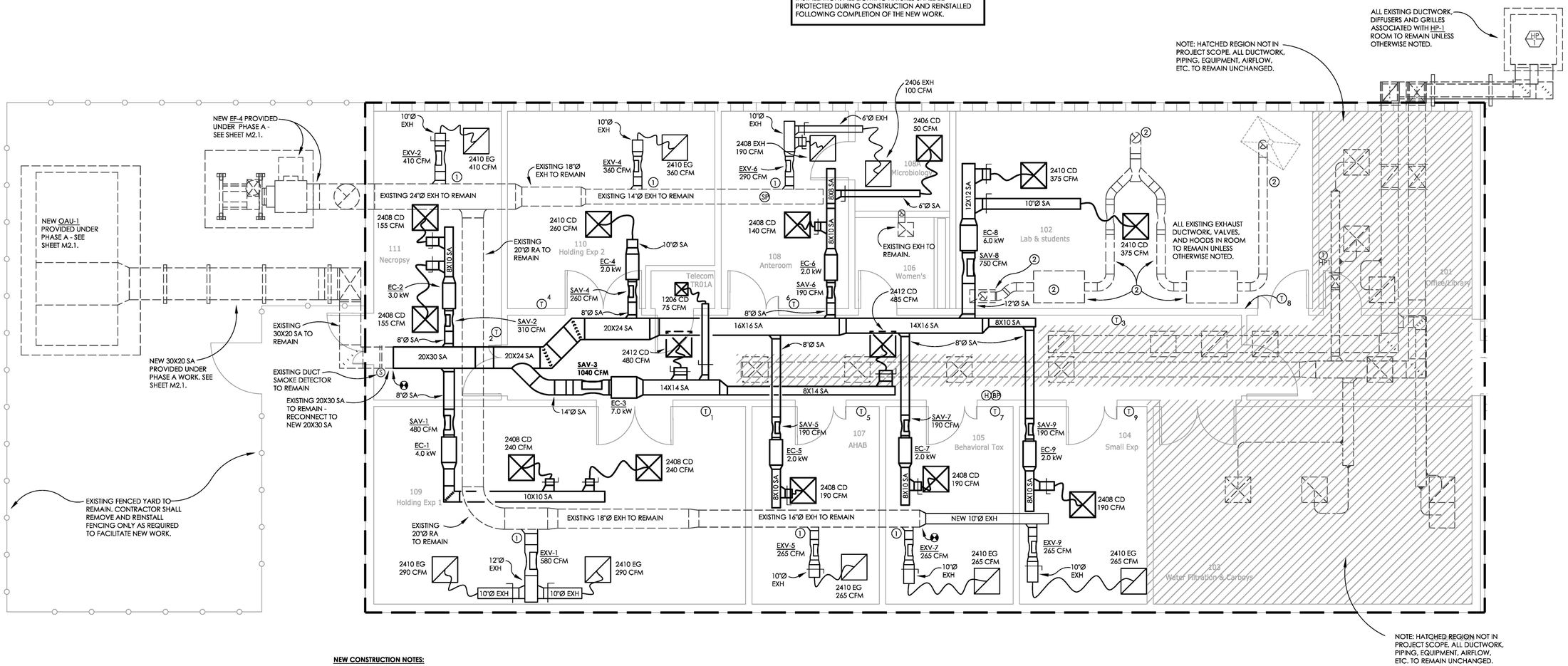

NEW CONSTRUCTION NOTES:

1. PROVIDE NEW SPIN-IN EXHAUST TAP AT EXISTING DUCTWORK. TAP DIAMETER SHALL NEW VALVE INLET DIAMETER.
2. EXISTING EXHAUST DUCT, SOUND ATTENUATORS, FUME HOOD, GRILLES, VALVES, AND ASSOCIATED EXHAUST FAN SERVING LAB 102 TO REMAIN AS INSTALLED AND BE UNAFFECTED BY THIS PROJECT.
3. REMOVE EXHAUST AIR GRILLE AND DUCT BACK TO MAIN DUCT AND CAP.

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PARTIAL MECHANICAL FLOOR PLAN - PHASE B NEW WORK

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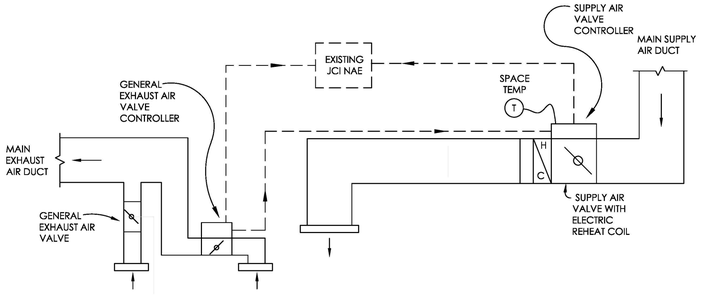


TYPICAL LAB CONTROLS DIAGRAM

NOT TO SCALE

CONTROLS SCOPE OF WORK - EACH LAB

1. PROVIDE NEW TRACKING PAIR CONTROL FOR NEW GENERAL EXHAUST AIR AND SUPPLY AIR VALVE IN EACH LAB.

2. INTEGRATE VALVE CONTROLLERS WITH EXISTING JCI BAS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING POINTS AS A MINIMUM.

   2.1. SPACE TEMPERATURE (°F)
   2.2. SUPPLY AIR VALVE AIRFLOW (CFM)
   2.3. GENERAL EXHAUST AIR VALVE AIRFLOW (CFM)
   2.4. REHEAT COIL CAPACITY (% FULL CAPACITY)

3. PROVIDE REVISED PROGRAMMING OF THE JCI DATABASE TO PROVIDE THE SEQUENCES OF OPERATION OUTLINED BELOW.

4. IN LAB 102 WHICH HAS A FUME HOOD, SAME POINTS AND SEQUENCE SHALL BE PROVIDED BUT THE SUPPLY AIR AND GENERAL EXHAUST AIR VALVE SHALL ACCOUNT FOR THE MEASURED CFM OF THE HOOD IN THE CALCULATION OF AIRFLOW OFFSET.

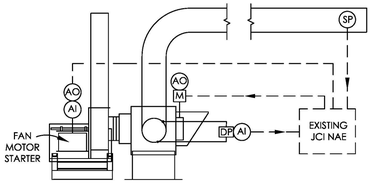
LAB SEQUENCE OF OPERATION

1.1. SUPPLY AIR VALVE CONTROL: SUPPLY AIR VALVES SHALL MODULATE TOGETHER (EQUALLY) BETWEEN THE MINIMUM AND MAXIMUM AIRFLOWS PROPORTIONATELY TO MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT.

1.2. GENERAL EXHAUST AIR VALVE CONTROL: GENERAL EXHAUST AIR VALVE SHALL TRACK THE TOTAL SUPPLY AIRFLOW AND MODULATE BETWEEN THE OCCUPIED MINIMUM AND MAXIMUM AIRFLOWS PROPORTIONATELY TO MAINTAIN A MINIMUM OF 8 AIR CHANGES/HOUR AND THE SPECIFIED NEGATIVE AIRFLOW OFFSET FOR EACH LAB.

1.3. REHEAT COIL VALVE CONTROL: WITH THE SUPPLY AIR VALVE AT MINIMUM AIRFLOW POSITION, UPON A FALL IN SPACE TEMPERATURE BEYOND THE OCCUPIED HEATING SETPOINT, THE REHEAT COIL SHALL ENERGIZE PROPORTIONATELY BASED ON THE SPACE THERMOSTAT TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. SUPPLY AIR VALVES SHALL REMAIN AT MINIMUM POSITION DURING REHEAT/HEATING OPERATION.

