BOARD OF REGENTS

FINANCE & FACILITIES COMMITTEE

MEETING AGENDA

March 8, 2022 1:30 p.m.
VIRTUAL MEETING

THE UNIVERSITY OF NEW MEXICO

TAB 1

#1

Call to Order, Confirmation of a Quorum, and Adoption of Agenda

The University of New Mexico
Board of Regents' Finance and Facilities Committee
March 8, 2022, 1:30 p.m.
Held Virtually, Via Zoom
https://live.unm.edu/board-of-regents
AGENDA

1.	ACTION ITEM:	Call to Order, Confirmation of a Quorum, and Adoption of Agenda
2.	COMMENTS:	Open for Comments
3.	ACTION ITEM:	Approval of Finance and Facilities Committee Meeting Summary from February 8, 2022
4.	ACTION ITEM:	Approval of Disposition of Surplus Property for January 2022 *(Presenter: Bruce Cherrin, Chief Procurement Officer, Purchasing Department)*
5.	ACTION ITEM:	Project Construction Approvals: a. Silver Family Geology Museum Renovation b. Northrop Hall Radiogenic Isotopes Lab HVAC c. UNM-Taos Harwood Museum HVAC Improvement d. Biomedical Research Facility BLS-2 Lab Airflow Modifications *(Presenter: Lisa Marbury, Assistant VP, Campus Environments & Administration)*
6.	ACTION ITEM:	Approval of Lease: UNM Early Childhood Services Center, 4400 Alameda NE, Suites A and B, Albuquerque, NM, 87113 *(Presenter: Tom Neale, Director of Real Estate)*
7.	ACTION ITEM:	Approval of Appointments of Representatives from the Lobo Development Corporation to the South Campus Tax Increment Development District (TIDD) Board *(Presenter: Kelly Ward, LDC Director)*
8.	ACTION ITEM:	Approval of the Sale of Real Property to Tucker Acquisitions, LLC *(Presenters: Kelly Ward, LDC Director, and Tom Neale, Director of Real Estate)*
9.	ACTION ITEM RECOMMENDATIONS:	Recommendations for Consent Agenda Items on Full Board of Regents' Agenda *(Sandra Begay, Chair, Regents' Finance & Facilities Committee)*
10.	INFORMATION ITEM:	UNM Foundation Fundraising and Investment Performance Report *(Presenter: Kenny Stansbury, CFO, UNMF)*
11.	INFORMATION ITEM RECOMMENDATIONS:	Recommendations for Information Agenda Items to be Added to the Full Board of Regents' Agenda *(Sandra Begay, Chair, Regents' Finance & Facilities Committee)*
12.	EXECUTIVE SESSION:	None

TAB 2

#2

COMMENTS

COMMENTS:

Open for Comments

TAB 3

#3

Approval of Finance and Facilities Committee Meeting Summary from February 8, 2022

THE UNIVERSITY OF NEW MEXICO
Board of Regents' Finance and Facilities (F&F) Committee
February 8, 2022 Meeting Summary

Committee Members Present:
Regent Sandra Begay, Chair
Regent Rob Schwartz, Vice Chair
Regent William Payne

Non-Voting Committee Members Present:
Regent Doug Brown, President

Administration Present: Garnett Stokes, University President; Teresa Costantinidis, SVP for Finance and Administration (SVPFA); and James Holloway, EVP for Academic Affairs/ Provost

Presenters in Attendance: Bruce Cherrin, Purchasing; Norma Allen, University Controller; Eddie Nuñez, Athletics; Elizabeth Metzger, Controller; Nicole Dopson, Academic Affairs/ Provost Office; Lisa Marbury, ISS; Lisa Kuuttila, UNM Rainforest Innovations; Kelly Ward, Lobo Development Corporation; Jason Strauss, Lobo Energy Incorporated; and Riley White, Teach and Learning.

ACTION ITEMS:

1. **Call to Order, Confirmation of a Quorum, and Adoption of Agenda.** Regent Schwartz called the virtual meeting to order at 1:30 p.m. and confirmed that a quorum was established with Regent Payne and Regent Schwartz present. **Regent Schwartz moved to adopt the agenda and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

COMMENTS:

2. **There were no public comments.**

ACTION ITEMS (continued):

3. **Approval of Finance and Facilities Committee Meeting Summary from November 30, 2021. Regent Schwartz moved to approve and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

4. **Approval of Disposition of Surplus Property for November and December 2021.** Bruce Cherrin gave the presentation. Regents' approval was requested for the disposition of surplus property for November and December 2021. Items listed in the E-Book are either obsolete or beyond repair. The detailed reports are in the E-book. **Regent Schwartz moved to approve and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

INFORMATION ITEM:

5. **2nd Quarter Consolidated Financial Report through December 31, 2022.** Norma Allen gave the presentation the detailed report is in the E-book.

ACTION ITEMS (continued):

6. **Approval of the New Mexico Higher Education Department, Institutional Finance Division, 2nd Quarter Financial Actions Report and Certification through January 31, 2022.** Norma Allan gave the presentation. Regents' approval of the second Quarter Financial Actions report and certification through January 31, 2022 was requested. The Quarterly Financial Actions Report is a one-page report submitted to the Higher Education Department (HED), comprised of "yes" or "no" questions regarding the University's financial transactions. Answering any question "yes" requires further information to be provided to HED. There were no budget changes to report and a "no" response was provided for each question because all financial changes have been reflected in the Budget Adjustment Request (BAR). The detailed report is in the E-book. **Regent Schwartz moved to approve and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

7. **Approval of 2nd Quarter Athletics' Enhanced Fiscal Oversight Program Report and Certification through December 31, 2021, and 2nd Quarter Information on Athletics' Report by Sport through December 31, 2021.** Eddie Nunez gave the presentation. Regents' approval was requested for the Athletics' Report and Certification instituted by the New Mexico Higher Education Department (HED). The report covers the FY22 second quarter financial status and budget exhibits for the Athletics' department. The detailed report is in the E-book**. Regent Schwartz moved to approve and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

   Eddie Nunez gave the presentation on the 2nd Quarter Information on Athletics' Report by Sport through December 31, 2021. The report describes the pooled revenues and directed revenues by sport for FY22 budget and actuals year-to-date through December 31, 2021. This report also compares FY22 budget to quarterly actuals, and FY22 year-to-date actuals to prior year-to-date actuals. The detailed report is in the E-book

ACTION ITEMS (continued):

8. **Project Construction Approvals or Re-Approvals of:**
   a. **Approval for Student Residence Center Stairs and Repair & Modification Phase 2, Main Campus, Albuquerque, New Mexico.** Lisa Marbury gave the presentation. Regents' approval was requested for the approval of Student Residence Center Stairs Repair & Modification Phase 2. The total estimated project budget is $1.07M. The detailed report is in the E-book**.**

   b. **Approval for Clinical Translational Science Center (CTSC) Roof Replacement, North Campus, Albuquerque, New Mexico.** Lisa Marbury gave the presentation. Regents' approval was requested for the Center for Clinical Translational Science Center (CTSC) Roof Replacement. The total estimated project budget is $680K. The detailed report is in the E-book**.**

   c. **Approval for Student Union Building Partial Roof Replacement Phase 2.** Lisa Marbury gave the presentation. Regents' approval was requested for the Student Union

Building Partial Roof Replacement Phase 2. The total estimated project budget is $460K. The detailed report is in the E-book**.**

Regent Schwartz moved to approve and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.

9. **Approval of Reappointment to UNM Rainforest Innovations Board of Directors.** Elizabeth Kuuttila gave the presentation. Regents' approval was requested for the re-appointment of David Gibson to its Board of Directors. The appointments are for a four-year term beginning July 1, 2022 through June 30, 2026, these are subject to approval by the Board of Regents. Mr. Gibson's biography is included in the E-book. **Regent Payne moved to approve and Regent Schwartz seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

10. **Approval of Central and University Project Development Proposal and Agreement/ Real Estate Development and Management of Regent-Owned Land.** Kelly Ward gave the presentation. The proposed site is envisioned as a mixed-use zone that will provide a range of retail, office and housing. At this stage LDC would like to formally engage with the City of Albuquerque to on behalf of the Regents to prepare the site by demolishing a vacant building at the corner of University and Central. The detailed report is in the E-book. **Regent Payne moved to approve and Regent Schwartz seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

11. **Recommendations for Consent Agenda Items on Full Board of Regents' Agenda.** Regent Begay recommended items 6 through 9 be placed on the full Board of Regents' consent agenda. **Regent Schwartz moved to approve and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

INFORMATION ITEM(S) (continued):

12. **UNM Rainforest Innovations Annual Meeting of the Member. Acceptance of the FY 2020-21 Annual Report and Audit Report.** Lisa Kuuttila gave the presentation. The detailed report is in the E-book.

13. **Lobo Energy Inc. Annual Meeting of the Member. Summarized minutes of the February 16, 2021 meeting as well as acceptance of the FY 2020-21 Audit.** Jason Strauss gave the presentation. The detailed report is in the E-book.

14. **Lobo Development Annual Meting of the Member. Summarized minutes of the February 16, 2021 meeting and acceptance of the FY 2020-21 audit.** Kelly Ward and Teresa Costantinidis gave the presentation. The detailed report is in the E-book.

15. **2021 Report of the UNM Regents' Student-Run Portfolio.** Reilly White gave the presentation. The detailed report is in the E-book**.**

16. **Winter 2022 Regents' Budget Update.** Norma Allen gave the presentation. The detailed report is in the E-book**.**

17. **Recommendations for Information Agenda Items on Full Board of Regents' Agenda.** Regent Begay recommended item 5 be placed on the full Board of Regents' consent agenda. **Regent Schwartz moved to approve and Regent Payne seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.**

EXECUTIVE SESSION:

18. None

Regent Payne moved to adjourn at 4:30 p.m. and Regent Schwartz seconded. The motion passed by unanimous vote with a quorum of committee members present and voting.

TAB 4

#4

Approval of Disposition of Surplus Property for January 2022

THE UNIVERSITY OF NEW MEXICO®

UNIVERSITY SERVICES – DISPOSITION OF SURPLUS PROPERTY

JANUARY 2022

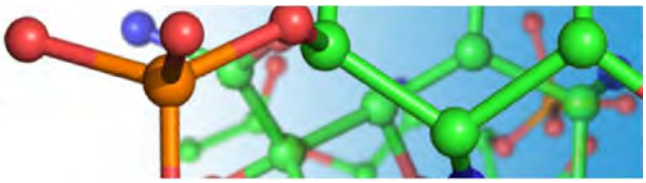
Surplus Property Disposition - January 2022

Memo	Asset Tag	Department	Description	Manufacturer	Purchased	Total Cost ($)	NBV ($)	Disposal Method
1	N00004200	Chemistry Department	Mass Spectrometry System	Waterscorp	6/28/2005	$229,717.69	$0.00	Beyond Repair
2	N00020153	Neurosciences	Infrared Imaging System	LiCorBio Part #9201-10	3/24/2009	$45,661.84	$0.00	Beyond Repair
3	253700	Admissions Office	MV BUS	BlueBird	1/11/2002	$38,545.00	$0.00	Too Costly to Repair
4	N00007380	ARTS Lab	ProjectorSystem/DLPSingleChannel	SkySkanInc	5/3/2006	$35,876.25	$0.00	Obsolete
5	N00007556	KNME Engineering Local State Wide	Vehicle	Ford	5/24/2006	$20,979.00	$0.00	Too Costly to Repair
6	N00004207	IM Div of Cardiology	Pulse Wave Analysis System	MillarInst SphygmoCor	6/28/2005	$20,500.00	$0.00	Obsolete
7	N00015431	Gallup Physical Plant	Vehicle	Buick 2007	3/27/2008	$20,140.00	$0.00	Too Costly to Repair
7	N00008779	Gallup Physical Plant	Vehicle	Chevrolet G66925	8/23/2006	$17,500.00	$0.00	Too Costly to Repair
8	217585	Chem & Resrch Lab Supplier (CRLS)	MV TRK UNDER 1 TON	Dodge	4/24/1996	$17,004.00	$0.00	Obsolete
9	229163	BSCI Faculty #18	MV PASSENGER CAR	Chevrolet	2/28/1998	$15,095.00	$0.00	Beyond Repair
10	N00018128	Art Art History Gen Admin	Copier	AlbDupSup	10/7/2008	$14,795.00	$0.00	Obsolete
7	227893	Gallup Physical Plant	# SBDO - MV PASSENGER CAR	Ford	10/31/1997	$14,711.00	$0.00	Too Costly to Repair
8	N00014319	Chem & Resrch Lab Supplier (CRLS)	Pickup Truck	Ford 2008	12/17/2007	$11,723.00	$0.00	Obsolete
11	237120	Residence Life and Student Housing	MV TRK UNDER 1 TON	Chevrolet	7/8/1999	$10,447.00	$0.00	Beyond Repair
	255452	Biology Department	MOTOR MOTION CAMERA	SkcGulf	5/23/2002	$7,699.00	$0.00	Obsolete
	261954	Cancer Research Treatment Ctr CRTC	SCANNER SYSTEM	BioRad	7/3/2003	$7,610.00	$0.00	Beyond Repair
	218372	Center for High Tech Materials CHTM	SPOTSCAN	PhotonInc	5/30/1996	$7,018.00	$0.00	Cannibalized
	N00000161	AS LTER Network Faculty #2	Computer, Server	Dell Dell	9/9/2004	$6,843.28	$0.00	Obsolete
	200545	Molecular Genetics Microbiology	THERMAL ANALYSIS UNT	PerkinElme	3/4/1993	$6,709.00	$0.00	Obsolete
	N00024794	CHTM PI #9	Laser Driver/Diode	Nlight	3/9/2010	$6,111.00	$0.00	Cannibalized
	N00024795	CHTM PI #9	Laser Driver/Diode	Nlight	3/9/2010	$6,111.00	$0.00	Cannibalized
12	N00064803	Emerg Med EMS Gen Admin	AdultAirwayTrainer/160410	SynDaver	3/7/2018	$6,033.00	$1,709.35	Beyond Repair

Surplus Property Disposition - January 2022

Memo	Asset Tag	Department	Description	Manufacturer	Purchased	Total Cost ($)	NBV ($)	Disposal Method
	N00021493	Dental Services	Gas Analazer	Criticare	7/9/2009	**$5,771.73**	$0.00	Obsolete
	179120	Center for High Tech Materials CHTM	GENERATOR SIGNAL	Wavetek	1/1/1987	**$5,705.00**	$0.00	Cannibalized
	176893	Center for High Tech Materials CHTM	GENERATOR SIGNAL	Fluke	1/1/1987	**$5,310.00**	$0.00	Cannibalized
	253061	Center for High Tech Materials CHTM	CUTTER	N/A	11/9/2001	**$5,283.00**	$0.00	Obsolete
	240614	Center for High Tech Materials CHTM	ELECTROMETER	Keithley	2/22/2000	**$5,036.00**	$0.00	Cannibalized
							Total Asset Disposition (#)	***27***
							Total Capitalization ($)	***$593,934.79***
							Total Net Book Value ($)	***$1,709.35***

DEPARTMENT OF CHEMISTRY & CHEMICAL BIOLOGY



December 14, 2021

To: Inventory Control

From: Fred Fuchs
Research Engineer
Department of Chemistry and Chemical Biology

To whom it may concern,

We have a Waters LCT Premier Mass Spec, tag#N00004200 that needs to be removed from the department.

- What the item was used for: This item was used analyze samples for various research in multiple chemistry labs. Mass Spectrometry is an **analytical tool** useful for measuring the mass-to-charge ratio (m/z) of one or more molecules present in a sample. These measurements can often be used to calculate the exact molecular weight of the sample.
- Reason for Disposal: This item is non-functional and repairs are cost-prohibitive as they cost more than a new system
- Purchase Date: June 28, 2005
- Total Cost: $153,910.85
- Current book value is $229,717.69.

UNM Tag	Serial Number/VIN	Manufacturer	Description	Model	Total Cost	Net Book Value	Adjusted Cost	Purchase Date
N00004200	NA	Waterscorp	Mass Spectrometry System	LCT Premier	$153,910.85	$0.00	$229,717.69	6/28/2005

The system has been purged and cleaned, it is ready for pickup.

Thank you
Fred Fuchs

Department Chair
Jeremy Edwards

DEPARTMENT OF CHEMISTRY AND CHEMICAL BIOLOGY
1 UNIVERSITY OF NEW MEXICO •MSC03 2060• ALBUQUERQUE, NM • 87131-0001
WWW.CHEMISTRY.UNM.EDU • 505.277.6655

SCHOOL OF MEDICINE
DEPARTMENT OF NEUROSCIENCES

Disposition of Surplus property – UNM Tag #N00020153

August 16, 2021

To: University Services

From: Neurosciences

RE: LiCorBio Infrared Imaging System

University Services UNM Tag N00020153 was purchased 03/05/2009 by the Department of Neurosciences for $41,924. This piece of scientific research equipment was used as a spectrophotometer to support Neurosciences and UNM's research mission. This asset has an adjusted cost of $45,661.84 with a net book value (NBV) of $0. The equipment item is not functioning and cannot be repaired per technical consultation with the manufacturer.

We are requesting surplus of this item to remove it from our inventory to make space for other shared equipment in the room.

Thank you for your consideration.

Charles LeBlanc, Department Administrator

Neurosciences

OFFICE OF ADMISSIONS

To: University Services, Surplus Property

Cc: Director Safety Risk Services

From: Matthew Hulett, Director Office of Admissions

Date: December 8, 2021

Re: Disposal of UNM Vehicle #1125, Asset Tag #253700

Asset Tag 253700 belongs to a 2002 Chevy BlueBird B1VC1800 MiniBus, that was added to our inventory on 1/11/2002. The original price is $38,545.00, we are not able to acquire the current net value as Kelly Blue Book and NADA do not show anything for this vehicle. The 2002 Chevy Bluebird was used for campus tours, which are currently taking place on main campus so we no longer require this vehicle for tours. The reasons for disposal is that the vehicle requires continual maintenance and is too costly to repair.

Thank you,

Matt Hulett, Director Office of Admissions

FINE ARTS

Date: September 23, 2021

To: UNM Inventory

From: Harris Smith, Dean, College of Fine Arts

Re: Surplus Disposal N00007380

The SkySkanInc DLP projector system was purchased on 05/03/2006 to serve projection dome work at the ARTSLab for research. The net book value is ($0.00), total cost is $31,310.00 and the adjusted cost is $35,876,25.

This projector is a 2006 model that is no longer under support. The projector is no longer working and has been sitting unused for a few years. Repair parts are outdated and not available to keep this projector running. It also has outdated technology that no longer works with modern computers to allow projections. We are requesting the disposal of this item due to it not functioning.

Thank you,

Michelle T. Evans
System Analysts II
College of Fine Arts
University of New Mexico
505.277.4987

Memo

To: University Services

From: Steven Campbell, Manager Information Technology

Date: 10/29/2021

Re: Surplus of item N00007556

This memo serves as a request to remove item the below items from our inventory list.

Item N00007556, Ford 2006 Supercab truck; is an older vehicle that is too costly to service and keep running. It was purchased in 2006. It was taken out of service as 3 years ago as it is unreliable for use for our engineering team which often needs to travel to remote locations to service our statewide translator system. The trucks age makes it difficult to find parts to repair it. The vehicle has reached its 15 years useful life and as a result, it is no longer cost effective to keep running.

This vehicle was purchased on 5/24/2006 at a cost of $20,979. It adjusted cost is $20,979 and it currently has a net book value of $0.00.

Thank you for your attention to this matter. If you should have any further questions please feel free to contact Steven Campbell at 505-379-3571 or scampbell@nmpbs.org.

SCHOOL OF MEDICINE
DEPARTMENT OF INTERNAL MEDICINE

April 28, 2021

Memorandum

To: Norris Cain, Supervisor, General Services, UNM Surplus Property

From: Mark Sheldon, MD, Internal Medicine Cardiology Division

Subject: Asset #N0004207 – Pulse Wave Analysis System

This memo is to justify the disposal of the UNM Asset #N00004207, Pulse Wave Analysis System MFG: MillarinstAtcor Medical, Model #:MM3, Serial #:RS-232.

Total cost $20,500.00, net book value $0.00, purchased 05/04/2005 and adjusted cost is $20,500.00.

This equipment was used in our Internal Medicine Cardiology Heart Station and Clinic for Cardiology tests but is outdated and no longer being used. If need, I can be reached at 272-4253
Thank you.

Phone: 505.272.4661 | Fax: 505.272.4682 | Department of Internal Medicine | MSC10 5550 | 1 University of New Mexico | Albuquerque, NM 87131
medicine.unm.edu

December 16, 2021
To: UNM Surplus Property Department
Re: Disposition of Surplus Property – UNM Tags N00015431, N00008779, 227893

Asset Tag N00015431 is for a 2007 Buick Lacrosse vehicle that was purchased on 03/27/2008 for $20,140.00 as a fleet vehicle for UNM Gallup faculty, staff, and administration to utilize for local and distance travel to and from the main campus and other travel as required. University Services lists this unit's adjusted cost as $20,140.00 and net Book Value of $0.00 This vehicle is now 15 years old and is rarely used for travel as it is no longer dependable and requires above average maintenance to keep it in good repair. We now have newer vehicles that are utilized as needed and this vehicle is no longer needed and is cost prohibitive to continue on-going repairs. UNM Gallup's Fleet Manager and the CFO has identified this as a cost saving measure and its deletion from the UNM G Fleet inventory will save insurance, maintenance and overhead.

Asset Tag N00008779 is for a 2006 Chevrolet Impala vehicle that was purchased on 8/23/2006 for $17,500.00 as a fleet vehicle for UNM Gallup faculty, staff, and administration to utilize for local and distance travel to and from the main campus and other travel as required. University Services lists this unit's adjusted cost as $17,500.00 and net Book Value of $0.00 This vehicle is now 19 years old and is rarely used for travel as it is no longer dependable and requires above average maintenance to keep it in good repair. We now have newer vehicles that are utilized as needed and this vehicle is no longer needed and is cost prohibitive to continue on-going repairs. UNM Gallup's Fleet Manager and the campus CFO has identified this as a cost saving measure and its deletion from the UNM G Fleet inventory will save insurance, maintenance and overhead.

Asset Tag 227893 is for a 1997 Ford Taurus vehicle that was purchased on 10/31/1997 for $14,711.00 as a fleet vehicle for UNM Gallup faculty, staff, and administration to utilize for local and distance travel to and from the main campus and other travel as required. University Services lists this unit's adjusted cost as $14,711.00 and net Book Value of $0.00 This vehicle is now 24 years old and is rarely used for travel as it is no longer dependable and requires above average maintenance to keep it in good repair. We now have newer vehicles that are utilized as needed and this vehicle is no longer needed and is cost prohibitive to continue repairs. UNM Gallup's Fleet Manager and the campus CFO has identified this as a cost saving measure and its deletion from the UNMG Fleet inventory will save insurance, maintenance and overhead.
Thank you,

Ron Petranovich

Ronald Petranovich
Mgr Physical Plant & Facilities
UNM Gallup FMD
505-863-7567 / ronp@unm.edu

UNIVERSITY SERVICES

University Services
Marcos Roybal
Associate Director

Business Operations
1128 University Blvd NE
505.277.2366

CRLS
Clark Hall
505.277.5109

Copy Center
Dane Smith Hall
505.277.8267

Mailing Systems
1128 University Blvd NE
505.277.4124

Records Management
1128 University Blvd NE
505.277.1136

Shipping & Receiving
915 Camino de Salud
505.272.6302

Surplus Property
1128 University Blvd NE
505.277.2923

January 6, 2022

University Services

Attention: Marcos Roybal, Associate Director, University Services

CC: Norris Cain, Supervisor, General Services, Surplus Property

Re: Disposition of CRLS Property - UNM Asset Tag #N00014319 & 217585

Dear Mr. Roybal,

I am writing to confirm a Request for Disposition that included the following UNM Asset Tag #N00014319 and UNM Asset Tag #217585. UNM Tag # N00014319 (Ford Ranger) was purchased on December 17, 2007 for a total $10,723.00 and an adjusted cost of $11,723.00 UNM Tag # 217585 (Dodge Clubcab) was purchased on April 24, 1996 for a total and adjusted cost of $17,004.00 These vehicles were used for delivering research lab supplies, chemicals, gas cylinders, and dewars throughout the UNM Campus and both have a net book value (NBV) of $0.00. These vehicles have had high maintenance costs and is no longer used due to improved route efficiency.

We believe our decision to send these vehicles to UNM Surplus Property surplus will result in monthly cost savings, which include insurance expenses, fuel expenses, and the aforementioned repair and maintenance expenses. Thank you for your consideration.

Sincerely,

Amanda Luna
CRLS Manager
Chemical & Research Lab Supplier
505-277-5116

COLLEGE OF PHARMACY
DEPARTMENT OF PHARMACEUTICAL SCIENCES

To: UNM Inventory

From: Jodi Perry, Department Administrator Jodi M. Perry

Date: 12/7/21

Re: Surplus Request UNM Vehicle 687, Asset Tag 229163

UNM Vehicle 687, Asset Tag 229163 was purchased 02/28/1998 for a total and adjusted cost of $15,095.00. This vehicle was used by faculty and staff of the Community Environmental Health Program to travel to/from UNM and the Navajo Nation to meet with participant families for the Navajo Birth Cohort Study. It now has a current net book value of $0.00. Per the UNM Fleet Maintenance, this vehicle needs major repairs ($3k-$5k) and costly monthly maintenance to keep the transmission and engine running well enough to drive to remote areas of the Navajo Nation.

We believe our decision to send this vehicle to UNM Surplus will result in monthly cost savings, which include insurance expenses, fuel expenses, and the previously mentioned repair and maintenance expenses. Thank you for your assistance in removing this vehicle from our inventory.

ART

STUDIO · HISTORY · EDUCATION

Disposition of Surplus Property- UNM Asset Tag #N00018128

December 21, 2021

To: Brandon Harrie

From: Jacklyn Le

Subject: Copier Disposition

Dear Mr. Harrie:

UNM Asset Tag #N00018128 was purchased on 10/07/2008 by UNM's Art Department for $8,295.00. This item was used for daily printing needs for our art studio, history, and education department. It has a net book value (NBV) of ($0.00), total cost ($8,295.00), and adjusted cost ($14,795.00). The machine is an older model and has not worked in years. We believe sending this copier to UNM Surplus Property will result in department savings that include cost of replacement parts and service maintenance. We thank you for your consideration.

Sincerely,

X

Jacklyn Le

Administrative Assistant II

RESIDENCE LIFE & STUDENT HOUSING

Disposition of Surplus Property – UNM Tag #237120

November 16, 2021

To: Brandon J. Harrie
From: John Simmons
Subject: Vehicle Disposition

Greetings Mr. Harrie,

- UNM Tag #237120, Chevrolet S-10 Pickup (MV TRK UNDER 1 TON) was purchased on: July 08, 1999 by UNM RLSH for $10,447.00. The vehicle was mostly for general use; picking up materials, driving from to Student Family Housing and back to UNM main campus. This truck now has a net book value NBV of $0, leaving the adjusted cost at $10,447.00.

- This vehicle is currently not functioning, it's not worth fixing, and we no longer have a need for it. Sending this truck to UNM Surplus will result in monthly cost savings, including: insurance, fuel, repair, and maintenance expenses.

Thank you for your consideration,

John Simmons
Administrative Assistant
Office Phone: (505) 277-3575
Email: jwsimmonsiii@unm.edu
2700 Campus Blvd NE

SCHOOL OF MEDICINE
DEPARTMENT OF EMERGENCY MEDICINE

To: UNM Surplus Property

From: Sherrie MacFarlane, Operations Manager

Date: September 16, 2021

Subject: Equipment Disposition

These items listed below are being presented for disposition. Item N00064803, purchased 3/7/18, total cost and adjusted cost $6,033.00, and NBV, $1,709.35. These items are no longer functional and obsolete. We are surplussing them and removing them from UNM Inventory, to manage UNM resources in a fiscally responsible fashion.

UNM Tag:	Manufacturer	Model	Serial Number	Description	Total Cost	Adjusted Cost	NBV
N00007572	MedEdTech	HPS363	M228	Human Patient Simulator	unknown	totally depreciated	$0
N00064803	SynDaver	160410	Unknown	Adult Airway Trainer	unknown	totally depreciated	$0

13-6-1 . Disposition of obsolete, worn-out or unusable tangible personal property.

A. The governing authority of each state agency, local public body, school district and state educational institution may dispose of any item of tangible personal property belonging to that authority and delete the item from its public inventory upon a specific finding by the authority that the item of property is:

(1) of a current resale value of five thousand dollars ($5,000) or less; and

(2) worn out, unusable or obsolete to the extent that the item is no longer economical or safe for continued use by the body.

B. The governing authority shall, as a prerequisite to the disposition of any items of tangible personal property:

(1) designate a committee of at least three officials of the governing authority to approve and oversee the disposition; and

(2) give notification at least thirty days prior to its action making the deletion by sending a copy of its official finding and the proposed disposition of the property to the state auditor and the appropriate approval authority designated in Section 13-6-2 NMSA 1978, duly sworn and subscribed under oath by each member of the authority approving the action.

C. A copy of the official finding and proposed disposition of the property sought to be disposed of shall be made a permanent part of the official minutes of the governing authority and maintained as a public record subject to the Inspection of Public Records Act [Chapter 14, Article 2 NMSA 1978].

D. The governing authority shall dispose of the tangible personal property by negotiated sale to any governmental unit of an Indian nation, tribe or pueblo in New Mexico or by negotiated sale or donation to other state agencies, local public bodies, school districts, state educational institutions or municipalities or through the central purchasing office of the governing authority by means of competitive sealed bid or public auction or, if a state agency, through the surplus property bureau of the transportation services division of the general services department.

E. A state agency shall give the surplus property bureau of the transportation services division of the general services department the right of first refusal when disposing of obsolete, worn-out or unusable tangible personal property of the state agency.

F. If the governing authority is unable to dispose of the tangible personal property pursuant to Subsection D or E of this section, the governing authority may sell or, if the property has no value, donate the property to any organization described in Section 501(c)(3) of the Internal Revenue Code of 1986.

G. If the governing authority is unable to dispose of the tangible personal property pursuant to Subsection D, E or F of this section, it may order that the property be destroyed or otherwise permanently disposed of in accordance with applicable laws.

H. If the governing authority determines that the tangible personal property is hazardous or contains hazardous materials and may not be used safely under any circumstances, the property shall be destroyed and disposed of pursuant to Subsection G of this section.

I. No tangible personal property shall be donated to an employee or relative of an employee of a state agency, local public body, school district or state educational institution; provided that nothing in this subsection precludes an employee from participating and bidding for public property at a public auction.

J. This section shall not apply to any property acquired by a museum through abandonment procedures pursuant to the Abandoned Cultural Properties Act [18-10-1 to 18-10-5 **NMSA** 1978].

K. Notwithstanding the provisions of Subsection A of this section, the department of transportation may sell through public auction or dispose of surplus tangible personal property used to manage, maintain or build roads that exceeds five thousand dollars ($5,000) in value. Proceeds from sales shall be credited to the state road fund. The department of transportation shall notify the department of finance and administration regarding the disposition of all property.

L. If the secretary of public safety finds that the K-9 dog presents no threat to public safety, the K-9 dog shall be released from public ownership as provided in this subsection. The K-9 dog shall first be offered to its trainer or handler free of charge. If the trainer or handler does not want to accept ownership of the K-9 dog, then the K-9 dog shall be offered to an organization described in Section 501(c){3) of the Internal Revenue Code of 1986 free of charge. If both of the above fail, the K-9 dog shall only be sold to a qualified individual found capable of providing a good home to the animal.

History: 1953 Comp.,§ 6-1-7.1, enacted by Laws 1961, ch. 100, § 1; 1979, ch. 195, § 2; 1984, ch. 47, § 1; 1987, ch. 15, § 1; 1989, ch. 211, § 6; 1995, ch. 181, § 1; 1998, ch. 16, § 1; 2001, ch. 317, § 1; 2007, ch. 57, § 4; 2012, ch. 10, § 1; 2013, ch. 9, § 1.

TAB 5

 # 5

Project Construction Approvals:

a. Silver Family Geology Museum Renovation
b. Northrop Hall Radiogenic Isotopes Lab HVAC
c. UNM-Taos Harwood Museum HVAC Improvement
d. Biomedical Research Facility BLS-2 Lab Airflow Modifications

INSTITUTIONAL SUPPORT SERVICES

MEMORANDUM TO ADVANCE
COMMITTEE AGENDA ITEM TO
THE BOARD OF REGENTS
THE UNIVERSITY OF NEW MEXICO

DATE: March 8, 2022

TO: Teresa Costantinidis, Sr. VP Finance & Administration

FROM: Lisa Marbury, Assistant Vice President, Campus Environments & Facilities, Vice President Office for Institutional Support Services

RE: Requested Construction Approval

RECOMMENDED ACTION:

Recommend to the Board of Regents Finance and Facilities Committee the following requests for Project Construction Approval:

1. Silver Family Geology Museum Renovation
2. Northrop Hall Radiogenic Isotopes Lab HVAC
3. UNM-Taos Harwood Museum HVAC Improvement
4. Biomedical Research Facility BLS-2 Lab Airflow Modifications

cc: A. Coburn, M. Dion, M. Bailey, C. Martinez, S. Rodgers, M.Pierce– PDC
A. Sena, R. Notary, D. Penasa, R.Sobieski, C. Grotbeck, J. Hart– FM

REQUEST FOR CAPITAL PROJECT CONSTRUCTION APPROVAL for
SILVER FAMILY GEOLOGY MUSEUM RENOVATION
UNIVERSITY OF NEW MEXICO
March 8, 2022

REQUESTED ACTION:

In accordance with Section 7.12 of the Board of Regents Policy Manual and as required by the New Mexico Higher Education Department and New Mexico State Board of Finance, project approval is requested for the **Silver Family Geology Museum Renovation on the Albuquerque Main Campus.**

PROJECT DESCRIPTION:

The project is located in Northrop Hall, Room 107 and will renovate 1,754 square feet to include new wall, ceiling and floor finishes, new LED light fixtures and new exhibit display cases. Interpretive content will include gems & minerals, planetary geology, vertebrate paleontology, an active seismograph and a fluorescent mineral exhibit.

PROJECT RATIONALE:

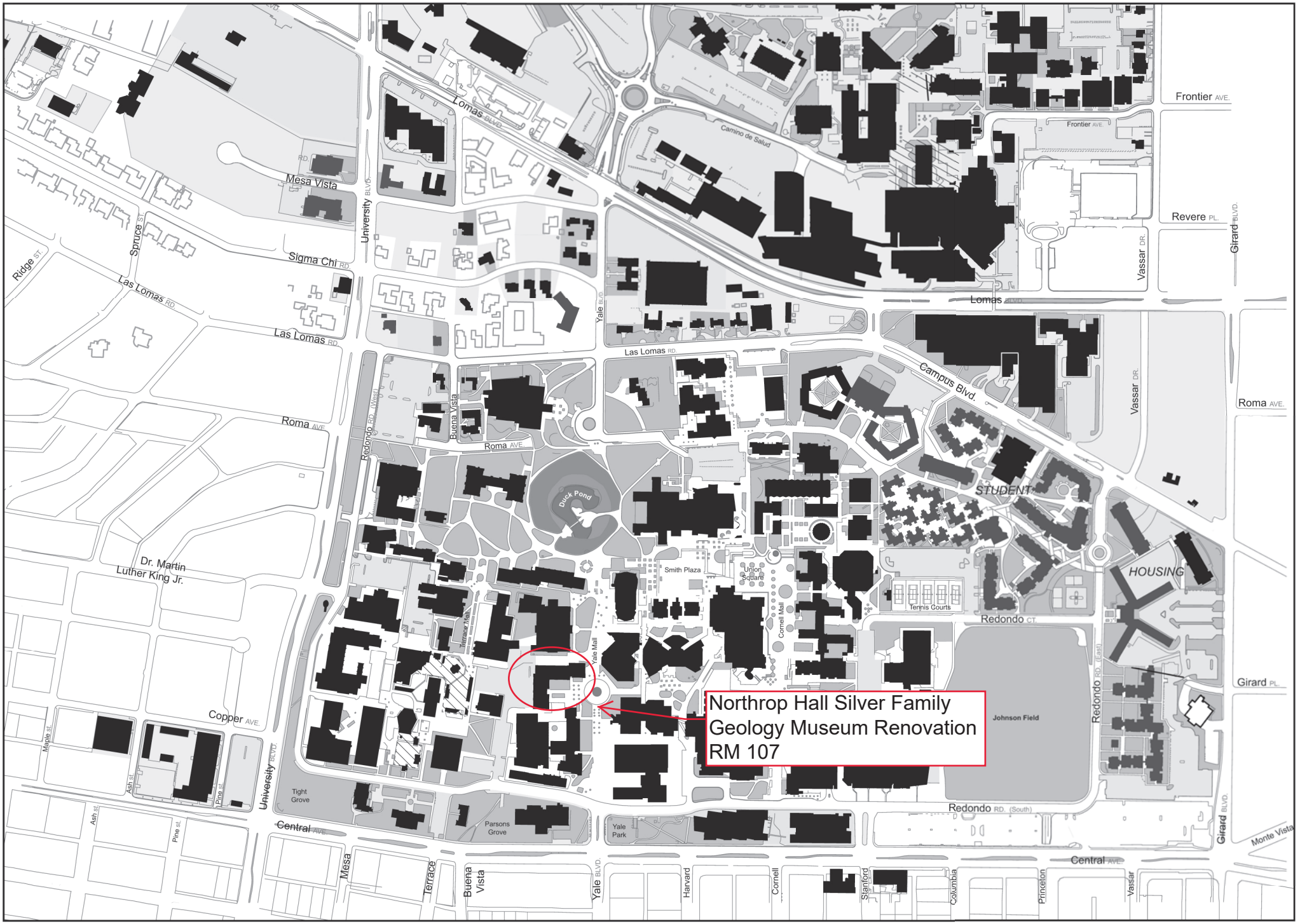
The museum was established in the 1930's by Stuart Northrop (after whom the building is named) and provides public exhibits of mineral, fossil and rock specimens. The last update to the exhibits occurred in 1987. The primary audience is educators and school groups; however, the museum is visited by thousands of visitors each year and is used for special classes, fundraising, alumni events and various receptions. The design includes a new security system, new casework, new LED lighting, a 3D model of the Galena King Mine and new interpretive content to improve the overall visitor experience. The existing space has deteriorating carpet and ceiling tiles, outdated lighting and casework, and no security system to protect valuable specimen. The consequences of not approving this project will result in poor visibility to the general public, alumni, the various user groups and missed teaching opportunities for Faculty and Students.

