

1

Department: 367 - University of Memphis (007)

Project Title: Research Modernization

Institution: UoM

City/County: Memphis / Shelby

Approved Current

07/24/2025

SBC No: 367/007-01-2025

3	<input checked="" type="checkbox"/> Capital Outlay		New	Renovation
	<input type="checkbox"/> Capital Maintenance	Gross Sq. Ft.	0	114,887
	<input type="checkbox"/> Disclosure	Net Sq. Ft.	0	89,988
	<input checked="" type="checkbox"/> Designer Required	Cost/Sq. Ft.	\$0.00	\$479.00

4 Project Description

This project will modernize space in 15 buildings to support research. Work includes lab renovations, infrastructure improvements and all associated work.

5	Total Project	Allocation			
	\$55,000,000.00	\$55,000,000.00	Building Construction		
	\$0.00	\$0.00	Site & Utilities		
	\$6,000,000.00	\$6,000,000.00	Built-in Equipment		
	\$61,000,000.00	\$61,000,000.00	Bid Target		
	\$6,100,000.00	\$6,100,000.00	Contingency	10.00%	10.00%
	\$67,100,000.00	\$67,100,000.00	M.A.C.C.		
	\$4,396,805.00	\$4,396,805.00	Fee	0.0000000	0.0000000 Fixed Fee
	\$2,000,000.00	\$2,000,000.00	Movable Equipment		
	\$500,000.00	\$500,000.00	Consultants		
	\$400,000.00	\$400,000.00	Commissioning & Pre-Construction		
	\$603,195.00	\$603,195.00	Administration & Miscellaneous		
	\$75,000,000.00	\$75,000,000.00	Total Cost		

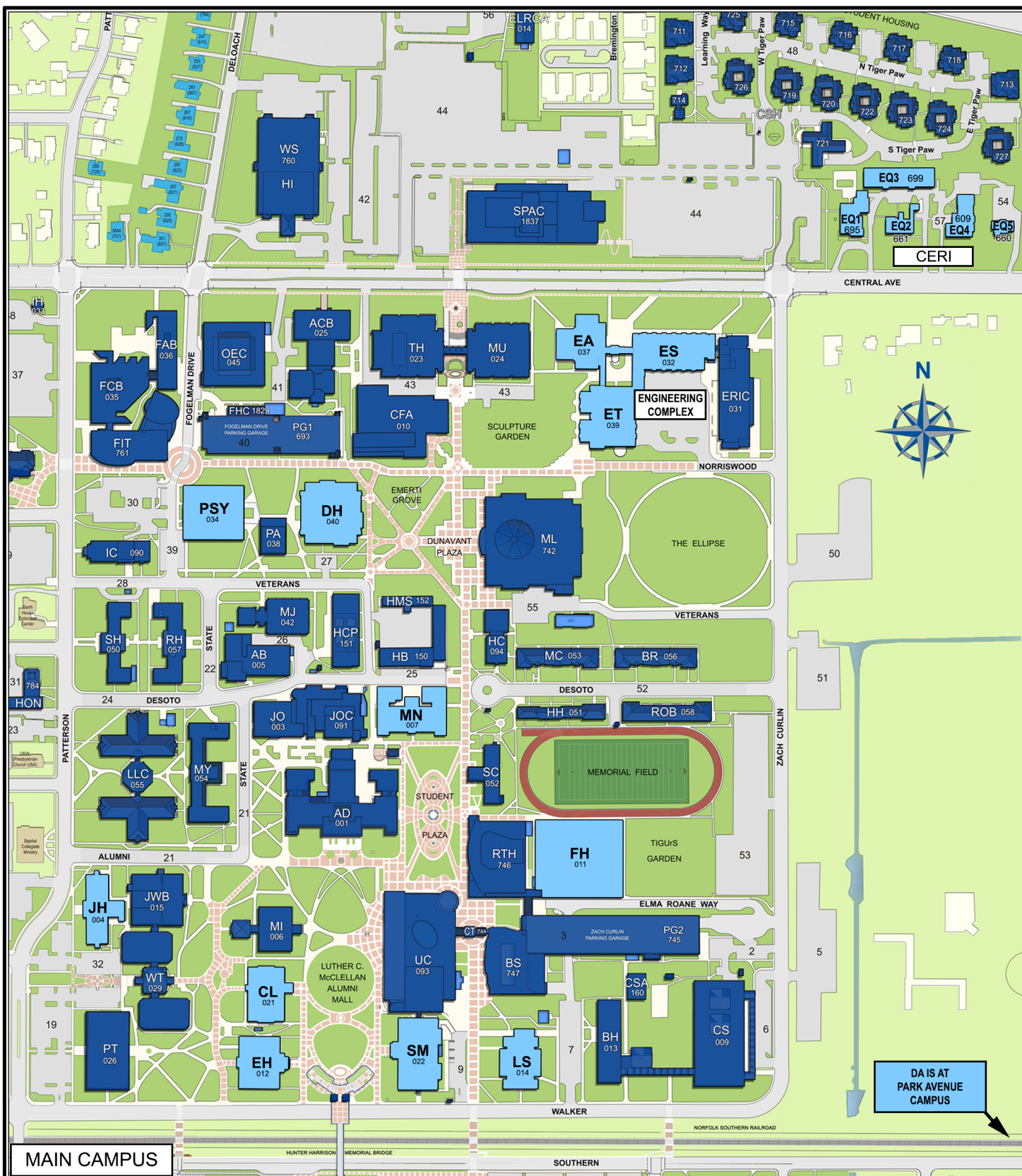
6 Funding			
	\$70,500,000.00	\$70,500,000.00	STATE Funds
	\$0.00	\$0.00	FEDERAL Funds
	\$4,500,000.00	\$4,500,000.00	Plant Funds (Non-Aux) (A)
	\$75,000,000.00	\$75,000,000.00	