2. ALARMS:
   2.1. ROOM DIFFERENTIAL PRESSURE
   2.2. HIGH SPACE TEMPERATURE



EF-4 CONTROLS DIAGRAM

NOT TO SCALE

CONTROLS SCOPE OF WORK - EF-4

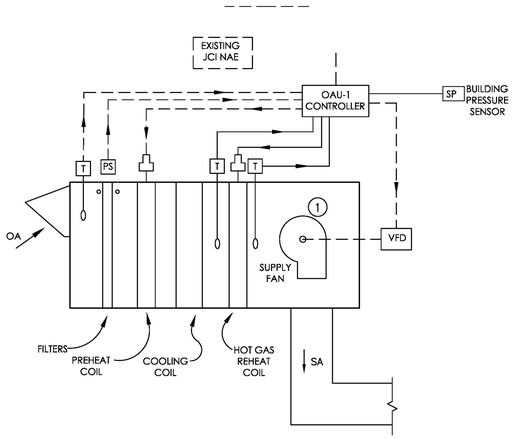
1. PROVIDE REMOTE START/STOP AND STATUS POINT FOR NEW EF-4.

2. PROVIDE LANDING OF MANUFACTURER'S PIEZOMETER RING AIRFLOW MEASUREMENT OUTPUT TO EXISTING JCI BAS TO REPORT EXHAUST AIR FLOW (CFM) FOF EF-4.

3. PROVIDE ALARM IF FAN FAILS TO START UPON COMMAND.

4. FAN SHALL RUN CONTINUOUS AT ALL TIMES.

5. PROVIDE DUCT STATIC PRESSURE SENSOR (2/3 DOWN LONGEST RUN) FOR CONTROL OF BYPASS AIR (BLEED) DAMPER. DAMPER SHALL BE CALIBRATED TO BE CLOSED WHEN ALL EXHAUST VALVES ARE AT DESIGN AIRFLOW. AS VALVES REDUCE AIRFLOW, BYPASS AIR DAMPER SHALL MODULATE OPEN TO MAINTAIN A CONTSTANT DUCT STATIC PRESSURE.



OAU-1 CONTROLS DIAGRAM

NOT TO SCALE

CONTROLS SCOPE OF WORK - OAU-1

1. PROVIDE INTEGRATION (LANDING) OF NEW OAU-1 UNIT CONROLLER (VIA BACNET) TO THE EXISTING JCI BAS. REPORTING TO JCI FRONT END SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING POINTS AS A MINIMUM.

   1.1. SPACE HUMIDITY
   1.2. SUPPLY FAN SPEED (% FULL SPEED)
   1.3. ENTERING AIR TEMPERATURE (°F)
   1.4. COOLING COIL LEAVING AIR TEMPERATURE (°F)
   1.5. REHEAT COIL LEAVING AIR TEMPERATURE (°F)
   1.6. COOLING CAPACITY (% FULL LOAD)
   1.7. ELECTRIC HEATING CAPACITY (%FULL LOAD)
   1.8. FAN STATUS
   1.9. COOLING STATUS
   1.10. HEATING STATUS
   1.11. REMOTE START/STOP
   1.12. FILTER DIFFERENTIAL PRESSURE (IN. H20)

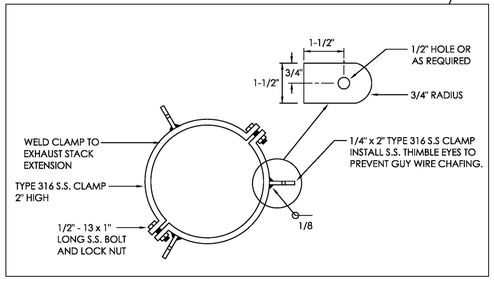
2. ALARMS:
   2.1. DIRTY FILTER
   2.2. HIGH SPACE HUMIDITY
   2.3. FAN FAILURE

3. COOLING COIL CONTROL: MANUFACTURER SHALL PROVIDE PRE-PROGRAMMED SEQUENCE FOR CONSTANT LEAVING AIR TEMPERATURE CONTROL (54°F ADJUSTABLE). IF SPACE HUMIDITY IS LESS THAN 55% RH, PROVIDE SEQUENCE TO RESET SUPPLY AIR TEMPERATURE SETPOINT FROM 54°F TO 62° F AS OUTDOOR VARIES FROM 95°F TO 75°F. INCREMENT SETPOINT NO FASTER THAN 1° PER 30 MINUTES. IF SPACE HUMIDITY RISES ABOVE 60% RH, SETPOINT SHALL RETURN TO 54°F.

4. PREHEAT CONTROL: ENERGIZE PREHEAT COIL (PROPORTIONATELY VIA SCR CONTROL) WHEN ENTERING AIR TEMPERATURE IS BELOW 55°F. REHEAT COIL SHALL MAINTAIN A CONSTANT DISCHARGE TEMPERATURE OF 55°F.

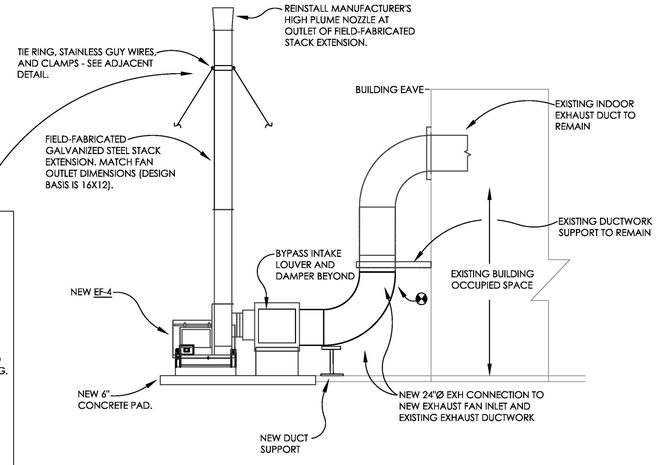
5. HOT GAS REHEAT COIL CONTROL: OAU-1 SHALL MONITOR ALL DUCT-MOUNTED REHEAT COILS (VIA BAS). IF ALL COILS ARE ACTIVE, HOT GAS REHEAT SHALL MODULATE TO PROVIDE A UNIT LEAVING AIR TEMPERATURE OF 65°F. WHEN ANY REHEAT COIL DE-ENERGIZES TO 0%, REHEAT COIL VALVE SHALL CLOSE.

6. SUPPLY FAN VFD CONTROL: PROVIDE NEW SPACE PRESSURE SENSOR LOCATED CENTERED IN THE MAIN CORRIDOR TO CONTROL OAU-1 VFD FOR CONSTANT BUILDING PRESSURE (0.01" ADJUSTABLE). UNIT SHALL RUN CONTINUOUSLY. PROVIDE INTERLOCK IN BAS TO START EF-4 ANY TIME OAU-1 FAN IS RUNNING.



TIE CLAMPING RING DETAIL

NOT TO SCALE



LAB/FUME HOOD EXHAUST FAN INSTALLATION DETAIL

NOT TO SCALE

CAMPBELL SPELLICY ENGINEERING

3720 NW 43rd Street
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Gainesville, Florida 32606
Phone: 352-372-6967
Fax: 352-372-7232
www.CampbellSpellicy.com
Certificate of Authorization: 00008813

PROJECT NAME:

AQUATIC PATHOBIOLOGY
BLDG 1379 - HVAC UPGRADES
UNIVERSITY OF FLORIDA
GAINESVILLE, FL

SEAL

KEVIN M. SPELLICY
PE - 0076968

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19026

100% CONSTRUCTION DOCUMENTS

DATE ISSUED
JULY 9, 2019

DRAWN BY
DAD

APPROVED BY
KMS

M3.1

ELECTRICAL LEGEND

L1-1,3 — HOMERUN TO PANELBOARD. "L1" INDICATES THE PANELBOARD NUMBER. "1,3" INDICATES THE BRANCH CIRCUIT NUMBERS. PROVIDE TWO #12 CONDUCTORS AND ONE #12 GROUNDING CONDUCTOR IN 1/2" CONDUIT UNLESS NOTED OTHERWISE.

EQUIPMENT CONNECTION OUTLET

BRANCH CIRCUIT PANELBOARD

MAIN CIRCUIT BREAKER

CONDUIT + CONDUCTOR. AS SPECIFIED ON RISER AND FLOOR PLAN.