FUNDING:

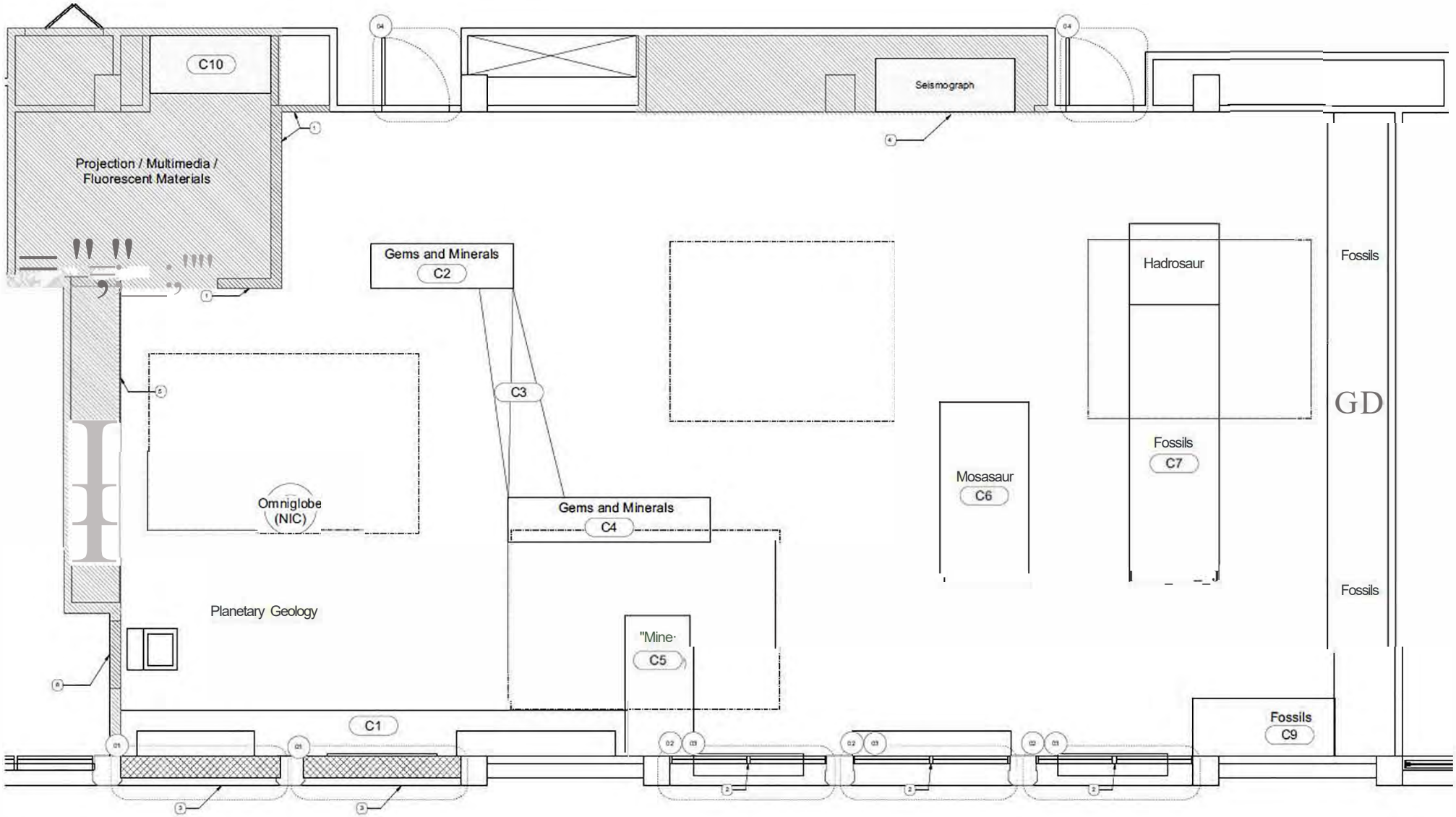
The total estimated Project Budget is: $472,031

- $159,518 2019 State Appropriation General Funds
- $102,513 FY22 Facilities Investment Needs (FIN)
- $210,000 UNM Foundation Funding

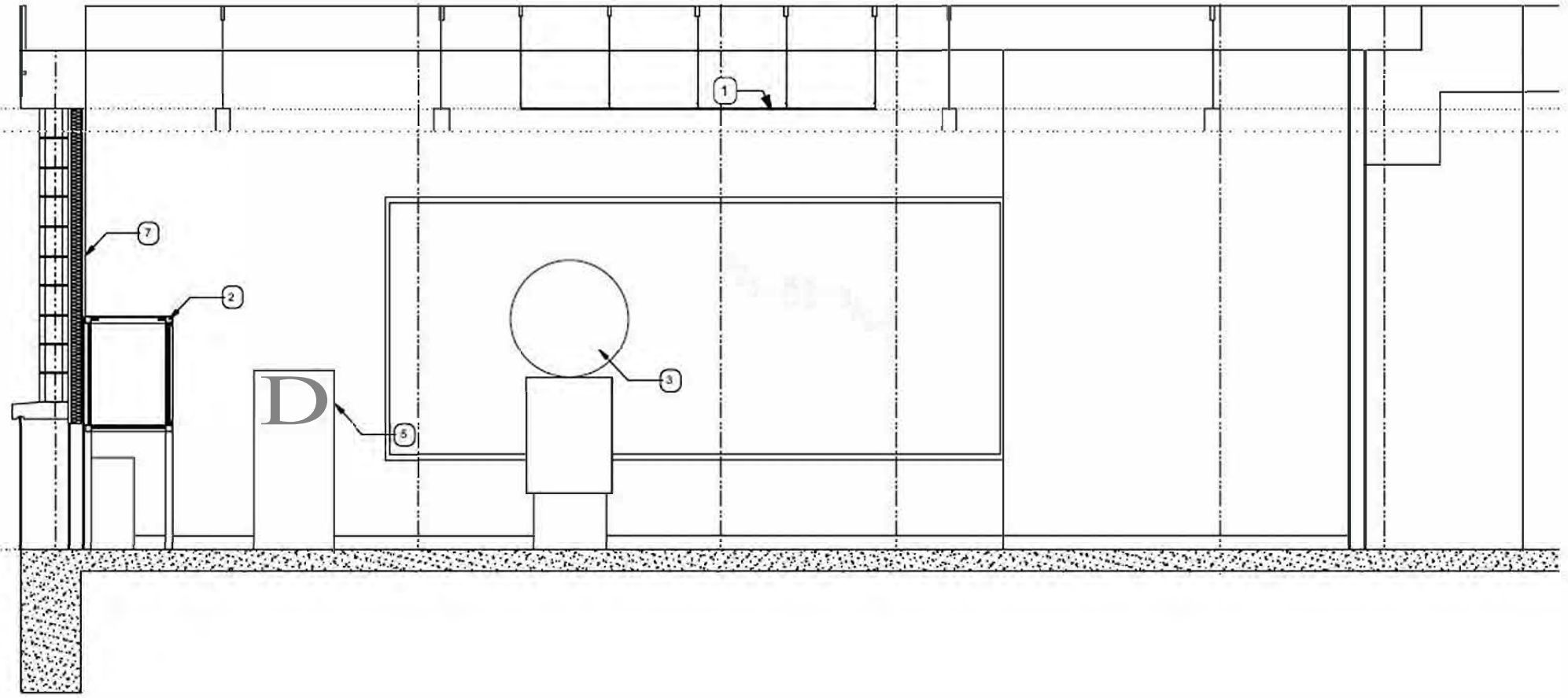
The University of New Mexico - Central Campus



A0024 – Northrop Hall
First Floor



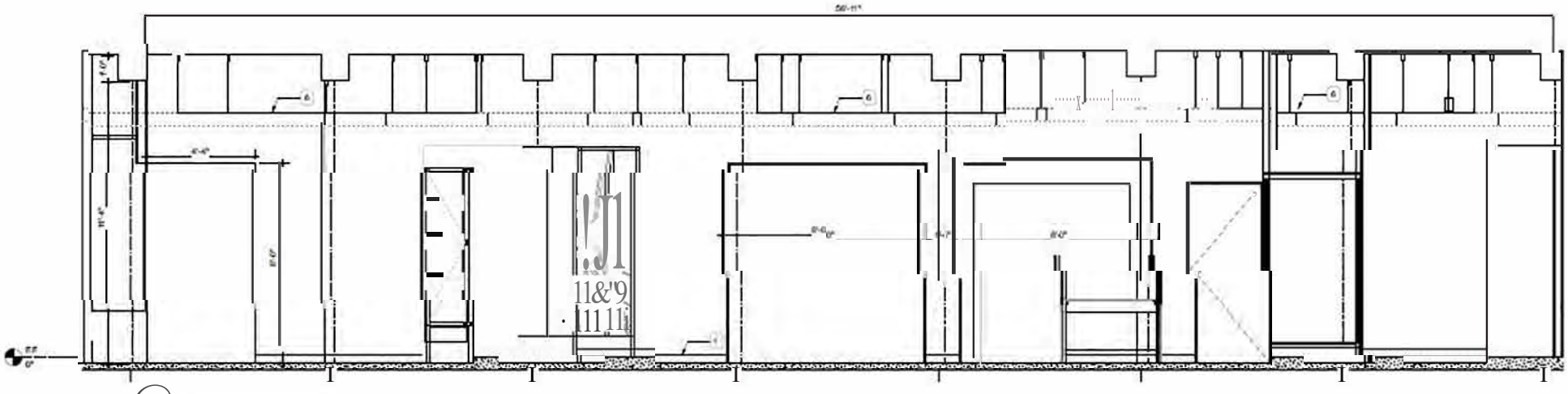
1 Phasing and Casework Plan
Scale: 3/8" = 1'-0"



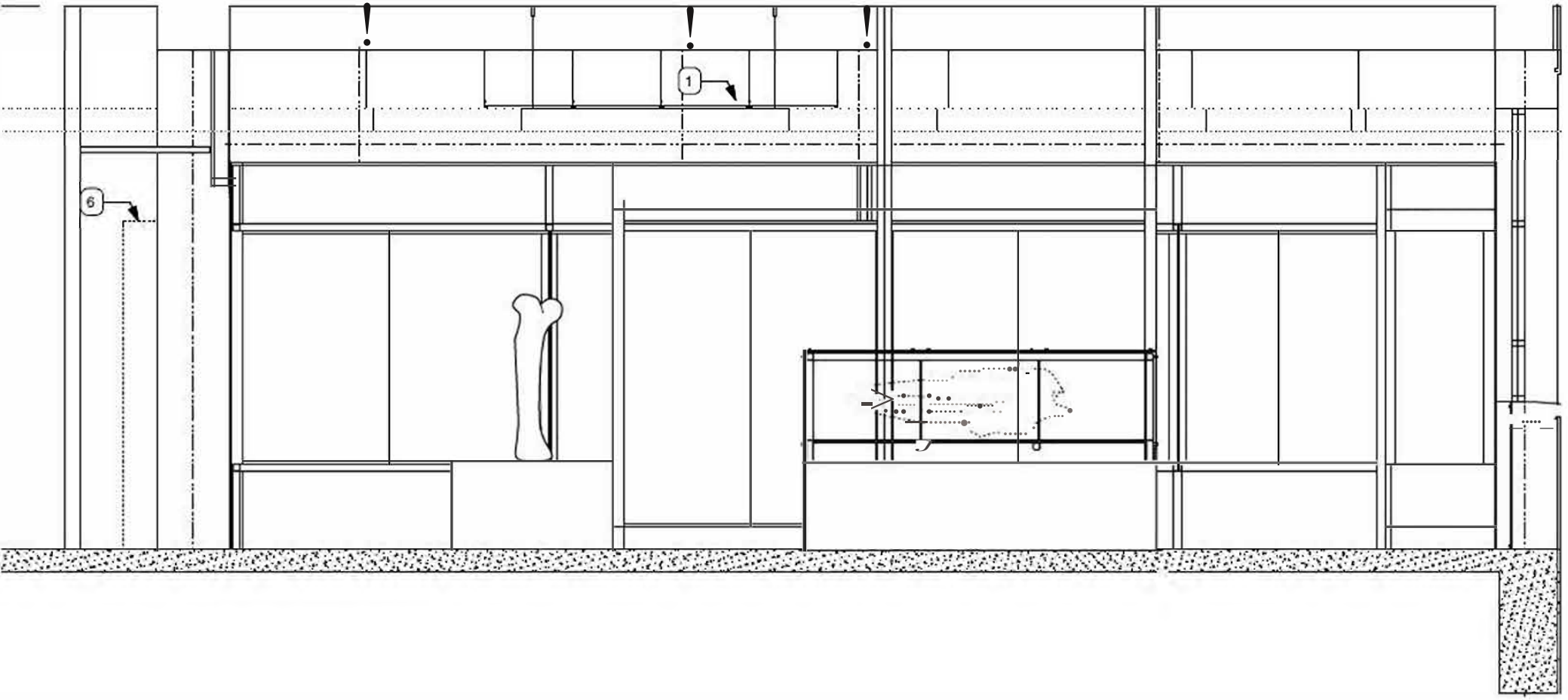
1
A3.1

E-W Section Looking N

Scale: 3/8" = 1'-0"



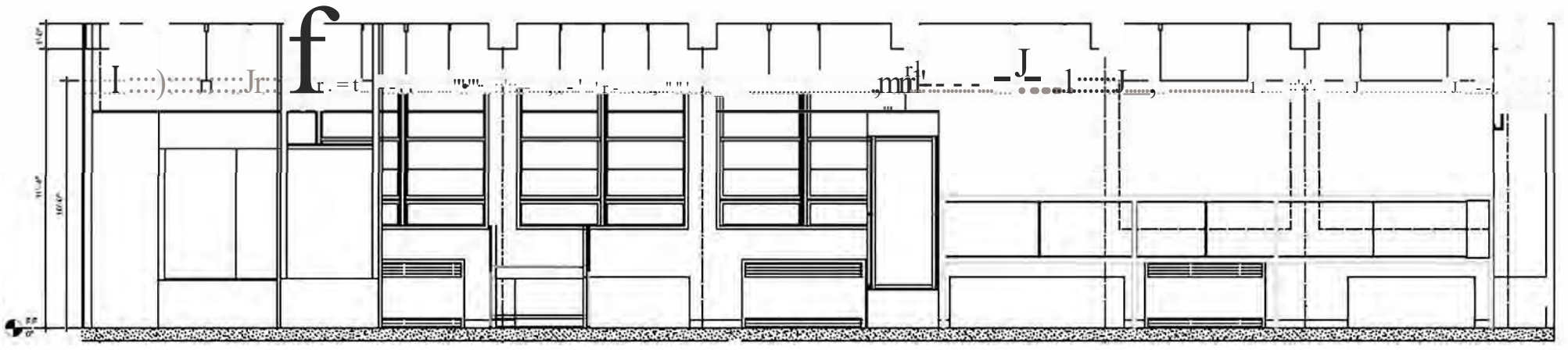
@ NS Section looking E
Scale: 3/8" = 1'-0"



2
A3.1

E-W Section Looking S

Scale: 318" = -1'-0"



1 / A3.0 N-S Section Looking W 2
Scale: 3/8" = 1'-0"

REQUEST FOR CAPITAL PROJECT CONSTRUCTION APPROVAL for
NORTHROP HALL RADIOGENIC ISOTOPES LAB HVAC
UNIVERSITY OF NEW MEXICO
March 8th, 2022

REQUESTED ACTION:

In accordance with Section 7.12 of the Board of Regents Policy Manual and as required by the New Mexico Higher Education Department and New Mexico State Board of Finance, project approval is requested for **Radiogenic Isotopes Lab HVAC Improvements in Northrop Hall, at the Albuquerque Main Campus.**

PROJECT DESCRIPTION:

A0024-Northrop Hall is 76,745 gross square feet (GSF) and comprised primarily of research laboratories and cleanrooms, with some administrative office and instruction spaces.

Removal of the no-longer-necessary Thermal Ionization Mass Spectrometer (TIMS) and relocation of the more-capable Multicolor Inductively-Coupled Plasma-Mass Spectrometer (MC ICP-MS) are required to support the research done in the Radiogenic Isotopes Labs. Upgrades to the HVAC systems and the controls systems serving those labs are required to provide an operable laboratory environment (class 100, +/-1ºF) and to support the process equipment and the specialized research done there.

This project will: 1) remove and salvage the existing TIMS and its appurtenances from laboratory 307C, 2) relocate the existing MC ICP-MS and its appurtenances from laboratory 308B to laboratory 307C, 3) replace the exhaust fans serving the Radiogenic Isotopes Labs with new fans and exhaust stacks, 4) replace the lab Makeup Air Handler (MAH) components necessary to achieve design cooling and heating capacity, airflows and pressurization and to meet modern refrigerant use standards as well as the strict micro contamination requirements of the laboratory, and 5) upgrade the existing controls system to modern digital controls standards for control of the lab HVAC.

PROJECT RATIONALE:

The UNM Radiogenic Isotopes Labs were founded, and are directed by Dr. Yemane Asmerom, a distinguished professor of isotope geochemistry in the UNM Department of Earth & Planetary Sciences. Over the last decade, Dr. Asmerom has been part of the leading edge in the technical, conceptual, and applied developments in uranium-series isotope geochemistry.

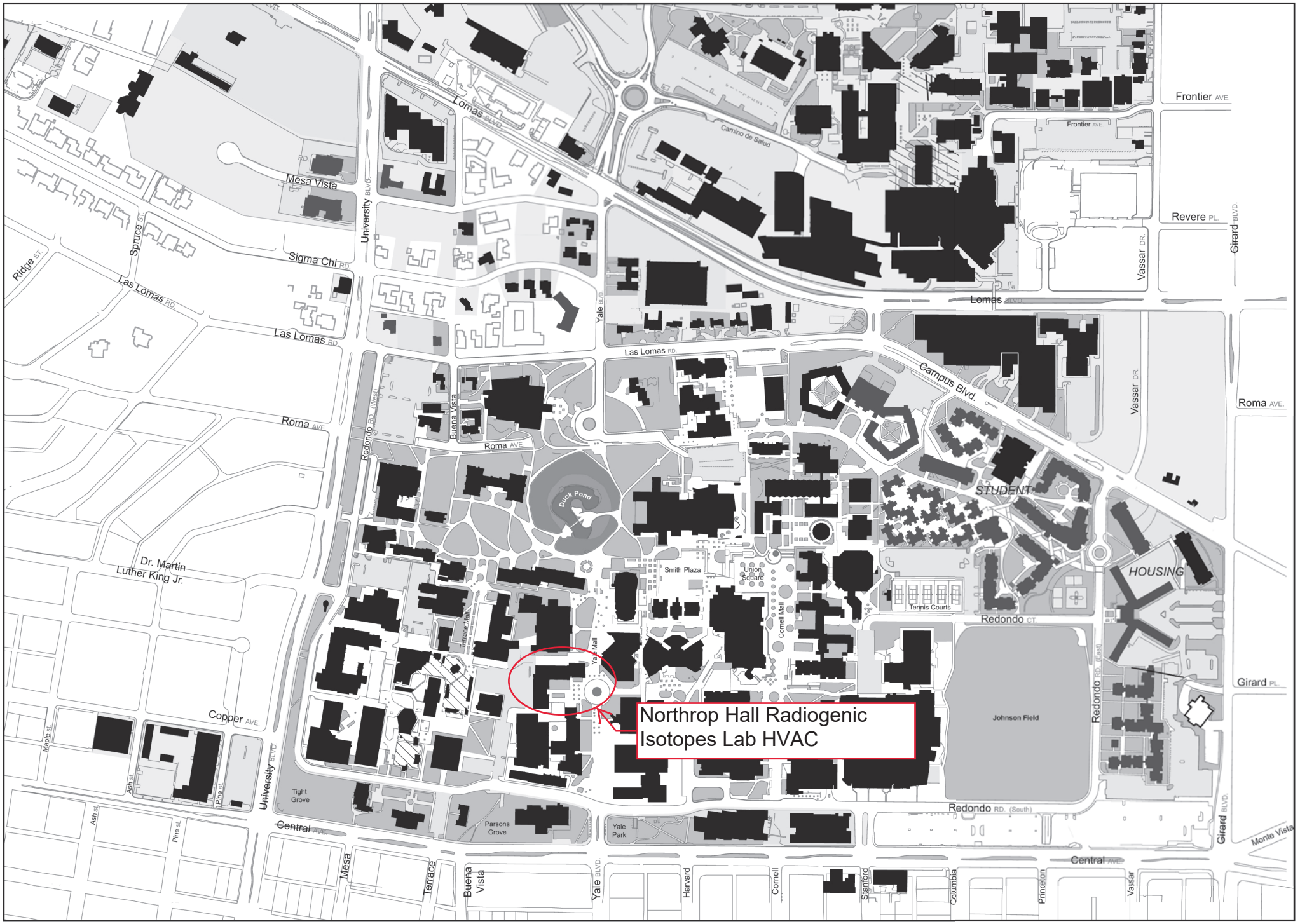
The research done in the Radiogenic Isotopes Labs requires that the MC ICP-MS be relocated adjacent to the clean lab. The HVAC system serving the clean lab areas, although highly specialized and well-constructed, does not have the thermal or airflow capacities to support the equipment and lab pressurization requirements. The refrigeration system serving the Tisdale Makeup Air Handler is based on the refrigerant R-22, the production or importation of which has been banned in the US by the EPA as of January 1, 2020. The HVAC controls system, although

Direct-Digital-Control (DDC) -based, is outdated and will require upgrades to control the new HVAC system/components.

FUNDING:
The total estimated Project Budget is $375,000:

- $375,000 is funded from 2021 Severance Tax Bonds

The University of New Mexico - Central Campus



EXISTING PANEL:	R	VOLTAGE:	120/208V, 3PH, 4W
LOCATION:	ROOF PENTHOUSE	MINIMUM BUS:	400
MOUNTING:	SURFACE	MAIN:	MLO
		MINIMUM AIC:	

NO.	LOAD A	LOAD B	LOAD C	TYPE	LOAD DESCRIPTION	BREAKER POLE	BREAKER TRIP	BUS A	BUS B	BUS C	BREAKER TRIP	BREAKER POLE	TYPE	LOAD DESCRIPTION	LOAD A	LOAD B	LOAD C	NO.
1	1000			E	UNKNOWN EXISTING	1	20	+			20	1	R	ROOF REC & AH-1 LTG	240			2
3		1000		E	UNKNOWN EXISTING	1	20		+		20	1		UNKNOWN EXISTING		1000		4
5			1000	E	UNKNOWN EXISTING	1	20			+	20	1		SPARE				6
7					SPARE	1	20	+						SPACE				8
9					SPARE	1	20		+					SPACE				10
11					SPARE	1	20			+				SPACE				12
13	3717			M	**AHU-1 SUPPLY FAN**	**3**	**80**	+			90	3	M	MCC1 - PENTHOUSE	5528			14
15		3717		M					+				M			5528		16
17			3717	M						+			M				5528	18
19	630			M	EXHAUST FANS EF-1,3	3	15	+			15	3	M	EXHAUST FAN EF-2	690			20
21		630		M					+				M			690		22
23			630	M						+			M				690	24
25	3717			M	**AHU-1 RETURN FAN**	**3**	**80**	+			50	3		SPARE				26
27		3717		M					+									28
29			3717	M						+								30
31					SPACE			+			**200**	**3**	M	**COND UNIT CU-1**	16333			32
33					SPACE				+				M			16333		34
35					SPACE					+			M				16333	36

LOAD TYPE	PANEL TOTAL	FEED THRU TOTAL	SUBFEED TOTAL	FEEDER SUBTOTAL	DEMAND	FEEDER TOTAL
(L) LIGHTING	0			0	125%	0
(R) RECEPTACLES	240			240	NEC 220	240
(LM) LARGEST MOTOR	0			0	25%	0
(M) MOTORS (ALL)	91845			91845	100%	91845
(E) EQUIPMENT	3000			3000	100%	3000
(A) APPLIANCES	0			0	0	0

PANEL TOTAL (KVA):	95.1
PANEL TOTAL (A):	264

GENERAL NOTES:

A. BOLD INDICATES NEW CIRCUIT BREAKERS.
B. SCHEDULE IS BASED ON EXISTING DRAWINGS.
C. FIELD VERIFY PANEL CONFIGURATION.
D.
E.

SPECIFIC NOTES:

(1) REPLACE (E) 50A/3P BREAKER IN SPACES 13,15,17
(2) REPLACE (E) 125A/3P BREAKER IN SPACES 25,27,29
(3)
(4)
(5)

WIRING SCHEDULE - COPPER

AMPS	(2WG) 1Ø, 2 WIRE, GROUND	(3WG) 1Ø, 3 WIRE, GROUND OR 3Ø, 3 WIRE, GROUND	(4WG) 3Ø, 4 WIRE, GROUND
20	(2#12 & 1#12 G) 3/4"C	(3#12 & 1#12 G) 3/4"C	(4#12 & 1#12 G) 3/4"C
40	(2#8 & 1#10 G) 3/4"C	(3#8 & 1#10 G) 3/4"C	(4#8 & 1#10 G) 1"C
50	(2#6 & 1#10 G) 3/4"C	(3#6 & 1#10 G) 1"C	(4#6 & 1#10 G) 1"C
200	(2#3/0 & 1#6 G) 1 1/2"C	(3#3/0 & 1#6 G) 2"C	(4#3/0 & 1#6 G) 2"C

CONDUCTOR SIZES ARE BASED ON 60° TERMINATIONS LESS THAN 100A AND 75° TERMINATIONS GREATER THAN 100A
CONDUIT SIZES ARE BASED ON NEC TABLE 4 (RNC) AND TABLE 5 (THHN INSULATION).

ELECTRICAL SYSTEMS LEGEND

NOTE: ALL SYMBOLS SHOWN ON LEGEND ARE NOT NECESSARILY USED.

POWER SYMBOLS

- SINGLE RECEPTACLE
- DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER
- DOUBLE DUPLEX RECEPTACLE
- GFCI DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE; HALF SWITCHED
- ISOLATED GROUND DUPLEX RECEPTACLE
- MULTI-OUTLET PLUG STRIP
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE
- FLUSH FLOOR MOUNTED DOUBLE DUPLEX RECEPTACLE
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE; HALF SWITCHED
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE AND TELECOM
- WALL MOUNTED SPECIAL OUTLET AS NOTED
- SPECIAL OUTLET AS NOTED
- JUNCTION BOX
- WALL MOUNTED JUNCTION BOX
- FLOOR MOUNTED JUNCTION BOX
- DIVISION 15 EQUIPMENT POWER CONNECTION
- TIMER SWITCH
- FUSED DISCONNECT
- NON FUSED DISCONNECT
- MOTOR STARTER
- ENCLOSED CIRCUIT BREAKER
- PULL BOX
- PUSH BUTTON
- TIME CLOCK
- PHOTO-CELL
- TRANSFORMER
- PANELBOARD OR LOADCENTER
- CONTACTOR
- ELECTRIC MOTOR
- METER
- THERMOSTAT
- ATS AUTOMATIC TRANSFER SWITCH
- CIRCUIT HOMERUN
- CONDUIT RUN
- CONDUIT RUN BELOW GRADE
- CONDUIT UP
- CONDUIT DOWN
- S SWITCH
- S^T THERMAL OVERLOAD SWITCH
- S^V VARIABLE SPEED SWITCH
- S^K KEY SWITCH

ONE-LINE DIAGRAM SYMBOLS

- DISCONNECT SWITCH
- FUSE
- CIRCUIT BREAKER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- METER
- VOLT-METER
- AMP-METER
- SURGE SUPPRESSION DEVICE
- SELECTOR SWITCH
- GROUND FAULT PROTECTION
- SHUNT TRIP
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- GROUND
- COLD WATER GROUND CONNECTION
- BUILDING STEEL GROUND CONNECTION

ABBREVIATIONS

AFC - ABOVE FINISHED CEILING
AFF - ABOVE FINISHED FLOOR
AFG - ABOVE FINISHED GRADE
AHJ - AUTHORITY HAVING JURISDICTION
AL - ALUMINUM
AP - ACCESS POINT
AWG - AMERICAN WIRE GAUGE
BAS - BUILDING AUTOMATION SYSTEM
BFG - BELOW FINISH GRADE
BMS - BUILDING MANAGEMENT SYSTEM
C - CONDUIT
CATV - COMMUNITY (CABLE) ANTENNA TELEVISION SYSTEM
CCTV - CLOSED CIRCUIT TELEVISION
CKT - CIRCUIT
CPU - CENTRAL PROCESSING UNIT
CT - CURRENT TRANSFORMER
DISP - GARBAGE DISPOSAL
DW - DISHWASHER
(E) - EXISTING
EM - EMERGENCY
EWC - ELECTRIC WATER COOLER
FA - FIRE ALARM
FACP - FIRE ALARM CONTROL PANEL
FBO - FURNISHED BY OTHERS
GC - GENERAL CONTRACTOR
GFI - GROUND FAULT CIRCUIT INTERRUPTER
GRD - GROUND
IAW - IN ACCORDANCE WITH
IC - INTERMEDIATE CROSS-CONNECT
IDF - INTERMEDIATE DISTRIBUTION FRAME
IG - ISOLATED GROUND
IR - INFRARED
LAN - LOCAL AREA NETWORK
MDF - MAIN DISTRIBUTION FRAME
(N) - NEW
NIC - NOT IN CONTRACT
NL - NIGHT LIGHT
NTS - NOT TO SCALE
OC - ON CENTER
PA - PUBLIC ADDRESS
REF - REFRIGERATOR
TTB - TELECOMMUNICATIONS TERMINAL BOARD
TVSS - TRANSIENT VOLTAGE SURGE SUPPRESSOR
TVTB - TELEVISION TERMINAL BOARD
UG - UNDERGROUND
UNO - UNLESS NOTED OTHERWISE
V - VOLT
W - WATT
WAN - WIDE AREA NETWORK
WAP - WIRELESS ACCESS POINT
WLAN - WIRELESS LOCAL AREA NETWORK
WP - WEATHERPROOF
XP - EXPLOSIONPROOF
+18" - MOUNTING HEIGHT TO CENTERLINE OF DEVICE ABOVE FINISH FLOOR (VERIFY W/ ARCH ELEVS)

NOTES:

- LIGHT LINEWEIGHT INDICATES EXISTING.
- HATCHED AREAS INDICATE DEMOLITION.
- 'C' ADJACENT TO A DEVICE INDICATES MOUNTING ABOVE COUNTERTOP.

MECHANICAL EQUIPMENT SCHEDULE

MARK	DESCRIPTION	VOLT / PHASE	HP	KW	FLA	MCA	MOCP	STARTER	DISCONNECT/ FUSE SIZE	FEEDER	CIRCUIT	SPECIFIC NOTES
AHU-1R	AIR HANDILING UNIT RETURN FAN	208/3	10						100A/3P 50AF	50A (3WG)	R-13,15,17	4
AHU-1S	AIR HANDILING UNIT SUPPLY FAN	208/3	10						100A/3P 50AF	50A (3WG)	R-25,27,29	4
CU-1	CONDENSING UNIT	208/3		49		150.2	200		FACTORY SUPPLIED	200A (3WG)	PANEL R	1,3,5
EF-1	EXHAUST FAN	208/3	1/2					COMBO FVNR	COMBO 30A 4AF	20A (3WG)	EXTEND FROM EF-3	2
EF-2	EXHAUST FAN	208/3	1-1/2					COMBO FVNR	COMBO 30A 9AF	20A (3WG)	EXISTING SAVED FROM DEMOLITION	2
EF-3	EXHAUST FAN	208/3	3/4					COMBO FVNR	COMBO 30A 5AF	20A (3WG)	EXISTING SAVED FROM DEMOLITION	2

GENERAL NOTES:

A. SEE SPECIFICATIONS FOR ELECTRICAL DIVISION AND MECHANICAL DIVISION MOTOR STARTER COORDINATION.
B. PROVIDE PHASE PROTECTION FOR ALL THREE PHASE MOTORS ABOVE 7-1/2 HP.
C. PROVIDE ALL EXTERIOR DISCONNECTS WITH NEMA 3R RATING.
D. WHEN EQUIPMENT IS LISTED WITH ONLY A HORSEPOWER RATING THE DISCONNECT AND FEEDER ARE SIZED PER THE N.E.C.

SPECIFIC NOTES:

(1) FEEDER UPSIZED FOR AMBIENT TEMPERATURE DERATING BASED ON CONDUIT EXPOSED ON ROOF W/ 4" ROOF CURB SUPPORTS.
(2) PROVIDE COMBINATION STARTER/DISCONNECT: FULL VOLTAGE, NON-REVERSING, SIZE 0. VERIFY FUSE SIZES WITH MANUFACTURER'S LITERATURE.
(3) UNIT COMES WITH FACTORY INSTALLED SERVICE RECEPTACLE REQUIRING SEPARATE CIRCUIT.
(4) PROVIDE NEW 80A/3P CIRCUIT BREAKER IN AVAILABLE SPACE IN PANEL R.
(5) PROVIDE NEW 200A/3P CIRCUIT BREAKER IN AVAILABLE SPACE IN PANEL R.

ELECTRICAL SHEET INDEX

ISSUE LOG KEY:
'√' ISSUED AS PART OF A SET
' ' NOT PART OF SET
'*' ISSUED FOR INFORMATION ONLY

GENERAL NOTES:

1. DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS ON ARCHITECTURAL DRAWINGS AND IN FIELD PRIOR TO COMMENCEMENT OF WORK.
2. VISIT SITE PRIOR TO BID AND VERIFY THAT CONDITIONS ARE AS INDICATED. CONTRACTOR SHALL INCLUDE IN HIS BID COSTS REQUIRED TO MAKE HIS WORK MEET EXISTING CONDITIONS.
3. SYSTEM OUTAGES SHALL BE PERMITTED ONLY AT TIMES APPROVED BY OWNER – IN WRITING. WORK WHICH COULD RESULT IN AN ACCIDENTAL OUTAGE (BEYOND BRANCH CIRCUITS) SHALL BE PERFORMED WITH THE OWNER'S MAINTENANCE PERSONNEL ADVISED OF SUCH WORK.
4. SERVICE SHALL BE MAINTAINED TO EXISTING AREAS DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE PORTABLE GENERATORS, CABLES, OUTLETS, ETC. AS REQUIRED TO MAINTAIN CONTINUITY OF SERVICE. PLACEMENT OF SUCH PORTABLE EQUIPMENT SHALL BE SUBJECT TO OWNER APPROVAL.
5. REVIEW ARCHITECTURAL, MECHANICAL AND OTHER DRAWINGS PRIOR TO BID.
6. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT.
7. WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL, STATE, AND NATIONAL CODES AND ORDINANCES.
8. PROVIDE PERMITS AND INSPECTIONS REQUIRED.
9. PROVIDE 1/4" SCALE LAYOUT DRAWINGS OF ROOMS WITH ELECTRICAL SWITCHBOARDS AND TRANSFORMERS WITH SHOP DRAWING SUBMITTAL. LAYOUTS SHALL SHOW LOCATIONS OF, AND SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT. ALL EQUIPMENT SHALL BE DRAWN TO SCALE.
10. CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT, OR INSTALLATION METHODS.
11. VERIFY EXACT LOCATIONS OF EXISTING AND NEW UNDERGROUND UTILITIES, PIPING AND RACEWAY SYSTEMS PRIOR TO TRENCHING. PROVIDE NECESSARY TRENCHING, BACKFILL, EXCAVATION, SUPPORTS, SERVICE FEEDERS (CONDUIT AND/OR WIRE), PULLBOXES, TRANSFORMER PADS, SAWCUTTING AND PATCHING, CONCRETE/PAVING, ETC. REQUIRED. BACKFILL TRENCHES TO 90 PERCENT COMPACTION AND PATCH TO MATCH EXISTING. CONTRACTOR SHALL OBTAIN AND VERIFY EXACT UTILITY COMPANY DRAWINGS AND REQUIREMENTS. ELECTRICAL CONTRACTOR IS TO SUBMIT A COMPLETE CONSTRUCTION DRAWING SET TO THE ELECTRICAL UTILITY COMPANY WITH-IN 10 DAYS OF AWARD OF CONTRACT. COORDINATE TIMELINE OF THEIR REVIEW, APPROVAL, CONSTRUCTION SCHEDULING AND INSTALLATION OF THE UTILITY TRANSFORMER WITH THE UTILITY COMPANY. NOTIFY OWNER OF ANY SCHEDULING CONFLICTS.
12. EXISTING SYSTEMS AND CONDITIONS SHOWN ON DRAWINGS FOR EXISTING BUILDINGS ARE TO BE NOTED "FOR GUIDANCE ONLY". THE ELECTRICAL CONTRACTOR TO FIELD CHECK ALL EXISTING CONDITIONS PRIOR TO BIDDING AND TO INCLUDE IN HIS BID AN ALLOWANCE FOR REMOVAL AND/OR RELOCATION OF EXISTING CONDUITS, WIRES, DEVICES, FIXTURES, OR OTHER EQUIPMENT AS INDICATED ON THE PLANS OR AS REQUIRED TO COORDINATE AND ADAPT NEW AND EXISTING ELECTRICAL SYSTEM TO ALL OTHER WORK AS REQUIRED
13. PROVIDE ELECTRICAL DEMOLITION REQUIRED. REFER TO ARCHITECTURAL AND ELECTRICAL DEMOLITION DRAWINGS FOR LOCATION AND EXTENT OF DEMOLITION REQUIRED. CONTRACTOR SHALL VISIT SITE PRIOR TO BID TO DETERMINE EXTENT OF WORK INVOLVED.
14. PROVIDE ALL NECESSARY DEMOLITION TO REMOVE EXISTING UNUSED CONDUIT, WIRE, CABLE, J-BOXES, RECEPTACLES, SWITCHES, LIGHTS, FIRE ALARMS DEVICES, ETC. COMPLETE WITH ASSOCIATED CIRCUITING TO SOURCE. WHERE IT IS NOT FEASIBLE TO REMOVE THE ABOVE, OUTLET SHALL BE ABANDONED, WIRE REMOVED, AND BLANK COVER PLATES PROVIDED.
15. ALL (E) EQUIPMENT, LAMPS, BALLASTS, ETC. BEING REMOVED SHALL BE DISCARDED IN ACCORDANCE WITH APPLICABLE EPA REQUIREMENTS.
16. EXISTING LIGHT FIXTURES, ELECTRICAL EQUIPMENT, ETC. BEING REMOVED SHALL BE OFFERED TO THE OWNER, EXCEPT FOR THOSE ITEMS BEING RELOCATED. ANY ITEMS REJECTED BY THE OWNER SHALL BE DISPOSED OF IN A LEGAL MANNER..
17. VERIFY EXACT LOCATION OF EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.
18. INSTALL ALL MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ANY DEVIATIONS SHALL BE BROUGHT TO THE ARCHITECT/ENGINEER'S ATTENTION PRIOR TO INSTALLATION.
19. FINAL CONNECTIONS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING EQUIPMENT WHICH IS DAMAGED DUE TO INCORRECT FIELD WIRING PROVIDED UNDER THIS SECTION, OR FACTORY WIRING IN EQUIPMENT PROVIDED UNDER THIS SECTION.
21. ALL ELECTRICAL SYSTEMS COMPONENTS SHALL BE LISTED OR LABELED BY U.L. OR OTHER RECOGNIZED TESTING FACILITY.
22. WIRING DEVICES SHALL BE SPECIFICATION GRADE AND RATED AT 20 AMPERES FOR LIGHT SWITCHES, AND 20 AMPERES FOR DUPLEX RECEPTACLES. THE COLOR OF THE DEVICES AND COVER PLATES SHALL BE WHITE.
23. ALL WIRING SHALL BE INSTALLED IN LISTED METALLIC RACEWAYS. EMT FITTINGS SHALL BE MALLEABLE IRON OR STEEL. CONNECTORS SHALL BE INSULATED THROAT TYPE. MINIMUM CONDUIT SIZE IS 3/4". FOLLOW NEC FOR MAXIMUM NUMBER OF CONDUCTORS PER CONDUIT. CONDUIT SHALL BE OF SUFFICIENT SIZE AND CONDUCTOR QUANTITY SHALL BE LIMITED TO ELIMINATE THE NEED TO DE-RATE CONDUCTORS. METAL CLAD CABLE IS PERMITTED.
24. ALL EMPTY RACEWAY SYSTEMS SHALL HAVE A 200LB NYLON PULL STRING OR EQUAL, AND SHALL BE IDENTIFIED AT ALL JUNCTION, PULL AND TERMINATION POINTS, USING PERMANENT METALLIC TAGS. TAG SHALL INDICATE INTENDED USE OF CONDUIT, ORIGINATION, AND TERMINATION POINTS OF EACH INDIVIDUAL CONDUIT.
25. WIRE SHALL BE COPPER, 75 DEGREE CELSIUS RATED FOR GENERAL USE. WIRING WITHIN 3 INCHES OF FLUORESCENT BALLASTS SHALL BE COPPER, MINIMUM 90 DEGREE CELSIUS RATED. SIZES INDICATED ARE FOR INSTALLATION IN A MAXIMUM 30 DEGREE CELSIUS AMBIENT. CONDUCTOR AMPACITY SHALL BE DERATED FOR HIGHER AMBIENT INSTALLATIONS.
26. PROVIDE NEW UPDATED PANELBOARD DIRECTORIES FOR EXISTING AND NEW CIRCUITS BEING UTILIZED FOR COMPLETION OF PROJECT.
27. PANEL DIRECTORIES SHALL BE REMOVABLE. ROOM NAMES AND NUMBERS SHALL BE AS DIRECTED BY OWNER. DIRECTORIES SHALL BE TYPED AND INSTALLED UNDER CLEAR PLASTIC COVERS.
28. FINAL CONNECTIONS TO MOTORS, TRANSFORMERS, AND OTHER VIBRATING EQUIPMENT SHALL BE SEAL TITE FLEX AND APPROVED FITTINGS. DO NOT SECURE CONDUITS, DISCONNECTS, OR DEVICES TO DUCTWORK OR MECHANICAL EQUIPMENT.
29. FIRE ALARM, SOUND, TELEPHONE, COMPUTER AND SIMILAR SYSTEMS CONDUITS LARGER THAN 1" SHALL HAVE LONG RADIUS SWEEPS (12 TIMES THE DIAMETER).
30. SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.
31. GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY REMEDIED WITHOUT COST TO THE OWNER.
32. SYSTEMS SHALL BE COMPLETE, OPERABLE, AND READY FOR CONTINUOUS OPERATION. LIGHTS, SWITCHES, RECEPTACLES, MOTORS, ETC. SHALL BE CONNECTED AND OPERABLE.

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SECTION 260010--ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Conditions, Special Conditions, and Contract Documents are part of these specifications. Consult them further for instructions and be governed by the requirements contained there under.

1.2 DESCRIPTION

A. Work Included

1. Work shall consist of furnishing all labor, equipment, supplies and materials, unless otherwise specified, necessary for the installation of complete electrical systems as required by the specifications and as shown on the drawings, subject to the terms and conditions of the contract. The work shall also include the completion of those details of electrical work not mentioned or shown which are necessary for the successful operation of all electrical systems.

B. Work Not Included

1. Certain labor, materials, and equipment may be furnished under other sections of these specifications, by Utility Companies or by the Owner; when this is the case, the extent, source, and description of these items will be as indicated on the drawings or as described in the specification.

1.3 PROVISIONS

A. Work performed under this division of the specifications shall conform to the requirements of Division 1, the electrical drawings, and all items hereinafter specified.

1. Prior to any work being performed under this division, examine architectural, structural, food service, civil, mechanical, specialty systems, and interior design drawings and specifications. If any discrepancies occur between them and the electrical drawings and specifications, report discrepancies to the Architect in writing and obtain written instructions for the work.

2. Electrical drawings are diagrammatic, but shall be followed as closely as actual construction of the building will permit. All changes from drawings necessary to make the electrical work conform to the building as constructed shall be made without additional cost to the Owner.

3. Coordinate the electrical work with the General Contractor and be responsible to him for satisfactory progress of the same. Coordinate electrical work with all other trades on the project without additional cost to the Owner.

4. All work and materials covered by drawings and specifications shall be subject to review at any time by representatives of the Architect and Owner. If the Architect or Owner's agent finds any materials or installation that does not conform to these drawings and specifications, Contractor shall remove the material from the premises and correct the installation to the satisfaction of the agent.

5. In acceptance or rejection of installed electrical systems, no allowance will be made for lack of skill on the part of the installers.

1.4 CODES AND STANDARDS

A. The latest editions of the following standards (including supplements and official interpretations) are minimum requirements:

1. NFPA 70 - National Electrical Code (NEC).
2. NFPA 72 - National Fire Alarm Code.
3. NFPA 101 - Life Safety Code.
4. Colorado Department of Health "Rules and Regulations Governing Restaurants in the State of Colorado".
5. Conform to all applicable State and Local Codes.
6. American National Standards Institute (ANSI).
7. National Electrical Safety Code (NESC).
8. Americans with Disabilities Acts (ADA) and American National Standards Institute (ANSI) 117.
9. National Electrical Manufacturer's Association (NEMA).
10. Underwriter's Laboratories (UL).
11. Insulated Cable Engineers Association (ICEA).
12. International Building Code.
13. International Mechanical Code.
14. International Fire Code.
15. Institute of Electrical and Electronic Engineers (IEEE).
16. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

B. The complete installation shall comply with requirements of the utility and telephone companies furnishing service to this installation. The drawings and specifications take precedence when they are more stringent than codes, statutes, or ordinances in effect. Applicable codes, ordinances, standards and statutes take precedence when they are more stringent or conflict with the drawings and specifications.

1.5 SPECIAL REQUIREMENTS

A. Definitions: "Provide" shall mean "furnish and install". "Furnish" means to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application. "Install" means to join, unit, fasten, link, attach, set up or otherwise connect together before testing and turning over to Owner, complete and ready for regular operation. The words "accept" or "acceptable" denote only that the equipment items are in general conformance with the design concept of the project.

B. Drawings:

1. The drawings indicate the general arrangement of circuits and outlets, locations of switches, panelboards and other work. Information shown on the drawings is schematic, however, re-circuiting will not be permitted without specific acceptance. Drawings and specifications are complementary to each other. What is called for by one shall be as binding as if called for by both. Data presented on these drawings is accurate as planning can be determined, but accuracy is not guaranteed and field verification of all dimensions, locations, levels, etc., to suit field conditions is directed. Review all Architectural, Structural and Mechanical Drawings and Specifications; adjust all work to conform to all conditions shown therein. The Architectural drawings shall take precedence over all other drawings.

2. Discrepancies between different plans, between plans and specifications, between specifications or regulations and codes governing this installation shall be brought to the attention of the Architect in writing before the date of bid opening. In the event such discrepancies exist, and the Architect is not so notified, the adjudication of responsibility shall be solely at the discretion of the Architect.

1.6 EXAMINATION OF BIDDING DOCUMENTS

A. Each bidder shall examine the bidding documents carefully, and not later than seven days prior to the date of receipt of bids, shall make written request to the Engineer for interpretation or correction of any discrepancies, ambiguity, inconsistency, or error therein which he may discover. Any interpretation or correction will be issued as an addendum by the Architect. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguity, inconsistency, or error are not covered by addendum or written directive, Contractor shall include in his bid, labor materials and methods of construction resulting in higher cost. After award of contract, no allowance or extra compensation will be made on behalf of the Contractor due to his failure to make the written requests as described above.

B. Failure to request clarification during the bid period of any inadequacy, omission, or conflict will not relieve the Contractor of their responsibilities. The signing of the contract will be considered as implicitly denoting that the Contractor has a thorough comprehension of the full intent and scope of the working drawings and specifications.

1.7 PERMITS, FEES & NOTICES

A. Obtain and pay for all necessary permits, inspections and certificates that may be necessary for the full completion of the work. Furnish the Architect with a certificate of final inspection and approval from the AHJ over the electrical installation.

B. Notify proper authorities when work is ready for inspections required by applicable codes, rules and regulations, allowing sufficient time for inspections to be made without hindering progress of the work. Furnish to the Owner copies of inspection certificates of acceptance.

1.8 TESTS

A. Upon completion of all work and adjustment of all equipment, provide complete operational tests of all electrical equipment provided under this division.

1.9 WARRANTY

A. Guarantee that all work governed by this division shall be free of defects in workmanship, materials and parts for a period of one (1) year after written acceptance. Promptly repair, revise, and replace defects as directed with no additional cost to the Owner (lamps and fuses are exempt).

1.10 RECORD DRAWINGS

A. Maintain a current set of electrical drawings at the site. Neatly mark all changes and deviations from the original drawings. Use a color which contrasts with the prints. This shall be a separate set of drawings, not used for construction purposes, and shall be kept up to date as the job progresses and shall be made available for inspection by the Architect at all times. These updated progress drawings shall be used to produce the final record drawings that shall be in AutoCad electronic format media upon project completion.

B. Upon completion of the contract, both sets (electronic and hard copy drawings) of record drawings shall be delivered to the Architect.

C. The Contractor shall mark all record drawings on the front lower right hand corner with a stamp impression that reads 'RECORD DRAWINGS' or similar.

1.11 PROJECT/SITE CONDITIONS

A. Install work in locations shown on Drawings, unless prevented by Project conditions.

B. Prior to submitting a bid, visit the site of job and ascertain all conditions affecting the proposed installation and adjust all work accordingly. Make provisions for these costs.

C. Coordinate the work with that of all other trades. Where conflicts of work occur and departure from the indicated arrangements are necessary, consult with other Contractors involved; come to agreement as to changed locations and elevations, etc., and obtain written acceptance from the Architect of proposed changes before proceeding with work.

D. All outages of electrical service shall be scheduled with the Owner and Utility Company five (5) days in advance of proposed outage. Include an overtime allowance in the bid for the performance of all work requiring outages at such time as it is approved by the Owner. Outages shall be at a time and of such duration as accepted by the Owner.

1.12 SEQUENCING AND SCHEDULING

A. Construct Work in sequence under provisions of Division 1.

1.13 USE OF THE ARCHITECT'S AND/OR ENGINEER'S DRAWINGS

A. The Contractor shall obtain, at the Contractor's expense, from the Architect or Engineer a set of AutoCAD or compatible format architectural and engineering drawings on electronic media where desired by the Contractor and/or required by the Specifications for use in preparing the shop drawings, coordination drawings, and record drawings. The Contractor shall provide to the Architect and Engineer a written release of liability acceptable to the Architect and Engineer prior to receiving the electronic media.

PART 2 - GENERAL

2.1 STANDARD FOR MATERIALS

A. All materials shall conform to current applicable industry standards. Workmanship and neat appearance shall be as important as the electrical and mechanical operation. Defective or damaged materials shall be replaced or repaired, prior to final acceptance, in a manner acceptable to the Architect or Owner at no additional cost to the Owner.

B. All electrical materials shall be acceptable for installation only if labeled or listed by a nationally recognized testing laboratory and if accepted by local authorities.

2.2 SUBMITTALS

A. Submit under provision of Division 1.

B. Listing of Equipment: The Contractor shall submit, within thirty days after the award of the contract, a complete typewritten list of those items of equipment which will be furnished under this contract. Include the name or description of the item, name of manufacturer, model, type, and catalog number.

C. Present shop drawing submittal data at one time, bound in three-ring binders, indexed in a neat and orderly manner. Partial submittals will not be accepted. Do not begin work until (1) copy is returned.

D. Submit five (5) copies of shop drawings, layouts, manufacturer's data, wiring diagrams and material schedules that may be requested by the Architect for his review. The review by the Architect will not constitute concurrence with any deviation from the plans and specifications unless such deviations are specifically identified by the method described below, nor shall it relieve the Contractor of responsibility for errors or omissions in the submitted data.