7 Available Funding Sources			
	SBC Meeting Date		
		\$4,500,000.00	Plant Funds (Non-Aux) (A)
		\$70,500,000.00	2025 GOBonds-CapImp (A)
		\$75,000,000.00	

8 SBC Action	Date	Action
	07/10/2025	Approved project and to select designer
	07/21/2025	Approved designer selection (The Crump Firm, Inc.)

9 Designer

The Crump Firm, Inc.



# THE UNIVERSITY OF MEMPHIS

## 2025 – 2026 CAPITAL OUTLAY REQUEST

### RESEARCH MODERNIZATION

## Supplemental Drawings

## **Recommendations for Research Modernization Funds**

The Governor's inclusion of \$70.5M for research modernization at the University of Memphis represents an opportunity to address long-standing research infrastructure challenges. In order to align the requests put forward to the state in the "UofM 2025-2026 Capital Outlay Request for Research Modernization" proposal with current research priorities and needs, the Office of Research Development consulted with the Associate Deans for Research (or equivalent) from the colleges. This review was conducted in consultation with the Campus Planning and Design team

### **Summary**

The Capital Outlay Request presented to the state budgeted \$54,902,108 for construction costs. This included \$9,710,352 for inflation and moving costs and \$6,000,000 for furniture costs. In order to enable decision making by the colleges and maximize the \$70.5M investment these funds will be allocated to the summarized priority areas below.

The School of Public Health, the University Research Park, the FedEx Institute of Technology/defense research space, and the University Libraries are included. These investments enable dynamic industry-responsive research capacity and create interdisciplinary resources to ensure that the total research capacity of the University is represented in the research modernization effort.

Swing space for the development will be housed at Defense Audit or Colleges may choose to implement temporary buildings as a solution utilizing the allocated construction budgets below. A furniture budget should be allocated to spaces as appropriate.