GROUNDING ELECTRODE

ELECTRICAL ABBREVIATIONS

A	AMPS
AICS	AMPS INTERRUPTING CAPACITY SYMMETRICAL
BKR	BREAKER
CKT	CIRCUIT
EX	EXISTING TO REMAIN
GRD	GROUND
MOCP/MOP	MAXIMUM OVERCURRENT PROTECTION
NEC	NATIONAL ELECTRICAL CODE
P	POLE
PH	PHASE
PWR	POWER
RCPT	RECEPTACLE
UL	UNDERWRITERS LABORATORY
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VA	VOLT-AMPERES
W	WATTS

GENERAL ELECTRICAL DEMOLITION NOTES

1. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO REMOVE ALL ELECTRICAL ITEMS INDICATED AS EXISTING TO BE REMOVED; TO REMOVE, STORE, CLEAN, AND REINSTALL ALL ELECTRICAL ITEMS INDICATED AS EXISTING TO BE RELOCATED; AND TO NOT DISTURB ANY OTHER ELECTRICAL ITEMS EXCEPT AS NECESSARY TO ACCOMMODATE OTHER WORK SPECIFIED. ALL EXISTING DEVICES, STRUCTURES, EQUIPMENT OR OTHER FEATURES SHALL BE CONSIDERED TO BE EXISTING TO REMAIN UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO PROTECT ANY EXISTING OR NEW SMOKE DETECTORS, IF ANY, DURING DEMOLITION AND CONSTRUCTION TO ENSURE NO PARTICULATE MATTER MAY ENTER THESE DETECTORS.
3. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY AND SHALL SCHEDULE WORK AS NECESSARY TO ENSURE THAT OUTAGES TO THE SERVICE OF FIRE ALARM DEVICES ARE MINIMIZED. ALL OUTAGES TO SUCH FIRE ALARM SYSTEM COMPONENTS, IF ANY, SHALL BE COORDINATED WITH THE OWNER AND CONDUCTED DURING TIMES SPECIFIED BY OWNER; SEE PROJECT MANUAL DIVISION ONE.
4. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO MAINTAIN IN SERVICE DURING DEMOLITION AND CONSTRUCTION THOSE EXISTING FIRE ALARM SYSTEM COMPONENTS WHICH ARE OUTSIDE THE RENOVATION AREA EVEN IF THESE COMPONENTS ARE SUPPLIED BY OR SERVED BY MATERIALS TO BE REMOVED, MATERIALS TO BE RELOCATED, OR OTHER MATERIALS WITHIN THE RENOVATION AREA.
5. CONTRACTOR SHALL REMOVE ALL UNUSED CONDUCTORS BACK TO SOURCE OR TO THE FIRST JUNCTION POINT SUPPLYING EXISTING OR NEW LOADS TO REMAIN.
6. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR NECESSARY TO RESUPPLY OR TO MAINTAIN IN SERVICE - TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY ELECTRICAL ITEMS OUTSIDE OF THE RENOVATION AREA WHICH ARE SERVED BY OR SUPPLIED BY ELECTRICAL ITEMS WITHIN THE RENOVATION AREA.
7. ALL EXPOSED UNUSED CONDUIT SHALL BE REMOVED. ALL UNUSED CONCEALED CONDUIT SHALL BE ABANDONED IN PLACE AFTER INSTALLING A PULLSTRING.
8. DEVICES SHOWN INSIDE THE RENOVATION AREA ARE NOT INTENDED TO REPRESENT ALL DEVICES WITHIN SPACE. ADDITIONAL DEMOLITION WORK MAY BE REQUIRED FOR INSTALLING NEW WORK. CONTRACTOR SHALL ASSUME ADDITIONAL ITEMS NOT INDICATED ARE PRESENT AND SHALL THOROUGHLY INSPECT PROJECT AREA PRIOR TO BIDDING.
9. CONTRACTOR SHALL PROVIDE MATERIALS AND LABOR AS NECESSARY TO REPAIR OR TO REPLACE - TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND THE ENGINEER - ANY EXISTING DEVICES, FINISHES, SURFACES, OR EQUIPMENT TO REMAIN WHICH IS DAMAGED DURING DEMOLITION OR CONSTRUCTION WITH NO CHANGE TO THE CONTRACT AMOUNT OR TIME SCHEDULE.
10. DEMOLITION SHALL INCLUDE ANY REMOVAL AND REPLACEMENT OF EXISTING MATERIALS TO MAKE PROVISION FOR NEW FINISHES IF REQUIRED TO ACCOMMODATE WORK BY OTHER DIVISIONS OF THIS CONTRACT.

EXISTING PNL MDP				600A MLO				SCR: 22 KAIC				JHMHC AQUATICS BLDG	
208/120 WYE, 3PH-4W		CKT BKR		PHASE LOAD AMP						CKT BKR		BTM FEED, SRFCE-MTD	
CKT	LOAD	P/TRIP	X	A		B		C		X	P/TRIP	LOAD	CKT
1			MX	157.5	5.0					M			2
3	OA-1 [N1]	3/175	MX			157.5	5.0			M	3/15	EF-1	4
5			MX					157.5	5.0	M			6
7			H	55.8	-					-	-	SPACE ONLY	8
9	EDH-1 [N1]	3/80	H			55.8	-			-	-	SPACE ONLY	10
11			H					55.8	-	-	-	SPACE ONLY	12
13			H	55.8	10.8					M			14
15	EDH-2 [N1]	3/80	H			55.8	10.8			M	3/20	EF-4 [N1]	16
17			H					55.8	10.8	M			18
19			H	14.2	-					-	1/20	SPARE	20
21	EDH-3 [N1]	3/20	H			14.2	-			-	1/20	SPARE	22
23			H					14.2	12.5	H	2/20	EWH-9 RM 106	24
25	HP-1	2/125	H	46.7	12.5					H			26
27			H			46.7	12.5			H	2/20	EWH-9 RM 108A	28
29	REC EXT	1/20	RX					6.7	12.5	H			30
31	SPARE	1/20	-	-	12.5					H	2/20	EWH-9 RM 111	32
33	SPARE	1/20	-			-	12.5			H			34
35	SPARE	1/20	-					-	-	-	1/20	SPARE	36
37			G	73.3	90.8					G			38
39	PANEL 2P2	3/125	G			71.7	90.0			G	3/125	PANEL 2P1	40
41			G					63.3	97.5	G			42
				535.0		532.5		491.6					

NOTES:
[N1] - EXISTING LOAD TO BE REMOVED. REMOVE BREAKER, CONDUIT, AND CONDUCTORS UNLESS STATED OTHERWISE ON THE FLOOR PLANS.

	AMP	KVA
CONNECTED:	519.7	187.2
DEMAND:	604.5	217.8

REVISED PNL MDP				600A MLO				SCR: 22 KAIC				JHMHC AQUATICS BLDG	
208/120 WYE, 3PH-4W		CKT BKR		PHASE LOAD AMP						CKT BKR		BTM FEED, SRFCE-MTD	
CKT	LOAD	P/TRIP	X	A		B		C		X	P/TRIP	LOAD	CKT
1			MX	115.6	5.0					M			2
3	NEW OUA-1	3/150	MX			115.6	5.0			M	3/15	EF-1	4
5			MX					115.6	5.0	M			6
7	NEW EC-1	2/25	M	16.7	16.7					M	1/25	NEW EC-2	8
9			M			16.7	16.7			M	1/25	NEW EC-4	10
11	NEW EC-3	2/40	M					29.2	16.7	M	1/25	NEW EC-5	12
13			M	29.2	7.5					M			14
15	NEW EC-8	2/40	M			25.0	7.5			M	3/15	NEW EF-4	16
17			M					25.0	7.5	M			18
19	NEW SAV SYSTEM	1/20	M	5.0	5.0					M	1/20	NEW EXV SYSTEM	20
21	NEW EC-6	1/25	M			16.7	-			-	1/20	SPARE	22
23	NEW EC-7	1/25	M					16.7	12.5	H	2/20	EWH-9 RM 106	24
25	HP-1	2/125	H	46.7	12.5					H			26
27			H			46.7	12.5			H	2/20	EWH-9 RM 108A	28
29	REC EXT	1/20	RX					6.7	12.5	H			30
31	SPARE	1/20	-	-	12.5					H	2/20	EWH-9 RM 111	32
33	SPARE	1/20	-			-	12.5			H			34
35	SPARE	1/20	-					-	16.7	M	1/25	NEW EC-9	36
37			G	73.3	90.8					G			38
39	PANEL 2P2	3/125	G			71.7	90.0			G	3/125	PANEL 2P1	40
41			G					63.3	97.5	G			42
				436.6		436.6		424.9					