E. Processed shop drawings shall not be construed as change orders. The shop drawings shall demonstrate that the Contractor understands the design concept, indicate which equipment and materials he intends to provide, and detail the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between shop drawing submittals and the design drawings and specifications are discovered, the design drawings and specifications shall govern.

F. Contractor shall be responsible for dimensions (which he shall confirm and correlate at the job site), fabrication processes and techniques of construction and coordination of his work with that of other trades. The Contractor shall check and verify all measurements and review shop drawings before submitting them and sign a statement on the shop drawings which signifies that they comply with plans and specifications and that equipment is dimensionally suitable for the application. If any deviations from the specified requirements for any item of material or equipment exist, such deviation shall be expressly stated in writing and incorporated with the submittal. The Owner's copies (two of each) of the reviewed submittals shall be retained by the Contractor until completion of the project and presented in bound form to the Owner.

G. Provide, with shop drawing submittal, 1/4" scale layout drawings of room with switchboards, transformers, telephone backboards, panelboards, and data equipment. Layouts shall show locations of, and shall be coordinated with mechanical equipment. Equipment shall be drawn to scale.

2.3 BID ALTERNATE(S)

A. Refer to Division 1 and all contract documents for additional information.

B. Alternate(s) for Material and Equipment

1. Equipment and material bid alternate(s) shall be proposed as additive or deductive alternate(s) to specified items by submitting it as a separate line item from the base bid on the Bidder's letterhead.

2. Such bid alternate proposals shall not be substituted or included in the base bid. Bid alternate proposal(s) must be accompanied by full descriptive data on the proposed equipment, together with a statement of the cost to be added or deducted for each item. The bid alternate shall include all materials, equipment, labor, electrical connections, coordination with all other trades, etc. for a complete and operational system.

3. The Contractor shall submit the bid alternates at the time the base bids are due.

2.4 SUBSTITUTIONS (CONTRACTOR AND/OR OWNER INITIATED)

A. Materials or equipment listed by several manufacturers' names are intended to be bidder's choice, and any of the listed manufacturers may be used in the base bid. Materials or equipment not listed are considered substitutions.

B. Performance Specification: When any item is specified by requirement to meet a performance, industry or regulating body standard or is specified generically (no manufacturer's name listed), no prior review by the Consulting Electrical Engineer is needed unless specifically called for in these specifications.

C. Contractor to be responsible for any changes and costs to accommodate any equipment except the first named in the specification.

D. Substitutions for Material

1. Equipment and materials not listed as equivalents may be proposed as deductive alternates to specified items by submitting it as a separate line item to the base bid on the Bidder's letterhead.

2. Such substitutions shall not be substituted for the base bid and must be accompanied by a full description of the difference between the Contract Document requirements and that of the substitution, the comparative features of each, and the effect of the change on the end result performance. Include the impact of all changes on other contractors and acknowledge the inclusion of additional costs to the other trades. If any such alternates are considered, the Contractor shall submit a list of the proposed alternate substitution items within 14 days of award of contract. Late requests for proposed substitutions will not be accepted by the Engineer due to scheduling or delivery concerns.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND COMPLETION OF INSTALLATION

A. Contractor's personnel and subcontractors selected to perform the work shall be well versed and skilled in the trades involved.

B. Coordinate electrical equipment and materials installation with other building components.

C. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

D. Any changes or deviations from the drawings and specifications must be accepted in writing by the Architect/Engineer. All errors in installation shall be corrected at the expense of the Contractor. All specialties shall be installed as detailed on the drawings. Where detail or specific installation requirements are not provided, manufacturer's recommendations shall be followed.

E. Upon completion of work, all equipment and materials shall be installed complete, thoroughly checked, correctly adjusted, and left ready for intended use or operation. All work shall be thoroughly cleaned and all residue shall be removed from surfaces. Exterior surfaces of all material and equipment shall be delivered in a perfect, unblemished condition.

F. Contractor shall provide a complete installation, including all required labor, material, cartage, insurance, permits, and taxes.

3.2 PROGRESS OF WORK

A. Order the progress of electrical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit. Any cost resulting from defective or ill-timed work performed under this Section shall be borne by this Contractor.

3.4 CHASES, OPENINGS, CUTTING, AND PATCHING

A. Carefully lay out all work in advance so as to eliminate where possible, cutting, channeling, chasing or drilling of floors, walls, partitions, ceilings and roofs. Any damage to the building, structure, piping, ducts, equipment or any defaced finish shall be repaired by skilled mechanics of the trades involved at no additional cost to the Owner and to the satisfaction of the Architect. Any necessary cutting, channeling, drilling or anchoring of raceways, outlets, or other electrical equipment shall be performed in a careful manner, and as accepted by the Architect.

B. All openings made in fire-rated walls, floors, or ceilings shall be patched and made tight in a manner to conform to the fire rating for the surface penetrated.

C. All penetrations required through existing concrete construction shall be core drilled at minimum size required. Precautions shall be taken when drilling to prevent damage to structural concrete. Contractor shall obtain permission from the Architect before proceeding with drilling.

D. Provide all cutting, trenching, backfilling, patching and refinishing or resurfacing required for electrical work in a manner meeting the approval of the Engineer and at no additional cost to the Owner.

3.5 DELIVERY AND STORAGE OF MATERIALS

A. Arrange and be held responsible for delivery and safe storage of materials and equipment for electrical installation.

B. Store materials and equipment for easy inspection and checking.

C. Carefully mark and store all materials.

D. Deliver materials to the job site in stages of the work that will expedite the work as a whole.

E. Carefully check materials furnished to this Contractor for installation, and provide receipt acknowledging acceptance of delivery and condition of the materials received. Thereafter, assume full responsibility for its safekeeping until the final installation has been reviewed and accepted.

3.6 PROTECTION OF WORK AND PROPERTY

A. Where there are existing facilities, be responsible for the protection thereof, whether or not such facility is to be removed or relocated. Moving or removing any facility must be done so as not to cause interruption of the work of Owner's operation.

B. Close all conduit openings with caps or plugs during installation. Cover all fixtures and equipment and protect against injury. At the final completion, clean all work and deliver in an unblemished condition, or refinish and repaint at the discretion of the Architect.

C. Any equipment or conduit systems found to have been damaged or contaminated above "MILL" or "SHOP" conditions shall be replaced or cleaned to the Engineer's satisfaction.

3.7 FINAL ACCEPTANCE

A. Final acceptance by the Owner will not occur until all operating instructions are received and Owner's personnel have been thoroughly indoctrinated in the maintenance and operation of all equipment.

B. Operating manual, parts lists, and indoctrination of operating and maintenance personnel: Furnish the services of a qualified representative of the supplier for each item or system itemized below who shall instruct specific personnel, as designated by the Owner, in the operation and maintenance of that item or system.

C. Instruction shall be made when the particular system is complete and shall be of the number of hours indicated and at the time requested by the Owner. A representative of the Electrical Contractor shall be present for all demonstrations.

1. Electrical distribution equipment under 600V, including MCC 2
2. Lighting control systems 4
3. Fire alarm system 2

D. Deliver three (3) complete operating manuals and parts lists to the Owner (or his designated representative) at the time of the above required indoctrination. Fully explain the contents of the manuals as part of required indoctrination and instruct the Owner's personnel in the correct procedure in obtaining service, both during and after the guarantee period. The operating manual and parts lists shall give complete information as to whom the Owner shall contact for service and parts, including the address and phone number. Furnish evidence that an authorized service organization regularly carries a complete stock of repair parts for these items (or systems), and that the organization is available for service. Service shall be furnished within twenty four (24) hours after requested.

E. Clean up: Remove all materials, scrap, etc., relative to the electrical installation and leave the premises and all equipment, lamps, fixtures, etc. in a clean, orderly condition. Any costs to the Owner for clean up of the site will be charged against the Contractor.

F. Acceptance Demonstration: Upon completion of the work, at a time to be designated by the Architect, the Contractor shall demonstrate for the Owner the operation of the entire installation, including all systems provided under this contract.

G. Operating and Acceptance Tests: Provide all labor, instruments, and equipment for the performance of tests as specified. Submit three (3) copies of a typewritten test report for the Architect for his approval.

1. Record the full load current in each phase or line at the main service entrance and for each feeder leaving the main distribution panelboard. Readings shall be taken with the maximum installed load connected and in operation.

2. Perform a careful inspection of the main switchboard bus structure and cable connections to verify that all connections are mechanically and electrically tight.

3. Measure the resistance to ground for the service ground, which shall not exceed ten (10) ohms under normal soil moisture conditions. If required, install additional ground provisions in a manner accepted by the Engineer at no additional cost to the Owner.

3.8 ELECTRICAL PROVISIONS FOR ROOFS

A. Raceways penetrating roofs shall be installed in a manner to preserve the integrity of the roof. Provide flashing and counter flashing for all roof penetrations required for the work.

B. Conduits routed above roofs shall be installed a minimum of twelve inches (12") above the finished roof surface, supported on metal stands installed with flashing and counter flashing, with maximum spacing of ten feet (10'-0").

C. Provide weatherproof duplex receptacles on roof so that no equipment installed on the roof is more than twenty-five feet (25'-0") from a receptacle. Connect to nearest receptacle circuit unless indicated on plans.

3.9 CONSTRUCTION LIGHTING AND POWER

A. Provide all temporary facilities required to supply construction power and light. Install and maintain facilities in a manner that will protect the public and workmen. Comply with all applicable laws and regulations.

B. Provide covered walkway lights and obstruction lights which shall be kept burning continuously between sunset and sunrise where required.

C. Upon completion of the work, remove all temporary facilities from the site.

D. The General Contractor shall pay for all power and light used by him and his subcontractors where construction power is separately metered, or is taken from the permanent project metered service solely for construction use.

E. The cutoff date for power cost allocation where permanent meters are used shall be either the agreed date of occupancy by the Owner or the date of final acceptance of the project, whichever shall be the earlier date.

3.10 MECHANICAL EQUIPMENT WIRING AND CONNECTIONS

A. Unless otherwise indicated, all motors and controls shall be furnished, set in place, and wired in accordance with the Mechanical Equipment Wiring and Connections Schedule. All items necessary for a complete system shall be included in the base contract.

B. Provide electrical connections to mechanical equipment. Refer to the Mechanical specifications and plans covering sprinkler systems, motor interlocks, switching, etc. Provide wiring, conduit, outlets and final electrical connections to all equipment.

C. Where motor controllers are furnished by others, install controller and provide connections at line and load side of controllers.

D. Where reduced voltage, multiple speed, duplex, triplex, lead-lag, pony motor and other unusual controller types are utilized, coordinate specific requirements of motor(s) and controller and provide required wiring between motor(s) and controller.

E. For electric water coolers verify whether the equipment is hard wired, cord and plug connected and whether a remote chiller is provided. Provide circuiting and connections to match.

3.11 REMODELING PROVISIONS

A. Existing systems and conditions shown on the drawings are provided for guidance only. The Electrical Contractor shall field check all existing conditions prior to bidding and shall include in his bid an allowance for the removal and relocation of existing conduits, wires, devices, fixtures, or other equipment as indicated on the plans or as required to coordinate and adapt new and existing electrical systems to all other work required for this project.

B. Where the reuse of existing conduits, outlets, junction boxes, etc., is permissible, make certain that the wiring form them is continuous from outlet to outlet. Provide modifications to assure that circuits, or system, shall not pass through outlets or junction boxes which may be rendered inaccessible by changes to be made to the building. Existing conduits, wire, devices, fixtures, etc., which shall be removed shall become the property of this Contractor unless otherwise noted.

C. Connect new work to existing in a manner that will assure proper raceway grounding throughout in conformance with the National Electrical Code.

D. Remodel Work Cutting and Patching: The Contractor shall perform cutting, channeling, chasing, drilling, etc., as required to install or remove electrical equipment in areas of remodeling. This work shall be performed so as to minimize damage to portions of wall finishes, surfaces, plastering, or the structure which are to be reused, resurfaced, plastered or painted under another division of these specifications.

E. Carefully coordinate with the required remodeling work, cutting and patching etc., performed by the other trades. Remove or relocate existing electrical conduits, wires, devices, fixtures and other equipment as necessary.

F. All outages on portions of existing electrical systems shall be minimized and shall be at a time and of duration as accepted by the Owner.

1.2 ELECTRICAL DEMOLITION

A. Examination

1. Verity field measurements and circuiting arrangements are as shown on drawings.
2. Verify that abandoned wiring and equipment serve only abandoned facilities.
3. Demolition drawings are based on casual field observation and existing record documents. Report discrepancies to Architect before disturbing existing installation.
4. Beginning of demolition means installer accepts existing conditions.

B. Preparation

1. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
2. Coordinate outages with Architect/Owner.
3. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
4. Existing telephone system: Maintain existing system in service. Disable system only to make switchovers and connections. Notify Owner/Architect in writing at least 24 hours before partially or completely disabling system. Minimize outage duration.

C. Demolition and Extension of Existing Electrical Work

1. Demolish and extend existing electrical work under provisions of Division 1, Division 2, and this section.
2. Remove, relocate, and extend existing installations to accommodate new construction.
3. Remove abandoned wiring to source of supply.
4. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
5. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets, which are not removed.
6. Disconnect and remove abandoned panelboards and distribution equipment.
7. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
8. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
9. Repair adjacent construction and finishes damaged during demolition and extension work.
10. Maintain access to existing electrical installations, which remain active. Modify installation or provide access panel as appropriate.
11. Extend existing installations using materials and methods compatible with existing electrical installation, or as specified in individual section.

D. Cleaning and Repair

1. Clean and repair existing materials and equipment, which remain or are to be reused.
2. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
3. Luminaries: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, non-operational ballasts, and broken electrical parts.

E. Installation

1. Install relocated materials and equipment under the provisions of Division 1.

END OF SECTION 260010

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Building wires and cables rated 2000 V and less.
2. Connectors, splices, and terminations rated 2000 V and less.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Comply with UL 1277, UL 1685, and NFPA 70 for Type TC-ER cable used in VFC circuits.

D. Conductors: Aluminum and copper, complying with NEMA WC 70/ICEA S-95-658.

1. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2.

E. Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Conductors shall be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.

B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN/THWN-2, single conductors in raceway or Metal-clad cable, Type MC.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway or Metal-clad cable, Type MC.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

G. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

H. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Perform each of the following visual and electrical tests:

a. Compare conductor and cable data with Drawings and Specifications.
b. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
c. Test bolted connections for high resistance using one of the following:

1) A low-resistance ohmmeter.
2) Calibrated torque wrench.
3) Thermographic survey.

d. Inspect compression applied connectors for correct cable match and indentation.
e. Inspect for correct identification.
f. Inspect cable jacket and condition.
g. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
h. Continuity test on each conductor and cable.
i. Uniform resistance of parallel conductors.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare Test and Inspection Reports: Prepare a written report to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes grounding and bonding systems and equipment.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.3 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

C. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt socket set screw.

D. Water Pipe Clamps:

1. Mechanical type, two pieces with zinc-plated bolts.

a. Material: Tin-plated aluminum.
b. Listed for direct burial.

2. U-bolt type with malleable-iron clamp and copper ground connector.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
9. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells. Make tests at ground rods before any conductors are connected.

a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4 factory-fabricated components for field assembly.

1. Material: Pre-galvanized steel .
2. Channel Width: 1-5/8 inches (41.25 mm).
3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
7. Channel Dimensions: Selected for applicable load criteria.

B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
2. Mechanical-Expansion Anchors: Insert-wedge-type, [zinc-coated steel] [stainless steel], for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems unless requirements in this Section are stricter.

B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 PAINTING

A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

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SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Boxes, enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. GRC: Comply with ANSI C80.1 and UL 6.
C. IMC: Comply with ANSI C80.6 and UL 1242.
D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch (1 mm), minimum.
E. EMT: Comply with ANSI C80.3 and UL 797.
F. FMC: Comply with UL 1; aluminum.
G. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
2. Fittings for EMT:
a. Material: Steel.
b. Type: compression.
3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
I. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
C. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

2.3 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
E. Metal Floor Boxes:
1. Material: sheet metal.
2. Type: Fully adjustable.
3. Shape: Rectangular.
4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
F. Nonmetallic Floor Boxes: Nonadjustable, round.
1. Listing and Labeling: Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
G. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
K. Gangable boxes are prohibited.
L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 or Type 3R as required with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic.
3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
M. Cabinets:
1. NEMA 250, Type 1 or Type 3R as required galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: EMT.
3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
B. Indoors: Apply raceway products as specified below unless otherwise indicated.
1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
a. Mechanical rooms.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
C. Minimum Raceway Size: 1/2-inch (16-mm) trade size.
D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C).

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
G. Support conduit within 12 inches (300 mm)of enclosures to which attached.
H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
I. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
K. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35-mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
M. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
N. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service raceway enters a building or structure.
3. Where otherwise required by NFPA 70.
O. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMCin damp or wet locations not subject to severe physical damage.
P. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
Q. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
R. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
S. Locate boxes so that cover or plate will not span different building finishes.
T. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
U. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
V. Set metal floor boxes level and flush with finished floor surface.
W. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Warning labels and signs.
5. Instruction signs.
6. Equipment identification labels, including arc-flash warning labels.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ASME A13.1.
B. Comply with NFPA 70.
C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
D. Comply with ANSI Z535.4 for safety signs and labels.
E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:
1. Black letters on an orange field.
2. Legend: Indicate voltage.
B. Warning labels and signs shall include, but are not limited to, the following legends:
1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.3 LABELS

A. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
B. Self-Adhesive Labels:
1. Preprinted, 3-mil- (0.08-mm-) thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

2.5 TAGS

A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.015 inch (0.38 mm) thick, color-coded for phase and voltage level, with factory screened permanent designations; punched for use with self-locking cable tie fastener.
C. Write-On Tags:
1. Polyester Tags: 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to raceway, conductor, or cable.
2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.6 SIGNS

A. Baked-Enamel Signs:
1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal Size: 7 by 10 inches (180 by 250 mm).
B. Metal-Backed Butyrate Signs:
1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch (1-mm) galvanized-steel backing and with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal Size: 10 by 14 inches (250 by 360 mm).
C. Laminated Acrylic or Melamine Plastic Signs:
1. Engraved legend.
2. Thickness:
a. For signs up to 20 sq. inches (129 sq. cm), minimum 1/16-inch- (1.6-mm-).
b. For signs larger than 20 sq. inches (129 sq. cm), 1/8 inch (3.2 mm) thick.
c. Engraved legend with white letters on a dark grey background.
d. Punched or drilled for mechanical fasteners or Self-adhesive.
e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
B. Apply identification devices to surfaces that require finish after completing finish work.
C. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
D. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
E. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench [**or concrete envelope**]exceeds 16 inches (400 mm) overall.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than A and V to Ground: Identify with self-adhesive vinyl label.
B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels containing the wiring system legend and system voltage. System legends shall be as follows:
1. "POWER."
C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use industry standard colors for ungrounded service feeder and branch-circuit conductors.
a. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
D. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.
E. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive vinyl labels with the conductor designation.
F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker-tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
1. Install underground-line warning tape for direct-buried cables and cables in raceways.
H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
1. Labeling Instructions:
a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine plastic label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
d. Unless labels are provided with self-adhesive means of attachment, fasten them with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION 260553

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Nonfusible switches.
2. Molded-case circuit breakers (MCCBs).
3. Molded-case switches.
4. Enclosures.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
B. Shop Drawings: For enclosed switches and circuit breakers.
1. Include plans, elevations, sections, details, and attachments to other work.
2. Include wiring diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
D. Comply with NFPA 70.

2.2 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
B. Basis-of-Design Product: Subject to compliance with requirements, provide [**product indicated on Drawings**] **<Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
1. Eaton.
2. General Electric Company.
3. Siemens Industry, Inc.
4. Square D; by Schneider Electric.
C. Type GD, General Duty, Three Pole, Single Throw, 240-V ac, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
D. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
E. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
B. Basis-of-Design Product: Subject to compliance with requirements, provide [**product indicated on Drawings**] **<Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
1. Eaton.
2. General Electric Company.
3. Siemens Industry, Inc.
4. Square D; by Schneider Electric.
C. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
D. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.
E. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 100 percent rated.
F. MCCBs shall be equipped with a device for locking in the isolated position.
G. Lugs shall be suitable for 167 deg F (75 deg C) rated wire.
H. Standards: Comply with UL 489 and NEMA AB 3, with interrupting capacity to comply with available fault currents.
I. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
J. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
3. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.

2.4 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
B. Enclosure Finish: The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1) gray baked enamel paint, electrodeposited on cleaned, phosphatized galvannealed steel (NEMA 250 Types 3R, 12).
C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.
D. Operating Mechanism: The circuit-breaker operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover directly operable through the front cover of the enclosure (NEMA 250 Type 1) directly operable through the dead front trim of the enclosure (NEMA 250 Type 3R). The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.
E. Enclosures designated as NEMA 250 Type 4, 4X stainless steel, 12, or 12K shall have a dual cover interlock mechanism to prevent unintentional opening of the enclosure cover when the circuit breaker is ON and to prevent turning the circuit breaker ON when the enclosure cover is open.
F. NEMA 250 Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor and wet location applications.

PART 3 - EXECUTION

3.1 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Kitchen Areas: NEMA 250, Type 4X, stainless steel.

3.2 INSTALLATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
E. Install fuses in fusible devices.
F. Comply with NFPA 70 and NECA 1.

3.3 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
C. Perform tests and inspections.
D. Tests and Inspections for Switches:
1. Visual and Mechanical Inspection:
a. Inspect physical and mechanical condition.
b. Inspect anchorage, alignment, grounding, and clearances.
c. Verify that the unit is clean.
d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
e. Verify that each fuse has adequate mechanical support and contact integrity.
f. Inspect bolted electrical connections for high resistance using one of the two following methods:
1) Use a low-resistance ohmmeter.
a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
g. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
2. Electrical Tests:
a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."
E. Tests and Inspections for Molded Case Circuit Breakers:
1. Visual and Mechanical Inspection:
a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, grounding, and clearances.
d. Verify that the unit is clean.
e. Operate the circuit breaker to ensure smooth operation.
f. Inspect bolted electrical connections for high resistance using one of the two following methods:
1) Use a low-resistance ohmmeter.
a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
g. Inspect operating mechanism, contacts, and chutes in unsealed units.
h. Perform adjustments for final protective device settings in accordance with the coordination study.
2. Electrical Tests:
a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
c. Perform a contact/pole resistance test. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
d. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two megohms.
e. Determine the following by primary current injection:
1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.
f. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of the shunt trip and close coils shall be as indicated by manufacturer.
g. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.
h. Verify operation of charging mechanism. Investigate units that do not function as designed.
3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
G. Prepare test and inspection reports.
1. Test procedures used.
2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
3. List deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 262816

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Current Issue:	50% Construction Documents
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Progress Set	06.19.2017

Sheet Title: ELECTRICAL SPECIFICATIONS

Date:	06.19.2017
Designed:	PJM
Reviewed:	DGD
Project No:	9817.00

Sheet No: E-003

Scale: As Shown

DEMOLITION NOTES:

A. ELECTRICAL CONTRACTOR TO FIELD VERIFY ALL EXISTING ELECTRICAL DEVICES THAT PERTAIN TO THIS PROJECT. PROVIDE A REASONABLE ALLOWANCE FOR ITEMS REQUIRED TO BE DEMOLISHED THAT ARE NOT INDICATED ON THESE PLANS.

B. CONTRACTOR SHALL PATCH, PAINT AND REPAIR BACK TO ORIGINAL CONDITION ANY DAMAGE ON WALLS, CEILINGS, FLOOR, ETC AS RESULT OF DEMOLITION.

C. ALL LIGHTS, SWITCHES, DEVICES, ETC. INDICATED ARE TO BE REMOVED UNLESS NOTED OTHERWISE.

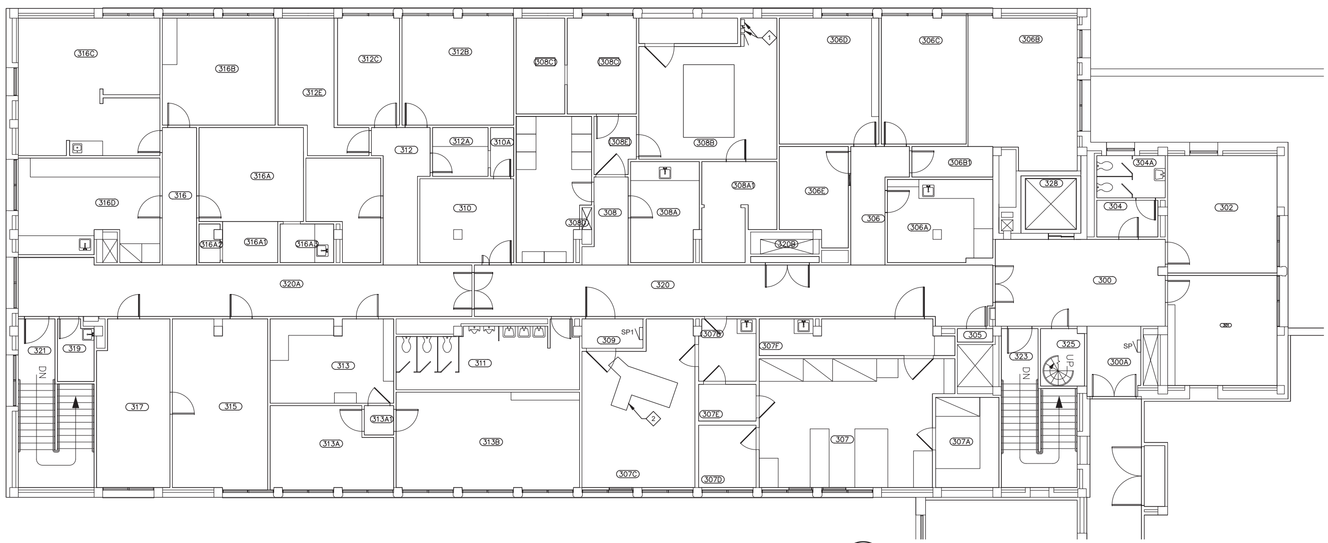
D. CONTRACTOR SHALL MAINTAIN CIRCUIT CONTINUITY FOR ANY ELECTRICAL DEVICES TO REMAIN.

E. ANY EXISTING DEVICES TO REMAIN IN PLACE SHALL BE REPLACED WITH NEW WHITE DEVICE AND COVER PLATE.

FLAG NOTES:

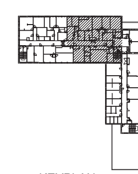
1. REMOVE EXISTING DISCONNECT AND ASSOCIATED CIRCUIT, WIRING, AND CONDUIT BACK TO SOURCE. RETAIN EXISTING DISCONNECT SWITCH FOR REUSE.

2. DISCONNECT 'TIMS' UNIT, PULL EXISTING FEEDER BACK TO PANEL OR LOCATION WHERE IT COULD BE EXTENDED TO NEW 'TIMS' UNIT LOCATION.



1 ELECTRICAL 3RD FLOOR DEMOLITION PLAN

SCALE: 1/8" = 1'-0"



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3RD FLOOR PLAN

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ELECTRICAL
3RD FLOOR
DEMOLITION PLAN

Date:	06.19.2017
Designed:	KJB
Reviewed:	PHW
Project No:	9817.00

Sheet No:
ED-103

Scale: As Shown

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DEMOLITION NOTES:

A. ELECTRICAL CONTRACTOR TO FIELD VERIFY ALL EXISTING ELECTRICAL DEVICES THAT PERTAIN TO THIS PROJECT. PROVIDE A REASONABLE ALLOWANCE FOR ITEMS REQUIRED TO BE DEMOLISHED THAT ARE NOT INDICATED ON THESE PLANS.

B. CONTRACTOR SHALL PATCH, PAINT AND REPAIR BACK TO ORIGINAL CONDITION ANY DAMAGE ON WALLS, CEILINGS, FLOOR, ETC AS RESULT OF DEMOLITION.

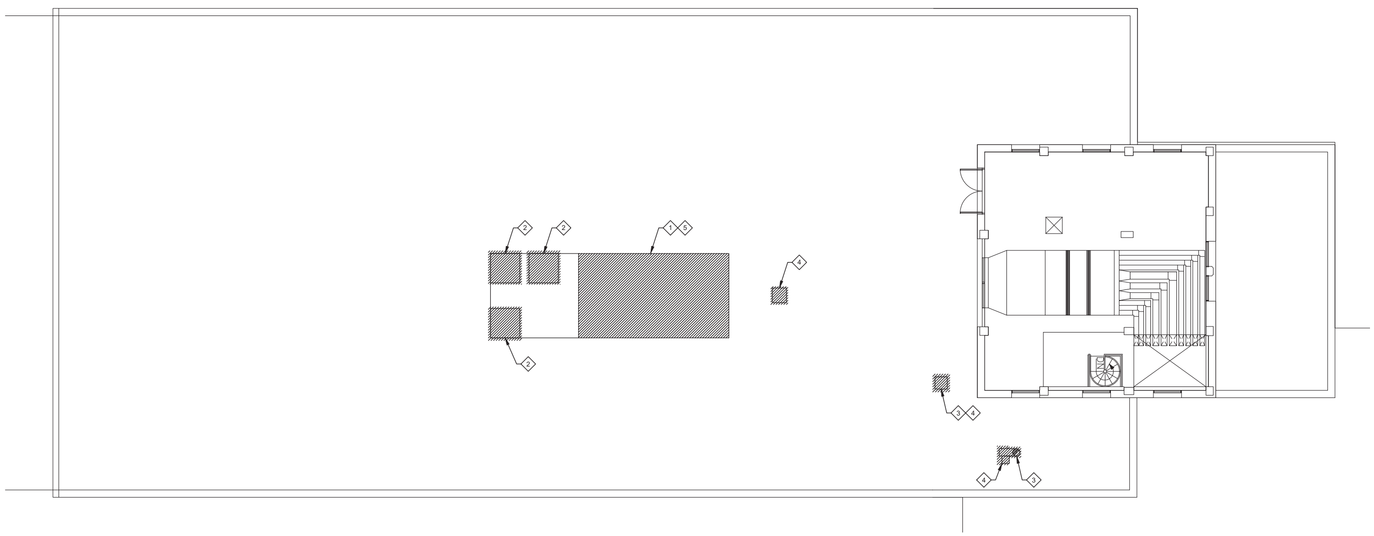
C. ALL LIGHTS, SWITCHES, DEVICES, ETC. INDICATED ARE TO BE REMOVED UNLESS NOTED OTHERWISE.

D. CONTRACTOR SHALL MAINTAIN CIRCUIT CONTINUITY FOR ANY ELECTRICAL DEVICES TO REMAIN.

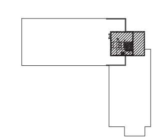
E. ANY EXISTING DEVICES TO REMAIN IN PLACE SHALL BE REPLACED WITH NEW WHITE DEVICE AND COVER PLATE.

FLAG NOTES:

1. DISCONNECT AIR HANDLING UNIT. REMOVE ASSOCIATED WIRING. RE-LABEL CIRCUIT AS "SPARE" IN PANEL. EXISTING CONDUIT MAY REMAIN FOR REUSE.
2. DISCONNECT CONDENSING UNIT. REMOVE ASSOCIATED WIRING AND CONDUIT BACK TO SOURCE. LABEL CIRCUIT AS "SPARE" AND TURN BREAKERS OFF.
3. REMOVE COMBINATION STARTER AND DISCONNECT EXHAUST FAN. RETAIN CONDUIT AND WIRING FOR REUSE FOR NEW UNIT.
4. REMOVE DUCT DETECTOR. FIELD VERIFY LOCATION. REMOVE CONDUIT AND WIRING BETWEEN ROOFTOP UNIT AND EXHAUST FANS AND REMOVE CONTROL WIRING.
5. DISCONNECT 120V CIRCUIT SERVING RECEPTACLES AND LIGHTING INSIDE AIR HANDLING UNIT. RETAIN HOMERUN CONDUIT AND WIRING IN PLACE FOR REUSE.



1 ELECTRICAL ROOF DEMOLITION PLAN
SCALE: 1/8" = 1'-0"



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Issued:	
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ELECTRICAL ROOF DEMOLITION PLAN

Date:	06.19.2017
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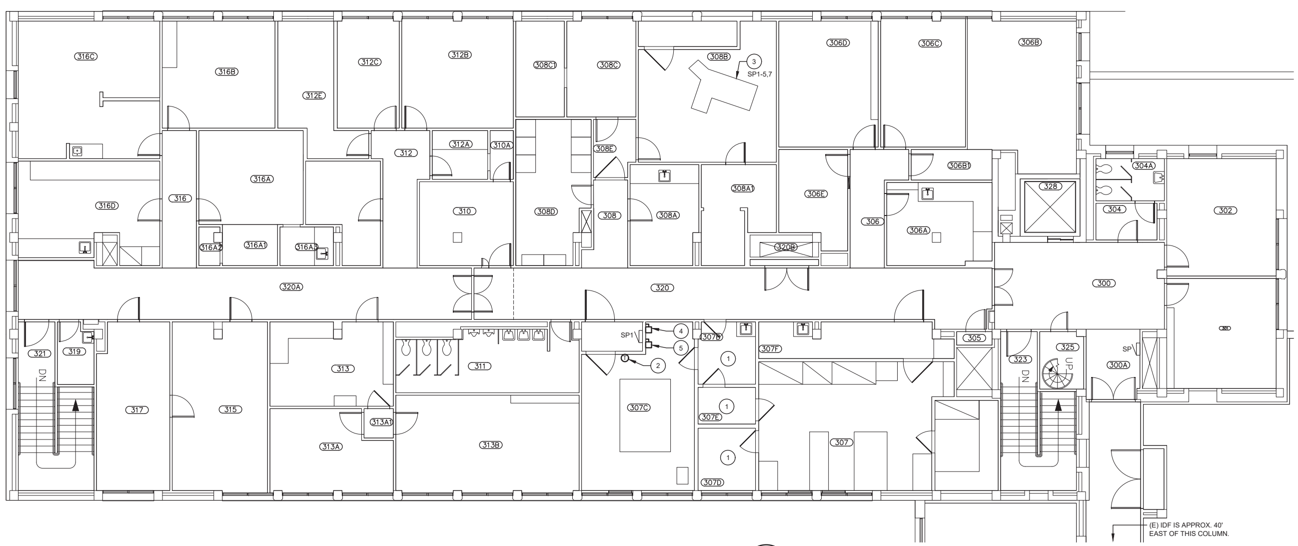


1 ELECTRICAL 3RD FLOOR PLAN
SCALE: 1/8" = 1'-0"

NOTES:

A. ALL WIRING SHALL BE #12 AWG UNLESS NOTED OTHERWISE.

B. ALL NEW CIRCUITS ARE SHOWN IN BOLD IN PANEL SCHEDULE. ALL EXISTING CIRCUITS ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR TO FIELD VERIFY.

C. REFER TO MECHANICAL PLANS FOR NEW EQUIPMENT CONNECTIONS.

FLAG NOTES:

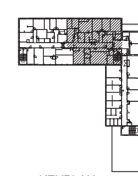
1. ALL CONDUIT, BOXES, FITTINGS IN THIS ROOM INCLUDING ABOVE CEILING SHALL BE PVC. PVC SCREWS SHALL BE USED TO SECURE CONDUIT, BOXES AND FITTINGS. NO METAL IS ALLOWED.

2. PROVIDE BOX AT 54" AFF AND CONDUIT FOR STUBBED ABOVE CEILING FOR T-STAT PROVIDED BY MECHANICAL.

3. CONNECT RELOCATED 'TIMS' UNIT. EXTEND 20A (3WG) FROM EXISTING 20A,2P CIRCUIT BREAKER IN PANEL SP1.

4. INSTALL DISCONNECT RETAINED DURING DEMOLITION. PROVIDE 40A (4WG), BACK TO 40A,3P CIRCUIT BREAKER IN PANEL SP1-2,4,6. FEEDER SHALL BE IN LFMC FROM LOAD SIDE OF DISCONNECT TO RELOCATED POWER CONDITIONER.

5. INSTALL DISCONNECT RETAINED DURING DEMOLITION. PROVIDE 50A (4WG), (4)#6 AND #10G IN 3/4"C, BACK TO 50A,3P CIRCUIT BREAKER IN PANEL SP1-1,3,5. FEEDER SHALL BE IN LFMC FROM LOAD SIDE OF DISCONNECT TO RELOCATED UPS.



KEYPLAN
3RD FLOOR PLAN

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Progress Set	06.19.2017

Sheet Title:
ELECTRICAL
3RD FLOOR PLAN

Date:	06.19.2017
Designed:	PJM
Reviewed:	DGD
Project No:	9817.00

Sheet No:
E-103

Scale: As Shown

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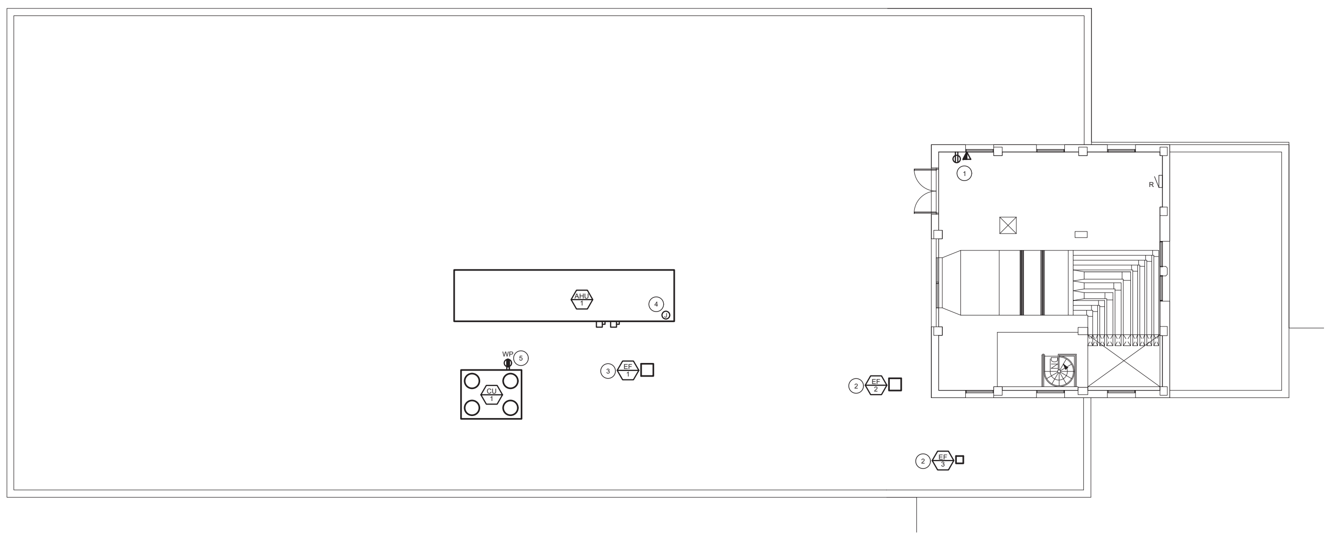


1 ELECTRICAL ROOF PLAN

SCALE: 1/8" = 1'-0"

NOTES:

A. ALL WIRING SHALL BE #12 AWG UNLESS NOTED OTHERWISE.

B. ALL NEW CIRCUITS ARE SHOWN IN BOLD IN PANEL SCHEDULE. ALL EXISTING CIRCUITS ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR TO FIELD VERIFY.

C. REFER TO MECHANICAL PLANS FOR NEW EQUIPMENT CONNECTIONS.

FLAG NOTES:

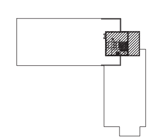
1. PROVIDE RECEPTACLE AND DATA OUTLET FOR HVAC CONTROL CABINET. REFER TO MECHANICAL FOR LOCATION. EXTEND 120V POWER FROM NEAREST SOURCE, VERIFY CONNECTED LOAD DOES NOT EXCEED 16A. EXTEND DATA CABLE FROM NEAREST IDF ROOM. COORDINATE LOCATION AND CABLING REQUIREMENTS WITH CAMPUS IT.

2. RECONNECT EXISTING WIRING AND CONDUIT RETAINED DURING DEMOLITION TO NEW EXHAUST FANS.

3. EXTEND 20A,3P BRANCH CIRCUIT FROM EF-3 TO NEW EF-1.

4. CONNECT INTERIOR LIGHTING, PREWIRED FROM FACTORY, TO 120V BRANCH CIRCUIT RETAINED DURING DEMOLITION.

5. EXTEND 120V BRANCH CIRCUIT SERVING AHU-1 LIGHTING TO SERVICE RECEPTACLE BUILT-IN TO CU-1.



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Issued:

Progress Set	06.19.2017

Sheet Title:

ELECTRICAL ROOF PLAN

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E-104

Scale: As Shown

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MECHANICAL SYSTEMS LEGEND

PIPING SYMBOLS

Symbol	Description
	90° ELBOW DN
	90° ELBOW UP
	TEE DOWN
	TEE UP
	BUTTERFLY VALVE
	SHUT OFF (BALL, GATE, BUTTERFLY)
	GLOBE VALVE
	CHECK VALVE
	FLOW CONTROL VALVE
	BALL VALVE
	PLUG OR BALANCING VALVE
	FLOW BALANCING VALVE
	PLUG VALVE IN RISER
	GATE OR GLOBE VALVE IN RISER
	DRAIN VALVE W/ HOSE END
	TEMPERATURE CONTROL VALVE (2-WAY)
	TEMPERATURE CONTROL VALVE (3-WAY)
	PRESSURE REDUCING VALVE
	SOLENOID VALVE
	VENTURI/FLOW INDICATOR
	PUMP & EQUIPMENT CONNECTOR
	PIPE UNION
	DOUBLE CHECK BACKFLOW PREVENTER
	PIPE ANCHOR
	PIPE EXPANSION JOINT
	FLEXIBLE CONNECTOR
	SAFETY RELIEF VALVE
	AIR VENT
	PRESSURE - TEMP. TAP
	PRESSURE GAUGE W/ PIG TAIL & COCK
	THERMOMETER
	VACUUM BREAKER
	STRAINER W/ BLOW-OFF VALVE
	SHOCK ABSORBER
FS	FLOW SWITCH
	HORIZONTAL CLEANOUT
	VERTICAL CLEANOUT
	FLOOR DRAIN
	FLOOR SINK
	ROOF DRAIN
	DECK/ROOF DRAIN ABOVE
TC	TEMPERATURE CONTROLLER OR SENSOR
H B	HOSE BIBB
W H	WALL HYDRANT
	STEAM TRAP TEST CHAMBER
Ø	STEAM TRAP: FT-FLOAT & THERMOSTATIC TD-THERMODYNAMIC IB-INVERTED BUCKET TS-THERMOSTATIC BP-BALANCED PRESSURE

NOTES

1. ALL SYMBOLS, ABBREVIATIONS, AND DESIGNATIONS ON LEGEND SHEET ARE NOT NECESSARILY USED ON THIS PROJECT.
2. THIS DRAWING SET CONSISTS OF DATA GENERATED, IN PART, BY OTHER PARTIES. NOT ALL SYMBOLOGIES AND NOTATION CONVENTIONS OCCURRING IN THIS DRAWING SET ARE NECESSARILY DEFINED ON THESE LEGENDS. CONSULT THE ENGINEER IN THE EVENT SYMBOLOGY OR NOTATION INTERPRETATION IS REQUIRED.