### **Summary of Prioritization of Investment (Ranked by Priority)**

1. **Vivarium** – Animal Care facilities are out of date and create a compliance risk. These costs need to be addressed in order to keep research competitive.
  - a. Facilities in Report: LS 115, 231, 233; Psych 422, 422A, 422C, 422C1, 422C2, 422D, 422G, 422F, 422E, 422I, 422J, 422J1, 450A, 452
  - b. Other Facilities: 422A
    - i. Reason: Remove incinerator
  - c. Instrumentation Needed: Cage Washer, Cage Wash Boilers
2. **STEM Program Lab Space Improvements** (Bio, Chem, Physics, Earth Sciences, CS, CERl) – Across campus, there are labs which can be outfitted to accommodate dynamic, research aligned spaces that can be allocated based on external grant support and other key factors. Infrastructure should also be compliant with hazardous waste storage and other risks to normal operations.

- a. Facilities in Report: Ellington 123, 125, 129, 111; LS 237, 237A, 331, 419, 4535E, 535, 535D; Dunn 216, 221, 247; Johnson 114, 215A, Floor B (1C, 1B, 1, 1A, 1D1, 1D, 2, 2A, 2B); Smith 303, 303A, 303B, 303C, 321, 413, 413A, 413B, 415, 415A, 415B, 425, 414, B21, B2; Clement 125; Manning 180, 109, 113, 117, 117A, 115, 115B, 114, 116, 116A, 116B, 118, 320, 340, 332, 413, 417, 426; Psych 349, 351, 353, 355, 357, 359, 361, 376, 379, 381, 383, 385, 387, Life Sciences, CERI
3. **Public Health Support** – The School of Public Health is the fastest growing college on campus in terms of research dollars awarded. Their most pressing priority is allocation of new space. Currently housed in Robison Hall, the college needs investment in order to continue current growth rates.
  - a. Facilities in Report: N/A
  - b. Other facilities: Robison Hall
4. **College of Health Sciences Research Solution** – The location of the facilities of CHS (basement, field house) and the high number of indicated instrumentation improvements requires a special level of investment in order to make the space viable for research. Persistent flooding and physical infrastructure challenges have made many of the spaces functionally unusable. Improvement costs calculated at 1.75% of the original estimates.
  - a. Facilities in Report: Elma Roane 171, 173, 162, 161G, 161L, 161K, 161F, 161 E, 161D, 153A, 153B, 153C, 182, 155A, 155B, 155D, 155, 135, 131, 135B, 135B1
  - b. Other Facilities: Elma Roane 116, 153A, 142, 254, 258
5. **Agricultural Research Enhancement** – The Greenhouse, located on the roof of Life Sciences, has been a persistent problem because of its location. It needs to be overhauled in alignment with the University's increased focus on agricultural research activities. Improvement costs calculated at 1.75% of the original estimates.
  - a. Facilities in Report: Floor 6 Life Sciences
6. **Herff College of Engineering Solution** – The Herff College of Engineering completed the ERIC building since the original estimates were produced. The space improvements focus on a realignment of research spaces on the first floor of ES and the realignment of research spaces on the 3<sup>rd</sup> floor of ET. The 3<sup>rd</sup> floor of ET will be converted to accommodate more dynamic, externally funded research.

- a. Facilities in Report: EA100; ES 309, 107, 109; ET 323,322A, 322B, 322B1, 325, 316
- b. Other Facilities: EA102D, ET 328C

7. **Research Park Improvements and Planning** – The Research Park functions as the front door for companies looking to engage with the University of Memphis. Currently housed at 460 South Highland, the UMRF Research Park has conducted initial surveys of partners in the city. A consistent priority has been the need for wet-lab research space that is dynamic and allows companies to grow with the University and the city. The space will serve as a combined flex space during the buildout period for other projects listed here.

- a. Facilities in Report: Defense Audit single story, and second floor of two story
- b. Other facilities: 460 South Highland

8. **Interdisciplinary Research Pods** – The University of Memphis Libraries are a natural home for an interdisciplinary collaboration zone for researchers looking to investigate new avenues for research. We recommend taking the second floor of the library currently home to bound periodicals and reassigning space to facilitate research engagement.