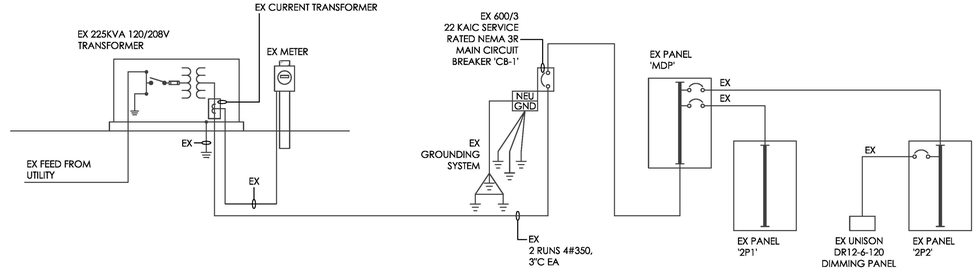
NOTES:

	AMP	KVA
CONNECTED:	432.7	155.9
DEMAND:	475.6	171.3

LOAD CALCULATION SUMMARY:

PROJECT SCOPE RESULTS IN AN OVERALL LOAD DECREASE OF 87A (31.3KVA) AT 'MDP'. THEREFORE, ALL COMPONENTS HAVE SUFFICIENT CAPACITY WITHOUT UPGRADE.

PANEL SCHEDULES & LOAD CALCULATIONS FOR 'MDP'



PARTIAL ONE-LINE RISER DIAGRAM

NOT TO SCALE. FOR REFERENCE ONLY.

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PROJECT NAME:
AQUATIC PATHOBIOLOGY
BLDG 1379 - HVAC UPGRADES
UNIVERSITY OF FLORIDA
GAINESVILLE, FL

SEAL
KEVIN M. SPELLICY
PE - 0076968

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DATE ISSUED
JULY 9, 2019

DRAWN BY
LEN

APPROVED BY
KMS

E0.1

ELECTRICAL SPECIFICATIONS

260005 / ELECTRICAL GENERAL

Field Measurements and Coordination:

Verify all field dimensions and locations of equipment to ensure close, neat fit with other trades' work. Make use of all Contract Documents and approved shop drawings to verify exact dimension and locations. Do not scale electrical drawings, rely on dimensions shown on architectural or structural drawings.

Locate all equipment, materials, and apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on electrical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.

Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval from Engineer or Architect.

Carefully examine any existing conditions, piping, and premises. Compare Drawings with existing conditions. Report any observed discrepancies. Written instructions will be issued by the Engineer to resolve discrepancies.

Interpretation of the Contract Documents is sometimes necessary due to perceived ambiguities or conflicts in the contract requirements. Where ever more than one interpretation of the requirements of the Contract Documents can be made, the Contractor shall provide materials and labor necessary to accommodate providing the most expensive of the different interpretations. No change order shall be processed for a failure to comply with this requirement.

Guarantee and Service

Owner reserves the right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.

Approval Submittals

Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.

Equipment and Materials:

Equipment and materials furnished under this Division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and respon\hichsibility. Where required, Contractor shall furnish proof of installation of similar equipment or materials.

Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identity it.

The label of the approving agency, such as UL or NEMA, by which a standard has been established for the particular item shall be in full view. Materials shall be UL-listed for the application specified. All materials provided shall be installed in conformance with their UL-Listing requirements and with their manufacturers installation instructions.

Model Numbers: Catalog numbers and model numbers indicated in the Drawings are used as a guide in the selection of the equipment and are only listed for the Contractor's convenience.

Requests for Substitution: Where a particular system, product or material is specified by name, consider it as standard basis for bidding. Other systems, products, equipment or materials may be accepted if they are deemed equivalent in quality and workmanship and will perform satisfactorily its intended purpose.

Means of Support for all lighting fixtures, raceway, devices, or other items suspended from the ceiling (or otherwise from above) shall be fully coordinated with and in compliance with all requirements and recommendations of the manufacturer of equipment suspended.

All Optional Color Selections which are made for any electrical materials shall be approved by the Architect and Owner prior to ordering any materials.

Construction Electrical Utilities: Provide all temporary wiring for power and light required for construction purposes and remove such temporary wiring when use is no longer required.

Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Engineer and Owner and this work shall be done at the time best suited to the Owner.

Cutting and Patching: Contractor shall be responsible for cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment.

Additional Steel Support Hardware required for the installation of any electrical or other equipment provided shall be provided by the Contractor. Contractor shall provide materials and labor necessary to ensure that all products are rigidly secured to structure pursuant to applicable portions of NEC 300-11.

Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 26.

Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, Contractor is to carefully clean and leave premises free from debris and in a safe condition.

Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

Record Drawings:

During the progress of the work the Contractor shall record on their field set of Drawings the corrections, variations, and deviations for systems which are not installed exactly as shown on the Contract Drawings.

Operation and Maintenance Manuals: Furnish PDF manual, organized by system or section. Manuals shall contain detailed operating instructions, complete wiring and control diagrams, routine maintenance operations, and manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.

Controls Wiring and Alarm Wiring shall be labeled by tags at all junction boxes, device boxes, and all enclosures.

Labeling for Boxes and Electrical Devices Provide box and device labeling as follows:

Switches Each light switch shall be marked by panel name and circuit number using numbered vinyl cloth adhesive markers, 1/4" minimum height. Locate marker behind device cover plate so it can be readily identified by removal of the cover plate. Thomas and Betts E-Z Code Markers are acceptable.

Receptacles Each receptacle shall be marked by panel name and circuit number using numbered vinyl cloth adhesive markers, 1/4" minimum height. Locate marker behind device cover plate so it can be readily identified by removal of the cover plate. Thomas and Betts E-Z Code Markers are acceptable.

Boxes All junction box covers in unfinished spaces shall be marked by panel name and circuit number using indelible ink, minimum height. Locate marker so it can be readily identified (without) removal of the cover plate.

260020 / CODES AND STANDARDS

GENERAL - Where code conflict exists, generally the most stringent requirement applies.

CODES

Florida Building Code (FBC) 2017, with all currently-adopted revisions, supplements, or other changes.

Florida Fire Prevention Code, 2017, with all currently-adopted revisions, supplements, or other changes.

National Electrical Code (NFPA 70 (National Fire Protection Association)), 2014

National Electrical Safety Code (NESC)

Life Safety Code (NFPA 101), 2015

Florida Accessibility Code for Building Construction (Chapter 11 of FBC)

STANDARDS

All electrical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments:

American National Standard Institutes (ANSI)

Illuminating Engineering Society (IES).

Institute of Electrical and Electronics Engineers (IEEE).

National Electrical Manufacturer's Associations (NEMA).

National Fire Protection Association (NFPA).

Occupational Safety and Health Act (OSHA).

Underwriter's Laboratories, Inc. (UL).

State Requirements for Educational Facilities (SREF Section 453 of FBC).

260040 / ALTERATIONS AND ADDITIONS TO EXISTING WORK

General:

All necessary additions and alterations to existing work shall be included as required to provide and maintain a complete and proper electrical installation. As necessary, relocate existing electrical work so other trades can pursue their work and maintain building in service, when occupied.

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

Relocation of fixtures, pull boxes, electrical ducts, and other similar items, to permit the installation of new equipment.

Installation of new conduits, conductors, wiring, and wiring devices, in order to maintain temporary and permanent use of electrical facilities.