EQUIPMENT ABBREVIATIONS

AHU	AIR HANDLING UNIT
AS	AIR SEPARATOR
B	BOILER (HOT WATER)
BB	BASE BOARD
BT	BUFFER TANK
CC	COOLING COIL
CH	CHILLER
CP	CIRC PUMP
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CV	CONSTANT VOLUME BOX
DC	DUCT COIL
DEF	DISHWASHER EXHAUST FAN
EBH	ELECTRIC BASEBOARD HEATER
ECU	EVAPORATIVE COOLING UNIT
EF	EXHAUST FAN
ERU	ENERGY RECOVERY UNIT
ET	EXPANSION TANK
EWH	ELECTRIC WATER HEATER
F	FURNACE
FC	FAN COIL
FP	FAN POWERED BOX
GF	GLYCOL FEEDER
H	HUMIDIFIER
HC	HEATING COIL
HP	HEAT PUMP
HX	HEAT EXCHANGER
KEF	KITCHEN EXHAUST FAN
MAU	MAKE-UP AIR UNIT
MCC	MOTOR CONTROL CENTER
MV	MIXING VALVE
P	PUMP
RF	RETURN (OR RELIEF) AIR FAN
RZ	RADIANT ZONE
SA	SNOWMELT AREA
SB	SUMP BASIN
SF	SUPPLY FAN
SP	SUMP PUMP
ST	STORAGE TANK
TMV	THERMOSTATIC MIXING VALVE
UH	UNIT HEATER
VR	VARIABLE VOLUME BOX W/ REHEAT
VV	VARIABLE VOLUME BOX
WH	WATER HEATER

PLAN SYMBOLS

Symbol	Description
	CONTROL PANEL/RADIANT MANIFOLD
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
H	HUMIDISTAT
S	REMOTE TEMPERATURE SENSOR
T	THERMOSTAT
SP	DUCT STATIC PRESSURE SENSOR
P	ROOM PRESSURE SENSOR
EPO	EMERGENCY POWER OFF SWITCH
P	PLUMBING/HVAC RISER
	DIAGRAM CONTINUATION REFERENCE
	SECTION CUT LETTER/SHEET SHOWN ON
	POINT OF DISCONNECTION
	POINT OF NEW CONNECTION
	ACCESS PANEL
	SNOWMELT MANIFOLD

PROJECT ALTITUDE

5,300' ABOVE SEA LEVEL

PLAN ABBREVIATIONS

AAV	AIR ADMITTANCE VALVE
ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AUTO	AUTOMATIC
BCS	BUILDING CONTROL SYSTEM
BDD	BACK DRAFT DAMPER
BFG	BELOW FINISHED GRADE
BLDG	BUILDING
B/N	BETWEEN
C	COMMON (OR CLOSED)
CA	COMBUSTION AIR
CC	CONTROLS CONTRACTOR
CDBBC	CONTINUATION DESIGN BUILD BY CONTRACTOR
CFM	CUBIC FEET PER MINUTE (AIR FLOW RATE)
CIP	CAST IN PLACE
CLG	CEILING (OR COOLING)
CO	CLEANOUT
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECT (OR CONNECTION)
CONTR'R	CONTRACTOR
COTG	CLEANOUT TO GRADE
CW	COLD WATER
DHR	DOMESTIC HOT WATER RECIRC
DHW	DOMESTIC HOT WATER
DN	DOWN
DW	DOMESTIC WATER
DWR	DOMESTIC HOT WATER RECIRC
(E)	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
(F)	FUTURE
FA	FREE AREA
FBO	FURNISHED BY OWNER
FCO	FLOOR CLEANOUT
FCT	FOR CONTINUATION
FD	FIRE DAMPER
FFI	FOR FURTHER INFORMATION
FSD	COMBINATION FIRE/SMOKE DAMPER
GC	GENERAL CONTRACTOR
GHX	GROUND HEAT EXCHANGER
GPM	GALLONS PER MINUTE (WATER FLOW RATE)
HP	HORSEPOWER
HW	HOT WATER
HWC	HOT WATER RECIRC
ILO	IN LIEU OF
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LF	LINEAR FOOT
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MFG	MANUFACTURER
MOD	MOTOR OPERATED DAMPER
(N)	NEW
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OBD	OPPOSED BLADE VOLUME DAMPER
OC	ON CENTER
OSA	OUTSIDE AIR
RA	RETURN AIR
RE:	REFER TO:
REQ'D	REQUIRED
REQ'MTS	REQUIREMENTS
SA	SUPPLY AIR
SF	SQUARE FOOT (FEET)
SP	STATIC PRESSURE
SS	STAINLESS STEEL
TA	THROW-AWAY (TRANSFER AIR)
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
W/	WITH
W/O	WITHOUT
WCO	WALL CLEANOUT
WRT	WITH REGARD TO
W/C	WATER COOLED
VTR	VENT THRU ROOF
XFR	TRANSFER
Ø	DIAMETER

PIPING DESIGNATIONS

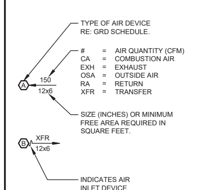
HYDRONIC PIPING

—CS—	CONDENSER SUPPLY
—CR—	CONDENSER RETURN
—CHS—	CHILLED WATER SUPPLY
—CHR—	CHILLED WATER RETURN
—CCS—	CLOSED CONDENSER SUPPLY
—CCR—	CLOSED CONDENSER RETURN
—GLS—	GROUND LOOP SUPPLY
—GLR—	GROUND LOOP RETURN
—GF—	GLYCOL FEED
—GLS—	GEOTHERMAL (OR GROUND) LOOP SUPPLY
—GLR—	GEOTHERMAL (OR GROUND) LOOP RETURN
—HWS—	HEATING WATER SUPPLY
—HWR—	HEATING WATER RETURN
-HWS(LT)-	HEATING WATER SUPPLY (LOW TEMP)
-HWR(LT)-	HEATING WATER RETURN (LOW TEMP)
-HWS(HT)-	HEATING WATER SUPPLY (HIGH TEMP)
-HWR(HT)-	HEATING WATER RETURN (HIGH TEMP)
—SHWS—	SOLAR HEATING WATER SUPPLY
—SHWR—	SOLAR HEATING WATER RETURN
—SMS—	SNOWMELT SUPPLY
—SMR—	SNOWMELT RETURN
— FCS —	FLOOR COOLING SUPPLY
— FCR —	FLOOR COOLING RETURN

STEAM & CONDENSATE PIPING

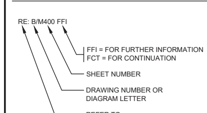
—HPS—	HIGH PRESSURE STEAM
—HPR—	HIGH PRESSURE CONDENSATE RETURN
—MPS—	MEDIUM PRESSURE STEAM
—MPR—	MEDIUM PRESSURE CONDENSATE RETURN
—LPS—	LOW PRESSURE STEAM
—LPR—	LOW PRESSURE CONDENSATE RETURN
—PC—	PUMPED CONDENSATE
—CA—	COMPRESSED AIR PIPE

AIR DEVICE DESIGNATION KEY



NOTE:
FOR STANDARD MODULE SIZE REGISTERS, SIZE GIVEN IS NECK SIZE. REFER TO GRD SCHEDULE FOR MODULE SIZE.

REFERENCE SAMPLE



DUCTWORK LEGEND

SINGLE LINE	DESCRIPTION	DOUBLE LINE
	90° ELBOW DOWN (ROUND DUCT ONLY)	
	ROUND 90° ELBOW UP (ROUND DUCT ONLY)	
D	OFFSET TO CHANGE ELEVATION (AT 30° WHEN POSSIBLE) D = DROP R = RISE	D
	ROUND RADIUS ELBOW	
	90° STRAIGHT TEE	
	90° CONICAL TEE	
	45° BRANCH	
	45° CONICAL TEE	
	SIZE OR SHAPE TRANSITION	
	ROUND FLEXIBLE DUCT	
	90° ELBOW DN (NEGATIVE PRESSURE)	
	90° ELBOW DN (POSITIVE PRESSURE)	
	90° ELBOW UP (NEGATIVE PRESSURE)	
	90° ELBOW UP (POSITIVE PRESSURE)	
	90° RADIUS ELBOW	
	90° RADIUS ELBOW W/TURNING VANES	
	SQUARE DUCT SPLIT	
	ROUND DUCT SPLIT	
	SPLIT BRANCH TAKE-OFF WITH SQUARE ELBOW & SPLITTER DAMPER	
	SPLIT BRANCH TAKE-OFF WITH RADIUS ELBOW & SPLITTER DAMPER	
	POSITIVE PRESSURE RISER, TYPICALLY SUPPLY	
	NEGATIVE PRESSURE RISER, TYPICALLY RETURN, EXHAUST OR OUTSIDE AIR	
F/S	COMBINATION FIRE & SMOKE DAMPER	F/S
	FIRE DAMPER	
	SMOKE DAMPER	
	MOTOR OPERATED DAMPER (MOD)	
	MANUAL VOLUME DAMPER, SINGLE BLADE DAMPER (SBD) FOR ROUND OR <10" TALL, OPPOSED BLADE DAMPER (OBD) >10" TALL	
BDD	BACKDRAFT DAMPER	BDD
SD	SMOKE DETECTOR	SD
24x36	DUCT SIZE: FIRST NUMBER IS PLAN WIDTH, SECOND NUMBER IS DEPTH.	24x36

MECHANICAL SHEET INDEX

#	TITLE	ISSUE LOG: 50% CONSTRUCTION DOCUMENTS	95% CONSTRUCTION DOCUMENTS	
M-001	MECHANICAL COVER SHEET	√	√	
M-002	MECHANICAL GENERAL NOTES	√	√	
M-003	MECHANICAL GENERAL NOTES			√
MD-103	MECHANICAL DEMOLITION 3RD FLOOR PLAN	√	√	
MD-104	MECHANICAL DEMOLITION ROOF PLAN	√	√	
M-103	MECHANICAL 3RD FLOOR PLAN	√	√	
MP-103	MECHANICAL PIPING PLAN		√	
M-104	MECHANICAL ROOF PLAN	√	√	
M-201	ZONE PRESSURIZATION PLAN			√
M-501	MECHANICAL SCHEDULES AND DETAILS	√	√	
M-701	MECHANICAL CONTROLS	√	√	
M-702	MECHANICAL CONTROLS			√
	DATE	06-01-17	06-19-17	

ISSUE LOG KEY:
'√' ISSUED AS PART OF A SET
' ' NOT PART OF SET
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Current Issue: 50% Construction Documents

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Sheet Title: MECHANICAL COVER SHEET

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Project No:	9817.00

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Scale: As Shown

GENERAL NOTES (MECHANICAL SPECIFICATIONS)

1. DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS IN FIELD PRIOR TO COMMENCEMENT OF WORK. REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS.

2. ALL SUBCONTRACTORS SHALL BE LICENSED, EXPERIENCED, AND THOROUGHLY KNOWLEDGEABLE IN THEIR RESPECTIVE AREAS OF THE CONSTRUCTION INDUSTRY AND SHALL PERFORM IN A RESPONSIBLE MANNER WITH ESTABLISHED CONSTRUCTION SEQUENCE, SHALL RECOGNIZE THE PRIORITY OF THE CONSTRUCTION DOCUMENTS, AND SHALL INFORM THE PRIME CONTRACTOR OF POTENTIAL PROBLEMS WHEN THE CONSTRUCTION DOCUMENTS ARE UNCLEAR OR INCONSISTENT.

3. SUBCONTRACTORS SHALL BE RESPONSIBLE TO NOTIFY THE PRIME CONTRACTOR OF DISCREPANCIES OR CONFLICTS IN THE CONSTRUCTION DOCUMENTS FOUND DURING BIDDING AND/OR PRIOR TO PERFORMING THE WORK.

4. EXAMINATION OF BIDDING DOCUMENTS.

   A. EACH BIDDER SHALL EXAMINE THE BIDDING DOCUMENTS CAREFULLY, AND NOT LATER THAN SEVEN (7) DAYS PRIOR TO THE DATE OF RECEIPT OF BIDS, SHALL MAKE WRITTEN REQUEST TO THE ARCHITECT FOR INTERPRETATION OR CORRECTION OF ANY DISCREPANCIES, AMBIGUITIES, INCONSISTENCIES, OR ERRORS THEREIN WHICH HE MAY DISCOVER. THE ARCHITECT WILL ISSUE ANY INTERPRETATION OR CORRECTION AS AN ADDENDUM. ONLY A WRITTEN INTERPRETATION OR CORRECTION BY ADDENDUM SHALL BE BINDING. NO BIDDER SHALL RELY UPON INTERPRETATIONS OR CORRECTIONS GIVEN BY ANY OTHER METHOD. IF DISCREPANCIES, AMBIGUITIES, INCONSISTENCIES, OR ERRORS ARE NOT COVERED BY ADDENDUM OR WRITTEN DIRECTIVE, CONTRACTOR SHALL INCLUDE IN HIS BID, LABOR MATERIALS AND METHODS OF CONSTRUCTION RESULTING IN HIGHER COST. AFTER AWARD OF CONTRACT, NO ALLOWANCE OR EXTRA COMPENSATION WILL BE MADE ON BEHALF OF THE CONTRACTOR DUE TO HIS FAILURE TO MAKE THE WRITTEN REQUESTS AS DESCRIBED ABOVE.

   B. FAILURE TO REQUEST CLARIFICATION DURING THE BID PERIOD OF ANY INADEQUACY, OMISSION, OR CONFLICT WILL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES. THE SIGNING OF THE CONTRACT WILL BE CONSIDERED AS IMPLICITLY DENOTING THAT THE CONTRACTOR HAS A THOROUGH COMPREHENSION OF THE FULL INTENT AND SCOPE OF THE CONSTRUCTION CONTRACT DRAWINGS AND SPECIFICATIONS.

6. PROVIDE A BASE BID WHICH SHALL INCLUDE ONLY SPECIFIED EQUIPMENT OR EQUIPMENT LISTED AS EQUIVALENT. NO SUBSTITUTIONS FOR THE LISTED EQUIPMENT SHALL BE ALLOWED IN THE BASE BID.

   A. THE MANUFACTURER OF EQUIPMENT OR MATERIALS FIRST NAMED ON THE DRAWINGS IS THE BASIS OF DESIGN. OTHER MANUFACTURERS LISTED ARE CONSIDERED GENERAL EQUIVALENTS ONLY.

   B. COORDINATION OF GENERAL EQUIVALENTS AND SUBSTITUTIONS: WHERE CONTRACT DOCUMENTS PERMIT SELECTION FROM SEVERAL GENERAL EQUIVALENTS, OR WHERE SUBSTITUTIONS ARE AUTHORIZED, COORDINATE CLEARANCE AND OTHER INTERFACE REQUIREMENTS WITH MECHANICAL AND OTHER WORK.

      1) PROVIDE NECESSARY ADDITIONAL ITEMS SO THAT SELECTED OR SUBSTITUTED ITEM OPERATES EQUIVALENT TO THE BASIS OF DESIGN AND PROPERLY FITS IN THE AVAILABLE SPACE ALLOCATED FOR THE BASIS OF DESIGN.

      2) PROVIDE ALL FEATURES WHICH ARE STANDARD ON THE BASIS OF DESIGN PLUS ANY SPECIFIED OPTIONS.

      3) BE RESPONSIBLE FOR ASSURING THAT PIPING, CONDUIT, DUCT, FLUE, AND OTHER SERVICE LOCATIONS FOR GENERAL EQUIVALENTS OR SUBSTITUTIONS DO NOT CAUSE ACCESS, SERVICE, OR OPERATIONAL DIFFICULTIES ANY GREATER THAT WOULD BE ENCOUNTERED WITH THE BASE DESIGN.

7. INASMUCH AS DESIGN FOR REMODEL AND/OR REHABILITATION REQUIRES THAT CERTAIN ASSUMPTIONS BE MADE REGARDING EXISTING CONDITIONS, AND BECAUSE SOME OF THESE ASSUMPTIONS CANNOT BE VERIFIED WITHOUT DESTROYING OTHERWISE ADEQUATE OR SERVICEABLE PORTIONS OF THE BUILDING, THE ENGINEER CANNOT ASSURE THE OWNER OR THE CONTRACTOR THAT THE PROFESSIONAL CONSULTING SERVICES HEREIN ENCOMPASS ALL CONTINGENCIES. FIELD COORDINATION DURING CONSTRUCTION IS IMPERATIVE. MAKE REASONABLE ALLOWANCES FOR UNSEEN CONDITIONS.

8. BE RESPONSIBLE TO FIELD VERIFY EXISTING EQUIPMENT OR DUCTWORK REMAINING TO BE CONNECTED TO NEW OR EXISTING SYSTEMS. PROVIDE DUCTWORK, PIPING, CONTROLS, DIFFUSERS, ETC., AS REQUIRED TO RESTORE CONTINUITY OF SYSTEM (S), OR TO MAKE [NEW] WORK MEET EXISTING CONDITIONS, WHETHER INDICATED OR NOT.

9. SUBCONTRACTOR SHALL VERIFY EXISTENCE AND LOCATION OF ALL UTILITY SERVICES AND COORDINATE AS REQUIRED BY THEIR RESPECTIVE AREA OF THE CONSTRUCTION, NOTIFYING THE PRIME CONTRACTOR OF VARIATIONS OR CONFLICTS.

10. IF NOT SPECIFICALLY DEFINED IN THESE CONSTRUCTION DOCUMENTS, MATERIALS AND/OR EQUIPMENT SHALL BE IDENTIFIED BY THE SUBCONTRACTOR WITH SUFFICIENT TIME TO ALLOW SELECTION, PURCHASE, AND DELIVERY TO MAINTAIN CONSTRUCTION SCHEDULE.

11. PROVIDE MECHANICAL DEMOLITION AS REQUIRED. REFER TO ARCHITECTURAL DEMOLITION DRAWINGS FOR LOCATION AND EXTENT OF DEMOLITION REQUIRED. VISIT SITE PRIOR TO BID TO DETERMINE EXTENT OF WORK INVOLVED. [EXISTING] FIXTURES, MECHANICAL EQUIPMENT, ETC., BEING REMOVED SHALL BE RETURNED TO THE OWNER. DISPOSE OF ALL REMOVED PIPING, DUCTWORK, ETC. UNLESS NOTED OTHERWISE. PIPES, DUCTWORK, EQUIPMENT, ETC. TO BE REMOVED, ARE SHOWN HATCHED, UNLESS OTHERWISE NOTED.

12. ALL DUCTWORK, DIFFUSERS, PIPING, FIXTURES, AND EQUIPMENT SHOWN IN LIGHT LINE WEIGHT IS EXISTING, NEW INDICATED BY HEAVIER LINE WEIGHT, EXCEPT WHERE NOTED. PIPES, DUCTWORK, EQUIPMENT, ETC. TO BE REMOVED, ARE SHOWN HATCHED.

13. OFFSET PIPING, DUCTWORK, ETC. AS NECESSARY TO ACCOMMODATE STRUCTURE, BEAMS, AND COLUMNS, AND EXISTING EQUIPMENT.

14. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT, OWNER, AND ENGINEER.

15. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM HIS/HER WORK IN CONFORMANCE WITH ALL APPLICABLE CODES, ORDINANCES AND LIFE SAFETY FEATURES AS REQUIRED BY LOCAL, STATE, OR NATIONAL AUTHORITIES. THE CONTRACTOR SHALL VERIFY WITH THE ARCHITECT IF MODIFICATION OF HIS/HER WORK IS REQUIRED FOR COMPLIANCE.

16. ALL WORK OF ALL TRADES MUST BE IN STRICT COMPLIANCE, OR EXCEED THE MINIMUM MATERIAL AND METHOD REQUIREMENTS OF THE **2012** VERSION OF THE **UNIFORM** MECHANICAL AND PLUMBING CODE; FIRE CODES AND THE **2014** NATIONAL ELECTRICAL CODE, MOST CURRENT NFPA, ALL LOCAL ORDINANCES AND AMENDMENTS AND MANUFACTURER'S INSTALLATION RECOMMENDATIONS. IF A CONFLICT BETWEEN THOSE PUBLICATIONS EXISTS, THE MOST STRINGENT REQUIREMENT SHALL APPLY.

17. PAY FOR AND SECURE ALL REQUIRED PERMITS AND INSPECTIONS. PRIOR TO FINAL PAYMENT, TURN OVER TO ARCHITECT ALL CERTIFICATES OF COMPLETION.

18. WARRANTY THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP. THE WARRANTY SHALL BE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY REMEDIED WITHOUT COST TO THE OWNER.

19. SUBMIT RECORD DOCUMENTS TO ARCHITECT. DOCUMENTS SHALL INCLUDE ALL ADDENDUM ITEMS, CHANGE ORDERS, ALTERATIONS, REROUTINGS, ETC.

20. SYSTEMS SHALL BE COMPLETE, OPERABLE, AND READY FOR CONTINUOUS OPERATION PRIOR TO ACCEPTANCE BY THE OWNER.

21. SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. PERFORM AT A MINIMUM ALL CODE REQUIRED TESTS OR SYSTEMS. IF TESTS OF WORK ARE DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO ADDITIONAL COST TO OWNER.

22. ALL MATERIALS AND/OR EQUIPMENT SHALL BE HANDLED AND INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

23. SUBMIT ALL MECHANICAL DIVISION SHOP DRAWING AND PRODUCT DATA AT ONE TIME. PARTIAL SUBMITTALS WILL BE REJECTED.

24. SHOP DRAWING SUBMITTALS SHALL STATE CAPACITIES, SIZES, ETC., OF ALL EQUIPMENT AND SHALL BE CERTIFIED AND INCLUDE COMPUTER BASED PROJECT SPECIFIC SELECTIONS WHERE APPLICABLE. CLEARLY MARK EACH SHOP DRAWING, CATALOG CUT AND/OR SPECIFICATION SHEET TO INDICATE THOSE PRODUCTS AND FEATURES WHICH ARE INTENDED TO BE FURNISHED. SPECIFICALLY INDICATE ANY DEVIATIONS FROM THE DESIGN INTENT. ENGINEER RESERVES THE RIGHT TO REQUIRE CORRECTION AT NO COST TO OWNER FOR DEVIATIONS NOT SPECIFICALLY INDICATED IN THE SUBMITTALS. REVIEW AND APPROVAL OF SHOP DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY OF FURNISHING EQUIPMENT AND MATERIALS OF PROPER DIMENSION, SIZE, QUANTITY, QUALITY AND ALL PERFORMANCE CHARACTERISTICS TO EFFICIENTLY PERFORM THE REQUIREMENTS AND INTENT OF THE CONTRACT DOCUMENTS. SUBMITTAL SHALL BE BOUND AND INDEXED IN A NEAT AND ORDERLY MANNER.

25. SUBMITTALS SHALL INCLUDE, BUT NOT BE LIMITED TO: EQUIPMENT, FIXTURES, INSULATION, DIFFUSERS, PUMPS, FANS, PIPING, VALVES, BOILERS, FURNACES, CONTROLS, AND FIRE PROTECTION.

26. FAILURE TO ORDER, OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT, OR INSTALLATION METHODS.

27. PROVIDE NECESSARY TRENCHING, BACKFILL, EXCAVATION, SUPPORTS, SAWCUTTING AND PATCHING, CONCRETE/PAVING, ETC., AS REQUIRED. BACKFILL TRENCHES IN 6" LAYERS AND TO 90% COMPACTION AND PATCH TO MATCH [EXISTING] GRADE.

28. REPAIR ALL ACCIDENTAL OR INTENTIONAL DAMAGE TO MATCH [EXISTING] CONSTRUCTION WITH NO NOTICEABLE DIFFERENCE IN CONTINUITY, APPEARANCE OR FUNCTION.

29. TEMPORARY HEAT SHALL BE FURNISHED BY THE GENERAL CONTRACTOR. USE OF THE PERMANENT HEATING SYSTEM WILL NOT BE ALLOWED.

30. COORDINATE ALL PENETRATIONS OF THE FLOOR SLAB PRIOR TO COMMENCING WORK. UTILIZE X-RAY AND VISUAL INVESTIGATION OF EXISTING CONDITIONS PRIOR TO DRILLING OR CUTTING. COORDINATE ALL NEW PENETRATIONS WITH OTHER DIVISIONS OF THE WORK. ALL CONTRACTORS ARE INDIVIDUALLY RESPONSIBLE FOR ALL PENETRATIONS REQUIRED BY THEIR DIVISIONS.

31. FIRE STOPPING REQUIREMENT. PENETRATIONS THROUGH RATED WALLS AND FLOORS SHALL BE SEALED WITH A MATERIAL CAPABLE OF PREVENTING THE PASSAGE OF FLAMES AND HOT GASSES WHEN SUBJECTED TO THE REQUIREMENTS OF THE TEST STANDARD SPECIFIC FOR FIRE STOPS ASTM-E-814. ACCEPTABLE MATERIALS INCLUDE: DOW CORNING RTV FIRE STOP FOAM FOR BARE PIPE, METAL CONDUIT, AND ELECTRICAL CABLE; 3M FIRE DAM 150 CAULK FOR BARE PIPE, METAL CONDUIT, AND BUILDING CONSTRUCTION GAPS; 3M CP-25 CAULK AND FS-195 INTUMESCENT STRIPS FOR INSULATED PIPES, PLASTIC PIPE OR CONDUIT, AND ELECTRICAL CABLE. SUBMIT UL LISTED APPLICATION DATA FOR EACH TYPE OF PENETRATION ENCOUNTERED.

32. DUCTS, PIPING, AND CONDUITS PENETRATING THROUGH ROOF SHALL HAVE ROOF FLASHING COMPATIBLE WITH THE ROOFING SYSTEM. SEE ARCHITECTURAL DRAWINGS. IN THE ABSENCE OF ANY OTHER REQUIREMENTS, PROVIDE SHEET LEAD TYPE FLASHING FOR PLUMBING VENTS IN BUILT-UP ROOFS, TALL CONE WITH EPDM BOOT FOR PIPE AND CONDUIT IN SINGLE PLY MEMBRANE ROOFS, AND CURBED ROOF PENETRATIONS IN ALL TYPES OF ROOF. INSTALLATION SHALL BE WATERTIGHT.

33. CAREFULLY VERIFY ELECTRICAL SERVICE VOLTAGE AND PHASE AVAILABLE.

34. MOUNT ALL STATS AT 48" AFF IN "ACCESSIBLE" AREAS, 4'6" AFF IN OTHER AREAS, UNLESS NOTED OTHERWISE. COORDINATE LOCATION WITH WALL FINISH, AND TO AVOID CASEWORK, FURNITURE, DOOR SWINGS, HEAT SOURCES, AND EXTERIOR WALLS. NOTIFY ENGINEER OF ANY CONFLICTS PRIOR TO BEGINNING THERMOSTAT INSTALLATION.

35. SUBMIT A WRITTEN BALANCE REPORT BY A NEBB OR AABC CERTIFIED BALANCING CONTRACTOR. BALANCING PROCEDURES SHALL BE IN ACCORDANCE WITH NEBB OR AABC GUIDELINES FOR PROPORTIONAL BALANCE. SUBMIT REPORT ON STANDARD NEBB FORMS OR SUBMIT FORMS FOR REVIEW PRIOR TO BALANCING. MEASUREMENTS SHALL INCLUDE ALL MOTOR AMPERAGE AND VOLTAGE READINGS; MOTOR AND FAN RPMS; STATIC PRESSURE AT INLET AND OUTLET OF ALL PACKAGED EQUIPMENT, FANS, COILS, AND FILTERS; PITOT TUBE MEASUREMENT OF SUPPLY, EXHAUST, RETURN, AND OUTSIDE AIR MAIN DUCTS, AT MINIMUM OUTSIDE AIR, AND 100% (ECONOMIZER) OUTSIDE AIR; VELOCITY DISTRIBUTION ACROSS THE FACE OF FILTERS; AIR INLET AND OUTLETS; WATER FLOW AT ALL FLOW MEASUREMENT STATIONS; INLET AND OUTLET PRESSURE AT PUMPS WITH FLOW CALCULATED FROM THE PUMP CURVE; WATER FLOW, TEMPERATURE DROP, AND PRESSURE DROP AT ALL COILS.

   A. PROVIDE BELTS AND SHEAVES AS REQUIRED FOR DRIVE CHANGES TO ADJUST FAN SPEED.

   B. ADJUST FLOWS TO WITHIN 3% OF REQUIRED QUANTITY. WHERE ROOM AIR PRESSURE RELATIONSHIP ARE REQUIRED TO BE MAINTAINED AS SHOWN BY A DIFFERENTIAL OF SUPPLY AND EXHAUST/RETURN OR BY NOTE, ADJUST SUPPLY TO WITHIN 3% AND THEN ADJUST EXHAUST/RETURN TO PROVIDE THE INDICATED ROOM PRESSURE. IF ACTUAL QUANTITY IS LESS THAN 90%, INVESTIGATE CAUSE, ATTEMPT TO RECTIFY AND NOTIFY ENGINEER. SUBMITTAL OF BALANCE REPORT WITH LESS THAN REQUIRED FLOWS WITHOUT EXPLANATION IS CAUSE FOR REJECTION OF REPORT.

   C. SUBMIT ONE (1) COPY OF ALL SUBMITTALS IN ADDITION TO ANY REQUIRED BY THE CONTRACTOR AND HIS SUPPLIERS.

   D. RETAIN ONE (1) COPY OF REVIEWED SUBMITTALS FOR INCLUSION IN THE OWNER'S MANUAL.

47. DUCTWORK: (LOW VELOCITY)

   A. PVC DUCT WORK

      1) COMPLY WITH SMACNA'S THERMO PLASTIC DUCT CONSTRUCTION MANUAL.

   2) PVC SHEETS: EXCEPT AS OTHERWISE INDICATED, FABRICATE DUCTWORK FROM STRESS RELIEVED PVC SHEETS. THE SHEETS SHALL BE EXTRUDED OR COMPRESSION MOLDED,DEPENDING ON GAUGE.

   3) SEAMS AND JOINTS SHALL BE THERMALLY WELDED, UTILIZING PVC WELDING SPLINE.

      4) RECTANGULAR DUCTING - THE SIZES OF RECTANGULAR DUCTING SHALL BE DETERMINED BY THE INSIDE DIMENSION. THERE ARE N~ STANDARD SIZES FOR RECTANGULAR DUCTING. UNLESS OTHERWISE SPECIFIED, THE TOLERANCE ON ORDERED SIZES SHALL BE ± 1A" FOR DIMENSIONS 20 INCH AND UNDER AND ± ONE PERCENT ON DIMENSIONS GREATER THAN 20 INCH. WALL THICKNESS SHALL BE A MINIMUM OF 0.187".

   B. STAINLESS STEEL DUCT WORK

      1) COMPLY WITH SMACNA'S SHEET METAL DUCT CONSTRUCTION MANUAL.

48. DUCTWORK NOTES:

   A. DIFFUSER NECK SIZE IS SAME AS SUPPLY DUCT SIZE.

   B. UNLESS OTHERWISE NOTED, ALL CHANGES IN DIRECTION SHALL BE MADE WITH RADIUS ELBOWS WITH RADIUS TO CENTERLINE EQUAL TO 1.5 DUCT WIDTH.

      1) WHERE REQUIRED FOR SPACE CONSTRAINTS, PROVIDE SQUARE THROAT ELBOWS WITH SINGLE WIDTH (NON-AIRFOIL) TURNING VANES.

      2) FOR DUCT DEPTHS OF 36" OR LESS, PROVIDE MANUFACTURED SINGLE WIDTH (NON-AIRFOIL) TURNING VANES, WITH SPACING IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS FOR "STANDARD SPACING". USE DOUBLE THICKNESS BLADES FOR DUCT DEPTHS GREATER THAN 36". USE NO TRAILING EDGES.

66. DRAIN PAN PIPING: NOT BURIED: TYPE "M" COPPER, WROUGHT COPPER FITTINGS, AND 95-5 SOLDER; BURIED: TYPE "L" COPPER WROUGHT COPPER FITTINGS, AND 95-5 SOLDER. ALL BURIED PIPE SHALL BE SURROUNDED WITH 4" OF CLEAN SAND.

67. REFRIGERATION PIPING--TYPE "L", ACR GRADE COPPER, CLEANED, DEHYDRATED, AND CAPPED AT THE FACTORY. USE WROUGHT COPPER FITTINGS AND HARD SOLDER HAVING A MINIMUM MELTING POINT OF 1100 DEGREE F FOR BURIED LINES, 95-5 SOLDER FOR NON-BURIED LINES. VALVES AND SPECIALTIES SHALL BE STANDARD BRASS OR BRONZE VALVES FOR REFRIGERATION SERVICE. BURIED PIPE SHALL BE SURROUNDED BY 4" CLEAN SAND.

68. SUPPORT EACH AIR OR REFRIGERATION COMPRESSOR, BASE MOUNTED PUMP, AIR HANDLING UNIT AND FAN BY MASON INDUSTRIES OR EQUIVALENT SPRING TYPE VIBRATION ISOLATORS.

69. INDOOR PIPING INSULATION - INSULATE ALL HEATING WATER, STEAM AND CONDENSATE PIPING, CHILLED WATER, REFRIGERANT, DOMESTIC WATER, DOMESTIC HOT WATER, DOMESTIC HOT WATER RECIRCULATION WITH UL APPROVED, WHITE, ALL SERVICE, MINERAL FIBER, SNAP-ON, PIPE INSULATION. INSULATE FITTINGS WITH MINERAL FIBER BLANKET INSULATION AND PRE-MOLDED PVC COVERS. ALL MATERIALS SHALL HAVE A SMOKE DEVELOPED RATING OF 50 OR LESS AND A FLAME SPREAD RATING OF 25 OR LESS. PROVIDE CALCIUM SILICATE THERMAL INSERT AT HANGERS AND SUPPORTS. INSULATION SHALL PASS UNINTERRUPTED THROUGH HANGERS. VAPOR BARRIERS SHALL BE CONTINUOUS, AND SEALED WITH "NON-BREATHING" VAPOR BARRIER MASTIC ON PIPING OPERATING AT TEMPERATURES BELOW AMBIENT. ALL RAW EDGES OF INSULATION SHALL BE NEATLY TRIMMED AND SEALED WITH MASTIC.

INSULATION THICKNESS BELOW BASED ON INSULATION CONDUCTIVITY VALUE NOT EXCEEDING 0.27 BTU*IN/(HR*FT^2*°F):

   1) LOW PRESSURE STEAM (< 15 PSIG) AND CONDENSATE - 3" DIA. AND LESS, 2.5" THICK; 4" DIA. AND GREATER, 3" THICK.

   2) CHILLED WATER, BRINE AND REFRIGERANT (NOT LESS THAN 40°F) - ALL PIPE SIZES, 1" THICK.

   3) FOR PIPING SMALLER THAN 1-1/2" DIA. LOCATED IN PARTITIONS WITHIN CONDITIONED SPACES, INSULATION THICKNESS REDUCTION OF 1" NOT RESULTING IN AN INSULATION THICKNESS LESS THAN 1", SHALL BE ALLOWED. FOR DIRECT-BURIED HEATING OR HOT WATER PIPING, A REDUCTION OF 1-1/2" NOT RESULTING IN AN INSULATION THICKNESS LESS THAN 1", SHALL BE ALLOWED

70. OUTDOOR PIPING INSULATION: INSULATE ALL STEAM AND CONDENSATE PIPING, REFRIGERANT PIPING WITH UL APPROVED, WHITE, ALL SERVICE, CELLULAR GLASS OR POLYISOCYANURATE, PRE-MOLDED, SNAP-ON, PIPE INSULATION. INSULATE FITTINGS WITH PRE-MOLDED INSULATING FITTINGS. VAPOR BARRIERS SHALL BE CONTINUOUS, AND SEALED WITH "NON-BREATHING" VAPOR BARRIER MASTIC ON PIPING OPERATING AT TEMPERATURES BELOW AMBIENT. ALL RAW EDGES SHALL BE NEATLY TRIMMED AND SEALED WITH MASTIC. PROVIDE STAINLESS STEEL OR ALUMINUM JACKET WITH Z-SHAPED LOCKING SEAM.

71. IDENTIFICATION: LABEL ALL NEW PIPING AND EQUIPMENT. PROVIDE FULL BAND OR STRIP TYPE MARKERS AND FLOW ARROWS ON PIPING. PROVIDE ENGRAVED PLASTIC VALVE TAGS WITH VALVE NUMBER AND ATTACH WITH STANDARD CHAIN OR S-HOOKS. PROVIDE ENGRAVED PLASTIC SIGN ON OR NEAR SPECIFIED EQUIPMENT.

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MECHANICAL EQUIPMENT SPECIFICATIONS

CONSTANT VOLUME MAKEUP AIR HANDLING UNIT - TWO ZONES

1.01 MANUFACTURERS

A. BASIS OF DESIGN IS MUNTERS, OR EQUAL. EQUAL INDICATES THAT ALL CAPACITIES, DIMENSIONS, WEIGHTS, MATERIALS, AND PERFORMANCE CRITERIA ARE EQUAL OR BETTER THAN BASIS OF DESIGN. ALL COSTS INCURRED BY DESIGN DEVIATION SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR, INCLUDING OPERATING COSTS.

1.02 CASING

A. BASE FRAME: THE BASE OF THE PACKAGE SHALL BE AN ALL-WELDED STRUCTURAL "C" CHANNEL STEEL FRAME WITH REQUIRED TUBULAR AND ANGULAR CROSS-MEMBERS AS REQUIRED TO MAINTAIN FLOOR RIGIDITY AND STIFFNESS & ACT AS ISOLATOR SUPPORTS - ALL SOLID WELDED IN PLACE. THE BASE SHALL BE PAINTED WITH ONE COAT OF A LEAD-FREE, RUST-INHIBITING, ALKYD METAL PRIMER, FOLLOWED BY TWO COATS CORROSION AND WEATHER RESISTANT 100% ACRYLIC LATEX PAINT. UNITS UP TO 300" LONG SHALL INCLUDE NO MORE THAN FOUR LIFTING LUGS. LUGS SHALL BE AN INTEGRAL PART OF THE STRUCTURAL FRAME AND SHALL BE ALL WELDED USING THREE-PASS WELDS. FRAME SHALL BE CONSTRUCTED TO LIMIT DEFLECTION TO 1/200TH OF ITS SPAN IN ANY DIRECTION. BOLTED OR SCREWED BASE FRAME AND FLOOR ASSEMBLIES ARE NOT ACCEPTABLE DUE TO THEIR POOR STRUCTURAL INTEGRITY AND PROPENSITY TO LEAK.

B. CURB MOUNTED UNITS SHALL INCLUDE SELF-FLASHING RAILS THAT ALLOW THE PERIMETER CHANNEL TO OVER-LAP THE CURB AND FORM A NATURAL WEATHER SEAL. EQUIPMENT THAT REQUIRES SEPARATE FLASHING BETWEEN THE CURB AND THE BASED OF THE UNIT SHALL BE UNACCEPTABLE.

C. CABINET: UNIT CASING SHALL BE OF THE MONOCOQUE STRESSED SKIN DESIGN WITH 2-INCH DOUBLE-WALL, WATERTIGHT CONSTRUCTION. WALLS AND ROOF SHALL HAVE AN 18-GAUGE OUTER SKIN (SEE CASING EXTERIOR FINISH OPTIONS BELOW) WITH A SOLID 22-GAUGE STAINLESS STEEL INNER LINER, AND A NON-METALIC PVC LINER (ALL INTERIOR SURFACES INCLUDING THE FLOOR SURFACE) DOWNSTREAM OF THE CARBON FILTERS. 2-INCH MINIMUM, 1.5 POUND DENSITY FIBERGLASS INSULATION SHALL BE SECURED BETWEEN THE INNER AND OUTER SKINS. THE INSULATION SHALL BE HELD BETWEEN THE INNER AND OUTER WALLS AND SHALL NOT BE EXPOSED TO ANY AIR STREAMS. ALL ROOF AND SIDEWALL SEAMS SHALL BE POSITIVELY SEALED TO PREVENT WATER AND AIR LEAKAGE. ALL ROOF JOINTS SHALL INCORPORATE A FLANGED AND CAPPED STANDING SEAM TO INSURE A WATERTIGHT SEAL. OUTDOOR UNITS OVER EIGHT FEET WIDE SHALL HAVE A PITCHED ROOF TO ELIMINATE STANDING WATER ON THE UNIT. AIR LEAKAGE SHALL NOT EXCEED 1% AT 1-1/2 TIMES MAXIMUM UNIT OPERATING PRESSURE. ALL FASTENING HARDWARE BETWEEN WALL PANELS SHALL BE ENCAPSULATED WITHIN THE WALL FOR A CLEAN EXTERIOR APPEARANCE AND TO MINIMIZE EXTERIOR WALL PANEL PENETRATION. UNIT SHALL BE CONSTRUCTED TO LIMIT PANEL DEFLECTION TO 1/200TH OF ITS SPAN IN ANY DIRECTION.

D. ACCESS DOORS: SELF-SUPPORTING HINGED ACCESS DOORS SHALL BE PROVIDED FOR ALL INTERNAL COMPONENTS REQUIRING PERIODIC MAINTENANCE OR INSPECTION. WEATHER-RESISTANT CLOSED-CELL NEOPRENE BULB TYPE GASKETS SHALL BE A MECHANICALLY FASTENED TO THE FRAME TO CREATE A SMOOTH CONTINUOUS SEAL, WITH LONG RADIUS CORNERS, AROUND THE ENTIRE PERIMETER OF THE DOOR WITH ONLY A SINGLE SPLICE POINT. THE ADVANTAGE OF SINGLE PIECE LONG RADIUS GASKET MATERIAL IS TO PREVENT SHARP CORNERS AND MULTIPLE SPLICE POINTS. THE DOOR SHALL BE INSULATED THE SAME AS THE UNIT CASING, AND DOUBLE-WALL CONSTRUCTED WITH FULL-LENGTH STAINLESS STEEL PIANO-TYPE HINGES FOR RIGIDITY AND AIRTIGHT ENCLOSURE. A MINIMUM OF TWO ADJUSTABLE GLASS REINFORCED NYLON HANDLE-TYPE DOOR LATCHES SHALL BE FURNISHED FOR EACH HINGED DOOR. DOOR HANDLES SHALL BE PROVIDED WITH LARGE NYLON TAPERED ROLLER CAM FOR EASE OF OPERATION AND SUPERIOR GASKET DEPRESSION. EACH HINGED DOOR SHALL INCLUDE LOCKING MECHANISM THAT REQUIRES THE USE OF A TOOL TO OPEN FOR SAFETY AND SECURITY PURPOSES PRIOR TO UNIT STARTUP. HANDLES SHALL BE OPERABLE FROM EITHER SIDE OF THE DOOR. DOOR FRAMES SHALL BE A MINIMUM 16 GAUGE ALUMINIZED OR 304L STAINLESS STEEL, WELDED AT THE CORNERS TO CREATE A CONTINUOUS RIGID SEALING SURFACE FOR THE DOOR. DOORS SHALL HAVE ADHESIVE-BACKED STICKERS APPLIED TO THEIR EXTERIOR SURFACES WHICH INDICATE THE UNIT CONTENTS THAT LIE BEHIND THAT DOOR. ALL EXTERIOR DOORS SHALL BE EQUIPPED WITH RAIN GUTTERS. DOORS SHALL BE MANUFACTURED IN SUCH A WAY AS TO ALLOW REMOVAL OF INTERIOR COMPONENTS WITHOUT DISASSEMBLY OF THE WALL PANELS.

a. HINGED DOORS SHALL INCLUDE DOOR TIE-BACKS.

E. FLOORS: FLOORS SHALL BE CONSTRUCTED OF SEAM WELDED 16 GA STAINLESS STEEL WITH 2" SPRAY FOAM INSULATION UNDERNEATH. FLOORS AND ALL INTERIOR SURFACES DOWNSTREAM OF THE CARBON FILTER SECTION SHALL BE LINED WITH PVC. FLOORS SHALL HAVE AN UPTURNED FLANGE AROUND THE ENTIRE PERIMETER AND AROUND ALL INTERIOR CHASES TO CONTAIN MOISTURE WITHIN THE UNIT.

F. CASING FINISH: EXTERIOR PANELS SHALL BE PRE-PAINTED G90 GALVANIZED STEEL.

G. HOODS: FOR OUTDOOR UNITS, INTAKE HOODS SHALL BE PROVIDED. OPENING SHALL BE COVERED WITH AN ALUMINUM BIRD SCREEN WHICH IS SEPARATE FROM THE HOOD. THE INTAKE HOOD SHALL HAVE A MAXIMUM 500 FEET PER MINUTE FACE VELOCITY THROUGH THE FREE AREA. HOOD MATERIAL SHALL MATCH THAT OF THE OUTER CASING, AND MAY BE SHIPPED LOOSE FOR FIELD INSTALLATION AND/OR ASSEMBLY BY THE CONTRACTOR.

1.03 SUPPLY FANS (DUAL FANS 100% REDUNDANT)

A. FAN ASSEMBLY SHALL CONSIST OF A TOTAL QUANTITY OF TWO SINGLE WIDTH, SINGLE INLET, CLASS II, DIRECT-DRIVE TYPE PLENUM FANS DYNAMICALLY BALANCED AS AN ASSEMBLY, AS SHOWN IN SCHEDULE. MAXIMUM FAN RPM SHALL BE BELOW FIRST CRITICAL FAN SPEED. ALL FAN ASSEMBLIES SHALL BE DYNAMICALLY BALANCED BY THE MANUFACTURER ON ALL THREE PLANES.

B. EACH FAN SHALL PROVIDE 100% OF SPECIFIED AIR FLOW AT DESIGN CONDITIONS.

C. UNIT SHALL COME EQUIPPED WITH A MOTORIZED 2-POSITION ISOLATION DAMPER UPSTREAM OF EACH FAN IN THE ARRAY. DAMPERS SHALL BE LOW LEAKAGE TYPE, AND SHALL BE CONSTRUCTED OF EXTRUDED ALUMINUM

A. FANS SHALL BE INDIVIDUALLY ISOLATED WITH SEISMIC SPRING ISOLATORS (MINIMUM ISOLATION EFFICIENCY OF 90 - 95%).

D. FAN PERFORMANCE SHALL BE BASED ON TESTS AND PROCEDURES PERFORMED IN ACCORDANCE WITH AMCA PUBLICATION 211 AND PUBLICATION 311 AND COMPLY WITH THE REQUIREMENTS OF THE AMCA CERTIFIED RATINGS PROGRAM. FANS SHALL BEAR THE AMCA SEAL. FANS WITH FORWARD CURVED WHEELS SHALL BE UNACCEPTABLE.

1.04 MOTORS

A. MOTOR ELECTRICAL CONNECTIONS ARE TO BE FACTORY PREWIRED TO THE UNIT CONTROL PANEL. MOTOR SHALL BE MOUNTED ON ADJUSTABLE BASE. TOTALLY ENCLOSED FAN COOLED (TEFC) TYPE FAN MOTORS SHALL BE FURNISHED WITH EFFICIENCIES EQUAL TO OR GREATER THAN THOSE SPECIFIED IN THE ENERGY POLICY ACT OF 1992 (EPACT).