- a. Facilities in Report: N/A
- b. Other Facilities: University Libraries

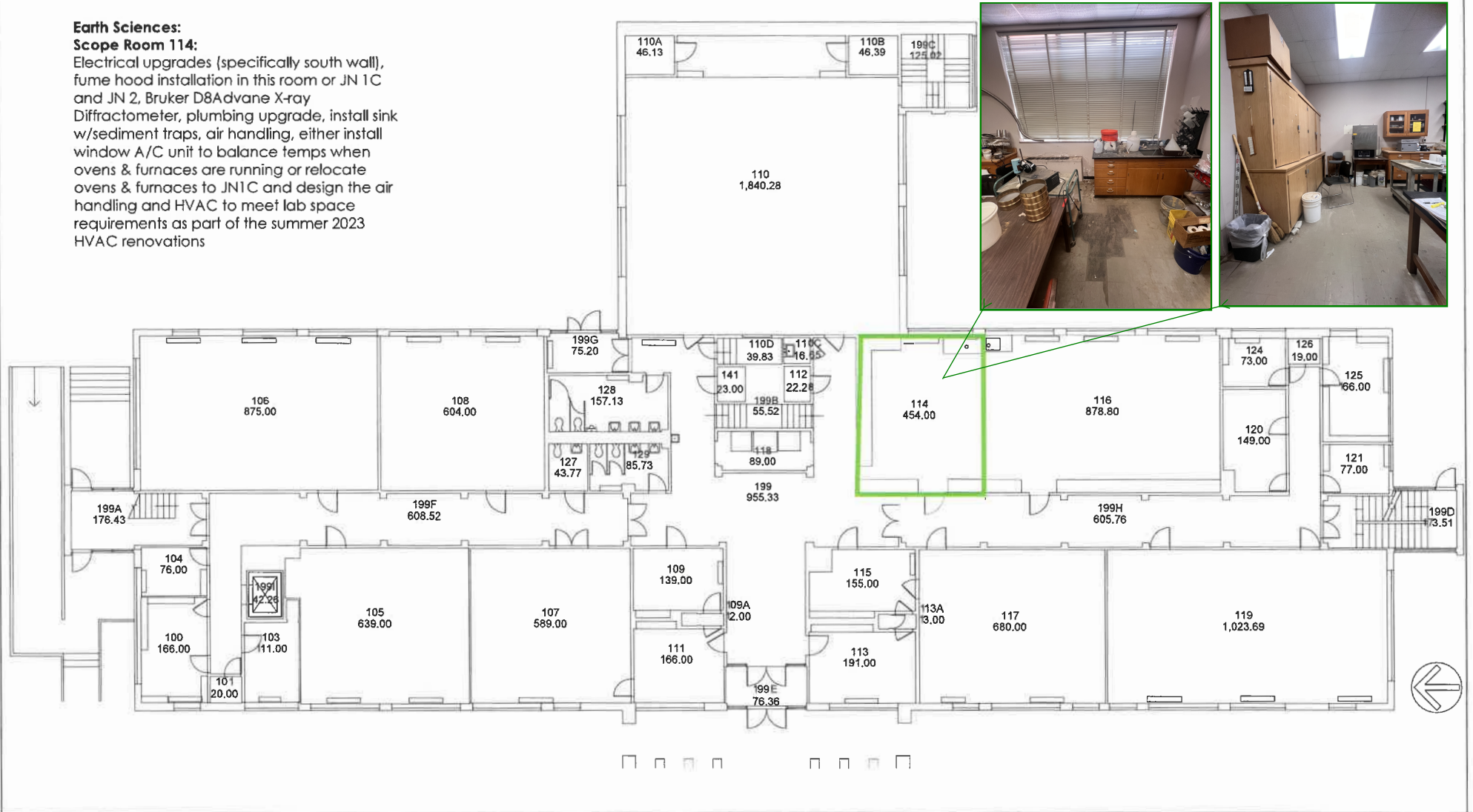
9. **FedEx Institute of Technology Improvement/Defense Research Enhancement** – Defense Research has been the largest single federal funding source on the UofM campus for the last three years. Secure research requires expansion of space and facilities to conduct work effectively. We recommend an investment in the current facility in the FIT as well as improving research spaces in the building to support interdisciplinary research activities across campus.