Disconnection and reconnection of circuits as required for continued operation of services.

Provision for the relocation of all mechanical work as required for proper installation of electrical work where not shown or specified in other sections or on other drawings.

Unused, existing, surface mounted work shall be removed and concealed. Outlets shall be blanked up.

Existing work to be maintained shall be reconnected and shall have all outlets, boxes and devices accessible after completion of work by other trades.

Within NEC limitations, existing conduits may be reused after cleaning.

Existing Building Power Outages: Where portions of buildings are altered, and remainder of building continues in operation, temporary wiring shall be provided to maintain all necessary building functions. Provide all equipment, material, labor for a continuous functional system.

Temporary Wiring for Remodeled Areas: Progress of the work will require temporary wiring installations to utilize a portion of the remodeled area. Wiring may not be the final, permanent installation, and shall be included as necessary to supply required electrical function.

Openings in Existing Work:

Provide cutting and patching of existing work as required. Verify exact locations and materials before performing work. Cutting of structural members and bearing walls shall not be done without written approval of the Engineer.

Removal and Ownership of Existing Work: Unless otherwise specified, all equipment and materials shall remain the property of the Owner.

If any new circuit breakers are provided in any existing panelboards or in any existing switchboards as part of this Contract for Construction, then the new circuit breakers provided shall have a short-circuit interrupting-capacity (RMS symmetrical amps) which is greater than or equal to the highest capacity of all of the existing circuit breakers in the existing switchboard or panelboard into which the new circuit breakers are added.

Cutting of Concrete Materials: Holes for materials and supports shall be made with uniform speed rotation drilling equipment which does not provide effects associated with impact type equipment.

If any work is performed in existing panelboards or switchboards, Contractor shall provide a typewritten circuit directory with a protective covering in a frame inside the door which indicates all changes to the panelboard or switchboard.

260100 / BASIC MATERIALS AND METHODS

Raceways:

Rigid Metal Conduit (NEC Art. 344) shall be galvanized steel, protected inside and outside.

Electrical Metallic Tubing (EMT) (NEC Art. 358) shall be steel, protected inside and outside by a coating of approved corrosion-resistant material such as zinc or cadmium.

Flexible Metal Conduit (NEC Art. 348) shall be galvanized steel, protected inside and outside.

Raceway Fittings:

Rigid Metal Conduit shall have threaded fittings, galvanized steel or threadless compression galvanized steel. Fittings shall be rain tight/concrete tight.

Electrical Metallic Tubing (EMT) fittings shall be compression type, all zinc plated steel; zinc plated steel body with cadmium plated malleable iron nut or cadmium plated malleable iron body and compression nut. Fittings shall be UL listed for rain tight, concrete tight or rain tight/concrete tight. EMT fittings for sizes 2" and larger may be zinc plated steel, set screw type unless otherwise indicated on the Drawings. Die cast or indenter type fittings shall not be permitted.

Flexible Metal Conduit fittings shall be zinc plated steel or cadmium plated mal\hichleable iron screw type with insulated throat and angular wedge fitting between convolutions of conduit.

Expansion Fittings shall be corrosion protected steel for metal raceways, and PVC for non-metallic raceways. Provide bonding fittings for metal raceways and grounding conductors for PVC raceways.

Materials for Conducting Power such as busways, panelboard busbars, switchboard busbars, wires, conductors, or other cable assemblies (including non-current carrying conductive materials such as grounding conductors and buses and neutral conductors and buses) shall not be made of aluminum unless specifically specified as being comprised of aluminum elsewhere in the Contract Documents.

Couplings and Unions shall be galvanized steel, tapered thread-standard conduit couplings for rigid metal conduit. PVC couplings for rigid non-metallic conduit shall use approved adhesive, and threaded couplings shall be used for schedule 80 conduit. Split couplings shall be galvanized steel. Unions shall be ground joint type galvanized steel.

Bushings:

Bushings shall be one of the following types:

Galvanized steel, threaded or threadless

Galvanized-plated steel, threaded or threadless, phenolic insulated with temperature rating of 150C

Cadmium-plated malleable iron, threaded or threadless

Cadmium-plated malleable iron, threaded or threadless, phenolic insulated, with temperature rating of 150C

Phenolic with temperature rating of 150C

Zinc-plated steel, or cadmium plated malleable iron; threaded or threadless; non-insulated or insulated with grounding connector or grounding lug

Insulated bushings shall have phenolic insulation molded to the bushing

Conduit Seals: Conduit Seals shall be galvanized steel, tapered thread for rigid metal conduit with sealing compound and fiber.

Boxes: All boxes shall be 4" x 4" x 1" deep or larger.

For indoor work, flush type junction, outlet and switch boxes shall be galvanized pressed steel.

Boxes for exposed work in indoor finished spaces shall be FS or FD type, with the appropriate covers for the device and location. Surface type pressed steel boxes shall be used in nonfinished spaces only.

Cabinets: Cabinets shall be flush or surface mounted as indicated on the Drawings, and fabricated of code gauge galvanized steel with turned lip on front. Cover shall be flat steel sheet with hinged door (concealed hinges) and flush catch and lock. All cabinets for the project shall be keyed alike. Cover shall be treated with rust-resistant undercoat and grey baked finish coat.

Conductor Identification: Ungrounded conductors larger than No. 10 and grounded conductors larger than No. 6 may have factory colored insulation or black insulation with color coded identification tape.

Identification tags or labels shall be vinyl coated, with 1/8" minimum height, black characters on white background or stamped brass. Tag or label shall be " wide minimum.

Wire Connectors for 600 volt conductors Size No. 18 to No. 6 AWG shall be pressure type, spring connectors. Use 600 volt splicer-reducer pressure connectors for copper conductors to 500 MCM. Use rectangular, solderless pressure connectors or split bolt copper alloy connectors for copper conductors to 1000 MCM.

Wire Pulling Lubricant shall be a product produced specifically for wire pulling lubrication.

Ground Rods: Ground rods shall be copper clad steel, " diameter, 10' length minimum or as indicated on the Drawings. Use thermic welding to connect grounding conductor to ground rod.

Sleeves: Sleeves shall be hot dip galvanized metal flanged type or schedule 40 galvanized steel pipe.

Concrete Inserts: Concrete inserts shall be hot dip galvanized steel, minimum 14 gauge cut to necessary length for the purpose. Use galvanized hardware.

Metal Framing System:

Steel channel sections shall be rolled from commercial grade steel.

The cross-sectional width dimension of the channel shall be a minimum of 1." The depth shall be sized to satisfy the load requirements and deflection.

Channels 1" in depth or greater shall be rolled from 12 gauge steel. Channels smaller than 1" in depth may be 14 gauge steel.

Attachment holes shall be factory punched on hole centers equal to the channel cross-sectional width dimension and shall be maximum of 9/16" diameter.

The finish on steel components shall be electro-galvanizing for use in dry locations indoor only, hot dip galvanized elsewhere.

Nuts, bolts, washers, straps, threaded rod and other parts shall be protected with the same finish as the channels.

Equipment Identification: Provide nameplate for equipment identification sized as indicated on the Drawings. Nameplate shall be 3" x 1" minimum. Plates shall be laminated plastic (micarta) with white core. Mount plates with a minimum of two stainless steel screws, with round head or fillster head. Normal power nameplates shall be Black. Emergency Power nameplates shall be Red.

Pull Wire and Pull Rope:

Pullwire shall be galvanized steel wire, No. 14 AWG minimum size.

Terminal Strips: Terminal strips shall be sectional barrier type made of molded phenolic for use in wiring control panels. Number of terminals and ampacity shall be as indicated on the Drawings. The binding head shall be screw in type.

Equipment Backboards: Equipment Backboards shall be exterior grade " plywood finished on one side. Finish backboard with fire retardant gray paint before mounting.

EXECUTION

General: Materials and equipment shall be installed in a neat and workmanlike manner according to the standards of the industry.