B. MOTOR STARTERS:
1.1.A. ABB MODEL ACH550 VARIABLE FREQUENCY DRIVE WITH DISCONNECT MOUNTED IN THE UNIT ELECTRICAL PANEL. PROVIDE ONE VFD FOR EACH FAN MOTOR.
1.1.B. VFDS SHALL BE PROVIDE FOR FIELD BALANCING AND FOR MODULATION TO OVERCOME PRESSURE LOSS FROM FILTER LOADING.

1.05 DAMPERS

A. DAMPERS SHALL HAVE A MAXIMUM LEAKAGE OF 6 CFM/ SQ. FT. @ 4 IN. WG OR 3 CFM/SQ. FT. @ 1 IN. WG. DAMPER SHALL MEET OR EXCEED THE IECC (INTERNATIONAL ENERGY CONSERVATION CODE) REQUIREMENTS FOR DAMPER LEAKAGE RATINGS OF 3 CFM/ SQ. FT @ 1 IN. WG OR 8 CFM/SQ. FT. @ 4IN. WG OR LESS WHEN INTEGRAL TO THE BUILDING ENVELOPE. DAMPERS SHALL HAVE A MAXIMUM DIFFERENTIAL PRESSURE RATING OF 5 IN. WG.

B. ALL DAMPERS SHALL BE OF THE LOW LEAKAGE AIRFOIL BLADE TYPE WITH BLADE EDGE AND SIDE SEALS. DAMPERS SHALL BE CONSTRUCTED OF EXTRUDED ALUMINUM FRAMES (6063T5) OF NOT LESS THAN 2.03 MM THICKNESS. BLADES SHALL BE OF EXTRUDED ALUMINUM PROFILES WITH BLADE GASKETS OF EXTRUDED EPDM. FRAME SEALS SHALL BE OF EXTRUDED TPE. GASKETS SHALL BE SECURED IN AN INTEGRAL SLOT WITHIN ALUMINUM EXTRUSIONS.

C. THE INTAKE DAMPER SHALL BE PROVIDED WITH A FACTORY FURNISHED BELIMO NC SPRING RETURN ACTUATOR.

1.06 DIRECT EXPANSION COIL

A. DIRECT EXPANSION-COOLING COIL SHALL BE SIZED TO PROVIDE COOLING/MOISTURE REMOVAL OF THE CAPACITY INDICATED ON THE EQUIPMENT SCHEDULE. COIL SHALL BE FURNISHED WITH INTERLACED REFRIGERANT CIRCUITS SO THAT THE ENTIRE COIL FACE AREA IS ACTIVE WHEN THE UNIT IS IN OPERATION.

B. COIL SHALL BE OF INTERNALLY FINNED 1/2-INCH O.D. COPPER TUBES MECHANICALLY BONDED TO CONFIGURED ALUMINUM PLATE FINS WITH A 16 GAUGE STAINLESS STEEL CASING. COIL FACE VELOCITY SHALL NOT EXCEED 500 FEET PER MINUTE. MINIMUM CLEARANCE BETWEEN COIL AND UP/DOWNSTREAM DEVICE SHALL BE 12" FREE TO FACILITATE CLEANING. COILS SHALL BE SECURED TO THEIR RESPECTIVE SUPPORTS WITH STAINLESS STEEL HARDWARE. COILS SHALL BE LEAK TESTED AT THE FACTORY TO INSURE PRESSURE INTEGRITY. THE COILS SHALL BE RATED AT 250 PSIG. COIL SHALL BE RATED IN ACCORDANCE WITH ARI STANDARDS.

C. COILS SHALL HAVE AN INTEGRAL ALL SEAM WELDED STAINLESS STEEL DRAIN PAN WITH A MINIMUM DEPTH OF TWO INCHES. DRAIN PAN SHALL BE PART OF THE ALL WELDED FLOOR, RECESSED, AND SLOPED TOWARD BASINS. BASINS SHALL BE PROVIDED MINIMUM EVERY 60" AND ALLOW FOR CAPTURE AND CLEANING OF LARGER DEBRIS. MINIMUM BASIN SIZE IS 6" X 3" X 1.75" DEEP. UNDERNEATH OF THE ENTIRE DRAIN PAN, AND BASINS, SHALL BE INSULATED WITH SPRAY URETHANE INSULATION POSITIVELY PREVENTING ANY UNDERNEATH CONDENSATE FROM FORMING. ENTIRE COIL ASSEMBLY, INCLUDING SAFE-OFFS SHALL BE INSIDE OF THE RECESSED DRAIN PAN. DRAIN PANS THAT SIT ON TOP OF UNIT FLOOR SHALL NOT BE ACCEPTABLE DUE TO WATER MANAGEMENT ISSUES. AN ACCESS DOOR SHALL BE PROVIDED ON EACH SIDE OF THE COIL, WHERE FEASIBLE, TO ALLOW COIL REMOVAL.

D. ALL COILS OVER 42 INCHES IN LENGTH SHALL INCORPORATE A 16 GAUGE GALVANIZED TUBE SUPPORT AT THE CENTER OF THE FIN LENGTH; COILS OVER 96 INCHES IN FIN LENGTH SHALL INCORPORATE ADDITIONAL TUBE SUPPORTS. COILS SHALL BE SEALED AROUND THE PERIMETER (BETWEEN THE COIL FLANGES AND THE UNIT CASING CHANNELS) WITH SILICONE OR POLYURETHANE SEALANT TO ELIMINATE AIR BYPASS AND PREVENT MOISTURE CARRYOVER.

1.07 FILTERS

A. THE FOLLOWING FILTERS SHALL BE PROVIDED:
1. 2" DEEP MERV 8 INTAKE PRE-FILTER
2. 4" DEEP MERV 13 INTAKE AIR FILTER
3. CARBON FILTER SECTION WITH CAMFIL CAMSORB CANISTERS WITH STAINLESS STEEL HOLDING FRAME AND PLASTIC, 24" LONG CANNISTERS FILLED WITH CFS-201 ACTIVATED CARBON.
4. 2" DEEP MERV 8 DUSTING FILTER
5. 12" DEEP 99.97% GASKET SEAL HEPA FILTER WITH NON-METALLIC HOUSING

B. A FILTER GAUGE WITH TRANSMITTER FOR EACH FILTER BANK SHALL BE WIRED TO THE UNIT ELECTRICAL PANEL.

1.08 OUTSIDE AIR FLOW MEASURING STATION

D. FURNISH AND INSTALL AN AIRFLOW MEASUREMENT SYSTEM FOR MONITORING AND CONTROLLING THE MINIMUM OUTDOOR AIRFLOW RATE. THE MINIMUM OUTDOOR AIRFLOW MEASUREMENT SYSTEM SHALL MEASURE THE MINIMUM AMOUNT OF OUTSIDE AIR AS RECOMMENDED BY ANSI/ASHRAE STANDARD 62.1-2010,

E. VENTILATION FOR ACCEPTABLE INDOOR AIR QUALITY, AND SHALL PROVIDE AN INPUT TO THE BUILDING AUTOMATION SYSTEM THAT IS LINEAR TO THE MEASURED AIRFLOW RATE. THE AIRFLOW MEASUREMENT SYSTEM SHALL BE TESTED IN ACCORDANCE WITH ANSI/AMCA STANDARDS 610-06, FIGURE 4, METHODS OF TESTING AIRFLOW MEASUREMENT STATIONS FOR RATING, AND AMCA STANDARD 611-06, CERTIFIED RATINGS PROGRAM - AIRFLOW MEASUREMENT PERFORMANCE, IN AN AMCA-REGISTERED TESTING FACILITY.

F. THE AIRFLOW MEASUREMENT SYSTEM SHALL BE ACCURATE TO ±1% OVER AN OPERATING RANGE OF 200 TO 1,200 FEET PER MINUTE, AND WITHIN ±5% FOR OPERATING RANGES AS LOW AS 100 FEET PER MINUTE. THE AIRFLOW MEASUREMENT SYSTEM SHALL BEAR THE AMCA INTERNATIONAL CERTIFIED RATINGS SEAL FOR AIRFLOW-MEASUREMENT STATION PERFORMANCE.

G. THE AIR FLOW MEASURING STATION SHALL PROVIDE AN OUTPUT SPEED SIGNAL TO THE BLOWER VFDS THAT WILL CONTROL THE SPEED OF THE FAN MOTOR TO MAINTAIN AN AIRFLOW SET POINT AS THE AIR FILTERS LOAD.

H. THE AIRFLOW MEASUREMENT SYSTEM SHALL BE MODEL OAFE-1550 AS MANUFACTURED BY PARAGON CONTROLS, INC.

1.09 ELECTRICAL

A. AN INTEGRAL ELECTRICAL CONTROL PANEL SHALL BE PROVIDED THAT HAS HINGED ACCESS DOORS AND AN APPROVED LOCKING DEVICE. ALL POWER WIRING SHALL BE BROUGHT TO A COMMON TERMINAL STRIP AND ONLY A SINGLE POINT ELECTRICAL CONNECTION SHALL BE REQUIRED.

B. ALL FACTORY WIRING SHALL BE IN LIQUID TIGHT CONDUIT.

C. A FUSED CONTROL POWER TRANSFORMER SHALL BE FURNISHED. ALL COMPONENTS SHALL BE FULLY WIRED AND TESTED PRIOR TO SHIPMENT AND ALL MAJOR ELECTRICAL COMPONENTS SHALL BE UL LISTED. ELECTRICAL SYSTEM SHALL BE ETL LISTED AND LABELED, IN ACCORDANCE WITH UL 1995.

D. A MAIN DISCONNECT SWITCH SHALL BE FACTORY MOUNTED WITH ROTARY HANDLE EXTENDING THROUGH THE UNIT ELECTRICAL ENCLOSURE. ALL WIRING SHALL BE CONNECTED TO A NUMBERED TERMINAL STRIP FOR EASY TROUBLESHOOTING. ANY CONDUIT USED SHALL NOT BE RUN ACROSS OR COME INTO CONTACT WITH THE FLOOR.

E. ALL TEMPERATURE CONTROLS SHALL BE FURNISHED AND INSTALLED BY OTHERS.

F. ACCESSORIES:
1. VAPOR PROOF LIGHTS IN EACH ACCESS SECTION, WIRED TO A COMMON SWITCH AND POWERED FROM A SEPARATE 120V POWER FEED.
2. GFCI RECEPTACLE POWERED FROM A SEPARATE 120V POWER FEED.

1.10 STEAM COILS (PRE-HEAT AND RE-HEAT)

A. STEAM COIL SHALL BE SIZED TO PROVIDE THE CAPACITY INDICATED ON THE EQUIPMENT SCHEDULE. TUBE ARRANGEMENT SHALL BE STAGGERED AND HEAT TRANSFER SHALL BE COUNTER-FLOW. COILS SHALL HAVE BRAZED COPPER INLET AND DRAINABLE OUTLET HEADERS AND IRON CONNECTIONS. SUPPLY AND RETURN CONNECTIONS SHALL BE MALE PIPE THREAD OF THE SIZE SCHEDULED. BOTH SUPPLY AND RETURN COIL CONNECTIONS SHALL BE LOCATED AT THE SAME END OF THE COIL.

B. COIL SHALL BE OF INTERNALLY FINNED 5/8-INCH O.D. COPPER TUBES MECHANICALLY BONDED TO CONFIGURED ALUMINUM PLATE FINS WITH A 16 GAUGE GALVANIZED STEEL CASING. THE CASING SHALL BE PITCHED TO PROVIDE POSITIVE CONDENSATE REMOVAL. COIL FACE VELOCITY SHALL NOT EXCEED 850 FEET PER MINUTE. MINIMUM CLEARANCE BETWEEN COIL AND UP/DOWNSTREAM DEVICE SHALL BE 12" FREE TO FACILITATE CLEANING. COILS SHALL BE SECURED TO THEIR RESPECTIVE SUPPORTS WITH STAINLESS STEEL HARDWARE. COILS SHALL BE LEAK TESTED AT THE FACTORY TO INSURE PRESSURE INTEGRITY. THE COILS SHALL BE RATED AT 150 PSIG. COIL SHALL BE RATED IN ACCORDANCE WITH ARI STANDARDS.

C. AN ACCESS DOOR SHALL BE PROVIDED ON EACH SIDE OF THE COIL, WHERE FEASIBLE, TO ALLOW COIL REMOVAL.

D. ALL COILS OVER 42 INCHES IN LENGTH SHALL INCORPORATE A 16 GAUGE GALVANIZED TUBE SUPPORT AT THE CENTER OF THE FIN LENGTH; COILS OVER 96 INCHES IN FIN LENGTH SHALL INCORPORATE ADDITIONAL TUBE SUPPORTS. COILS SHALL BE SEALED AROUND THE PERIMETER (BETWEEN THE COIL FLANGES AND THE UNIT CASING CHANNELS) WITH SILICONE OR POLYURETHANE SEALANT TO ELIMINATE AIR BYPASS AND PREVENT MOISTURE CARRYOVER.

1.11 ROOF CURB

A. A 12-INCH NON-SLOPED ROOF CURB SHALL BE PROVIDED CONSTRUCTED OF 18-GAUGE GALVANIZED STEEL WITH BOLTING BRACKETS AND STIFFENERS OF 12-GAUGE. CURB SHALL BE INSULATED WITH 1-1/2 INCHES OF RIGID FIBERGLASS. STIFFENERS SHALL BE PROVIDED AT NOT MORE THAN 10 FEET ON CENTER. FIELD ASSEMBLY REQUIRED.

CONDENSING UNIT

PART 1: GENERAL

1.01 SECTION INCLUDES:
A. CONDENSING UNIT RATED IN ACCORDANCE WITH AHRI STANDARD 365.

1.02 SUBMITTALS
A. SHOP DRAWINGS: INDICATE ASSEMBLY, UNIT DIMENSIONS, WEIGHT LOADING, REQUIRED CLEARANCES, CONSTRUCTION DETAILS, FIELD CONNECTION DETAILS, ELECTRICAL CHARACTERISTICS AND CONNECTION REQUIREMENTS.
B. PRODUCT DATA:
1. PROVIDE LITERATURE THAT INDICATES DIMENSIONS, WEIGHTS, CAPACITIES, RATINGS, AND ELECTRICAL CHARACTERISTICS AND CONNECTION REQUIREMENTS.

1.03 OPERATION AND MAINTANENCE DATA
A. MAINTENANCE DATA: PROVIDE INSTRUCTIONS FOR INSTALLATION, MAINTENANCE AND SERVICE

1.04 QUALIFICATIONS
A. MANUFACTURER: COMPANY SPECIALIZING IN MANUFACTURING THE PRODUCTS SPECIFIED IN THIS SECTION WITH MINIMUM FIVE YEARS DOCUMENTED EXPERIENCE, WHO ISSUES COMPLETE CATALOG DATA ON TOTAL PRODUCT.

B. STARTUP MUST BE DONE BY TRAINED PERSONNEL EXPERIENCED WITH SPLIT SYSTEMS.
C. DO NOT OPERATE UNITS FOR ANY PURPOSE, TEMPORARY OR PERMANENT, UNTIL REMOTE CONTROLS ARE IN PLACE, AND MANUFACTURERS' INSTALLATION INSTRUCTIONS HAVE BEEN FOLLOWED.

1.05 DELIVERY, STORAGE, HANDLING
A. DELIVER, STORE, PROTECT AND HANDLE PRODUCTS TO SITE.
B. HANDLE CAREFULLY TO AVOID DAMAGE TO COMPONENTS, ENCLOSURES, AND FINISH
C. STORE IN A CLEAN, DRY PLACE TO PROTECT FROM WEATHER AND CONSTRUCTION TRAFFIC.

PART 2: PRODUCTS

2.01 MANUFACTURERS
A. BASIS OF DESIGN: DAIKIN APPLIED

2.02 GENERAL DESCRIPTION
A. FURNISH AS SHOWN ON PLANS, CONDENSING UNIT(S) . UNIT PERFORMANCE AND ELECTRICAL CHARACTERISTICS SHALL BE PER THE JOB SCHEDULE.
B. CONFIGURATION: FABRICATE AS DETAILED ON PRINTS AND DRAWINGS.
C. THE COMPLETE UNIT SHALL BE ETL LISTED.
D. UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED AND SHIPPED IN ONE PIECE.
E. UNIT TO BE SHIPPED WITH A NITROGEN HOLDING CHARGE ONLY.
F. THE UNIT SHALL UNDERGO AN OPERATIONAL TEST PRIOR TO SHIPMENT. THE FACTORY TEST SHALL INCLUDE A REFRIGERATION CIRCUIT CHECK TEST, A UNIT SAFETY CONTROL SYSTEM OPERATIONS CHECKOUT, AND A FINAL UNIT INSPECTION.
G. ALL UNITS SHALL HAVE DECALS AND TAGS TO INDICATE CAUTION AREAS AND AID UNIT SERVICE. UNIT NAMEPLATES SHALL BE FIXED TO THE MAIN CONTROL PANEL DOOR. ELECTRICAL WIRING DIAGRAMS SHALL BE ATTACHED TO THE CONTROL PANELS. INSTALLATION, OPERATING AND MAINTENANCE BULLETINS AND START-UP FORMS SHALL BE SUPPLIED WITH EACH UNIT.
H. PERFORMANCE: ALL SCHEDULED CAPACITIES AND FACE AREAS ARE THE MINIMUM ACCEPTED VALUE. ALL SCHEDULED AMPS, KW, AND HP ARE MAXIMUM ACCEPTED VALUES THAT ALLOW SCHEDULED CAPACITY TO BE MET.

2.03 CABINET
A. EXTERIOR SURFACES SHALL BE CONSTRUCTED OF PRE-PAINTED GALVANIZED STEEL FOR AESTHETICS AND LONG TERM DURABILITY. PAINT FINISH TO INCLUDE A BASE PRIMER WITH A HIGH QUALITY, POLYESTER RESIN TOPCOAT OF A NEUTRAL BEIGE COLOR. FINISHED SURFACE TO WITHSTAND A MINIMUM 750-HOUR SALT SPRAY TEST IN ACCORDANCE WITH ASTM B117 STANDARD FOR SALT SPRAY RESISTANCE.
B. THE UNIT BASE FRAME SHALL BE CONSTRUCTED OF 15 GAUGE PRE-PAINTED GALVANIZED STEEL.
C. LIFTING BRACKETS SHALL BE PROVIDED ON THE UNIT BASE WITH LIFTING HOLES TO ACCEPT CABLE OR CHAIN HOOKS.

2.04 ELECTRICAL
A. UNIT WIRING SHALL COMPLY WITH NEC REQUIREMENTS AND WITH ALL APPLICABLE UL STANDARDS. ALL ELECTRICAL COMPONENTS SHALL BE UL RECOGNIZED WHERE APPLICABLE. ALL WIRING AND ELECTRICAL COMPONENTS PROVIDED WITH UNIT SHALL BE NUMBER AND COLOR CODED AND LABELED ACCORDING TO THE ELECTRICAL DIAGRAM PROVIDED FOR EASY IDENTIFICATION.
B. THE UNIT SHALL BE PROVIDED WITH A FACTORY WIRED WEATHERPROOF CONTROL PANEL. UNIT SHALL HAVE A POWER TERMINAL BLOCK FOR MAIN POWER CONNECTION. A TERMINAL BOARD SHALL BE PROVIDED FOR LOW VOLTAGE CONTROL WIRING. BRANCH CIRCUIT SHORT CIRCUIT PROTECTION, 115 VOLT CONTROL CIRCUIT TRANSFORMER AND FUSE, SYSTEM SWITCHES, AND A HIGH TEMPERATURE SENSOR. EACH COMPRESSOR AND CONDENSER FAN MOTOR SHALL BE FURNISHED WITH CONTACTORS AND INHERENT THERMAL OVERLOAD PROTECTION. KNOCKOUTS SHALL BE PROVIDED IN THE SIDE OF THE MAIN CONTROL PANELS FOR FIELD WIRING ENTRANCE.
C. ALL 115-600 VOLT INTERNAL AND EXTERNAL WIRING BETWEEN CONTROL BOXES AND COMPONENTS SHALL BE PROTECTED FROM DAMAGE BY RACEWAYS OR LIQUID TIGHT CONDUIT.
D. THE RECEPTACLE SHALL BE POWERED BY A FIELD SUPPLIED 115V SOURCE.
E. SINGLE NON-FUSED DISCONNECT SWTICH SHALL BE PROVIDED FOR CONNECTING ELECTRICAL POWER AT THE UNIT. DISCONNECT SWITCHES SHALL BE MOUNTED INTERNAL TO THE CONTROL PANEL AND OPERATED BY AN EXTERNALLY MOUNTED HANDLE. EXTERNALLY MOUNTED HANDLE IS DESIGNED TO PROHIBIT OPENING OF THE CONTROL PANEL DOOR WITHOUT THE USE OF A SERVICE TOOL.
F. UNIT SCCR RATING TO BE 10 KAIC.
G. PHASE FAILURE AND UNDER VOLTAGE PROTECTION SHALL BE PROVIDED TO PREVENT DAMAGE FROM SINGLE PHASING, PHASE REVERSAL, AND LOW VOLTAGE CONDITIONS.
H. UNIT SHALL BE PROVIDED WITH A 24 VOLT TRANSFORMER AND TERMINAL STRIP FOR FIELD SUPPLIED CONTROLS.

2.05 CONDENSING SECTION
A. AIR COOLED CONDENSER
1. THE CONDENSING SECTION SHALL BE OPEN ON THE SIDES AND BOTTOM TO PROVIDE ACCESS AND TO ALLOW AIRFLOW THROUGH THE COILS. CONDENSER COILS SHALL BE MULTI-ROW AND FABRICATED FROM CAST ALUMINUM MICRO-CHANNEL COILS. EACH CONDENSER COIL SHALL BE FACTORY LEAK TESTED WITH HIGH-PRESSURE AIR UNDER WATER. COILS ARE TO BE RECESSED SO THAT THE CABINET PROVIDES BUILT IN HAIL PROTECTION.
2. CONDENSER FANS SHALL BE DIRECT DRIVE, PROPELLER TYPE DESIGNED FOR LOW TIP SPEED, VERTICAL AIR DISCHARGE, AND INCLUDE SERVICE GUARDS. FAN BLADES SHALL BE CONSTRUCTED OF STEEL AND RIVETED TO A STEEL CENTER HUB. CONDENSER FAN MOTORS SHALL BE HEAVY-DUTY, INHERENTLY PROTECTED, THREE-PHASE, NON-REVERSING TYPE WITH PERMANENTLY LUBRICATED BALL BEARING AND INTEGRAL RAIN SHIELD.
3. UNITS SHALL HAVE AT LEAST ONE HEAD PRESSURE SENSING CONDENSER FAN CONTROLLED TO MAINTAIN POSITIVE HEAD PRESSURE. AN AMBIENT THERMOSTAT SHALL PREVENT THE REFRIGERATION SYSTEM FROM OPERATING BELOW 45° F AMBIENT. SPEEDTROL™ CONDENSER FAN SPEED CONTROL SHALL BE ADDED TO THE LAST FAN OFF ON EACH REFRIGERATION CIRCUIT TO PROVIDE COOLING OPERATION TO AMBIENT TEMPERATURES DOWN TO 0° F. FAN SPEED CONTROL SHALL BE FIELD ADJUSTABLE.
B. REFRIGERATION CIRCUIT
C. HOT GAS BYPASS CAPPED T SHALL BE FACTORY INSTALLED ON THE DISCHARGE LINE OF REFRIGERANT CIRCUITS.

2.06 CONTROLS
A. REFRIGERATION CAPACITY CONTROL SHALL BE ACCOMPLISHED BY THE MODULATION OF THE DIGITAL SCROLL COMPRESSOR AND STAGING OF FIXED COMPRESSOR(S). UNIT SHALL BE EQUIPPED WITH A 24V TERMINAL STRIP FOR FIELD SUPPLIED AND INSTALLED CONTROLS.

2.07 WARRANTY
A. THE MANUFACTURER SHALL PROVIDE 12 MONTH PARTS ONLY WARRANTY. DEFECTIVE PARTS WILL BE REPAIRED OR REPLACED DURING THE WARRANTY PERIOD AT NO CHARGE. THE WARRANTY PERIOD SHALL COMMENCE AT START UP, OR 6 MONTHS AFTER SHIPMENT, WHICH EVER OCCURS FIRST.
B. THE MANUFACTURER WILL PROVIDE EXTENDED 48 MONTH PARTS ONLY WARRANTY ON THE COMPRESSOR.

PART 3: EXECUTION

3.01 INSTALLATION
INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTION

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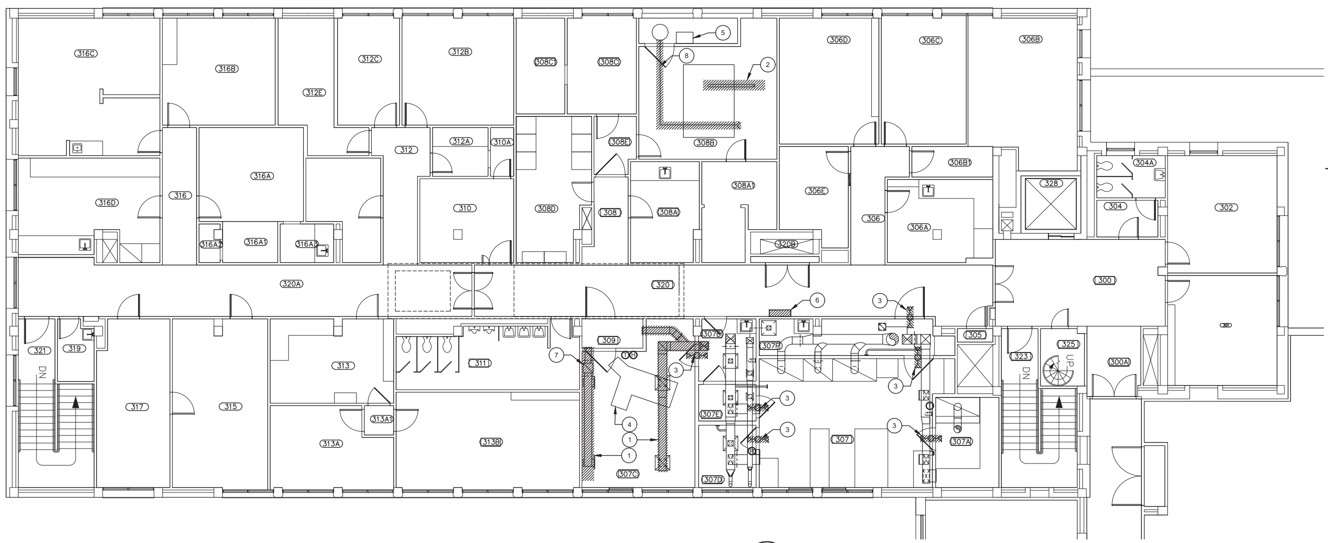
DEMOLITION NOTES:

1. ADDITIONAL STORM, HYDRONIC, DOMESTIC, WASTE AND VENT PIPING MAY BE ROUTED IN SPACE THAT IS NOT REPRESENTED, BUT IS TO REMAIN. OTHER SYSTEMS MAY EXIST WITHIN THE SPACE THAT ARE NOT REPRESENTED ON THESE DRAWINGS; MODIFICATIONS TO THESE SYSTEMS ARE NOT ANTICIPATED.
2. FIELD VERIFY ALL COMPONENTS PRIOR TO DEMOLITION. THE INFORMATION ON THIS SHEET WAS OBTAINED, IN PART, FROM HISTORIC DESIGN DRAWINGS. ONLY PORTIONS OF THE SYSTEMS WERE ACCESSIBLE FOR VISUAL CONFIRMATION DURING DESIGN PROCESS.
3. PROVIDE PRELIMINARY TESTING OF EXISTING HYDRONIC SYSTEMS. MEASURE CURRENT FLUID FLOW RATE THROUGH ALL EXISTING COILS, RADIANT, AND SNOWMELT ZONES FOR THE CURRENTLY INSTALLED SYSTEMS. SUBMIT REPORT OF MEASURED VALUES TO ENGINEER FOR REVIEW AND CONFIRMATION OF SYSTEM DESIGN ASSUMPTIONS PRIOR TO DEMOLITION.
4. PROVIDE PRELIMINARY TESTING OF EXISTING HVAC DUCTWORK SYSTEMS. MEASURE CURRENT AIR FLOW RATES AT ALL EXISTING SUPPLY, RETURN, AND EXHAUST REGISTERS. MEASURE TOTAL AIR FLOWS AT MAIN DUCT BRANCHES AND ALL FAN SYSTEMS. SUBMIT REPORT OF MEASURED VALUES TO ENGINEER FOR REVIEW AND CONFIRMATION OF SYSTEM DESIGN ASSUMPTIONS PRIOR TO DEMOLITION.
5. (E) WASTE SYSTEM SERVING SPACE IS LOCATED IN THE CEILING OF THE SPACE BELOW.
6. REMOVE ALL MECHANICAL ITEMS INDICATED.
7. TEMPORARILY SEAL OR CAP PIPING TO BE RE-USED FOR LATER CONNECTION.
8. SEAL ALL OPEN DUCTS DURING CONSTRUCTION TO MITIGATE DUST AND DEBRIS FROM SYSTEM. CAP DUCTWORK IN LOCATIONS THAT ARE NOT BEING RECONNECTED.
9. REMOVE ALL DEMOLISHED COLD WATER, HOT WATER AND HOT WATER RECIRCULATION PIPING BACK TO BRANCH FROM MAIN TO ELIMINATE ALL DEAD ENDS IN DOMESTIC WATER PIPING.
10. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OF INFORMATION REPRESENTED IN THE DOCUMENTS VERSUS WHAT IS FOUND IN THE FIELD.
11. COORDINATE PATCHING AND REPAIRS OF WALLS, CEILINGS AND FLOORS WITH ARCHITECT.
12. PATCH STRUCTURAL OPENINGS IN FLOORS, WALLS AND ROOFS THAT WERE PREVIOUSLY OCCUPIED BY SYSTEMS AND EQUIPMENT DEMOLISHED UNDER THIS CONTRACT IN ACCORDANCE WITH STRUCTURAL ENGINEER'S REQUIREMENTS.

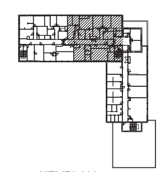
(#) FLAG NOTES:

1. REMOVE EXISTING PVC DUCT WORK AND RISER AS SHOWN. REFER TO MD-104 FOR CONTINUATION.
2. REMOVE 4" EXHAUST DUCT CONNECTED TO EQUIPMENT. CAP RUN OUT AT MAIN EXHAUST DUCT.
3. REMOVE EXISTING DIFFERENTIAL PRESSURE SENSORS, ASSOCIATED WIRING, AND ACCESSORIES.
4. LOCATE COMPRESSED AIR CONNECTION TO EQUIPMENT AND REMOVE COMPRESSED AIR PIPING BACK TO MAIN. PROVIDE A VALVE AND CAP AT MAIN FOR POSSIBLE FUTURE CONNECTION.
5. EXISTING CHILLER TO REMAIN. REMOVE FLEXIBLE CHILLED WATER LINES BETWEEN CHILLER AND MASS SPECTROMETER.
6. REMOVE CONTROL PANEL AND ACCESSORIES COMPLETELY.
7. REMOVE 16"x16" DUCT RISER COMPLETELY.
8. REMOVE PIPING CONNECTING ARGON TANK TO MASS SPECTROMETER.



1 MECHANICAL 3RD FLOOR PLAN

SCALE: 1/8" = 1'-0"



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MECHANICAL DEMOLITION 3RD FLOOR PLAN

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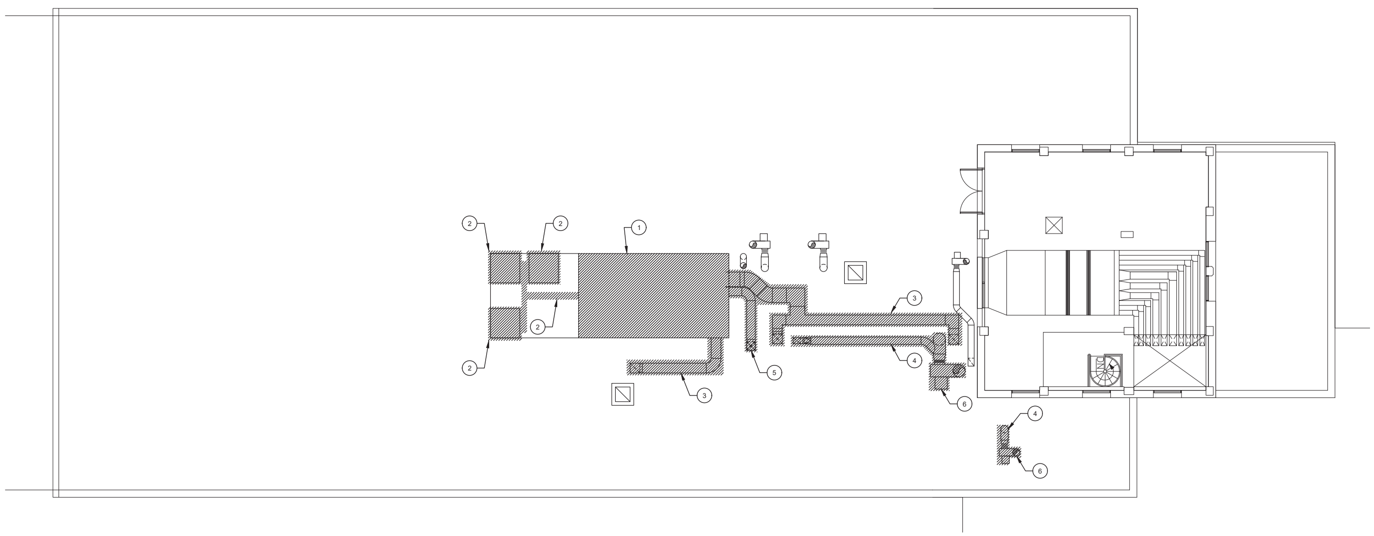


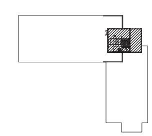
1 MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"

DEMOLITION NOTES:

1. ADDITIONAL STORM, HYDRONIC, DOMESTIC, WASTE AND VENT PIPING MAY BE ROUTED IN SPACE THAT IS NOT REPRESENTED, BUT IS TO REMAIN. OTHER SYSTEMS MAY EXIST WITHIN THE SPACE THAT ARE NOT REPRESENTED ON THESE DRAWINGS; MODIFICATIONS TO THESE SYSTEMS ARE NOT ANTICIPATED.
2. FIELD VERIFY ALL COMPONENTS PRIOR TO DEMOLITION. THE INFORMATION ON THIS SHEET WAS OBTAINED, IN PART, FROM HISTORIC DESIGN DRAWINGS. ONLY PORTIONS OF THE SYSTEMS WERE ACCESSIBLE FOR VISUAL CONFIRMATION DURING DESIGN PROCESS.
3. PROVIDE PRELIMINARY TESTING OF EXISTING HYDRONIC SYSTEMS. MEASURE CURRENT FLUID FLOW RATE THROUGH ALL EXISTING COILS, RADIANT, AND SNOWMELT ZONES FOR THE CURRENTLY INSTALLED SYSTEMS. SUBMIT REPORT OF MEASURED VALUES TO ENGINEER FOR REVIEW AND CONFIRMATION OF SYSTEM DESIGN ASSUMPTIONS PRIOR TO DEMOLITION.
4. PROVIDE PRELIMINARY TESTING OF EXISTING HVAC DUCTWORK SYSTEMS. MEASURE CURRENT AIR FLOW RATES AT ALL EXISTING SUPPLY, RETURN, AND EXHAUST REGISTERS. MEASURE TOTAL AIR FLOWS AT MAIN DUCT BRANCHES AND ALL FAN SYSTEMS. SUBMIT REPORT OF MEASURED VALUES TO ENGINEER FOR REVIEW AND CONFIRMATION OF SYSTEM DESIGN ASSUMPTIONS PRIOR TO DEMOLITION.
5. (E) WASTE SYSTEM SERVING SPACE IS LOCATED IN THE CEILING OF THE SPACE BELOW.
6. REMOVE ALL MECHANICAL ITEMS INDICATED.
7. TEMPORARILY SEAL OR CAP PIPING TO BE RE-USED FOR LATER CONNECTION.
8. SEAL ALL OPEN DUCTS DURING CONSTRUCTION TO MITIGATE DUST AND DEBRIS FROM SYSTEM. CAP DUCTWORK IN LOCATIONS THAT ARE NOT BEING RECONNECTED.
9. REMOVE ALL DEMOLISHED COLD WATER, HOT WATER AND HOT WATER RECIRCULATION PIPING BACK TO BRANCH FROM MAIN TO ELIMINATE ALL DEAD ENDS IN DOMESTIC WATER PIPING.
10. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OF INFORMATION REPRESENTED IN THE DOCUMENTS VERSUS WHAT IS FOUND IN THE FIELD.
11. COORDINATE PATCHING AND REPAIRS OF WALLS, CEILINGS AND FLOORS WITH ARCHITECT.
12. PATCH STRUCTURAL OPENINGS IN FLOORS, WALLS AND ROOFS THAT WERE PREVIOUSLY OCCUPIED BY SYSTEMS AND EQUIPMENT DEMOLISHED UNDER THIS CONTRACT IN ACCORDANCE WITH STRUCTURAL ENGINEER'S REQUIREMENTS.

FLAG NOTES:

1. REMOVE AIR HANDLING UNIT. DISCONNECT REFRIGERANT AND STEAM PIPING.
2. REMOVE CONDENSING UNITS AND ASSOCIATED REFRIGERANT PIPING.
3. REMOVE PVC RETURN DUCT AS SHOWN.
4. REMOVE PVC EXHAUST DUCT AS SHOWN.
5. REMOVE PVC SUPPLY DUCT AS SHOWN.
6. REMOVE FAN, STACK, AND ANY SUPPORTS.



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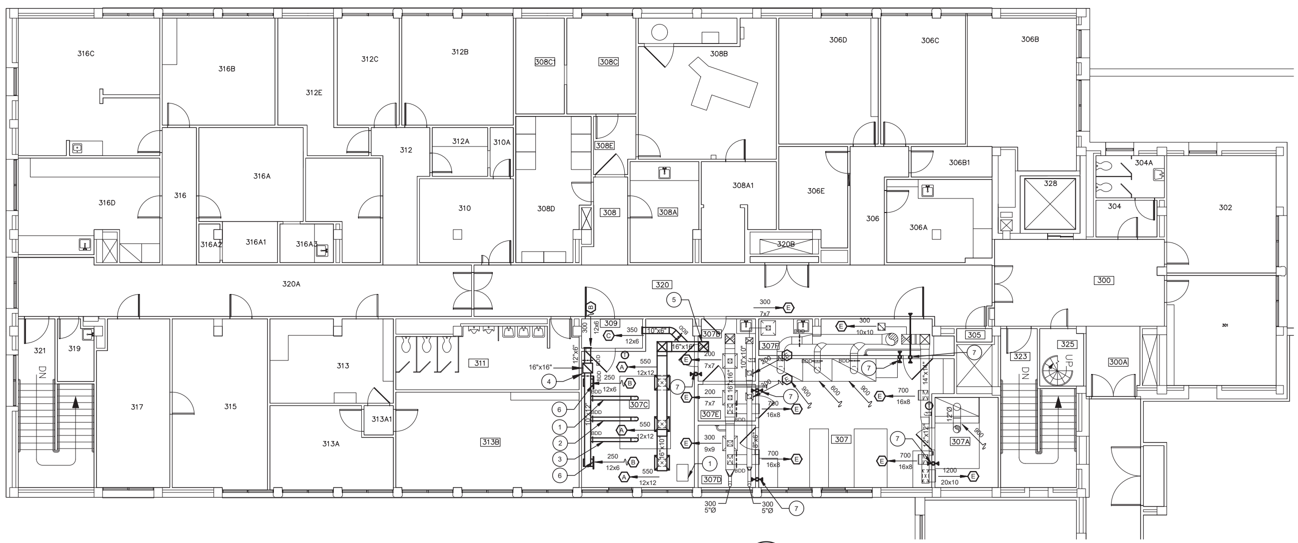
HVAC NOTES:

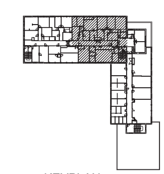
1. RE: M-501 FOR ROUND DUCT TAKE-OFF DIAGRAM.
2. RE: M-501 FOR 45° DUCT TAKE-OFF DIAGRAM.
3. COORDINATE ROUTING OF CONDENSATE DRAIN LINES PRIOR TO INSTALLATION.
4. CEILING COORDINATION OF ALL MEP SYSTEMS (LIGHTING, DUCTWORK, DIFFUSERS, ELECTRICAL, FIRE PROTECTION, ETC.) MUST BE COMPLETED BY THE CONTRACTOR PRIOR TO THE START OF ANY INSTALLATIONS.
5. AVOID ROUTING DUCTWORK OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 16 CONTRACTOR.
6. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT.
7. VERIFY ALL EQUIPMENT ACCESS PANELS WITH MANUFACTURER AND ARCHITECT.
8. SEAL ALL DUCT PENETRATIONS OF ACOUSTIC PARTITIONS.

(#) FLAG NOTES:

1. 10" STAINLESS STEEL EXHAUST DUCT TO EQUIPMENT. TRANSITION TO EQUIPMENT CONNECTION SIZE. BALANCE EXHAUST TO 415 CFM.
2. 10" STAINLESS STEEL EXHAUST DUCT TO EQUIPMENT. TRANSITION TO EQUIPMENT CONNECTION SIZE. BALANCE EXHAUST TO 300 CFM.
3. 6" STAINLESS STEEL EXHAUST DUCT TO EQUIPMENT. TRANSITION TO EQUIPMENT CONNECTION SIZE. BALANCE EXHAUST TO 70 CFM.
4. 16"x16" STAINLESS RISE THROUGH ROOF TO FAN ABOVE. INSTALL MAIN DUCT AS HIGH AS POSSIBLE.
5. 16"x16" STAINLESS RISE THROUGH ROOF TO AHU-1 ABOVE. INSTALL MAIN DUCT AS HIGH AS POSSIBLE.
6. 12X6 DUCT DROP DOWN TO GRILLE. INSTALL GRILLE 12" AFF.
7. SPACE DIFFERENTIAL PRESSURE SENSOR LOCATION. REFER TO M201, M701 AND M702 FOR MORE INFORMATION.



1 MECHANICAL 3RD FLOOR PLAN
SCALE: 1/8" = 1'-0"



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HVAC NOTES:

1. RE: M-501 FOR ROUND DUCT TAKE-OFF DIAGRAM.
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3. COORDINATE ROUTING OF CONDENSATE DRAIN LINES PRIOR TO INSTALLATION.
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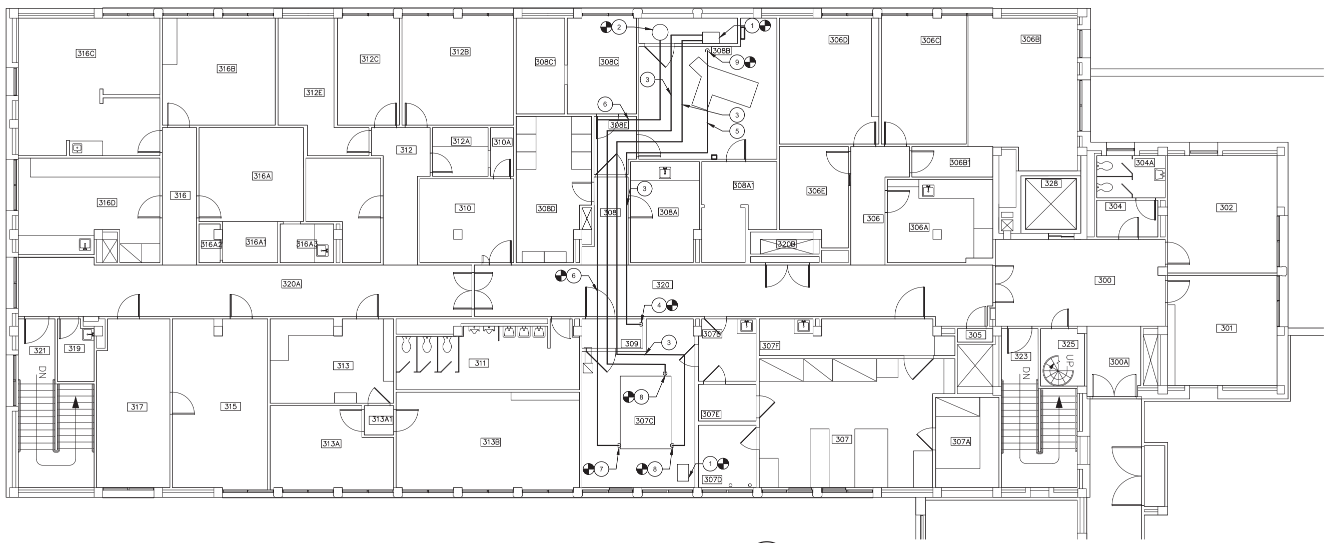
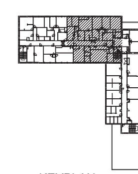
5. AVOID ROUTING DUCTWORK OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 16 CONTRACTOR.
6. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT.
7. VERIFY ALL EQUIPMENT ACCESS PANELS WITH MANUFACTURER AND ARCHITECT.
8. SEAL ALL DUCT PENETRATIONS OF ACOUSTIC PARTITIONS.

FLAG NOTES:

1. EXISTING THERMOFLEX TFL-5000 PROCESS CHILLER SERVING MASS SPECTROMETER. CONNECT (2) CIRCUITS OF CHS/ CHR FLEXIBLE PIPING. FLEXIBLE PIPING FOR THE CHILLER SHALL BE PRE-INSULATED FLEXIBLE PVC PIPING FROM THERMOFLEX.
2. EXISTING LIQUID ARGON TANK SERVING MASS SPECTROMETER. CONNECT NEW 1/2" COPPER LINE TO TANK AND ROUTE PIPING UP WALL ABOVE CEILING TO EQUIPMENT.
3. FLEXIBLE PVC PIPING ABOVE CEILING. SUPPORT PIPING EVERY 5'-0".
4. CONNECT 3/4" COMPRESSED AIR LINE TO MAIN AT THIS LOCATION. PROVIDE ISOLATION VALVE.
5. 1/2" CA LINE ABOVE CEILING.
6. 1/2" ARGON LINE ABOVE CEILING.
7. TRANSITION TO EQUIPMENT CONNECTION SIZE AND CONNECT TO MASS SPECTROMETER WITH SWAGELOK CONNECTOR.
8. CONNECT FLEXIBLE PVC CHS/ CHR LINE TO MASS SPECTROMETER. DROP PIPING IN A NEAT MANNER FROM CEILING TO EQUIPMENT.
9. CONNECT 1/2" CA PIPING TO EQUIPMENT. PROVIDE TRANSITIONS AND FITTINGS AS NEEDED FOR CONNECTION.



1 MECHANICAL 3RD FLOOR PLAN
SCALE: 1/8" = 1'-0"



KEYPLAN
3RD FLOOR PLAN

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MECHANICAL PIPING 3RD FLOOR PLAN

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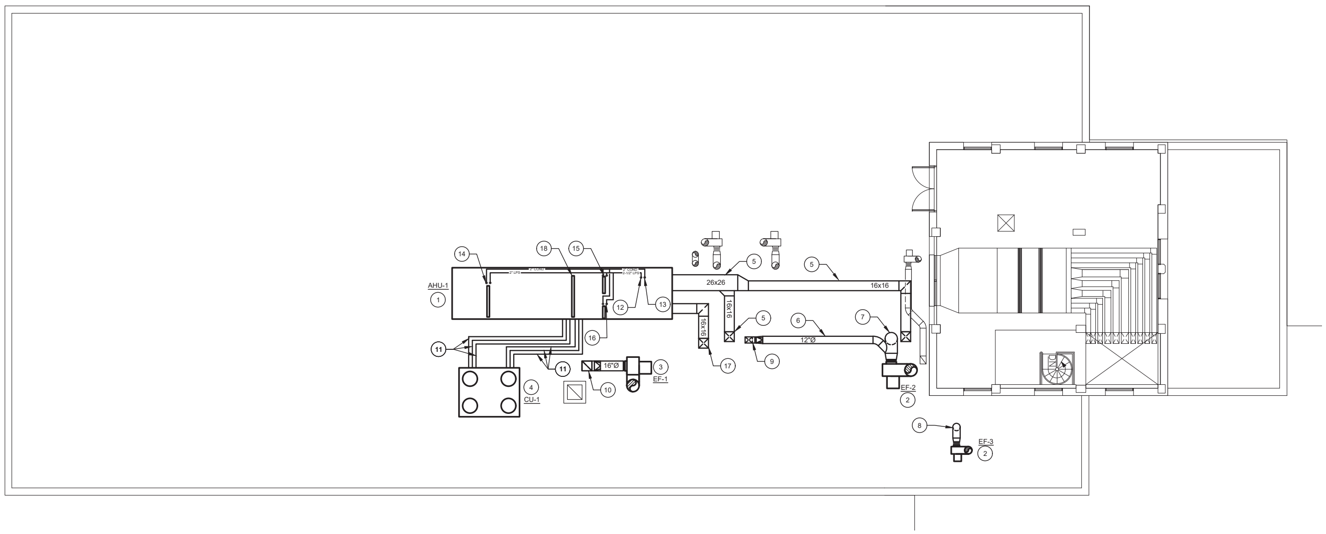


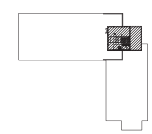
1 MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"

HVAC NOTES:

1. RE: M-501 FOR ROUND DUCT TAKE-OFF DIAGRAM.
2. RE: M-501 FOR 45° DUCT TAKE-OFF DIAGRAM.
3. COORDINATE ROUTING OF CONDENSATE DRAIN LINES PRIOR TO INSTALLATION.
4. CEILING COORDINATION OF ALL MEP SYSTEMS (LIGHTING, DUCTWORK, DIFFUSERS, ELECTRICAL, FIRE PROTECTION, ETC.) MUST BE COMPLETED BY THE CONTRACTOR PRIOR TO THE START OF ANY INSTALLATIONS.
5. AVOID ROUTING DUCTWORK OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 16 CONTRACTOR.
6. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT.
7. VERIFY ALL EQUIPMENT ACCESS PANELS WITH MANUFACTURER AND ARCHITECT.
8. SEAL ALL DUCT PENETRATIONS OF ACOUSTIC PARTITIONS.

(#) FLAG NOTES:

1. NEW AIR HANDLING UNIT ON NEW CURB. COORDINATE ROOF PATCHING WITH GENERAL CONTRACTOR.
2. NEW FRP UTILITY SET EXHAUST FAN ON EXISTING ROOF. PROVIDE THYCURB TEMS-1 EQUIPMENT RAILS AND COORDINATE ROOF PATCHING WITH GENERAL CONTRACTOR.
3. UTILITY SET FAN ON EQUIPMENT RAILS. COORDINATE ROOF PATCHING WITH GENERAL CONTRACTOR.
4. NEW CONDENSING UNIT ON THYCURB TEMS-1 EQUIPMENT RAILS. COORDINATE ROOF PATCHING WITH GENERAL CONTRACTOR.
5. PVC SUPPLY DUCT INSULATED AND JACKETED WITH EMBOSSED ALUMINUM JACKETING.
6. 12" ROUND PVC EXHAUST DUCT SUPPORTED ON ROOF.
7. 20" ROUND PVC EXHAUST DUCT DOWN THROUGH ROOF TO LAB BELOW.
8. 12" ROUND PVC EXHAUST DUCT DOWN THROUGH ROOF TO LAB BELOW.
9. 12"x10" EXHAUST DUCT DOWN THROUGH ROOF TO LAB BELOW.
10. 16"x16" STAINLESS STEEL EXHAUST DOWN THROUGH ROOF TO LAB BELOW.
11. SUPPORT REFRIGERANT LINES ON ROOF AND PROVIDE UV RESISTANT INSULATION ON PIPING. ROUTE 7/8" LIQUID, 1-5/8" SUCTION AND 7/8" HGBP LINES TO EACH CIRCUIT OF THE DX COIL.
12. CONNECT TO EXISTING 2-1/2" LOW PRESSURE STEAM LINE AT ROOF AND EXTEND TO THE STEAM COILS.
13. CONNECT TO EXISTING 2" CONDENSATE LINE AT ROOF. MAINTAIN SLOPE OF NEW LINES BACK TO THIS LOCATION.
14. CONNECT 2" STEAM LINE TO STEAM PRE-HEAT COIL. PROVIDE 2-WAY CONTROL VALVE INSTALLED INSIDE AIR HANDLER CABINET. CONNECT 2" CONDENSATE LINE FROM COIL AND SLOPE TO EXISTING LINE PENETRATING ROOF. PROVIDE F&T TRAP SIZED FOR DOUBLE THE SCHEDULED COIL CAPACITY.
15. CONNECT 2" STEAM LINE TO STEAM RE-HEAT COIL ZONE #2. PROVIDE 2-WAY CONTROL VALVE INSTALLED INSIDE AIR HANDLER CABINET. CONNECT 2" CONDENSATE LINE FROM COIL AND SLOPE TO EXISTING LINE PENETRATING ROOF. PROVIDE F&T TRAP SIZED FOR DOUBLE THE SCHEDULED COIL CAPACITY.
16. CONNECT 1-1/4" STEAM LINE TO STEAM RE-HEAT COIL ZONE #2. PROVIDE 2-WAY CONTROL VALVE INSTALLED INSIDE AIR HANDLER CABINET. CONNECT 1" CONDENSATE LINE FROM COIL AND SLOPE TO EXISTING LINE PENETRATING ROOF. PROVIDE F&T TRAP SIZED FOR DOUBLE THE SCHEDULED COIL CAPACITY.
17. STAINLESS STEEL SUPPLY DUCT INSULATED AND JACKETED WITH EMBOSSED ALUMINUM JACKETING.
18. PROVIDE 1" TYPE M COPPER CONDENSATE LINE FROM DRAIN PAN TO THE NEAREST ROOF DRAIN.



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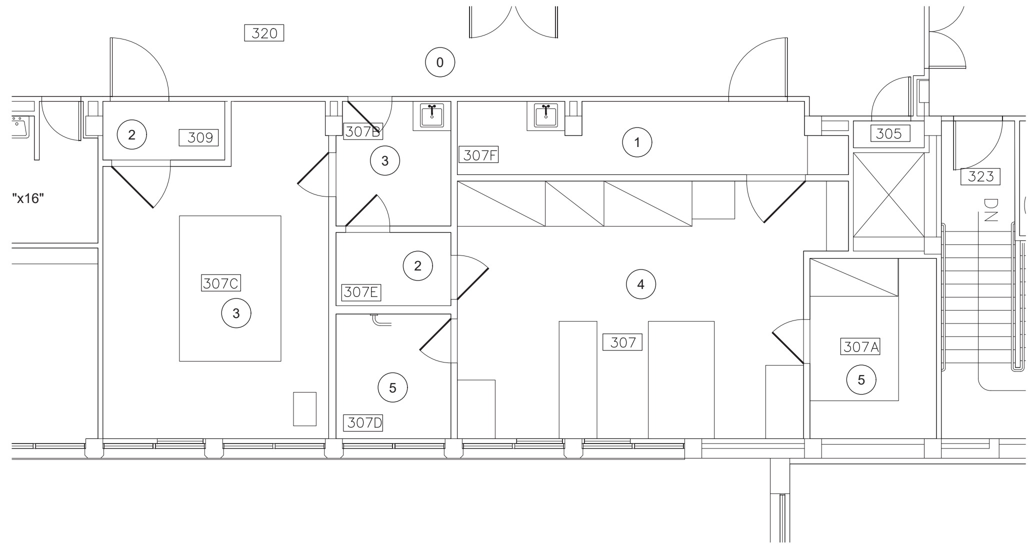
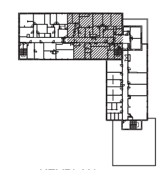
LEGEND:

0 LOWEST PRESSURE
5 HIGHEST PRESSURE



1 ZONE PRESSURIZATION PLAN
SCALE: 1/4" = 1'-0"



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3RD FLOOR PLAN

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AIR HANDLING UNIT SCHEDULE

MARK	AREA SERVED	TYPE	AIR DELIVERY CAPACITY / SUPPLY FAN: CFM	E.S.P. (IN W.C.)	WHEEL TYPE	CLASS	R.P.M.	MOTOR (HP)	2 CIRCUIT DX COOLING COIL / AIR CONDITIONS: E.A.T. DB/WB (°F)	L.A.T. DB/WB (°F)	TOTAL MBH	SENSIBLE MBH	COIL: MIN. AREA (SQ. FT.)	MAX. WTR P.D. (FT.)	MAX. AIR P.D. (IN.)
AHU-1	LAB	OUTDOOR	7,500	1.00	PLENUM	II	1199	2@10	102/69	55.0/54.2	333	-	30	5	0.65

MARK	PREHEAT COIL / AIR CONDITIONS: E.A.T. DB (°F)	L.A.T. DB (°F)	SENSIBLE MBH	STEAM: PRESSURE (PSIG)	PPH	COIL: MIN. AREA (SQ. FT.)	MAX. AIR P.D. (IN.)	PREHEAT COIL ZONE #1 / AIR CONDITIONS: E.A.T. DB (°F)	L.A.T. DB (°F)	SENSIBLE MBH	STEAM: PRESSURE (PSIG)	PPH	COIL: CFM	MAX. AIR P.D. (IN.)
AHU-1	10	55	303	7	160	30	0.2	55	90	74	7	75	2000	0.15

MARK	PREHEAT COIL ZONE #2 / AIR CONDITIONS: E.A.T. DB (°F)	L.A.T. DB (°F)	SENSIBLE MBH	STEAM: PRESSURE (PSIG)	PPH	COIL: CFM	MAX. AIR P.D. (IN.)	VOLT/ PHASE	PRE-FILTER	APPROX. OPER. WEIGHT (LBS)	MANUFACTURER* & MODEL #	ACCESSORIES	REMARKS
AHU-1	55	90	210	7	210	5500	0.15	208/3	2" MERV 8/ 4" MERV 13	10,500	MUNTERS PV-W10-MUA	PROVIDE ABB 550ACH VFD'S FOR SUPPLY FANS.	A,B,C,D,E

MANUFACTURERS:
* MUNTERS, TISDALE

GENERAL NOTES:
- A: R13 INSULATED DOUBLE WALL STEEL CABINET _GALVANIZED EXTERIOR WITH A STAINLESS STEEL INTERIOR), FACTORY MOUNTED MARINE LIGHTS IN EACH MODULE, WITH HINGED ACCESS PANELS AND QUARTER TURN HANDLES.
- B: SUPPLY FANS TO BE DIRECT DRIVE PLENUM FANS AND FACTORY MOUNTED VFD'S WITH INTEGRAL DISCONNECTS RATED FOR THE MOTOR HP AT PROJECT ELEVATION
- C: A PVC LINER SHALL BE INSTALLED AFTER THE CARBON FILTERS. CARBON FILTERS SHALL BE CAMFIL CAMSORB CANISTERS THE HEPA FILTER HOUSING SHALL BE NON-METALLIC.
- D: PROVIDE OUTSIDE AIR MEASURING STATION
- E: SEE DRAWING ON THIS SHEET FOR MODULES AND CONSTRUCTION INFORMATION.

GRILLE, REGISTER, DIFFUSER & LOUVER

SYMBOL	USE	PATTERN	FINISH	MANUFACTURER* & MODEL #	ACCESSORIES	REMARKS
A	SUPPLY	4-WAY	WHITE	PRICE SCD	-	24X24 HARD CEILING
B	EXHUAST	45 DEGREE LOUVER	WHITE	PRICE 91	-	SEE PLANS
C	SUPPLY	DOUBLE DEFLECTION	WHITE	PRICE 520	-	12X12 HARD CEILING SUPPLY
E	EXISTING					AIRFLOW INFORMATION PROVIDED FOR TEST AND BALANCE

MANUFACTURERS:
- GRD: KRUEGER, METALAIRE, TITUS
- LOUVER: GREENHECK, L&D, RUSKIN

GENERAL NOTES:
- A:
- B:

EXHAUST FAN SCHEDULE

MARK	TYPE	SERVICE	FAN: CFM	ESP (IN. W.C.)	INLET SOUND POWER LEVEL (dB re. 10-12 WATT): 63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	8000 HZ	MOTOR: HP/ (WATT)	BHP	VOLT/ PHASE	MANUFACTURER* & MODEL #	WEIGHT (LBS.)	ACCESSORIES	REMARKS
EF-1	UTILITY SET	NEPTUNE ROOM	1600	0.5	78	79	77	74	72	69	64	57	1/2	0.39	208/3	GREENHECK FJC-212-10-BI-5	225		
EF-2	FRP UTILITY SET FAN	MAIN LAB	3500	0.85	82	82	85	86	83	73	69	65	1-1/2	1.19	208/3	GREENHECK 8-BCSW-FRP-10	300		
EF-3	FRP UTILITY SET FAN	LEAD LAB	900	0.75	77	80	80	71	65	59	54	50	3/4	0.43	208/3	GREENHECK 8-BCSW-FRP-10	230		

MANUFACTURERS:
* GREENHECK, COOK, TWIN CITY

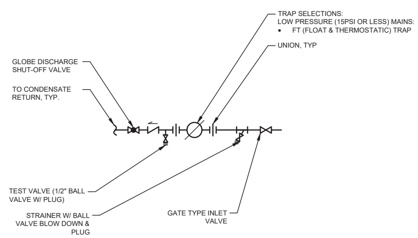
GENERAL NOTES:
- A: MANUFACTURER TO PROVIDE
- B:

AIR HANDLER CONDENSING UNIT SCHEDULE

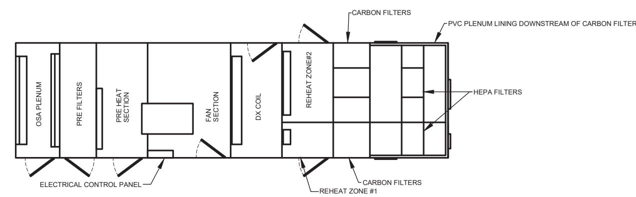
MARK	MATCHED SYSTEM COMPONENT	NOMINAL COOLING CAPACITY (TONS)	COOLING CAPACITY (MBH)	EER (AHRI)	IEER (AHRI)	AMBIENT TEMP. DB(F°)	ELECTRICAL: MCA	VOLT/ PH	MOCP	APPROX.OPER. WEIGHT (LBS)	MANUFACTURER MODEL #	ACCESSORIES	REMARKS
CU-1	AHU-1	30	274	12.3	14.6	105	140.5	208/3	175	2250	DAIKIN APPLIED RCS030D	HAIL PROTECTION, PHASE FAILURE, DISCONNECT SWITCH	

MANUFACTURERS:
*

GENERAL NOTES:
- A: PROVIDE MOUNTING RAILS WITH SPRING ISOLATION
- B: PROVIDE ALL SERVICE AND OPERATIONAL CLEARANCES AS REQUIRED BY MANUFACTURER AND CODE.
- C: PROVIDE ALL REQUIRED ACCESSORIES INCLUDING CONTROLS FOR A COMPLETE AND OPERATIONAL SYSTEM. REFER TO SEQUENCE OF CONTROLS. ACCESSORIES TO INCLUDE LOW AMBIENT CONTROLS, FILTER DRIER, CRANK CASE HEATER AS REQUIRED BY MFG.
- D: PROVIDE ALL SIZING OF REFRIGERANT PIPING BETWEEN ALL SYSTEM COMPONENTS ACCORDING TO MANUFACTURER SHOP DRAWINGS. PIPING SHALL NOT EXCEED MANUFACTURER RECOMMENDED LENGTH.
- E: UNIT SELECTED AT PROJECT ELEVATION.

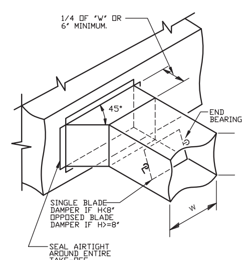


TYPICAL CONDENSATE TRAP PIPING



AIR HANDLING UNIT MODULES

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



45° DUCT TAKE-OFF DIAGRAM

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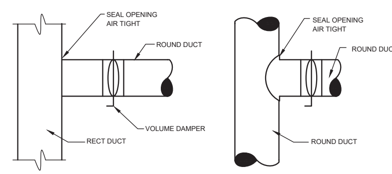

DUCT TAKE-OFFS DETAILS

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MECHANICAL SCHEDULES AND DETAILS

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SEQUENCE OF OPERATION:

AHU (TYPICAL OF 1)

RUN CONDITIONS - CONTINUOUS:
THE UNIT SHALL RUN CONTINUOUSLY AND SHALL MAINTAIN:

- A 75°F (ADJ.) COOLING SETPOINT.
- A 70°F (ADJ.) HEATING SETPOINT.

FREEZE PROTECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

HIGH STATIC SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AN HIGH STATIC SHUTDOWN SIGNAL.

SUPPLY AIR SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SUPPLY AIR SMOKE DETECTOR STATUS.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

PREHEATING COIL STEAM VALVE:
THE CONTROLLER SHALL MEASURE THE OUTSIDE AIR TEMPERATURE AND MODULATE THE PREHEATING COIL STEAM VALVE TO MAINTAIN A SETPOINT 4°F (ADJ.) LESS THAN THE COOLING SUPPLY AIR TEMPERATURE SETPOINT.

THE PREHEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 55°F (ADJ.).
- AND THE SUPPLY FAN STATUS IS ON.

THE PREHEATING COIL STEAM VALVE SHALL OPEN FOR FREEZE PROTECTION WHENEVER:

- MIXED AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.).
- OR THE FREEZESTAT (IF PRESENT) IS ON.

COOLING SUPPLY AIR TEMPERATURE SETPOINT - OPTIMIZED:
THE COOLING SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET BASED ON ZONE COOLING REQUIREMENTS AS FOLLOWS:

- THE INITIAL COOLING SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 55°F (ADJ.).
- AS COOLING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 53°F (ADJ.).
- AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 72°F (ADJ.).

COOLING STAGING:
THE CONTROLLER SHALL MEASURE THE COOLING SUPPLY AIR TEMPERATURE AND AND STAGE THE DX CONDENSING UNIT TO MAINTAIN ITS COOLING SETPOINT.

THE COOLING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
- AND THE SUPPLY FAN STATUS IS ON.

THE COOLING COIL VALVE SHALL OPEN TO 50% (ADJ.) WHENEVER THE FREEZESTAT (IF PRESENT) IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH COOLING SUPPLY AIR TEMP: IF THE COOLING SUPPLY AIR TEMPERATURE IS 5°F (ADJ.) GREATER THAN SETPOINT

ZONE RE-HEAT SUPPLY AIR TEMPERATURE SETPOINT - OPTIMIZED:
THE HEATING SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET BASED ON ZONE HEATING REQUIREMENTS AS FOLLOWS:

- THE INITIAL PRE-HEAT SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 80°F (ADJ.).
- AS HEATING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 90°F (ADJ.).
- AS HEATING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 72°F (ADJ.).

ZONE RE-HEAT STEAM VALVE:
THE CONTROLLER SHALL MEASURE THE HEATING SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL STEAM VALVE TO MAINTAIN ITS SETPOINT.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE SUPPLY FAN STATUS IS ON.

THE HEATING COIL STEAM VALVE SHALL OPEN WHENEVER:

- HEATING SUPPLY AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.).
- OR THE FREEZESTAT (IF PRESENT) IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH HEATING SUPPLY AIR TEMP: IF THE HEATING SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW HEATING SUPPLY AIR TEMP: IF THE HEATING SUPPLY AIR TEMPERATURE IS 5°F (ADJ.) LESS THAN SETPOINT.

OUTSIDE AIR DAMPERS:
THE DAMPERS SHALL OPEN TO PROVIDE OUTSIDE AIR ANYTIME THE UNIT IS OPERATING AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE DAMPERS SHALL CLOSE 5SEC (ADJ.) AFTER THE SUPPLY FAN STOPS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- OUTSIDE AIR DAMPERS FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- OUTSIDE AIR DAMPERS IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.

PREFILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

CARBON FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE CARBON FILTER.

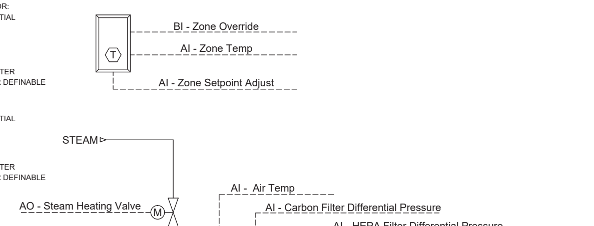
ALARMS SHALL BE PROVIDED AS FOLLOWS:

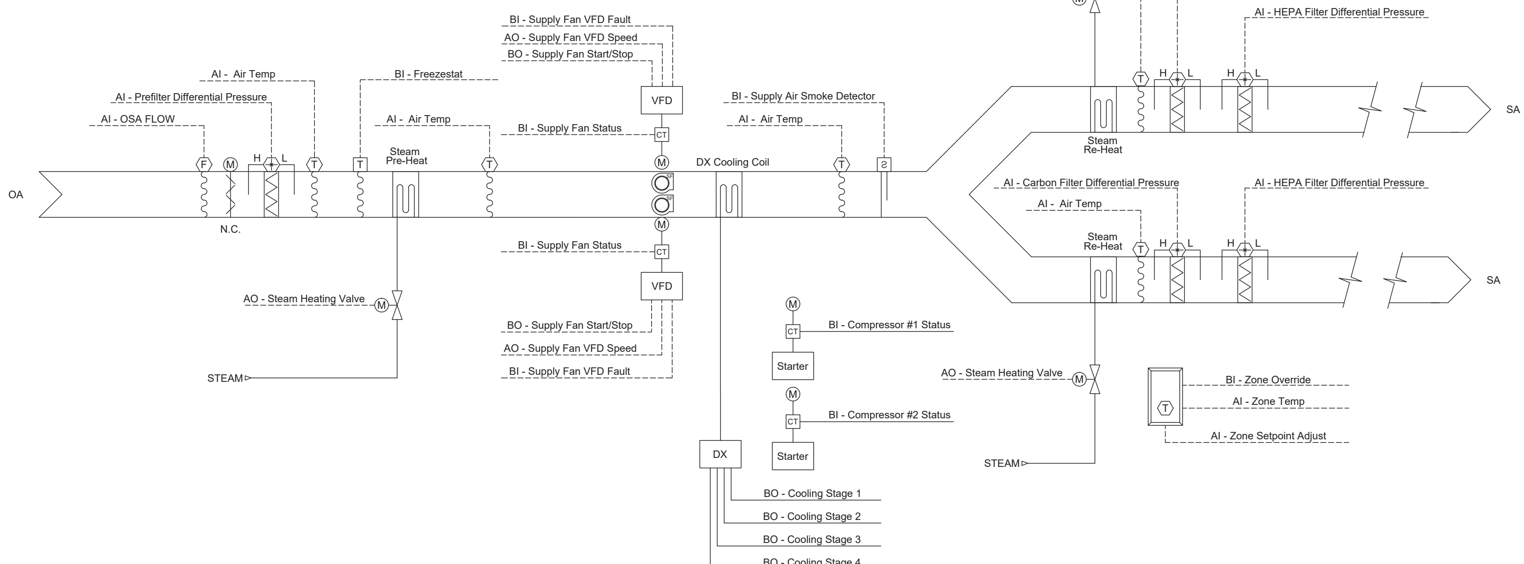
- FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

HEPA FILTER DIFFERENTIAL PRESSURE MONITOR:
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE HEPA FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).





1 AIR HANDLING SCHEDULED
SCALE: NONE

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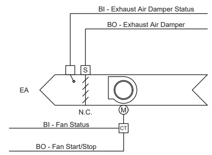


SEQUENCE OF OPERATION:

RUN CONDITIONS - SCHEDULED:
THE FAN SHALL RUN ACCORDING TO A USER DEFINABLE SCHEDULE.

FAN:
THE FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

EXHAUST AIR DAMPER:
THE EXHAUST AIR DAMPER SHALL OPEN ANYTIME THE UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE EXHAUST AIR DAMPER SHALL CLOSE 30 SEC (ADJ.) AFTER THE FAN STOPS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- DAMPER FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.

DAMPER STATUS:
THE FAN SHALL BE ENABLED AFTER THE DAMPER STATUS HAS PROVEN.

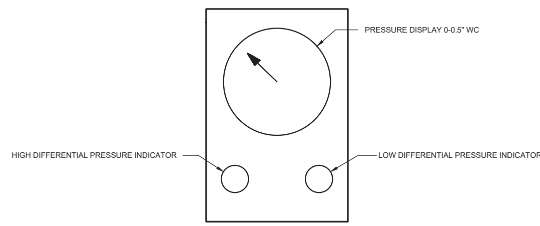
ALARMS SHALL BE PROVIDED AS FOLLOWS:
- DAMPER FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.

FAN STATUS:
THE CONTROLLER SHALL MONITOR THE FAN STATUS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
- FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- FAN RUNTIME EXCEEDED: FAN STATUS
- RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

1 EXHAUST FAN SCHEDULED

SCALE: NONE



PROVIDE GRAPHICS INDICATING THE DIFFERENTIAL PRESSURE BETWEEN THE FOLLOWING ROOMS AS INDICATED ON M201:

1. 307A/307
2. 307D/307
3. 307E/307
4. 307C/307B
5. 307F/307
6. 307/320

ROOM DIFFERENTIAL SETPOINTS AND THRESHOLDS FOR ALARM SHALL BE PROVIDED BY THE OWNER AND SET NY THE TEST AND BALANCE CONTRACTOR.

1 DIFFERENTIAL PRESSURE GRAPHICS

SCALE: NONE

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SEAL

100% CD'S FOR REVIEW

UNIVERSITY OF NEW MEXICO
NORTHROP HALL
221 YALE BLVD. N.E.

Current Issue:
50% Construction Documents

Issued:

Progress Set	06.19.2017

Sheet Title:
MECHANICAL CONTROLS

Date:	06.19.2017
Designed:	KJB
Reviewed:	PHW
Project No:	9817.00

Sheet No:
M-702

Scale: As Shown

09.28.17 9:58:58 AM S:\BGPROJECTS\9817.00 UNM NORTHROP HALL AIR HANDLER REPLACEMENT\DRAWINGS\9817M702.DWG

REQUEST FOR CAPITAL PROJECT CONSTRUCTION APPROVAL for
TAOS HARWOOD MUSEUM: HVAC IMPROVEMENTS
UNIVERSITY OF NEW MEXICO
March 8, 2022

REQUESTED ACTION:
In accordance with Section 7.12 of the Board of Regents Policy Manual and as required by the New Mexico Higher Education Department and New Mexico State Board of Finance, project approval is requested for **Taos Harwood Museum: HVAC Improvements**

PROJECT DESCRIPTION:

Replacement of RTU's identified as 3 and 4 are required and will include new electrical power feed from the existing panel. This requires new conduit, new wire and new breakers within the electrical panel. In addition, there may be structural modifications, reinforcement of the roof deck, due to the new unit size and increased weight. Mechanical controls integration into the existing system will be needed in order to operate the new units to include including programming and commissioning of the units prior to start up.

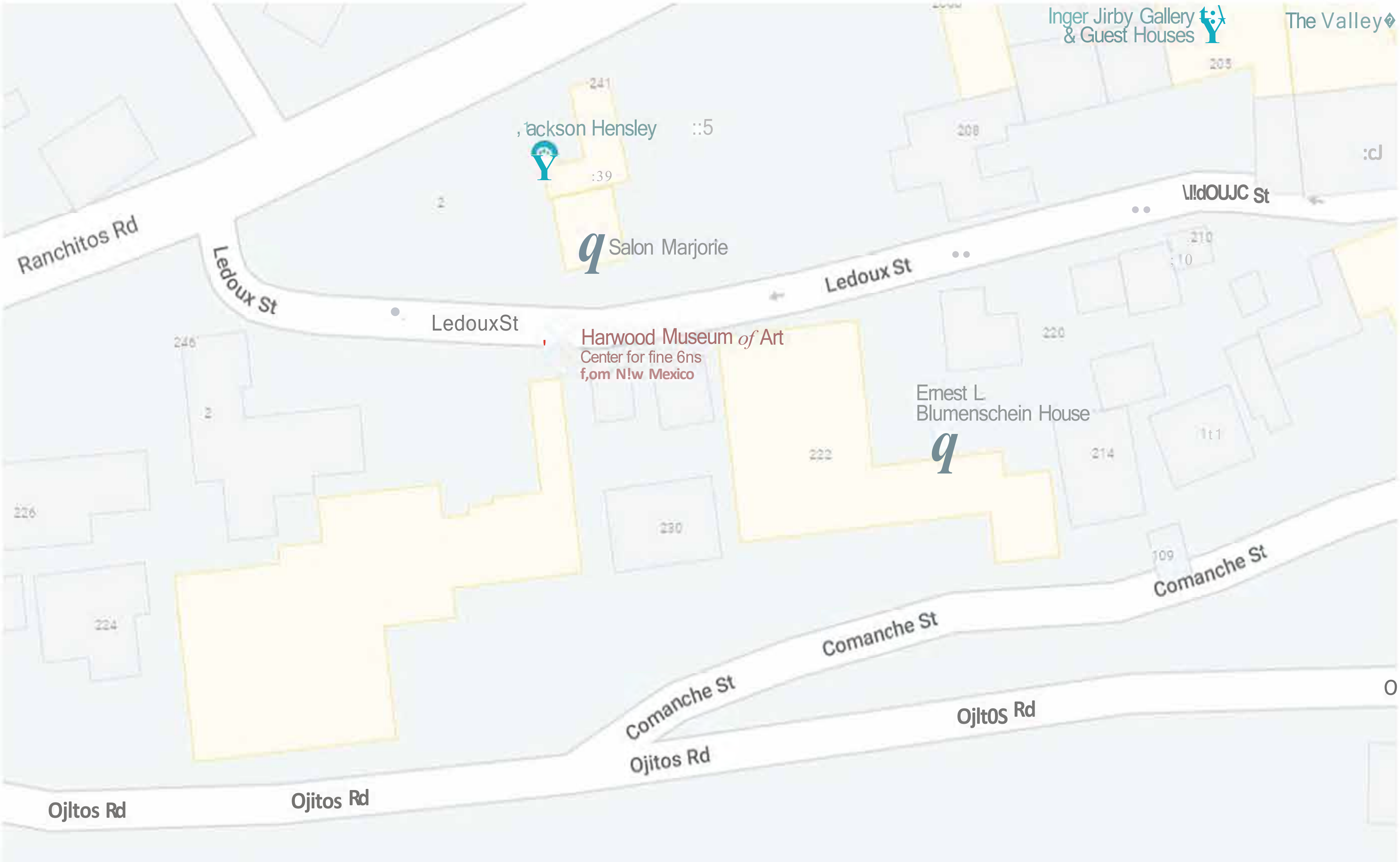
PROJECT RATIONALE:

The Harwood Museum has 4 Roof Top Units (RTUs) that are approximately 23 years old and need to be replaced. These systems are not up-to-date in their monitoring capability, and not accessible for remote control. RTU-3 and RTU-4 are currently failing. RTU-3 is leaking and mostly non-functioning and RTU-4 is only partially working. Both units are required to maintain proper temperature and humidity requirements for the art exhibits.

If the project does not receive approval, the museum, the collections are at risk and the facility's American Association of Museums accreditation is jeopardized due to not being able to meet the indoor air requirements for temperature and humidity.

FUNDING:
The total estimated Project Budget is $350,000:

- $100,000 is funded from Legislative Capital Outlay FY22 Funding Granted
- $150,000 is funded from FY22 FIN Allocation
- $50,000 is funded from Harwood Museum Unrestricted Reserves from Individual Gifts
- $50,000 is funded from FY22 Emergency Reserves


Inger Jirby Gallery
& Guest Houses
The Valley
, ackson Hensley
Salon Marjorie
Ranchitos Rd
Ledoux St
Ledoux St
LedouxSt
Harwood Museum of Art
Center for fine 6ns
f,om N!w Mexico
Emest L.
Blumenschein House
Comanche St
Comanche St
Comanche St
Ojitos Rd
Ojitos Rd
Ojltos Rd
Ojlt0s Rd

REQUEST FOR CAPITAL PROJECT CONSTRUCTION APPROVAL for BIOMEDICAL RESEARCH FACILITY (BRF) LABORATORY AIRFLOW SAFETY MODIFICATIONS TO BSL-2 LABS 120-127
UNIVERSITY OF NEW MEXICO
March 08, 2022 REQUESTED ACTION:

In accordance with Section 7.12 of the Board of Regents Policy Manual and as required by the New Mexico Higher Education Department and New Mexico State Board of Finance, project approval is requested for **Laboratory Airflow Safety Modifications to BSL-2 Labs 120-127 at the Biomedical Research Facility (BRF)**, on the Albuquerque North Campus.

PROJECT DESCRIPTION:

The Biomedical Research Facility (building 253) is 108,465 gsf and is composed primarily of research laboratories, with some administrative office spaces. Sealing of the Bio-Safety Level 2 (BSL-2) laboratories 120-127 and installing laboratory airflow controls will provide a safe Indoor Air Quality (IAQ) environment for research done in those labs. The remaining labs not covered in this project will be addressed in future projects.

PROJECT RATIONALE:

The Biomedical Research Facility was constructed in 1982 and comprises five levels: a basement, a ground level, and three upper floors containing primarily Bio-Safety Level 2 (BSL-2) laboratories for biomedical research. It was recently discovered that the laboratory levels have an open airflow path between the laboratories and other spaces on the same floor level (laboratories, corridors, offices, etc.). To isolate the laboratory processes and provide secondary containment, the perimeter walls of each lab must be continued above the ceiling up to the floor or roof above, and all penetrations through the walls must be sealed.

Once 120-127 laboratories have been properly sealed, standard laboratory airflow controls can be installed, including airflow valves and controls for primary containments (fume hoods, biosafety cabinets, etc.), room supply air and room general exhaust.

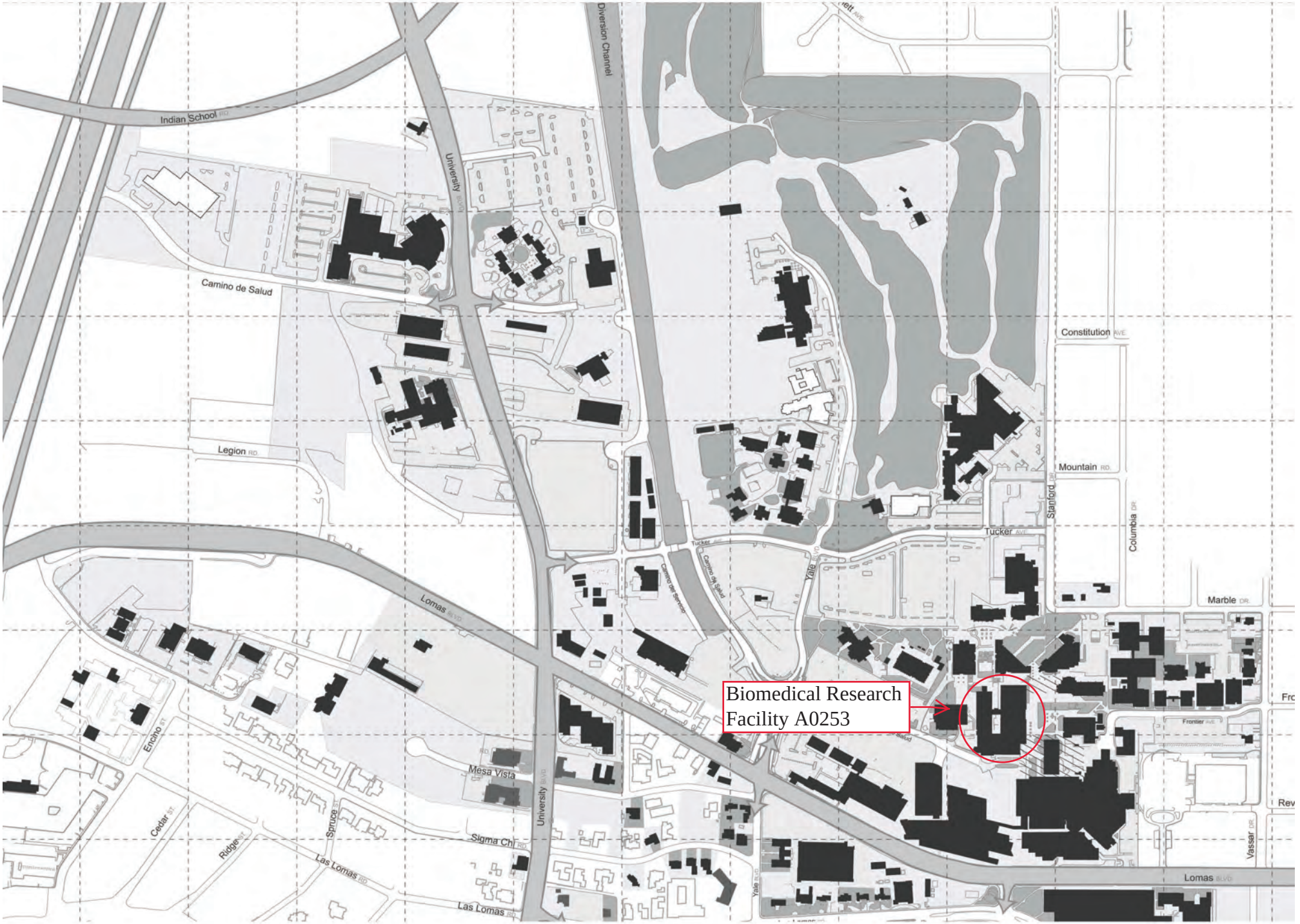
The combination of sealing each lab and installing airflow controls will provide a safe indoor air quality environment for the research performed in 120-127 labs. Additionally, isolating the laboratories will allow the building makeup air and exhaust systems to operate at a lower energy level, without struggling to maintain differential pressures between unsealed spaces.

If this project is not approved, the 120-127 laboratories would remain in their present state with the potential of exposure for building occupants to biological materials that would otherwise be contained within the laboratory and exhausted from the building. Building makeup air and exhaust systems will continue to operate at a higher-than-necessary energy level to maintain differential pressures.

FUNDING: The total estimated Project Budget is $565,000

- $565,000 is funded from FY22 Sustainability Surcharge

The University of New Mexico - Albuquerque: North Campus



BIOMEDICAL RESEARCH FACILITY

UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE

915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500

FIRST FLOOR - BSL-2 LAB & INTERLAB
HVAC EXHAUST & SUPPLY AIR SYSTEMS
LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

PROJECT SITE LOCATION

BUILDING 253

BSL-2 LAB AND INTERLAB 120, 121, 124, 125 & 127

SCALE: 1/8" = 1'-0"

THE UNIVERSITY OF NEW MEXICO

FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

Albuquerque, NM 87131-3500 | Phone: (505) 277-1126 Fax: (505) 277-3561

NOVEMBER 5, 2021
INDEX OF DRAWINGS
LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

GENERAL

SEQUENCE	SHEET NUMBER	LEVEL	SHEET TITLE
01	G-001		COVER SHEET

ARCHITECTURAL

SEQUENCE	SHEET NUMBER	LEVEL	SHEET TITLE
02	A-101	1ST FLOOR	1ST FLOOR PARTIAL ARCHITECTURAL PLAN
03	A-201	1ST FLOOR	CEILING PLENUM - WALL PENETRATION PLAN
04	A-301	1ST FLOOR	INTERIOR PARTITION TYPE, FINISH SCHEDULE AND MISCELLANEOUS PHOTOS

MECHANICAL

SEQUENCE	SHEET NUMBER	LEVEL	SHEET TITLE
05	MD-101	1ST FLOOR	MECHANICAL DEMOLITION PLAN
06	M-101	1ST FLOOR	MECHANICAL NEW WORK PLAN
07	M-501	-	TYPICAL PENETRATION DETAILS
08	MI-601	-	B.A.S. BASED LABORATORY AIRFLOW SAFETY STANDARD CONTROLS DIAGRAM, LABORATORY HOOD EXHAUST - LAB ROOMS 121 AND 125
09	MI-602	-	SEQUENCE OF OPERATION AND CONTROLS EQUIPMENT SCHEDULE

B.A.S. -BASED LAB RECIRCULATION HOOD AIRFLOW CONTROLS DIAGRAM

QA ENGINEERING | 1409 ORTIZ DRIVE SE | ALBUQUERQUE, NM 87108 | (505) 338-7092

G-001

Keyed Notes ⟨X⟩

1. EXTEND INTERIOR PARTITION WALL TO BOTTOM OF STRUCTURAL DECK.
2. FIELD VERIFY MECHANICAL CHASE WALL EXTENDS TO BOTTOM OF STRUCTURAL DECK ALL AROUND. REFER TO INTERIOR PARTITION ASSEMBLY, TYPE B.
3. COORDINATE AND REFER TO SHEET A-201, CEILING PLENUM AND PENETRATION PLAN FOR ADDITIONAL INFORMATION. SEE SHEET A-301 INTERIOR PARTITION ASSEMBLY, TYPE A & B FOR NEW WALL EXTENSION DETAIL.
4. SEAL BOTH SIDES OF ALL WALL PENETRATIONS WITH FIRE CAULK , TYPICAL. (SHEET ROCK SHALL BE CONTINUOUS AROUND EACH SPACE).