Raceways: Install all wiring in metallic raceway systems including grounding, unless specifically indicated otherwise in other Sections herein or on the Drawings. This shall include all controls wiring, thermostat wiring, occupancy sensor wiring, or any other such controls-voltage or low-voltage wiring unless specifically indicated otherwise in another part of the Contract Documents.

EMT conduit shall be installed only in interior spaces. EMT shall not be installed in any slabs on or below grade; however, it is permitted in slabs suspended above grade such as in the floors higher than the ground floor in multistory construction. EMT installed in concrete shall have concrete tight fittings.

Maximum size of EMT shall be 4". Minimum size shall be " unless noted otherwise on the Drawings. EMT shall only be used with cables rated 600 volts or less.

Conduit may be exposed in equipment rooms, vertical chases, mechanical and electrical rooms, other similar spaces not normally habitable or exposed to public view, and where electrical drawings specifically note "exposed conduit."

Raceways shall be supported by approved types of galvanized wall brackets, ceiling trapeze with threaded rod support, or pipe straps. Conduit shall not be supported at any point by wire or wire clips.

Expansion fittings shall be provided for raceways to compensate for thermal expansion and contraction and at building expansion joints. Bonding jumpers shall be provided for electrical con\hichtinuity of the raceway system at the expansion fittings.

Bushings shall be provided at the end of a conduit to protect the insulation of the conductor. Provide grounding bushings for metal raceways, boxes, cabinets to insure that all metallic surfaces are effectively grounded. Metallic raceway may be bonded to cabinets, boxes and panelboards by double locknut and bushing to ensure the metallic parts are all effectively grounded.

Conduit or raceways through which moisture may enter and contact energized live parts shall be sealed or plugged at either or both ends with conduit seals where portions of an interior raceway system are exposed to widely different temperatures, e.g., circulation of air from a warmer to a cooler section through the raceway shall be prevented by conduit seals.

Boxes:

Attach boxes to concrete formwork, or to other surrounding building material. Provide additional junction and pull boxes where injury to insulation or deformation of wire would occur due to excessive pulling resistance. When several feeders pass through a common pull box, tag each feeder separately, indicating electrical characteristics and destination.

Wiring:

General: Conductors shall not be installed until conduit system is complete. Bending radius of insulated wire or cable shall not be less than the minimum recommended by wire or cable manufacturer. Maximum pulling tension of any wire or cable shall not exceed manufacturer's recommended values. Do not injure insulation while installing wire in conduits.

Color Coding: Conductors of size No. 6 and smaller shall have color coded insulation. Sizes larger than No. 6 may have color coded insulation or color coded tape for the purpose. Should tape be used, cover not less than 2" of conductor within the enclosure.

Green shall be used only as the grounding conductor. White or gray shall be used only as the grounded conductor which is the neutral conductor. The neutral shall not be used as the grounding conductor and the grounding conductor shall not be used as the neutral.

Conductors in Parallel: Conductors connected in parallel (electrically joined at both ends to form a single conductor) shall be of the same length, of the same conductor material, the same circular-mil area, the same insulation type and terminate in the same manner. Where installed in separate raceways or cables, the raceways or cables shall have the same physical characteristics.

A single neutral shall not be shared by more than one load on different phases of power as part of a mult-wire branch circuit. If a multiwire branch circuit supplies only one individual load then only one neutral shall be required. Unless they supply only one individual load, all branch circuits shall have a separate and dedicated grounded (neutral) conductor. Provide materials and labor necessary to increase the conduit sizes from that which is specified, as necessary, to accommodate pulling these additional dedicated grounded (neutral) conductors. The Contractors shall not provide two-pole circuit breakers, three-pole circuit breakers, or separate circuit breakers with breaker ties in order to avoid providing these above-required dedicated grounded (neutral) conductors (as would otherwise be required for compliance with NEC 210.4 (B) (2008 Ed.) for more than one load being supplied by a multiwire branch circuit if the above-required additional neutrals were not provided.)

The minimum size of wire shall be No. 12 AWG.

Interconnections of control wiring shall be on identified numbered terminal strips.

Splices: Splices shall be permitted in junction boxes, outlet boxes of other permanently accessible locations where permitted by applicable codes. Conductors No. 6 or smaller shall be spliced with devices approved by Underwriters Laboratories, Inc., as splicing connectors. Splices in conductors larger than No. 6 shall be accomplished with devices approved by Underwriters Laboratories as pressure cable connectors.

Splices made in underground boxes or wet locations shall be made with a commercial, UL approved cast resin splicing kit.

Wire Pulling Lubrication: Shall be used when any wire is pulled by mechanical means. Wire and cable shall be carefully handled during installation. Soap flakes or vegetable soaps shall not be used for lubrication.

Equipment Identification: Secure tags and markers to each item of equipment. Secure all cabinet nameplates with self-tapping screws or machine screws and nuts. Do not rely on adhesive mounting. Name tags for equipment operated from normal power shall be "Black." Name tags for equipment operated from emergency power shall be "Red."

Sleeves, Inserts and Supports:

Equipment Supports: Concrete bases and structural steel to support this Division's equipment and raceways, and not speci\hichifically shown on Structural or Architectural Drawings shall be furnished by Contractor whose equipment or raceways is to be supported. Provide a raised reinforced 4" concrete base for all floor supported equipment, or as indicated on the Drawings.

Setting in Concrete: Place all inserts in concrete forms prior to time concrete is poured. If additional inserts are required in existing concrete work, use self-drilling screw anchors.

Support Spacing: Comply with codes and regulations referenced earlier and as follows:

Support no electrical work from piping, ductwork, etc. Where metal decking is used, provide supports independent of decking so that loads will not be transferred to decking. Drill through decking and secure supports to concrete slab.

Vertical conduit inside building shall be supported at each floor level and at 10'0" intervals.

Support conduit within one foot of changes of direction, and within one foot of each enclosure to which it is connected.

Sleeves Through Roofs: Coordinate setting with Division 7. Contractor shall provide penetrations complying with Architectural requirements.

Additional Steel Support Hardware required for the installation of any electrical or other equipment or devices provided shall be provided by the Contractor. Contractor shall provide materials and labor necessary to ensure that all products are rigidly secured to structure pursuant to applicable portions of NEC 300.11.

Caulking and Seals:

Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases in accordance with Division 7 requirements. Fire stop shall be UL listed and NFPA approved for such service. Completely fill and seal clearances between raceways and openings with the fire stop material. Adhere to manufacturer's installation instructions.

At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight.

Hangers, supports, structural steel and equipment that are not factory finished shall be prime coated and finished coated with color to match the area in which it will be located.

260101 / CONDUCTOR AND CABLE IDENTIFICATION

Grounded Conductor (neutral), Size No. 6 AWG or smaller, shall be identified by a continuous outer finish along its entire length which is the color stated below. Sizes larger than No. 6 AWG shall be identified either by a continuous outer finish along its entire length or at the time of installation by a distinctive marking at its terminations, which is the color stated below.

A continuous white or natural gray covering on a conductor or a termination marking of white or natural gray color shall be used only for the grounded conductor (neutral). See below colors.

Terminals to which a grounded conductor is to be connected shall be substantially white in color or identified by white markings. Other terminals shall be a different, readily distinguishable color, or by markings in different, readily distinguishable colors.

Grounding Conductor Size No. 6 AWG or smaller shall be identified by a continuous green outer finish along its entire length. Sizes larger than No. 6 AWG shall be identified either by a continuous green outer finish along its entire length or at the time of installation by a distinctive green marking at its termination.

Terminals to which grounding conductors are connected shall be green in color.

A continuous green covering on a conductor or a termination marking of green shall be used only for the grounding conductor.

Control wiring and data cables shall be identified by heat shrink sleeves at both ends not stamped with wire numbers coordinated to wiring diagrams. Adhesively attached Brady tag type markers are specifically forbidden. All terminal boards shall be numbered.