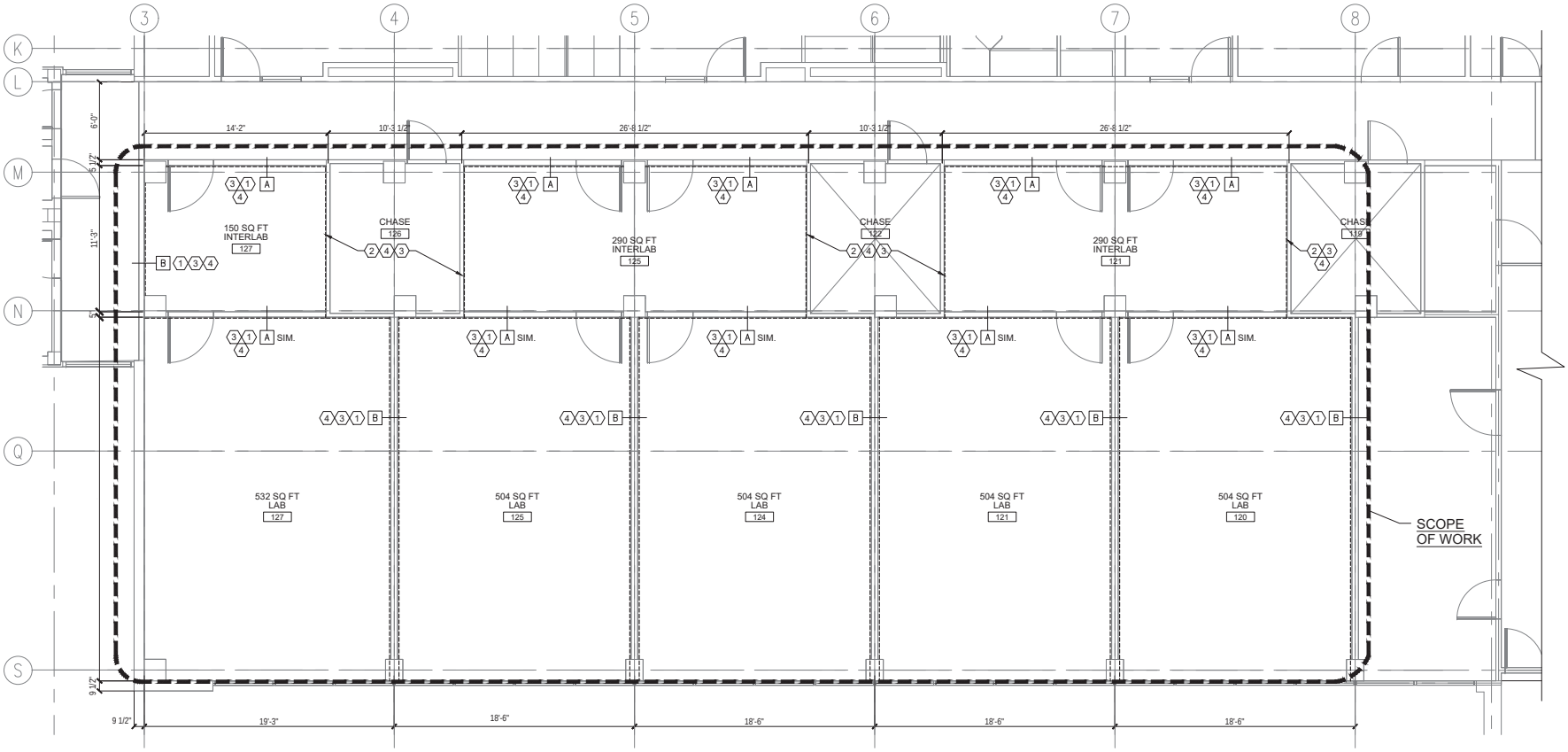
Symbol Legend

A — WALL TYPE

POINT OF CONNECTION

General Notes

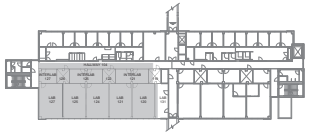
A. CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE JOB SITE. IF ANY DISCREPANCIES ARE FOUND, THE ENGINEER OF RECORD SHALL BE NOTIFIED.
B. PROTECT FROM DAMAGING EXISTING ELECTRICAL, MECHANICAL EQUIPMENT, ETC. WHICH WILL REMAIN AS PART OF THE FINAL SYSTEMS. IF DAMAGED, THE CONTRACTOR SHALL REPAIR AND/OR RESTORE THESE ITEMS TO PRE-CONSTRUCTION CONDITIONS.
C. THE CONTRACTOR SHALL PATCH ALL WALLS IN AREAS WHERE MISCELLANEOUS FIXTURES, CONDUIT, AND DEVICES HAVE BEEN REMOVED.
D. PATCH/REPAIR/TEXTURE ALL WALLS FOR CONSISTENT FINISH FREE OF DEFECTS & UNEVEN SURFACES.
E. CONTRACTOR SHALL CONFIRM ADEQUATE BLOCKING SUPPORT FOR ALL WALL-HUNG ITEMS. FOR WALL-HUNG ITEMS IN CONCRETE WALLS, CONTRACTOR SHALL CONFIRM REQUIRED ANCHORING WITH EQUIPMENT MANUFACTURER.
F. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2018 EDITION OF THE IBC, INTERNATIONAL BUILDING CODE AND ALL OTHER GOVERNING AUTHORITIES HAVING JURISDICTION.
G. CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS REQUIRED BY LOCAL AUTHORITIES.
H. ALL TESTING AND INSPECTIONS SHALL BE COORDINATED AND SCHEDULED BY THE CONTRACTOR TO FIT WITHIN THE WORKFLOW OF THE PROJECT.
I. CONTRACTOR SHALL COORDINATE SCHEDULE DATE, SITE ACCESS WITH THE USER PRIOR TO COMMENCING WORK.
J. ONLY MAJOR ITEMS OF DEMOLITION ARE SHOWN ON THE DEMOLITION DRAWINGS. THERE MAY BE SPECIFIC AND SMALL ITEMS OF DEMOLITION AND REPAIR THAT WILL BE NECESSARY THROUGHOUT THE COURSE OF THE WORK WHICH IS APPARENT BY A COMPLETE AND THOROUGH REVIEW OF EXISTING CONDITIONS AND ALL OF THE CONSTRUCTION DOCUMENTS. IT IS THE CONTRACTORS' RESPONSIBILITY TO PERFORM ALL DEMOLITION OPERATIONS REQUIRED FOR THE PROJECT.
K. EXISTING CONSTRUCTION SHALL BE MODIFIED AS NEEDED TO ACCOMMODATE NEW DEVICES AND CONDUIT ROUTES, SUCH MODIFICATIONS WILL BE REPAIRED AND FINISHED TO MATCH ADJACENT.
L. ALL SYMBOLS AND ABBREVIATIONS USED ON DRAWINGS ARE CONSIDERED TO BE CONSTRUCTION STANDARDS. IF THE CONTRACTOR HAS QUESTIONS REGARDING SAME, OR THEIR EXACT MEANING, THE ENGINEER OF RECORD SHALL BE NOTIFIED FOR CLARIFICATION.
M. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CEILING SPACES IN THE PROJECT AREA TO REMOVE ALL DUST DEPOSITS AND DEBRIS.



1ST FLOOR PARTIAL ARCHITECTURAL PLAN - BSL-2 LAB AND INTERLAB 120, 121, 124, 125 & 127

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

NORTH



NORTH KEY PLAN - FIRST FLOOR

NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE
915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500

THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB
1ST FLOOR PARTIAL - ARCHITECTURAL PLAN

HVAC EXHAUST & SUPPLY AIR SYSTEMS
LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

REV	DESCRIPTION	DATE	CHK'D
C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	8-17-21	
A	75% REVIEW PACKAGE	7-15-21	

DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

QAE

FILE: B #253_21-035

A-101

2 of 9 SHEETS

Symbol Legend

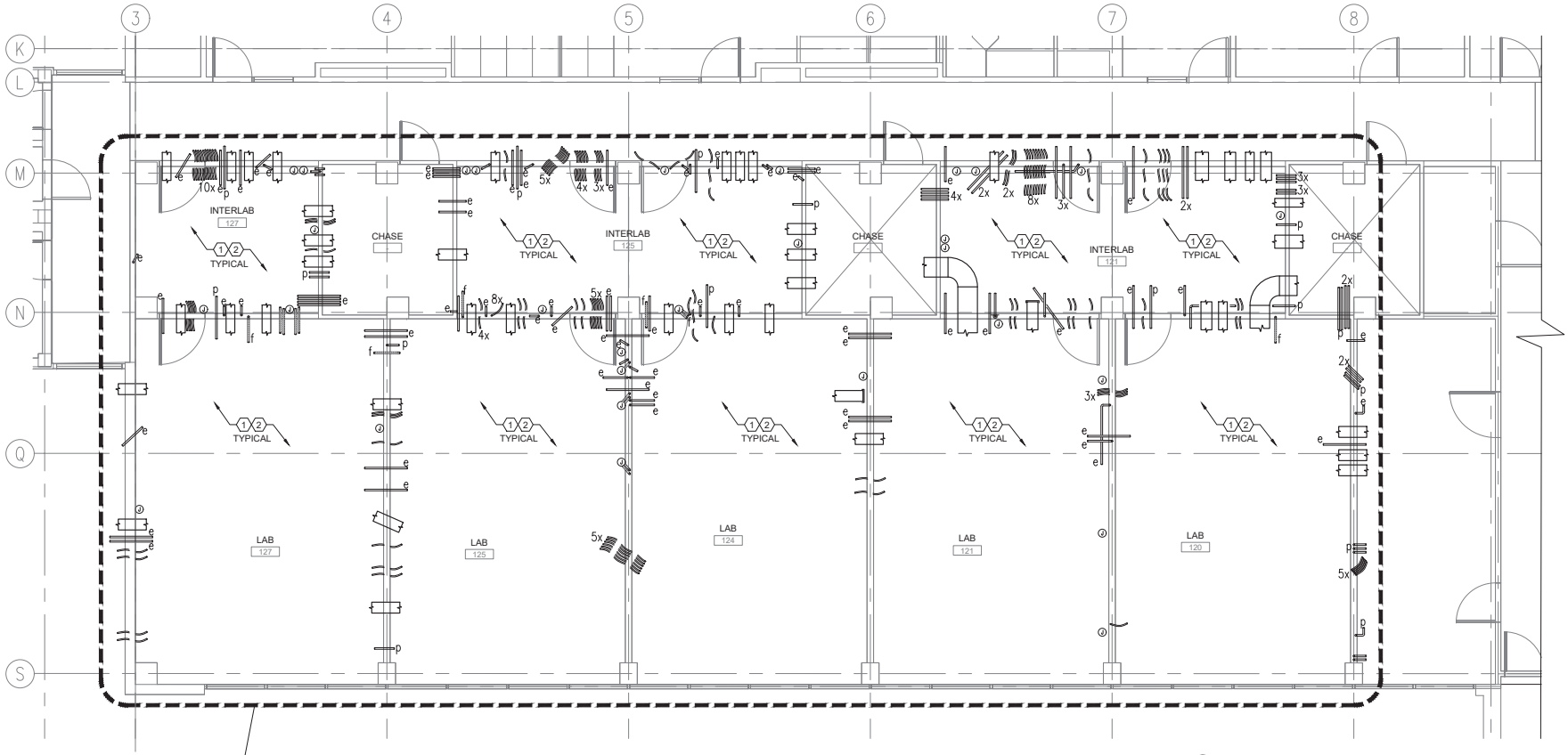
- CONDUIT
- LOOSE WIRE(S)
- DUCT
- CAST IRON / PIPE
- FLEX CONDUIT
- JUNCTION BOX

General Notes

A. PLANS ARE GRAPHIC REPRESENTATIONS. CONTACT BUILDING MANAGEMENT WITH ANY QUESTIONS REGARDING INTENT. ALL AREAS TO BE REMODELED REQUIRE FIELD VERIFICATION PRIOR TO PROJECT START.
B. CONTRACTOR TO COORDINATE ALL UTILITY SHUT DOWNS AND TIE-INS WITH THE OWNER.
C. LABORATORY SHALL BE ADEQUATELY SEALED TO MAINTAIN DIFFERENTIAL PRESSURE BETWEEN LABORATORY AND SURROUNDING SPACES.

Keyed Notes ⓧ

1. REFER TO SYMBOL LEGEND FOR GENERAL DESCRIPTION OF PENETRATION TYPE. DUCT SIZES ARE NOT SHOWN ON PLAN. REFER TO SHEET A-301 WHERE MISCELLANEOUS PHOTOS ARE PROVIDED.
2. WALL PENETRATIONS SHOWN ON PLAN ARE CLOSE REPRESENTATION OF TYPE AND NUMBER OF DUCTS, CONDUITS, WIRES AND LOOSE COMM LINES THAT ROUTE BETWEEN ANTE-ROOM / INTERLAB, LABORATORY AND HALLWAY 104.

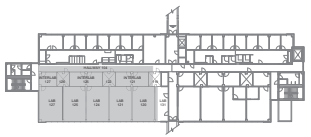


SCOPE OF WORK

CEILING PLENUM - WALL PENETRATION PLAN - BSL-2 LABS AND INTERLABS 127 THRU 120

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

NORTH



NORTH KEY PLAN - FIRST FLOOR

NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE
915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500

THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB CEILING PLENUM - WALL PENETRATION PLAN

HVAC EXHAUST & SUPPLY AIR SYSTEMS

LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	8-17-21	
A	75% REVIEW PACKAGE	7-19-21	
REV	DESCRIPTION	DATE	CHK'D

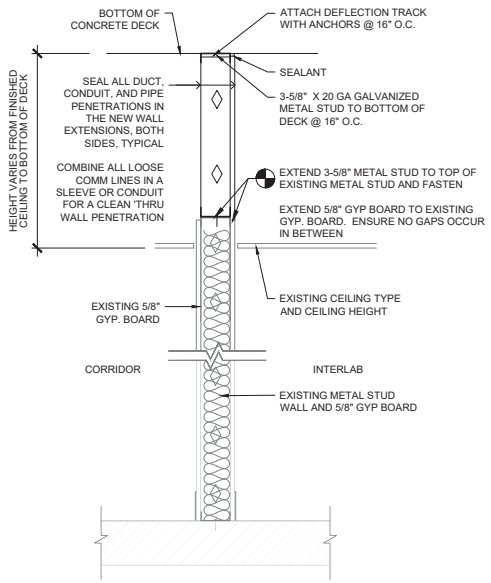
DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

QAE

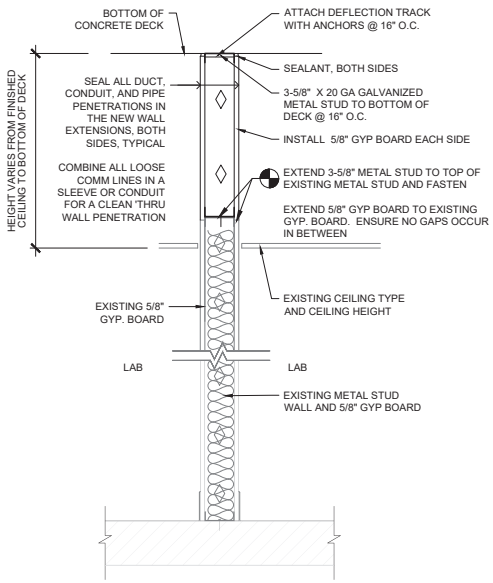
FILE: B #253_21-035

A-201

3 of 9 SHEETS



NON-RATED, TYPICAL PARTITION A

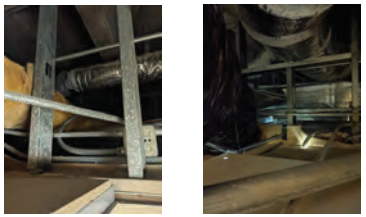


NON-RATED, TYPICAL PARTITION B

MATERIAL & FINISH SCHEDULE

ROOM	WALL TYPE	CEILING	REMARK
INTERLAB 121	A, B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS
LAB 120	B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS
LAB 121	B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS
INTERLAB 125	A, B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS
LAB 124	B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS
LAB 125	B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS
INTERLAB 127	A, B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS
LAB 127	B	MATCH EXISTING	GENERAL WALL PAINT; SEMI-GLOSS

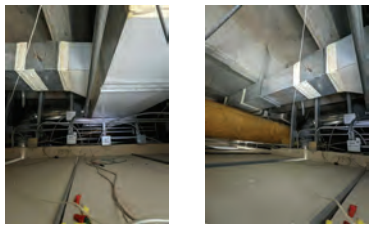
1. A = NON-RATED WALL B = NON-RATED WALL
2. PAINT MANUFACTURER: DUNN EDWARDS
3. PAINT COLOR TO MATCH EXISTING
4. BLEND AND MATCH EXISTING WALL / TEXTURE FINISH



1 WALL BETWEEN INTERLAB 127 AND HALLWAY 104
NOT TO SCALE

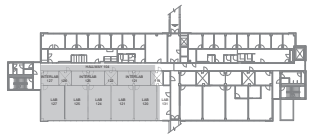
2 WALL BETWEEN INTERLAB 125 AND LAB 125
NOT TO SCALE

3 WALL BETWEEN LAB 120 AND INTERLAB 121
NOT TO SCALE



4 WALL BETWEEN LAB 127 AND LAB 125
NOT TO SCALE

5 WALL BETWEEN LAB 120 AND LAB 130
NOT TO SCALE



NORTH KEY PLAN - FIRST FLOOR
NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE
915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500

THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB INTERIOR PARTITION TYPE, FINISH SCHEDULE AND MISCELLANEOUS PHOTOS HVAC EXHAUST & SUPPLY AIR SYSTEMS

LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

NO	DESCRIPTION	DATE	CHK'D
C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	8-17-21	
A	75% REVIEW PACKAGE	7-19-21	

DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

FILE: B #253_21-035

A-301

EXHIBIT A

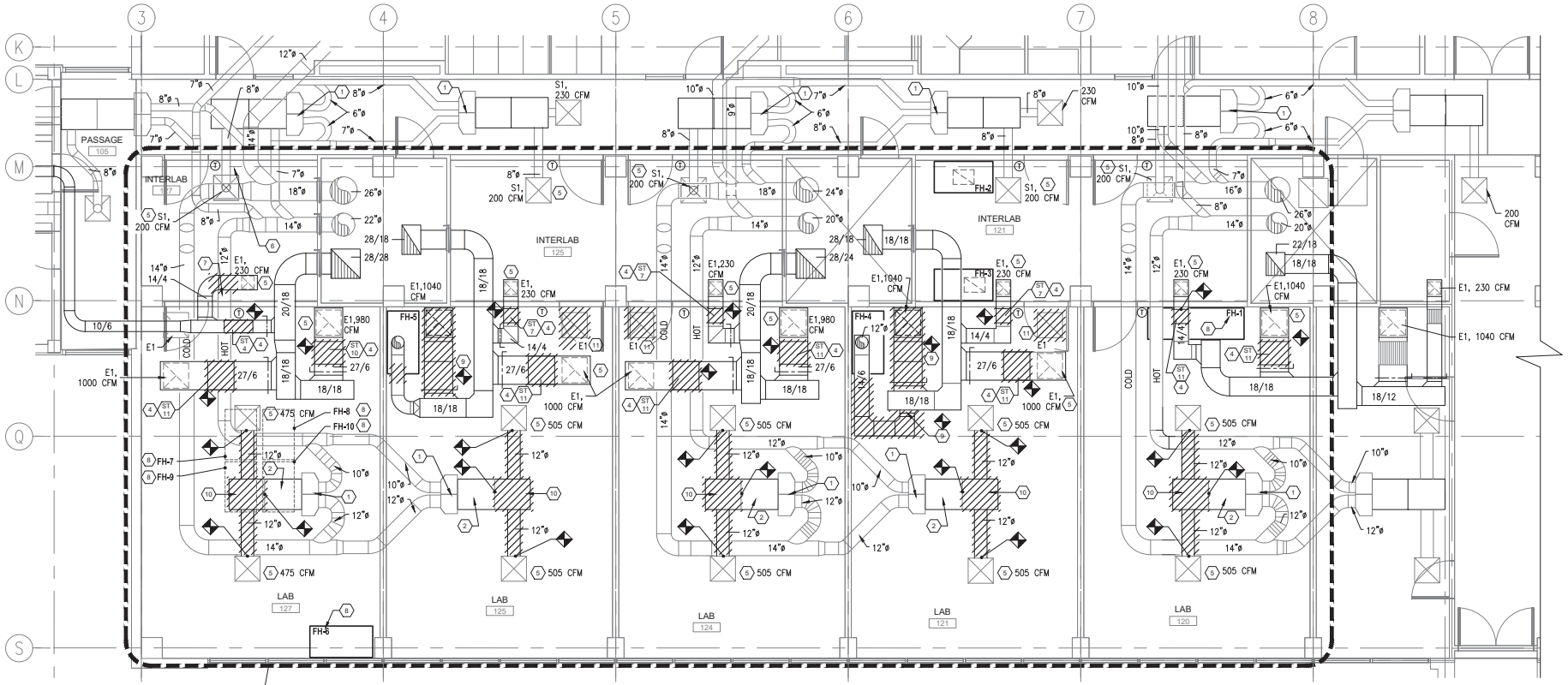
EXHIBIT B

Keyed Notes ⓧ

1. EXISTING CONSTANT VOLUME, DOUBLE DUCT TERMINAL UNIT TO REMAIN.
2. EXISTING MIXING BOX TO REMAIN.
3. DEMO EXISTING SUPPLY DUCT TO THE LIMITS SHOWN. MAINTAIN REMAINING FOR REUSE WITH NEW SUPPLY AIR VALVES. REFER TO SHEET M-101, MECHANICAL NEW WORK PLAN.
4. REMOVE EXISTING SOUND TRAP. MAINTAIN DISTRIBUTION FOR REUSE.
5. EXISTING SA / EA DIFFUSER TO REMAIN, TYPICAL.
6. EXISTING GENERAL EXHAUST DUCT DROPS DOWN TO FINISH FLOOR SHALL BE DEMO'D BACK TO MAIN AND CAPPED. REFER TO EXHIBIT 'A', THIS SHEET.
7. EXISTING GENERAL EXHAUST DUCT DROPS DOWN TO FINISH FLOOR SHALL BE DEMO'D BACK TO MAIN AND CAPPED. REFER TO EXHIBIT 'B', THIS SHEET.
8. EXISTING LAB RECIRCULATING FUME HOODS TO REMAIN.
9. DEMO EXISTING EXHAUST DUCT TO LIMITS SHOWN AND CAP, LEAKTIGHT. REFER TO SHEET M-101 MECHANICAL NEW WORK PLAN.
10. DEMO EXISTING DUCTWORK TO LIMITS SHOW. MAINTAIN MIXING BOX AND DIFFUSERS FOR RE-USE.
11. REMOVE EXISTING DIFFUSER / GRILLE AND REPLACE WITH ACOUSTICAL CEILING TILE (SIMILAR TO EXISTING).

General Notes

A. PLANS ARE GRAPHIC REPRESENTATIONS. CONTACT BUILDING MANAGEMENT WITH ANY QUESTIONS REGARDING INTENT. ALL AREAS TO BE REMODELED REQUIRE FIELD VERIFICATION PRIOR TO PROJECT START.
B. CONTRACTOR TO COORDINATE ALL UTILITY SHUT DOWNS AND TIE-INS WITH THE OWNER.

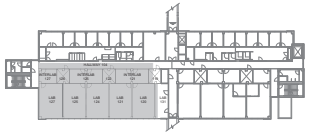


SCOPE OF WORK

FIRST FLOOR MECHANICAL PLAN - DEMOLITION | BSL-2 LAB AND INTERLAB 120, 121, 124, 125 & 127

SCALE: 1/8" = 1'-0"

NORTH



NORTH KEY PLAN - FIRST FLOOR

NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE
915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500

THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB
MECHANICAL PLAN - DEMOLITION

HVAC EXHAUST & SUPPLY AIR SYSTEMS
LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	8-17-21	
A	75% REVIEW PACKAGE	7-19-21	
NO	DESCRIPTION	DATE	CHK'D

DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

QAE

FILE: B #253_21-035

MD-101

5 of 9 SHEETS

New UNM BRF Lab Air Flows (Exh is Used for AC/Hr)

Lab/Space Name	Cold Deck Supply (CFM)	Hot Deck Supply (CFM)	C/H Total Supply (Max CFM)	C/H Total Supply (Min CFM)	Return (CFM)	Exhaust (Max CFM)	Exhaust (Min CFM)	Delta (CFM)	Lab Area (ft^2)	Lab Vol (ft^3)	Max Air Changes/Hr	Min Air Changes/Hr
Lab 120A	900	900	900	450	0	1200	500	200	538	4663	14.16	6.44
Inter Lab 121	400	400	150	100	0	250	150	100	156	1404	10.68	6.41
Inter Lab 121	400	400	150	100	0	250	150	100	156	1404	10.68	6.41
Lab 121A	900	900	900	450	0	1200	500	200	538	4663	14.16	6.44
Lab 124A	900	900	900	450	0	1200	500	200	538	4663	14.16	6.44
Inter Lab 125	400	400	150	100	0	250	150	100	156	1404	10.68	6.41
Inter Lab 125	400	400	150	100	0	250	150	100	156	1404	10.68	6.41
Lab 125A	900	900	900	450	0	1200	500	200	538	4663	14.16	6.44
Lab 127A	900	900	850	475	0	1050	525	200	538	4809	12.94	6.47
Inter Lab 127	200	200	150	100	0	250	150	100	365	3285	10.20	6.06

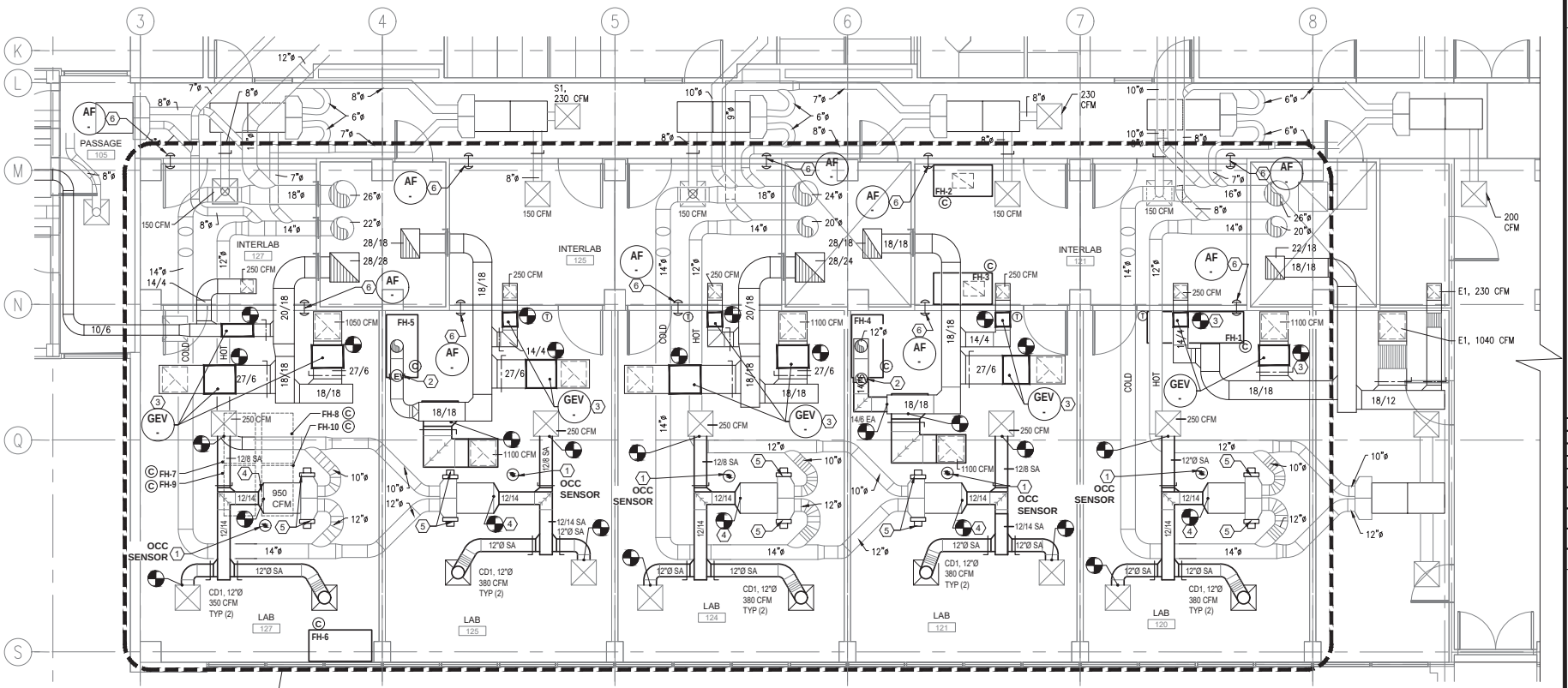
UNM BRF LAB AND INTERLAB AIR FLOW SCHEDULE

General Notes

A. PLANS ARE GRAPHIC REPRESENTATIONS. CONTACT FACILITIES WITH QUESTIONS REGARDING SCOPE OF WORK. CONTRACTOR IS RESPONSIBLE TO PERFORM FIELD VERIFICATION TO ALL AREAS PRIOR TO PROJECT START.
B. CONTRACTOR TO COORDINATE ALL UTILITY SHUT DOWNS AND TIE-INS WITH THE OWNER.

Keyed Notes (X)

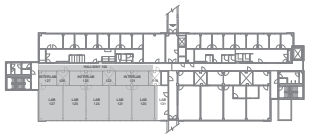
1. OCCUPANCY SENSOR (ECCO FLEX OR LEUTRON) WITH ASSOCIATED RELAY TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM.
2. INSTALL AND CONNECT NEW LEV, GENERAL EXHAUST VALVE. ADJUST AIR VELOCITY AS INDICATED ON SCHEDULE, THIS SHEET. PROVIDE ACCESSORIES CONTROL VALVE ACTUATOR AND AIRFLOW TRANSMITTER. REFER TO CONTROL EQUIPMENT SCHEDULE AND CONTROLS DIAGRAM, SHEET MI-602.
3. INSTALL AND CONNECT NEW GEV, GENERAL EXHAUST VALVE TO MODULATE ROOM PRESSURIZATION AS INDICATED ON SCHEDULE, THIS SHEET. PROVIDE ACCESSORIES CONTROL VALVE ACTUATOR AND AIRFLOW TRANSMITTER. REFER TO CONTROL EQUIPMENT SCHEDULE AND CONTROLS DIAGRAM, SHEET MI-602.
4. CONNECT NEW SUPPLY AIR PLENUM TO EXISTING MIXING BOX. PROVIDE TRANSITIONS AS REQUIRED FOR A SEALTIGHT CONNECTION.
5. NEW DDC, FULLY MODULATING ACTUATOR.
6. PROVIDE BLEED AIRFLOW SENSOR, EBTRON MODEL II EF-X2000-B WITH DISPLAY AND WALL KIT. INSTALL APPROXIMATELY 6'-10" BELOW FINISHED CEILING. FIELD COORDINATE EXISTING CONDITIONS PRIOR TO INSTALL.



1ST FLOOR MECHANICAL PLAN - NEW WORK | BSL-2 LAB AND INTERLAB 120, 121, 124, 125 & 127

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

NORTH



NORTH KEY PLAN - FIRST FLOOR

NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE
915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500
THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB MECHANICAL NEW WORK PLAN

HVAC EXHAUST & SUPPLY AIR SYSTEMS

LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

NO	DESCRIPTION	DATE	CHKD
C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	8-17-21	
A	75% REVIEW PACKAGE	7-19-21	

DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

QAE

FILE: B #253_21-035

M-101

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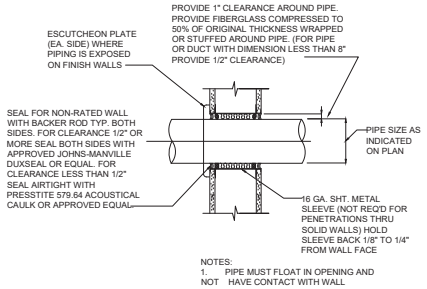
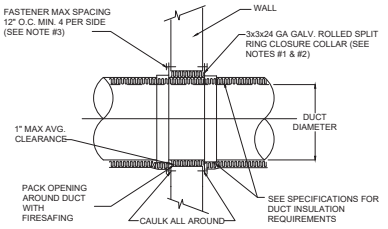
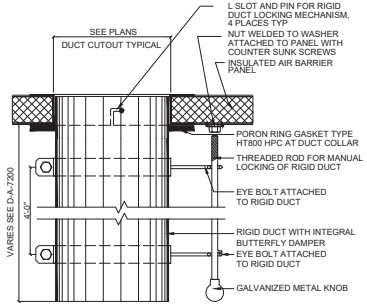


C2 PIPE THRU GWB WALL PENETRATION
NOT TO SCALE

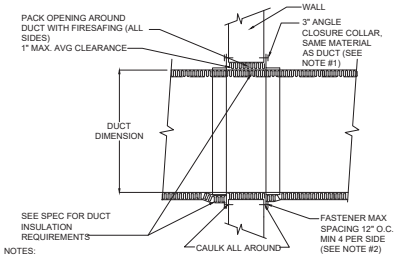


NOTES:
1. CLOSURE COLLARS ARE NOT TO BE USED FOR SUPPORTING DUCT. PROVIDE INDEPENDENT SUPPORT ON EITHER SIDE OF WALL PER SMACNA CONSTRUCTION STANDARDS.
2. WHERE WALL CONSTRUCTION DOES NOT ALLOW FOR ROUND OPENING PROVIDE SHEET MEAL CLOSURE PIECES FASTENED AND SEALED TO BOTH SIDES OF WALL.
3. FASTENERS TO BE SM. SCREWS FOR METAL STUD WALLS, POWDER DRIVEN FASTENERS FOR CONC. WALLS OR MASONRY ANCHORS FOR MASONRY WALLS.

C3 ROUND DUCT WALL PENETRATION
NOT TO SCALE



B3 RIGID DUCT PENETRATION
NOT TO SCALE



NOTES:
1. CLOSURE COLLARS ARE NOT TO BE USED FOR SUPPORTING DUCT. PROVIDE INDEPENDENT SUPPORT ON EITHER SIDE OF WALL PER SMACNA CONSTRUCTION STANDARD.
2. FASTENERS TO BE SM SCREWS FOR METAL STUD WALLS, POWDER DRIVEN FASTENERS FOR CONC. WALLS OR MASONRY ANCHORS FOR MASONRY WALLS.

A3 RECTANGULAR DUCT WALL PENETRATION
NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
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915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500
THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB
TYPICAL PENETRATION DETAILS

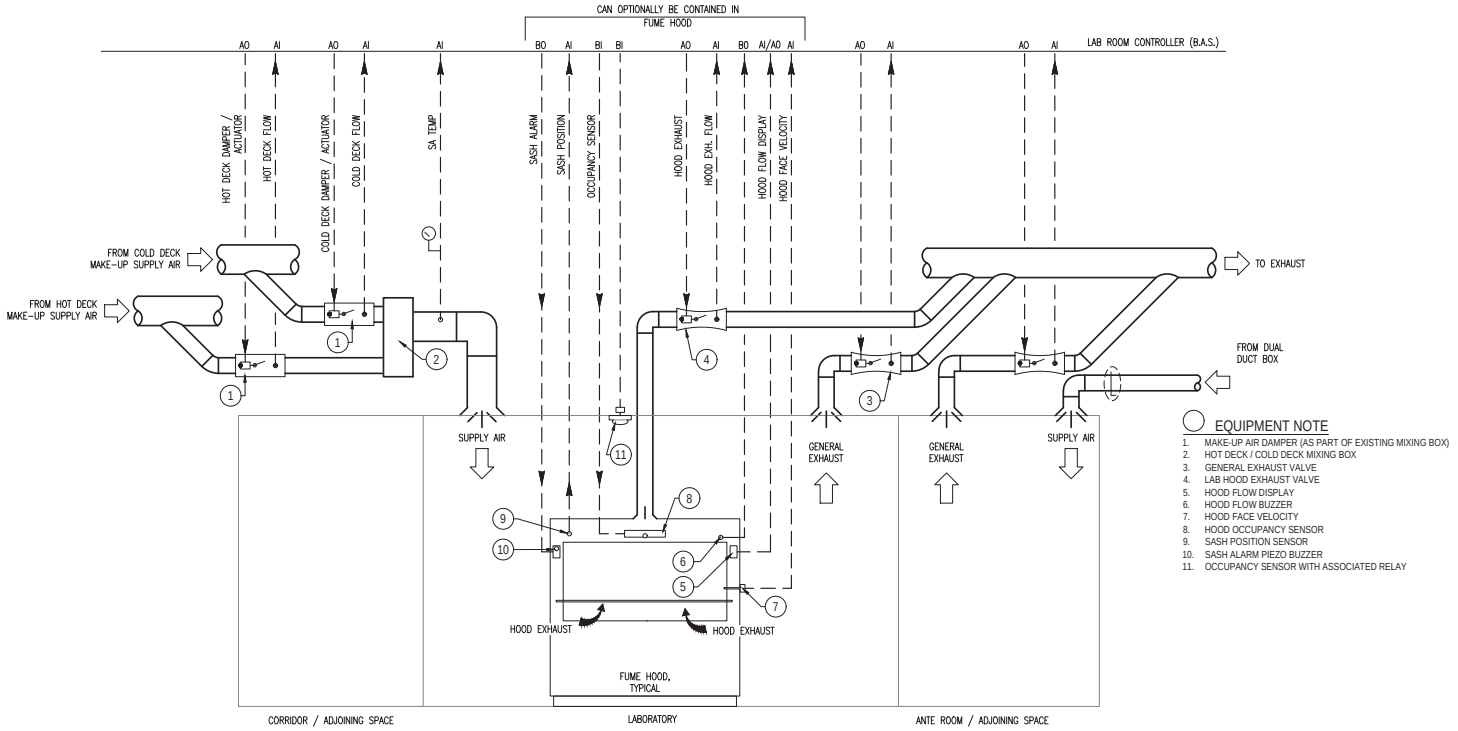
HVAC EXHAUST & SUPPLY AIR SYSTEMS
LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

REV	DESCRIPTION	DATE	CHK'D
C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	9-17-21	
A	75% REVIEW PACKAGE	7-13-21	

DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

FILE: B #253_21-035

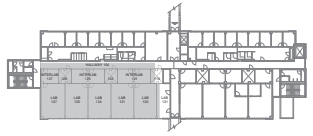
M-501



EQUIPMENT NOTE

1. MAKE-UP AIR DAMPER (AS PART OF EXISTING MIXING BOX)
2. HOT DECK / COLD DECK MIXING BOX
3. GENERAL EXHAUST VALVE
4. LAB HOOD EXHAUST VALVE
5. HOOD FLOW DISPLAY
6. HOOD FLOW BUZZER
7. HOOD FACE VELOCITY
8. HOOD OCCUPANCY SENSOR
9. SASH POSITION SENSOR
10. SASH ALARM PIEZO BUZZER
11. OCCUPANCY SENSOR WITH ASSOCIATED RELAY

1 B.A.S. BASED LABORATORY AIRFLOW SAFETY STANDARD CONTROLS DIAGRAM
LABORATORY HOOD EXHAUST - LAB ROOMS 121 AND 125



NORTH KEY PLAN - FIRST FLOOR
NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE
915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500

THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB
B.A.S. -BASED LAB HOOD EXHAUST AIRFLOW CONTROLS DIAGRAM
HVAC EXHAUST & SUPPLY AIR SYSTEMS
LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	8-17-21	
A	75% REVIEW PACKAGE	7-19-21	
REV	DESCRIPTION	DATE	CHKD

DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

FILE: B #253_21-035

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CONTROLS EQUIPMENT SCHEDULE

		UNM BAS-BASED LAB AIRFLOW SAFETY STANDARD (BLASS)		
SYMBOL I.D.	SYMBOL I.D.	DESCRIPTION	MANUFACTURER (OR PRIOR APPROVED BY P.E.)	REMARKS
GEV -	GEV	GENERAL EXHAUST VALVE	ACCUTROL	A. AIRFLOW CONTROL VALVE MODULATES TO MAINTAIN ROOM PRESSURIZATION, BASED ON SUPPLY AIR VOLUME AND LAB EXHAUST VOLUME AND A CALCULATED VOLUMETRIC OFFSET FOR PRESSURIZATION. B. UNM FM ENGINEERING DESIGN STANDARDS PERMIT AIRFLOW CONTROL VALVES WITH LESS THAN 0.5"WC MINIMUM PRESSURE DROP.
		CONTROL VALVE ACTUATOR	BELIMO	
		GEV AIRFLOW TRANSMITTER	ACCUTROL (SUPPLIED WITH VON KARMAN VORTEX-SHEDDING VELOMETERS)	
LEV -	LEV	GENERAL EXHAUST VALVE	ACCUTROL	A. AIRFLOW CONTROL VALVE MODULATES TO MAINTAIN A SPECIFIED AIR VELOCITY AT THE FACE OF A FUME HOOD, BASED ON SASH POSITION. B. UNM FM ENGINEERING DESIGN STANDARDS PERMIT AIRFLOW CONTROL VALVES WITH LESS THAN 0.5"WC MINIMUM PRESSURE DROP.
		CONTROL VALVE ACTUATOR	BELIMO	
		LEV AIRFLOW TRANSMITTER	ACCUTROL (SUPPLIED WITH VON KARMAN VORTEX-SHEDDING VELOMETERS)	
	ACT	DDC, FULLY MODULATING ACTUATOR	BELIMO	
AF -	AF	BLEED AIRFLOW SENSOR	EBTRON, EB-FLOW II MODEL EF-X2000-B. UNIT WITH DISPLAY AND WALL MOUNT KIT.	BLEED AIRFLOW SENSOR WILL DETECT VERY SMALL PRESSURE DIFFERENTIALS BETWEEN TWO ADJACENT SPACES BY SENSING AIRFLOW RATE INDUCED BY THE PRESSURE GRADIENT.
C	FUME HOOD MONITOR / CONTROLLER/ KEYPAD			DISPLAYS FUME HOOD FACE VELOCITY AS CALCULATED FROM MEASURED VELOCITY AT A POINT NEAR LEV WITH KNOWN AREA AND THE HOOD SASH POSITION. OUTPUTS ALARM FUNCTION TO AN ALARM BUZZER MOUNTED NEAR THE FUME HOOD CONTROLLER/KEYPAD. ALSO ACTS AS A LOCAL CONTROLLER, TAKING INPUT FROM THE HOOD SIDEWALL VELOCITY SENSOR, SASH POSITION SENSOR, LEV FLOW, AND OCCUPANCY/PROXIMITY SENSOR, AND CONTROLLING LEV POSITION FOR ONE HOOD. CURRENT BASIS OF DESIGN IS A TEL AFA 1000/2 MK2 FUME HOOD MONITOR.

SEQUENCE OF OPERATION

GENERAL

PROGRAMMING. THE FMS SHALL BE PROGRAMMED ACCORDING TO THE FOLLOWING SEQUENCE OF OPERATIONS INCLUDING ALL ENERGY REDUCTION OPERATIONS DESCRIBED IN THIS SEQUENCE.

SYSTEM STATUS DISPLAY. THE FMS SHALL PROVIDE OPERATING STATUS FOR ALL SYSTEMS CONTROLLED BY THE FMS. THE DISPLAYS SHALL INCLUDE ALL POINTS INDICATED ON THE DRAWINGS AND ANY OTHERS REQUIRED TO ACHIEVE THE SEQUENCE OF OPERATIONS. THE FMS SHALL BE ABLE TO INTEGRATE SYSTEM DIAGNOSTICS INTO CONTROL ACTION DECISIONS. THIS SHALL ALSO INCLUDE THE ABILITY TO DESIGNATE INDIVIDUAL UNITS AS BEING IN MAINTENANCE MODE TO AVOID GENERATING ALARMS. ALL SYSTEM CONTROL AND STATUS EVENTS SHALL BE RECORDED AT THE OPERATOR'S SELECTION. IN THE FMS EVENT LOG TO FACILITATE TROUBLESHOOTING. ALL DETECTED ALARMS OR FAILURES SHALL INITIATE AN ALARM WITHIN THE FMS.

POWER FAILURE RECOVERY. THE FMS SHALL CONTAIN A POWER FAILURE RECOVERY MODE (OPERATOR ADJUSTABLE). THE POWER FAILURE RECOVERY CAPABILITY SHALL RETURN THE SYSTEM TO ITS LAST STATE (BEFORE THE BUILDING LOST POWER).

LABORATORY CONTROLS

GENERAL. EACH LABORATORY SHALL BE INSTALLED WITH A FMS VARIABLE AIR VOLUME CONTROL SYSTEM WHICH SHALL CONTROL THE VARIABLE VOLUME SUPPLY AIR HOT DECK AND COLD DECK DAMPERS, GENERAL EXHAUST AIR VALVE AND LAB HOOD EXHAUST VALVES WHERE NEEDED. THE CONTROL SYSTEM SHALL INCLUDE ALL REQUIRED EXHAUST AIR VALVES, SUPPLY AIR DAMPERS / ACTUATORS, CONTROLLERS, NETWORK ROUTERS, AND SENSORS FOR A COMPLETE AND OPERATIONAL SYSTEM. THE SYSTEM SHALL OPERATE TO MAINTAIN A MINIMUM OF 6 AIR CHANGES PER HOUR. REFER TO MECHANICAL FLOOR PLANS FOR EXACT AIR FLOW REQUIREMENTS IN EACH LAB.

VAV FUME HOOD CONTROL. EACH FUME HOOD FACE VELOCITY AND EXHAUST VOLUME SHALL BE CONTINUOUSLY MEASURED. THE FMS CONTROLLER SHALL MODULATE THE FUME HOOD AIR VALVE TO MAINTAIN THE FACE VELOCITY AT A SETPOINT OF 100 FPM +20/-0 FPM AND THE MINIMUM EXHAUST VOLUME SET POINT AT ALL TIMES. IF A FAILURE IS DETECTED IN THE FUME HOOD SYSTEM, THE LOCAL FUME HOOD INDICATOR SHALL ALARM AS WELL AS AN ALARM SHALL BE INITIATED BY THE FMS. THE FUME HOOD CONTROLLER SHALL SEND AIRFLOW VALUES TO THE FMS VIA HARDWIRED CONNECTION TO CONTROL SUPPLY AND GENERAL EXHAUST TO MAINTAIN THE LABORATORY SPACE PRESSURE.