Identification of conductors shall follow the format set forth herein for the electrical characteristics as indicated:

120/208 Volt Three Phase 4 Wire WYE

Neutral	White
Phase A	Black
Phase B	Red
Phase C	Blue
Grounding Conductor	Green

277/480 Volt Three Phase 4 Wire WYE

Neutral	Gray
Phase A	Brown
Phase B	Orange
Phase C	Yellow
Grounding Conductor	Green with Yellow Stripe (tracer)

Where more than one nominal voltage system exists, provide 1/8" thick engraved phenolic white on black lettered sign on every branch circuit panelboard in the project, new or existing, in compliance with NEC 210.5.

Communication, temperature control and fire alarm conductors shall be color coded or permanently tagged for identification. The colors shall not include white, gray, or green base colors or stripes (tracers) unless these colors are used on grounded conductors or grounding conductors.

Colors shall comply with the Insulated Power Cable Engineers Association (IPCEA) Method K-2 chart.

Identification shall be provided at terminations of the conductors and at junction boxes, terminals or cabinets when multi conductors are installed at these locations.

Tag or label each conductor with zone numbers at each end and in each junction or pull box in the raceway system. Example Zone 1, Zone 2 etc. Each conductor shall have in addition to the zone number a terminal number at each end.

260103 / GENERAL GROUNDING ELECTRICAL SYSTEMS

Ground rods shall be copperclad 3/4'x 10 feet.

Grounding conductors shall be copper with green insulation.

Grounding Conductor Size No. 6 AWG or smaller shall be identified by a continuous green outer finish along its entire length. Sizes larger than No. 6 AWG shall be identified by either a continuous green outer finish along its entire length or at the time of installation by a distinctive green marking at its termination.

Provide an equipment grounding conductor which shall be separate from the electrical system neutral conductor. The equipment grounding conductor shall be colored green. It shall be continuous from a connection at the Service Entrance Equipment Ground to all switchboards, Motor Control Centers; distribution and branch panelboards. Equipment grounding conductors shall be provided in all branch circuits. Branch circuit grounding conductors shall be sized in accordance with the National Electric Code. Connections at panelboards, outlets, equipment apparatus shall be made in an approved and permanent manner. Electrical raceway shall not be used as a grounding conductor.

All ground connections shall be made on surfaces which have been cleaned of all paint, dirt, oil, etc., so that connections are bare metal to bare metal contact. All ground connections shall be tight, and shall be made with U.L. listed grounding devices fittings, bushings, etc.

Bond all metallic piping and structural systems to the service entrance ground bus with bonding jumpers the same size as the service grounding electrode conductor.

Grounding electrodes shall be driven as required. Where rock is encountered, grounding plates may be used in lieu of grounding rods.

All equipment enclosures, motor and transformer frames, conduits systems, cable armor, and similar items shall be grounded.

Exposed connections shall be made by means of approved grounding clamps. Exposed connections between different metals shall be sealed with No-Oxide Paint Grade A or approved equal. All connections which are buried, concealed in concrete, or otherwise not accessible for inspection after construction shall be made by welding process equal to Cadweld.

The Contractor shall exercise care to insure good continuous ground, in particular between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

Multiple conductors in a single lug are not permitted. Each grounding conductor shall terminate in its own terminal lug.

Provide a ground conductor from each transformer location to the building ground system. This conductor shall be used to ground the secondary side neutral, case and core in accord with grounding requirements for a separately derived system.

SECTION 260125 / CIRCUIT BREAKERS, MOLDED CASE

Provide molded case circuit breakers with a minimum AIC rating of 10,000 amperes RMS symmetrical and with higher AIC ratings as indicated on the Drawings. Any circuit breaker provided in an existing panelboard or in an existing switchboard shall have minimum short circuit interrupting ratings (AIC) equal to the highest ratings of any of the existing overcurrent devices in the same panelboard or switchboard at the given voltage of the panelboard or switchboard. All circuit breakers shall be fully rated for the interrupting ratings indicated and shall not be series rated. Every overcurrent device provided shall be UL approved to individually interrupt its rated short circuit current and shall not depend upon operation of another overcurrent device to achieve its rating. Series-rated devices are not acceptable.

Individual circuit breakers shall be safety dead front units in NEMA Type enclosure.

Molded case circuit breakers shall have overcenter, trip free, toggle-type operating mechanisms with quick-make, quick-break action and positive handle indication. All breakers shall be bolt-on type.

Two and three pole circuit breakers shall have a common trip.

Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.

The circuit breaker shall be constructed to accommodate the supply connections at either end.

Circuit breakers provided shall be HACR-type as required by the manufacturers of the equipment supplied; see paragraph 3.1, below.

Circuit breaker operating handle shall assume a center position when tripped.

Circuit breakers shall be calibrated for operation in an ambient temperature of 40 C.

Provide molded case circuit breakers with shunt trip features where indicated on the Drawings.

Contractor shall coordinate exact electrical requirements and circuit breaker types with that which is required by manufacturers of the equipment supplied as necessary to maintain equipments UL Listing; coordinate with other divisions of this contract. Contractor shall provide HACR-type circuit breakers as required by manufacturers of equipment supplied.

Provide circuit breakers as specified in the Panelboard Schedules on the Drawings. Ampere ratings and the number of poles are indicated on the Panelboard Schedules.

Circuit breakers shall be UL listed.

Shunt trip device where required shall operate in conjunction with contact closure of push button, ground fault relay or other pilot device to trip open associated circuit breakers upon command.

Coils of shunt trip device shall be rated continuous duty and shall include interlock arrangement to clear power from coil after operation.

Control Power: Where no other source of control power is indicated, energy to actuate tripping devices through action of pilot device shall be 120 volts, 60 Hz as follows:

120/208 Volt Panelboards: Energy shall be from dedicated branch circuit breaker of panelboard set to trip at not greater than 20 amperes.

277/480 Volt Panelboards: Energy shall be from control power transformer, with secondary voltage of 120 volts, 60 Hz and with primary leads protected by current limiting fuses mounted in plug-in style, dead front fuse block. Locate fuse block within panelboard and locate C.P.T. adjacent to panelboard in protected housing. Connect transformer primary at load side of circuit breaker to be tripped.

Testing: Test all circuit breakers which are rated 200 amps or greater, both main and feeders, using standard tests to verify overcurrent and time delay settings and characteristics. Defective devices shall be replaced and the replacement device tested. All testing shall be performed by and independent electrical testing organization regularly involved in such work. Submit name of testing agency thirty days prior to test and advise engineer of test time and date at least two weeks in advance. Submit four copies of test results, including device operating characteristics plotted on log-log time-current paper and operating and maintenance manuals.

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PROJECT NAME:

AQUATIC PATHOBIOLOGY BLDG 1379 - HVAC UPGRADES UNIVERSITY OF FLORIDA GAINESVILLE, FL

SEAL

KEVIN M. SPELLICY
PE - 0076968

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DATE ISSUED
JULY 9, 2019

DRAWN BY
LEN

APPROVED BY
KMS

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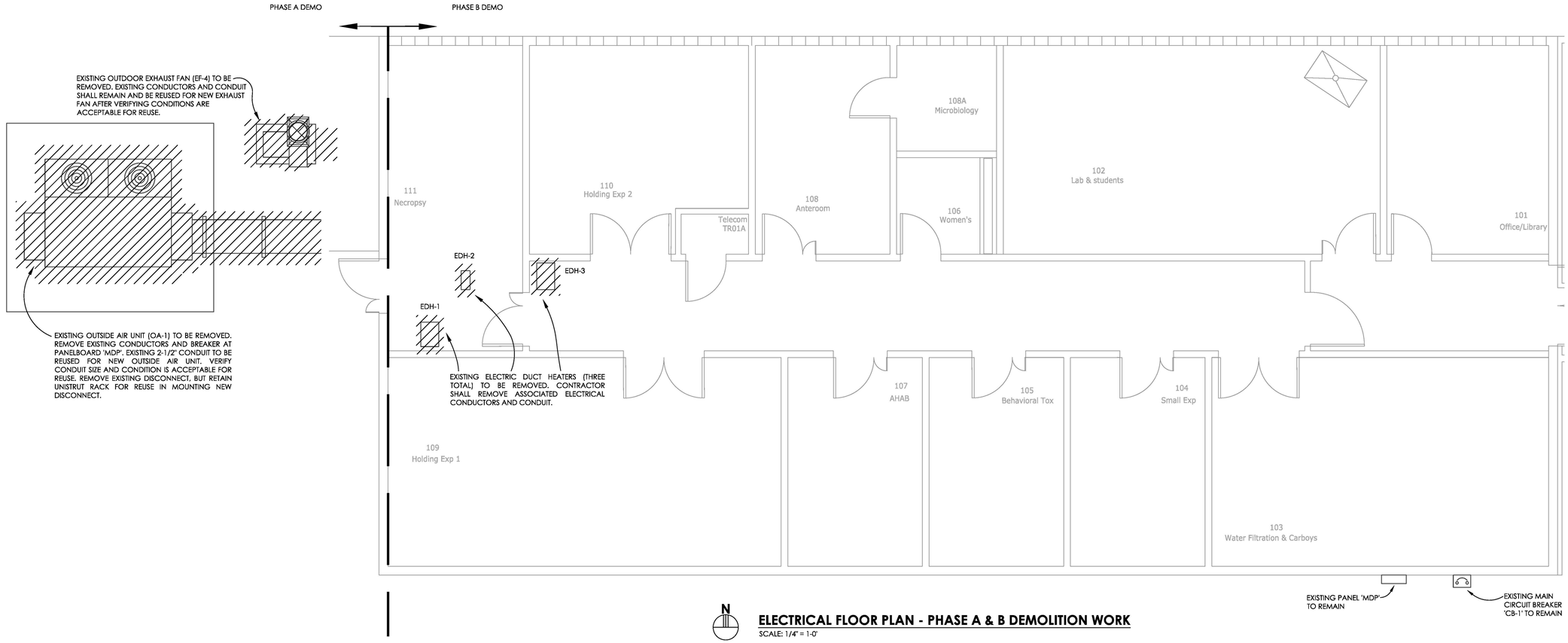

ELECTRICAL FLOOR PLAN - PHASE A & B DEMOLITION WORK

SCALE: 1/4" = 1'-0"

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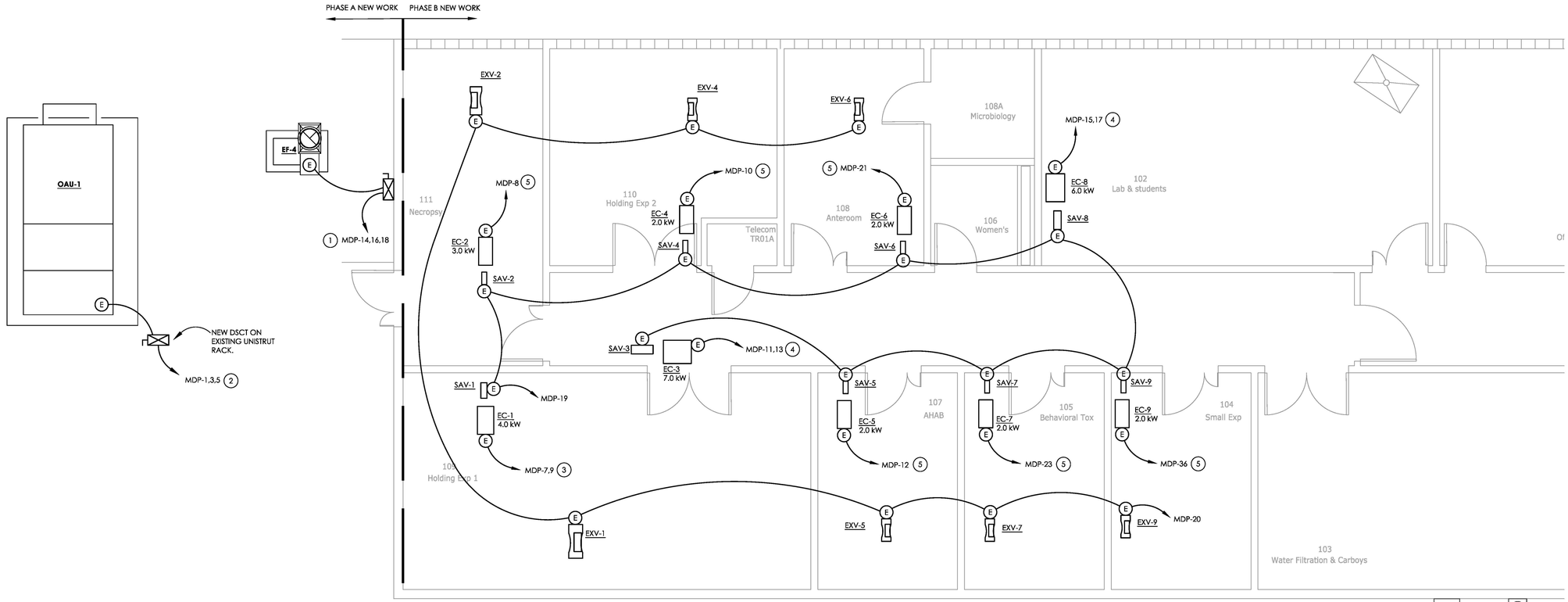

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ELECTRICAL FLOOR PLAN - PHASE A AND B NEW WORK

SCALE: 1/4" = 1-0'

SHEET NOTES:

1. NEW 2HP OUTDOOR EXHAUST FAN (EF-4). EXISTING ELECTRICAL CONDUCTORS (3 #12, #12 GROUND), CONDUIT (1/2") TO BE REUSED FOR NEW INCOMING EXHAUST FAN AFTER VERIFYING ALL ITEMS IN SUITABLE WORKING CONDITION. PROVIDE NEW 15A/3-POLE NEMA 3R DISCONNECT SWITCH MOUNTED ON BUILDING EXTERIOR WALL. PROVIDE NEW BREAKER AT PANEBOARD 'MDP' - POLES AND RATING AS INDICATED ON PANEL SCHEDULE.

2. NEW OAU-1 ON EXISTING CONCRETE PAD AND NEW MANUFACTURER'S CURB. PROVIDE 4 #1/0 CONDUCTORS, 1 #6 GROUND FROM OAU-1 TO PANELBOARD 'MDP'. EXISTING 2-1/2" CONDUIT RUN TO PANELBOARD 'MDP' TO BE REUSED IF WORKING CONDITION IS ACCEPTABLE. PROVIDE NEW 200A/3-POLE NEMA 3R DISCONNECT SWITCH MOUNTED ON EXISTING RACK.

3. NEW DUCT-MOUNTED ELECTRIC REHEAT COIL). PROVIDE 3 #10, 1 #10 GROUND IN 3/4" CONDUIT FROM SINGLE-POINT HARDWIRE POWER CONNECTION AT 'EC' TO PANELBOARD 'MDP'. DOOR INTERLOCK DISCONNECT SWITCH FACTORY-INSTALLED WITH 'EC' UNIT. ENSURE CLEARANCE PROVIDED IN FRONT OF DISCONNECT PER NEC.

4. NEW DUCT-MOUNTED ELECTRIC REHEAT COIL. PROVIDE 3 #8, 1 #10 GROUND IN 3/4" CONDUIT FROM SINGLE-POINT HARDWIRE POWER CONNECTION AT 'EC' TO PANELBOARD 'MDP'. DOOR INTERLOCK DISCONNECT SWITCH FACTORY-INSTALLED WITH 'EC' UNIT. ENSURE CLEARANCE PROVIDED IN FRONT OF DISCONNECT PER NEC.

5. NEW ELECTRIC COIL, HEATING (EC). PROVIDE 2 #10, 1 #10 GROUND IN 1/2" CONDUIT FROM SINGLE-POINT HARDWIRE POWER CONNECTION AT 'EC' TO PANELBOARD 'MDP'. DOOR INTERLOCK DISCONNECT SWITCH FACTORY-INSTALLED WITH 'EC' UNIT. ENSURE CLEARANCE PROVIDED IN FRONT OF DISCONNECT PER NEC.

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