FUME HOOD SASH ALARM SYSTEM. IF SASH IS OPEN GREATER THAN 5% AND NO MOTION IS DETECTED BY THE MOTION DETECTOR FOR 60 SECONDS (ADJUSTABLE), THEN THE FUME HOOD CONTROLLER SHALL INITIATE AN AUDIBLE PULSE TONE. IF THE SASH IS CLOSED LESS THAN 5% OR MOTION IS DETECTED BY THE MOTION DETECTOR (WITHIN THE PAST 60-SECONDS, ADJUSTABLE), THEN NO ALARM TONE IS PRODUCED. THE FUME HOOD SASH ALARM SHALL HAVE A DISTINCT TONE FROM, AND SHALL BE PHYSICALLY SEPARATED FROM, THE FUME HOOD MONITOR AND AIRFLOW ALARM TONE GENERATOR. THERE SHALL BE A PLACARD NEAR THE SASH MONITOR ALARM BUZZER THAT DESCRIBES THAT THE ALARM IS A SASH ALARM, THAT IT CAN BE SILENCED ONLY BY OCCUPYING THE HOOD OR CLOSING THE SASH, AND THAT CONDITIONING MAKEUP AIR FOR A 6-FOOT HOOD WITH AN OPEN SASH REQUIRES THE SAME ENERGY AS CONDITIONING THE VENTILATION AIR FOR 6.4 RESIDENTIAL HOMES OF 2000 FT2 EACH.

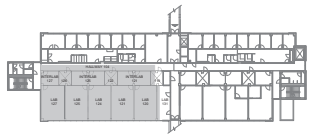
VARIABLE VOLUME ROOM PRESSURE CONTROL. THE FMS SHALL CONTROL SUPPLY AND GENERAL EXHAUST AIRFLOW DEVICES IN ORDER TO MAINTAIN A VOLUMETRIC OFFSET (NEGATIVE). OFFSET SHALL BE MAINTAINED REGARDLESS OF ANY CHANGE IN FLOW OR STATIC PRESSURE. THIS OFFSET SHALL BE FIELD ADJUSTABLE AND REPRESENTS THE VOLUME OF AIR, WHICH WILL ENTER (OR EXIT) THE ROOM FROM THE CORRIDOR OR ADJACENT SPACES. THE PRESSURIZATION CONTROL ALGORITHM SHALL SUM THE FLOW VALUES OF ALL SUPPLY AND EXHAUST AIRFLOW DEVICES AND COMMAND APPROPRIATE CONTROLLED DEVICES TO NEW SET POINTS TO MAINTAIN THE DESIRED OFFSET. THE OFFSET SHALL BE ADJUSTABLE. THE PRESSURIZATION CONTROL ALGORITHM SHALL CONSIDER BOTH NETWORKED DEVICES, AS WELL AS NON-NETWORKED DEVICES PROVIDING A LINEAR ANALOG FLOW SIGNAL AND ANY NUMBER OF CONSTANT VOLUME DEVICES WHERE THE TOTAL OF SUPPLY DEVICES AND THE TOTAL OF EXHAUST DEVICES MAY BE FACTORED INTO THE PRESSURIZATION CONTROL ALGORITHM. VOLUMETRIC OFFSET SHALL BE THE ONLY ACCEPTABLE MEANS OF CONTROLLING ROOM PRESSURIZATION. THE PRESSURIZATION CONTROL ALGORITHM SHALL SUPPORT THE ABILITY TO REGULATE THE DISTRIBUTION OF TOTAL SUPPLY FLOW ACROSS MULTIPLE SUPPLY AIRFLOW CONTROL DEVICES IN ORDER TO OPTIMIZE AIR DISTRIBUTION IN THE SPACE.

VARIABLE VOLUME TEMPERATURE CONTROL. THE TEMPERATURE OF THE LAB SHALL BE CONTINUOUSLY MEASURED. IF THE LAB REQUIRES COOLING, THE SUPPLY AIR VALVE AND GENERAL EXHAUST AIR VALVE SHALL BE MODULATED TOGETHER BETWEEN THE MINIMUM AND MAXIMUM COOLING AIR FLOWS TO MAINTAIN THE SPACE TEMPERATURE AT THE OCCUPIED COOLING SETPOINT OF 76°F (ADJUSTABLE), I.E.,

IF THE COLD DECK DAMPER IS FULL OPEN, THE HOT DECK DAMPER SHALL BE IN ITS MINIMUM POSITION).

IF THE LAB REQUIRES HEATING, THE HOT DECK DAMPER SHALL BE MODULATED TO MAINTAIN THE SPACE TEMPERATURE AT THE OCCUPIED HEATING SETPOINT OF 70°F (ADJUSTABLE).

THE LAB TEMPERATURE SETPOINT SHALL BE ADJUSTABLE THROUGH THE FMS.



NORTH KEY PLAN - FIRST FLOOR
NOT TO SCALE

BIOMEDICAL RESEARCH FACILITY
UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE
915 Camino De Salud NE | Building 253 - #A0253 | Albuquerque, NM 87131-3500
THE UNIVERSITY OF NEW MEXICO
FACILITIES MANAGEMENT ENGINEERING & ENERGY SERVICES

FIRST FLOOR - BSL-2 LAB & INTERLAB
SEQUENCE OF OPERATION &
CONTROLS EQUIPMENT SCHEDULE
HVAC EXHAUST & SUPPLY AIR SYSTEMS
LAB 120, LAB 121, LAB 124, LAB 125 & LAB 127

NO	DESCRIPTION	DATE	CHK'D
C	100% SUBMITTAL	11-5-21	
B	100% REVIEW PACKAGE	8-17-21	
A	75% REVIEW PACKAGE	7-19-21	

DESIGNED	RAQ
DRAWN	NM
REVISED	-
REVISION #	-
DATE	10-7-2021

QAE

FILE: B #253_21-035

MI-602

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TAB 6

#6

Approval of Lease: UNM Early Childhood Services Center, 4400 Alameda NE, Suites A and B, Albuquerque, NM, 87113

REAL ESTATE DEPARTMENT

Memo

To: **Teresa Costantinidis, Senior Vice President for Finance and Administration**

From: **Thomas M. Neale, Director of Real Estate**

Date: **February 15, 2022**

Re: **Request for Lease Approval – 4400 Alameda NE, Suites A and B, Albuquerque, NM 87113**

On behalf of the University of New Mexico Early Childhood Services Center (ECSC) program, the Real Estate Department is seeking Regent's approval to lease real property located at 4400 Alameda Boulevard NE, in Albuquerque, New Mexico. The property is a one-story office building containing 11,639 square feet and is located on the southside of Alameda Boulevard NE, west of I-25 and across from Albuquerque's Balloon Fiesta Park.

ECSC provides integrated services, support and resources to early childhood professionals, programs, communities, families and children. UNM operates five ECSC locations across the state of New Mexico including Albuquerque, Espanola, Gallup, Roswell and Las Cruces. The Albuquerque ECSC is currently housed in multiple facilities and this lease will consolidate activities into one location.

The leased space contains a high density of partitioned office areas along with spaces designated for conference/classroom space and a resource lending library. The location provides good linkages to the targeted service areas of the northern portion of the Albuquerque metropolitan area, including Rio Rancho and Bernalillo.

The lease provisions include a ten-year term commencing at $16.50 per square foot, or $192,044 for the initial year. Rent escalates at 2.5% annually through the lease term. The Landlord is responsible for property taxes, insurance, structural repairs and maintenance, mechanical systems, and grounds maintenance. UNM will be responsible for utilities, telecommunication/data, and janitorial services. UNM will have one, three-year renewal option. A copy of the letter of the intent is attached.

COMMERCIAL REAL ESTATE SERVICES

Debbie Dupes, CCIM
First Vice President
505-837-4921
debbie.dupes@cbre.com

Cheryl Hardt
Senior Vice President
505-837-4925
cheryl.hardt@cbre.com

CBRE, Inc.
Advisory & Transaction Services

CBRE

CBRE Centre
6100 Uptown Blvd NE, Suite 300
Albuquerque, NM 87110

505 837 4999 Tel
505 837 4994 Fax

www.cbre.com

Tenant Counter 2-3-22
14 February 2022

Debbie Dupes
Cheryl Hardt

Via email: Debbie.dupes@cbre.com

Re: 4400 Alameda -Suites A and B
Letter of Intent (LOI) from the University of New Mexico

Dear Debbie and Cheryl ::

Below is a response to your LOI. On behalf of the Regents of the University of New Mexico, we are pleased to present this Letter of Intent to lease 4400 Alameda, Suites A and B to you. Please consider this proposal as confidential between Tenant, Landlord and CBRE, Inc. Your response is requested within **5 days** from receipt of this letter of intent.

Sincerely,

CBRE, Inc.

Debra L. Dupes CCIM
First Vice President

Cheryl Hardt
Senior Vice President

Jim Chynoweth, Managing Director
(License #16374 Expiration 3/31/24)

Letter of Intent

Tenant:	The Regents of the University of New Mexico, a body corporate of the State of New Mexico, on behalf of the Early Childhood Services Center.
Landlord:	Please provide the legal ownership entity, including its State of Domicile. Mike and Kathleen Mechenbier Trust
Use:	General office use, or all other lawful purposes.
Building/Property:	4400 Alameda NE, Albuquerque, NM 87113
Premises:	Suites A and B, containing approximately 11,639 RSF. Tenant will be permitted to verify the size of the proposed area.
Lease Commencement Date:	The lease is subject to approval by the Board of Regents and the Higher Education Department which shall take place no later than May 2022. Please state the earliest Tenant could occupy pending final approval of the lease. Lease commencement date shall be 90 days from full execution of lease between Landlord and Tenant.
Rent Commencement:	Rent Commencement shall be based upon the Lease Commencement Date, taking into consideration abated rent period(s).
Early Access:	Tenant shall have access to the Premises, at no charge, for installation of fixtures, telecommunications, and other items as it relates to getting the Premises ready for occupancy 4 weeks prior to Lease Commencement.
Lease Term:	10 Years 2 month.
Renewal Options:	Tenant shall have 1 option to renew the lease for 1 additional terms of 3 years. Tenant shall give Landlord 6 months' prior written notice of its intention to exercise such option. Such Renewal Option will be at 3% annual increases.
Base Rent:	Year 1 of the Lease Term shall begin at $16.50/RSF per the Base Rent schedule below based on 2.5% annual increases for the Lease Term is as follows:

Period Commencing	Rate	Monthly Rent	Annual Rent
Year 1	$ 16.50	$ 16,003.63	$ 192,043.50
Year 2	$ 16.91	$ 16,403.72	$ 196,844.59
Year 3	$ 17.34	$ 16,813.81	$ 201,765.70
Year 4	$ 17.77	$ 17,234.15	$ 206,809.84
Year 5	$ 18.21	$ 17,665.01	$ 211,980.09
Year 6	$ 18.67	$ 18,106.63	$ 217,279.59
Year 7	$ 19.13	$ 18,559.30	$ 222,711.58
Year 8	$ 19.61	$ 19,023.28	$ 228,279.37
Year 9	$ 20.10	$ 19,498.86	$ 233,986.36
Year 10	$ 20.61	$ 19,986.33	$ 239,836.02

Two month free rent

Tenant Improvements: Tenant requires a turnkey installation based upon a mutually acceptable space plan. Please advise when Tenant may meet with Landlord's tenant improvement contractor to prepare a space plan and advise as to layout and finishes of the proposed Premises. Preliminary plan attached

Restoration: Tenant shall not have any restoration obligations at the end of the Lease Term other than to remove its personal property form the Premises and leave it in broom-clean condition. Tenant shall not have the obligation to remove any alterations at the end of the Lease Term unless Landlord reasonably requires Tenant to do so at the time it approves Tenant's plan(s).

Assignment & Subletting: Tenant shall have the right to assign or sublease the Premises or any part to any other University administered programs including without limitation, any University auxiliary, collaboration or join venture, for any remaining term of the Lease or extension thereof. Tenant shall not otherwise assign or sublease the Premises without first obtaining the written consent of Landlord, which shall not be unreasonably withheld.

Lease Type: Modified Gross. Please explain building expenses that are Tenant's responsibility. Tenant is responsible for individually metered electric and gas utilities, prorata share of water, sewer and refuse, interior maintenance (i.e. replacement of light bulbs, ballasts, clogged toilets and sinks, glass breakage, recharging of fire extinguishers, pest control, janitorial, snow removal and prorate share of increases in property taxes and fire and extended coverage insurance of 2022 base year. Snow removal for Suites A and B in the past was performed by previous Suite A and B tenants. Landlord assumes

	since Tenant has its own facilities that they would use their own facilities people for snow removal.
	Please see Tenant's standard lease form attached.
Security Deposit:	None.
Rental Abatement:	Landlord will abate the first 2 month of Rent.
Security:	Tenant will be permitted to tie its Premises security system into the Building's alarm and access system.
	Please describe Landlord's current security measures. Tenant is responsible for its own alarm and security system.
Parking:	Please define the number of surface parking spaces available to Tenant. 60 parking spaces.
ADA and Code Compliance:	The Building and the Premises, as of the Commencement Date, will be ADA compliant. Any costs associated with ADA compliance will be at the Landlord's sole cost and expense. Landlord at its sole cost and expense, will cause the Building and all related improvements to be in compliance with all codes and regulations pursuant to any federal, state or local government law, and shall so represent such compliance to Tenant.
Broadband Access & Fiber:	Please indicate Broadband and Fiber providers available to the Tenant. Comcast and Century Link
Signage:	Landlord shall provide Building standard directory and Suite signage. Please state exterior building signage opportunities available to tenant. Two monument signs for tenant's identification in front of Suite A and Suite B.
Holdover:	Tenant's holding over or continued use or occupancy shall be construed as a tenancy from month-to-month at 115% of then current rent at the end of the lease term and subject to the same conditions set forth in the Lease.
Subordination Agreement/Non-disturbance:	Throughout the term of the lease, and any extension thereof, Landlord shall have the right to mortgage, assign, sell or otherwise convey its interest in the Premises and Tenant shall, at the request of Landlord, subordinate its interest to that of any mortgagee or other lender of Landlord; provided, however, that Tenant's quiet enjoyment of the Premises shall not be disturbed so long as Tenant pays the Rent and

fulfills the other obligations imposed upon it by the lease. Upon request of Landlord, Tenant will execute any document reasonably required to give effect to this paragraph. In the event of a transfer or mortgage of Landlord's interest in the Premises, or upon Landlord's written request, Tenant agrees to execute, acknowledge and deliver to Landlord, within ten (10) days after written request, in recordable form, a certificate certifying that the rights of Tenant in the Premises are subordinate to and inferior to those of the mortgage lender and certifying, among other things, that the lease is in full force and effect; that there are no deficiencies or offsets thereto, or stating those claimed by Tenant, as the case may be; that there are no uncured defaults in Landlord's performance thereunder; and that not more than the current month's rent has been paid in advance as of the date the written request was delivered. Tenant agrees that failure by Tenant to deliver such statement within such time shall be deemed conclusively to mean that the lease is in full force and effect without modifications except as may be represented by Landlord and that the requested representations are true and correct. In the event any proceedings are brought for foreclosure under any mortgage or deed of trust made by the Landlord or any predecessor or any successor covering the Premises, the Tenant shall attorn to the purchaser upon any foreclosure sale and recognize such purchaser as the Landlord under this lease. Property does not have any debt against it.

Landlord covenants that if and so long as Tenant pays the Rent and performs the covenants hereof, Tenant shall peaceably and quietly have, hold and enjoy the Premises for the term herein mentioned, subject to the provisions of the lease.

Funding Clause: All State of New Mexico entities are subject to a funding clause in their leases. Should the proposed lease be terminated under the funding clause, Tenant will reimburse Landlord for unamortized Tenant improvement costs and commissions for the period of time from the date of termination through the end of the tenth lease year. The amortization rate for this calculation will be 6% per annum.

Loan & Encumbrances: Please state the name of lender and provide information on the type of loan or other encumbrance (ground lease, etc.) currently related to the Building. State whether the lender or Landlord must approve the lase and/or any procedural issues of this type (including time frames for such approval), which may affect execution of the lease. Property has no debt against it.

Brokerage and Brokerage Disclosure: Landlord acknowledges Debbie Dupes and Cheryl Hardt of CBRE, Inc. ("Tenant's Broker") as Tenant's transaction broker. Mike Leach and Greg Leach represent the Landlord. Upon execution of a lease between the parties, Tenant's Broker will be entitled to a commission equal to 3% of the total lease consideration for the first 5 years of lease value plus NMGRT and 2% of the total lease consideration for the second 5 years of lease value pus NMGRT per the terms stipulated in a separate

agreement to be completed between Landlord's broker and Tenant's broker. Landlord shall be responsible for payment of brokerage commissions.

Landlord:

By: Mike Mechenbier

Print: Mike Mechenbier

Title: Trustee

Date: 2-14-22

Tenant:
Regents of the University of New Mexico

Signed: Julie Brasil

Print: Julie Brasil

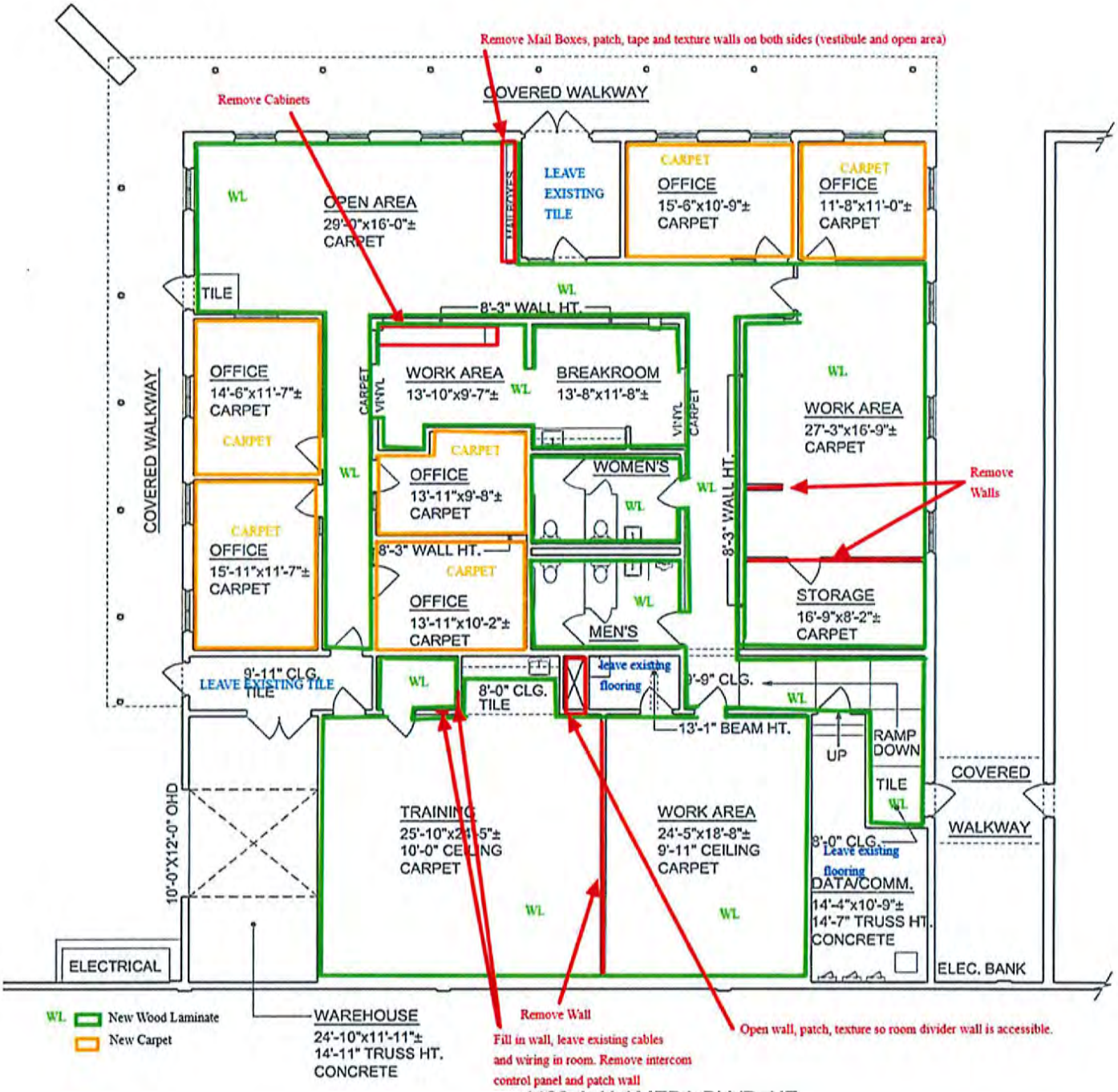
Title: Real Estate Manager

Date: 02/14/22

See preliminary space plans attached.

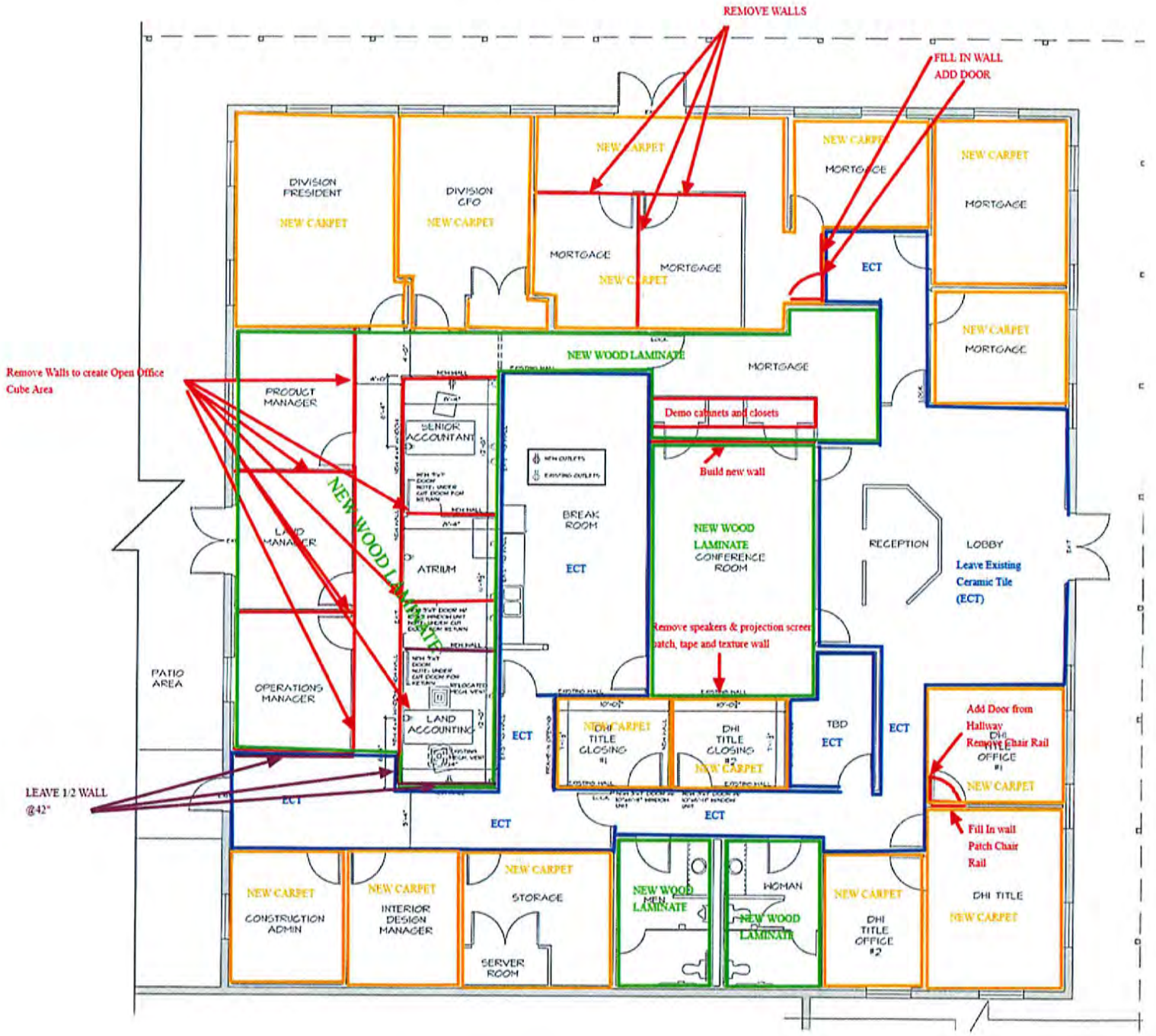
Preliminary Space Plans

BUILDING A: TI EXHIBIT



4400-A ALAMEDA BLVD. NE

BUILDING B: TI EXHIBIT



TAB 7

#7

Approval of Appointment of a Representative of Lobo Development Corporation to the South Campus Tax Increment Development District (TIDD)

LOBODEVELOPMENT
CORPORATION

Memo

To: Regent Doug Brown, Chair, UNM Board of Regents

From: Kelly S. Ward, Director, Lobo Development Corporation

Date: February 25, 2022

Re: Appointments to South Campus Tax Increment Development District Board

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Per the City of Albuquerque City Council approved South Campus Tax Increment Development District (TIDD) Formation Resolution, the Regents of the University of New Mexico are required to appoint two members of the five member South Campus Tax Increment Development District Board. One member shall represent the University of New Mexico and shall serve a four-year term and one member shall represent the Lobo Development Corporation and shall serve a six-year term as the Treasurer of the District. The other Board members will consist of one representative of the City of Albuquerque City Council appointed by the City Council, one representative of the City Administration appointed by the Mayor, and one representative of the State of New Mexico appointed by the Secretary of the Department of Finance and Administration.

We would like to formally request the appointments of Lisa Marbury, UNM Institutional Support Services Asst. Vice President, as the University of New Mexico representative, and Teresa Costantinidis, Lobo Development Corporation CEO, as the Lobo Development Corporation representative to the South Campus Tax Increment Development District (TIDD) Board.

TAB 8

#8

Approval of the Sale of Real Property to Tucker Acquisitions, LLC

LOBODEVELOPMENT
CORPORATION

Memo

To: Teresa Costantinidis, UNM Senior Vice President for Finance and Administration

From: Kelly S. Ward, Director of Business Development, Lobo Development Corporation
Tom Neale, Director, UNM Real Estate Department

Date: February 25, 2022

Re: Approval of the sale of real property to Tucker Acquisitions, LLC

Pursuant to Section 7.9 (Property Management) of the Regents' Policy Manual, Lobo Development Corporation and the UNM Real Estate Department is seeking the Board of Regents' approval of the sale of real property located at the northeast corner of Gibson Boulevard SE and Alumni Drive SE at UNM's South Campus. The site is owned by the Regents of the University of New Mexico and the contract buyer is Tucker Acquisitions, LLC.

The Lobo Development Corporation (LDC) Board reviewed and approved the terms of the sale at its September 9, 2021 meeting. The agreement calls for final approval by the Board of Regents and notification to the Higher Education Department.

The sale is Tract 3 of the Gibson Commercial District Subdivision and is located at the northeast corner of Gibson Boulevard SE and Alumni Drive SE. The tract is approximately 1.3 acres. The sales price is $1,694,658.00, or $30.00 per square foot. Attached is a map identifying the location of the property.

The tract will be developed as a Raising Cane's Chicken Fingers fast food restaurant with an option to develop a coffee shop adjacent to Raising Cane's and within the tract.

LDC and UNM Real Estate have negotiated certain provisions which protect the site and the adjacent property from development and use for potential undesirable purposes. Specifically, the agreement calls for the owner to develop a Raising Cane's Chicken Fingers restaurant and, if feasible, an adjoining coffee shop. No other uses are allowed on this parcel. If the developer fails to develop the property in less than five years, the University has the right to repurchase the parcel at a purchase price equal to this sale price.

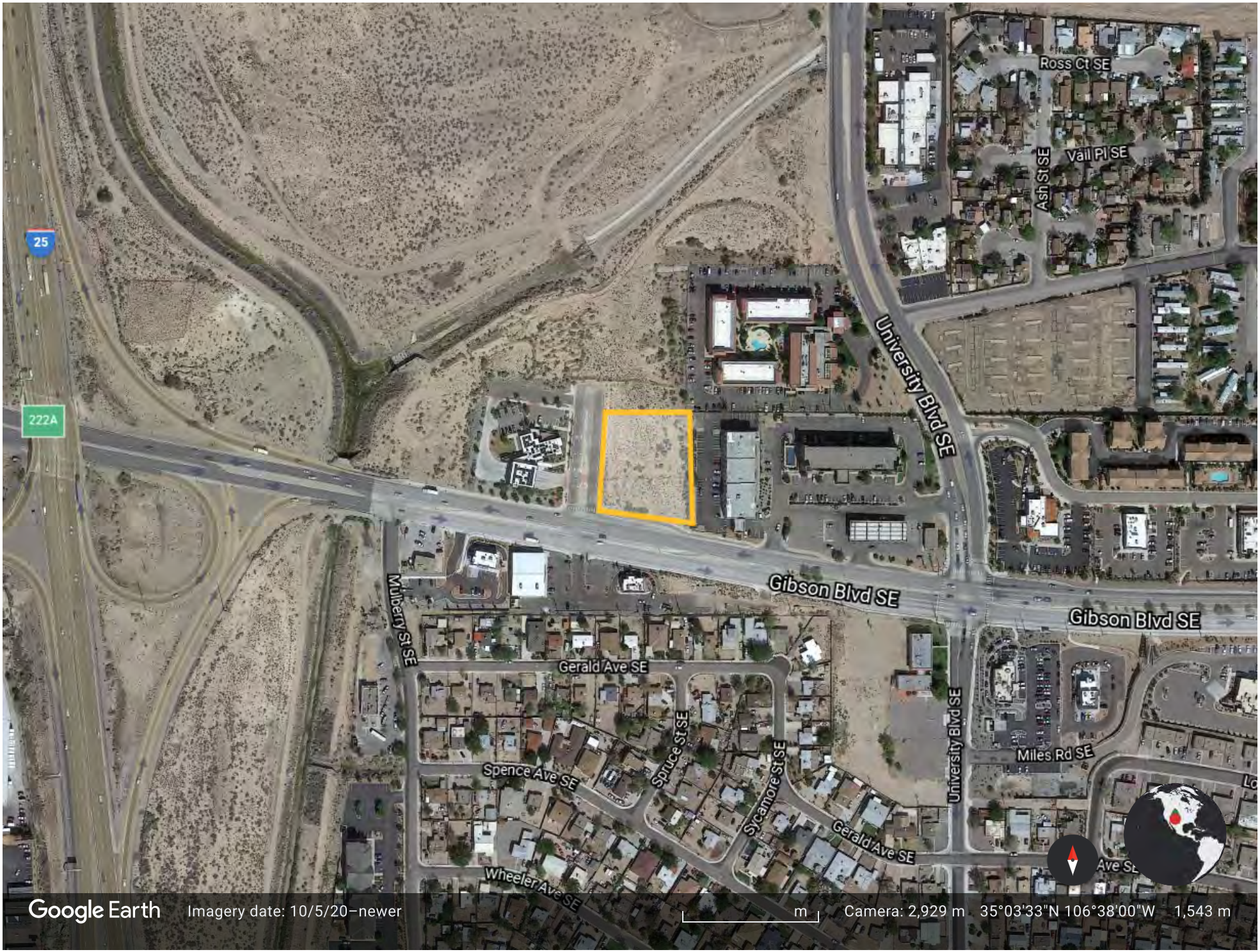
UNM will have development plan review and approval responsibilities prior to construction commencement.

Additionally, UNM will have the option to purchase the parcel, any improvements and interest in leases at any time after the tenth year following closing of the property.

Lastly, UNM will have the right of first refusal should the buyer seek to sell the parcel at any time in the future.

The tract is located within the recently approved South Campus Tax Increment Development District. Gross receipts tax generated from construction and operation will accrue to the district to support infrastructure improvements.

Recommendation: Approval


25
222A
Ross Ct SE
Ash St SE
Vail Pl SE
University Blvd SE
Gibson Blvd SE
Gibson Blvd SE
Mulberry St SE
Gerald Ave SE
Spruce St SE
Spence Ave SE
Sycamore St SE
University Blvd SE
Miles Rd SE
Gerald Ave SE
Wheeler Ave SE
Google Earth
Imagery date: 10/5/20–newer
m
Camera: 2,929 m 35°03'33"N 106°38'00"W 1,543 m

TAB 9

#9

Recommendations for Consent Agenda Items on Full Board of Regents' Agenda

ACTION ITEM RECOMMENDATIONS:

Recommendations for Consent Agenda Items on Full Board of Regents' Agenda *(Sandra Begay, Chair, Regents' Finance & Facilities Committee)*

TAB 10

#10

Recommendations for Consent Agenda Items on Full Board of Regents' Agenda

THE UNIVERSITY OF NEW MEXICO FOUNDATION

Fundraising Performance Report

FY 21/22, December 31, 2021

Gift Commitments (Fiscal Year)	This Quarter	FYTD 21/22	GOAL	FY 20/21
Main Campus				
- Cash/Cash Equivalents	$ 5,957,208	$ 8,607,721	N/A	$ 11,460,402
- In-Kind	$ 359,022	$ 380,522	N/A	973,521
- Pledges	$ 752,000	$ 884,573	N/A	3,006,950
- Testamentary	$ 3,980,000	$ 6,902,500	N/A	12,286,643
Sub-Total	$ 11,048,230	$ 16,775,316	$ 27,900,000	$ 27,727,516
HSC				
- Cash/Cash Equivalents	$ 7,443,635	$ 13,582,084	N/A	$ 23,642,942
- In-Kind	$ 450	$ 39,685	N/A	509,929
- Pledges	$ 90,103	$ 1,465,103	N/A	211,263
- Testamentary	$ 80,000	$ 992,964	N/A	5,687,014
Sub-Total	$ 7,614,188	$ 16,079,836	$ 29,200,000	$ 30,051,148
Athletics				
- Cash/Cash Equivalents	$ 1,101,492	$ 2,162,712	N/A	$ 3,444,149
- In-Kind	$ 2,300	$ 92,779	N/A	428,733
- Pledges	$ -	$ -	N/A	-
- Testamentary	$ -	$ -	N/A	25,000
Sub-Total	$ 1,103,792	$ 2,255,491	$ 6,140,000	$ 3,897,882
Other Campus Units *				
- Cash/Cash Equivalents	$ 6,892,851	$ 11,153,055	N/A	$ 16,000,458
- In-Kind	$ 14,416	$ 21,898	N/A	442,977
- Pledges	$ 160,000	$ 160,000	N/A	445,000
- Testamentary	$ 3,015,000	$ 4,150,000	N/A	6,810,540
Sub-Total	$ 10,082,267	$ 15,484,953	$ 24,760,000	$ 23,698,975
Total	$ 29,848,477	$ 50,595,596	$ 88,000,000	$ 85,375,521

*** Other campus units include KNME, KUNM, UNM Branch Campuses, President's Office, Provost's Office, Enrollment Services, Student Affairs and numerous other units not classified as main campus, HSC or athletics.**

Gift Destinations	This Quarter	FYTD 21/22	FY 20/21	FY 19/20
UNM Foundation	$ 21,407,298	$ 32,982,705	$ 57,597,074	$ 63,793,148
Reported Gifts *	$ 8,441,179	$ 17,612,892	$ 27,778,447	$ 30,811,240
Total	$ 29,848,477	$ 50,595,597	$ 85,375,521	$ 94,604,388

*** Reported Gifts = gifts made directly to KNME, KUNM, Lobo Club, and OVPR, but reported by UNM Foundation per MOA.**

Fundraising Performance Report

FY 21/22, December 31, 2021

Gift Commitments (Fiscal Year)	FYTD 21/22	FY 20/21	FY 19/20
Gifts for UNM's Current Use			
Cash/Cash Equivalents	$ 27,103,174	$ 38,908,534	$ 48,953,571
In Kind	$ 534,884	$ 2,355,160	$ 3,381,622
Total Gifts for UNM's Current Use	$ 27,638,058	$ 41,263,694	$ 52,335,193
Gifts for UNM's Future			
Cash/Cash Equivalents to the Endowment	$ 8,402,398	$ 15,639,417	$ 9,817,176
Pledges	$ 2,509,676	$ 3,663,213	$ 1,565,438
Testamentary Gifts	$ 12,045,464	$ 24,809,197	$ 30,886,581
Total Gifts for UNM's Future	$ 22,957,538	$ 44,111,827	$ 42,269,195
Total Gift Commitments	$ 50,595,596	$ 85,375,521	$ 94,604,388

THE UNIVERSITY OF NEW MEXICO FOUNDATION

Fundraising Performance Report

FY 21/22, December 31, 2021

Pledges and Testamentary Gifts due	FYTD 21/22	FY 20/21	FY 19/20
Beginning Balance Pledges Receivable	$ 6,718,906	$ 8,730,412	19,822,964
Add: New Pledges	$ 2,509,676	$ 3,663,213	1,565,438
Less: Pledge Payments	$ (3,996,867)	$ (4,951,719)	$ (3,489,332)
Less: Pledges Cancelled/Modified/Written Off	$ (9,000)	$ (723,000)	(9,168,658)
Ending Balance Pledges Receivable	$ 5,222,715	$ 6,718,906	$ 8,730,412
Testamentary Pledges Due	$ 240,942,067	$ 231,917,313	218,292,411
Total Pledges and Testamentary Gifts Due	$ 246,164,782	$ 238,636,219	$ 227,022,823

Performance Measures	This Quarter	FYTD 21/22	FY 20/21	FY 19/20
Gift Commitment Income	$ 29,848,477	$ 50,595,596	$ 85,375,521	$ 94,604,388
# of Gifts	7,644	13,266	26,344	27,285
# of Donors	4,232	5,766	8,826	8,914

Consolidated Investment Fund - Investment Performance

FY 21/22, December 31, 2021

Investment Performance Results	Market Value	1-Year	3-Year	5-year	10-Year
FY 21/22, December 31, 2021	$ 630,865,350	20.1%	15.1%	10.9%	9.1%
Custom Benchmark *		18.4%	15.5%	11.4%	9.2%
FY 20/21, June 30, 2021	$ 580,297,462	31.3%	11.0%	10.6%	8.0%
Custom Benchmark *		29.9%	11.1%	10.8%	7.9%
NACUBO/Commonfund **		N/A	N/A	N/A	N/A

* Custom Benchmark is a blended benchmark consisting of indices for all asset classes.

** NACUBO/Commonfund Endowment Study ($101 million to $500 million)

Consolidated Investment Fund - Asset Allocation

FY 21/22, December 31, 2021

Investment Class	Current Allocation	Target Allocation	Investment Policy Ranges
Domestic Equity	33.2%	37.0%	10% - 50%
International Equity	22.3%	25.0%	10% - 40%
Fixed Income/Cash	12.8%	10.5%	10% - 50%
Real Assets	3.4%	3.5%	0% - 15%
Hedge Funds	7.9%	8.0%	5% - 20%
Private Investments	20.4%	16.0%	0% - 20%

Consolidated Investment Fund - Spending Distribution

FY 21/22, December 31, 2021

CIF Spending Distribution	FY 21/22 Approved Distribution	FY 20/21 Approved Distribution
Endowment Spending Distribution	$ 21,311,739	$ 18,253,344
Endowment Spending Distribution Rate	4.5%	4.5%

THE UNIVERSITY OF NEW MEXICO FOUNDATION

Regents' Endowment

In June 1983, the University of New Mexico Board of Regents established the Regents Endowment with $622,315. An additional $20,971,886 was added to the endowment from the sale of University land in fiscal years:

1985/86: $1,332,640	1990/91: $3,500,000
1987/88: $1,400,000	2006/07: $8,045,923 (Mesa Del Sol)
1988/89: $1,723,724	2020/21: $3,041,445
1989/90: $1,928,154	

The Regents Endowment is a "quasi endowment" which is co-invested along with other University and UNM Foundation endowments in the Consolidated Investment Fund. The endowment corpus and any annual spending distributions from the endowment to the University may be used at its discretion.

The Board of Regents initially designated the monies for recruitment and retention of outstanding faculty, student merit-based scholarship programs and to develop University owned real estate. In 2005, the Board of Regents approved Regents' Policy 7.19 that expanded the use of monies. The University has historically designated the monies to scholarships, professorships, lectureships, fellowships, study abroad programs, minority faculty hiring, the President's Advancement Fund, and tuition assistance programs.

Market Value (at 12/31/2021): $33,526,054

CIF Investment Performance:	**FYTD:**	**6.7%**
	1-Year	20.1%
	3-Year	15.1%
	5-Year	10.9%
	10-Year	9.1%

Spending Distributions: (5-year History)	2017/18	$964,646
	2018/19	$939,572
	2019/20	$917,053
	2020/21	$947,085
	2021/22	**$1,132,569**

Withdrawals from Corpus: (Approved by Regents)	2005/06	$2,000,000	ASM Student Investment Fund
	2005/06	$1,888,233	Purchase Properties
	2008/09	$880,525	Regents Scholarship
	2012/13	$1,100,000	Baseball Field
	2014/15	$761,918	Innovate ABQ
	2016/17	$1,000,000	UNM Branding Campaign
	2017/18	$814,207	UNM Athletics Funding
	2018/19	$798,039	UNM Athletics Funding
	2019/20	$350,000	Enrollment Management Initiatives
	2019/20	$487,500	Grand Challenges
	2020/21	$162,500	Grand Challenges

THE UNIVERSITY OF NEW MEXICO FOUNDATION

Winrock Land Sale Endowment

In November 2001, the University of New Mexico Board of Regents established the Winrock Land Sale Endowment with $25 million in proceeds from the sale of the Winrock Shopping Center property.

The Winrock Land Sale Endowment is a “quasi endowment” which is co-invested along with other University and UNM Foundation endowments in the Consolidated Investment Fund. The endowment corpus and any annual spending distributions from the endowment to the University may be used at the Regents’ discretion.

The University has historically designated the monies to national merit scholarships, need-based financial aid, faculty retention, graduate fellowships and travel grants, capital improvements. To date, over $19 million has been distributed from the endowment for these programs.

Market Value (at 12/31/2021):		**$35,695,641**
CIF Investment Performance:	**FYTD:**	**6.7%**
	1-Year	20.1%
	3-Year	15.1%
	5-Year	10.9%
	10-Year	9.1%
Spending Distributions:	2017/18	$1,024,422
(5-year History)	2018/19	$1,027,828
	2019/20	$1,034,960
	2020/21	$1,108,186
	2021/22	**$1,205,861**

THE UNIVERSITY OF NEW MEXICO FOUNDATION

Hugh B. and Helen K. Woodward Endowment

In 1982, the University of New Mexico Board of Regents established the Hugh B. and Helen K. Woodward Endowment to receive and invest distributions from the Woodward Trust.

The University receives 45% of the annual net income from the Woodward Trust administered by the Sandia Foundation, a Hugh and Helen Woodward Charity, in accordance with the will of Hugh B. Woodward. UNM's share of these annual distributions (approximately $1.4 million annually) from the Sandia Foundation are deposited in the Hugh B. and Helen K. Woodward Endowment.

The Hugh B. and Helen K. Woodward Endowment is co-invested along with other University and UNM Foundation endowments in the Consolidated Investment Fund

The Last Will and Testament of Mr. Woodward stated:
It is my hope and wish, but I do not require, that a substantial portion of the annual net income shall be used by the Regents of the University of New Mexico: (1) to financially assist deserving students to begin and complete their college education, (2) to establish and maintain scholastic awards, grants scholarships and prizes to be conferred upon individual students, including students in the School of Law and the School of Medicine, when established, in recognition of achievement and usefulness to said university and to its student body, and (3) to supplement regular salaries of the Dean of the School of Law and any deserving full professor of said school and the Dean of the School of Medicine and any deserving full professor of said school devoting full time to his professional employment. No more than Six Thousand Dollars ($6,000.00) of the moneys passing to the Regents of the University of New Mexico annually shall be utilized to supplement the salaries as provided in subpart (3) of this paragraph.

Market Value (at 12/31/2021):		**$72,207,082**
CIF Investment Performance:	**FYTD:**	**6.7%**
	1-Year	20.1%
	3-Year	15.1%
	5-Year	10.9%
	10-Year	9.1%
Spending Distributions:	2017/18	$2,146,914
(5-year History)	2018/19	$2,236,177
	2019/20	$2,330,920
	2020/21	$2,562,137
	2021/22	**$2,862,091**

The FY2021/22 endowment distribution was used for Regents' merit scholarships, presidential scholarships, UNM scholars and national merit scholarships.

TAB 11

#11

Recommendations for Information Agenda Items to be Added to the Full Board of Regents' Agenda

INFORMATION ITEM RECOMMENDATIONS:

Recommendations for Information Agenda Items to be Added to the Full Board of Regents' Agenda *(Sandra Begay, Chair, Regents' Finance & Facilities Committee)*

TAB 12

#12

EXECUTIVE SESSION

EXECUTIVE SESSION:

None