- a. Facilities in Report: Defense Audit Building
- b. Other facilities: FedEx Institute of Technology

**Earth Sciences:**

**Scope Room 114:**

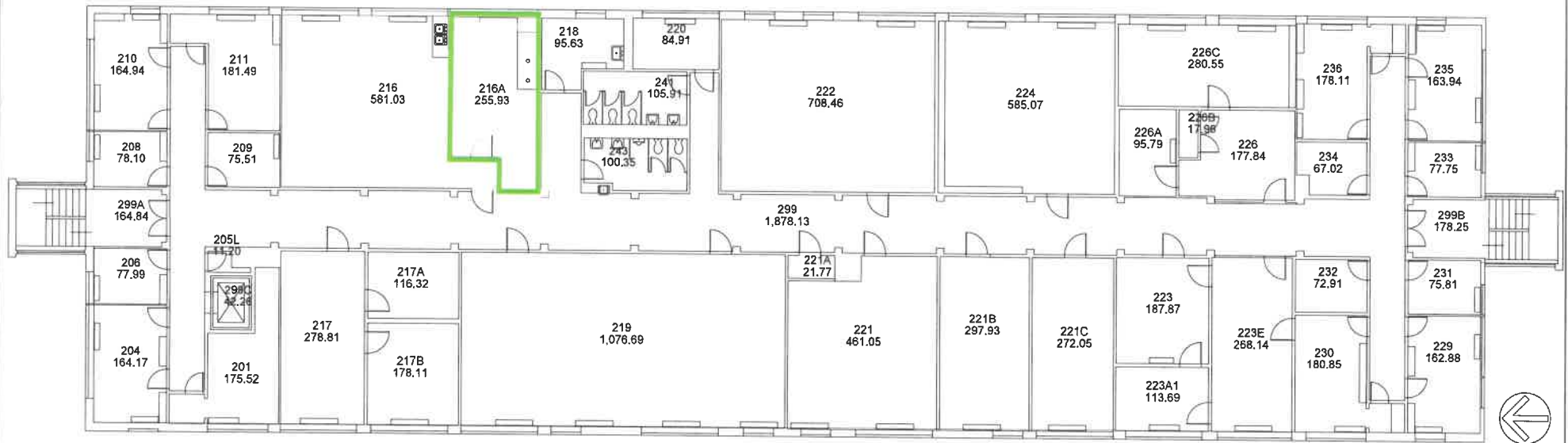
Electrical upgrades (specifically south wall), fume hood installation in this room or JN 1C and JN 2, Bruker D8Advane X-ray Diffractometer, plumbing upgrade, install sink w/sediment traps, air handling, either install window A/C unit to balance temps when ovens & furnaces are running or relocate ovens & furnaces to JN1C and design the air handling and HVAC to meet lab space requirements as part of the summer 2023 HVAC renovations



**Earth Sciences:**

**Scope Room 216A:**

Remove the plumbing from the original dark room, install electrical outlets for microscopes, air filtration to control dust, shock resistant lab benches



**Earth Sciences:****Scope Room 1C:**

Create Soils Analysis Lab - fume hood, eyewash station, shock resistant lab benches/counters w/integrated storage to line wall, Bettersizer S3 Plus Laser Particle Analyzer will need water hook-up

**Scope Room 1B:**

Create Dendrochronology Lab. Exhaust fans, sink if possible (or locate in JN 005 where a sink exists)

**Scope Room 1:**

Shelving, currently an office, but will be converted to research

**Scope Room 1A:**

Create USDA Regulated Soil Lab dedicated for quarantining samples. Fume hood, eyewash station, shock resistant lab benches/counters with integrated storage to line walls. Currently an office but will be converted to research

**Scope Room 1D1:**

Create PC Lab for Research. Shelving. Currently shared graduate office, but will convert to research

**Scope Room 1D:**

Shelving, cabinets with sample trays

**Scope Room 2:**

Wet Lab w/ 2 fume hoods, eyewash stations, shock resistant lab benches/counters w/ integrated storage to line wall, vented storage

**Scope Room 2A:**

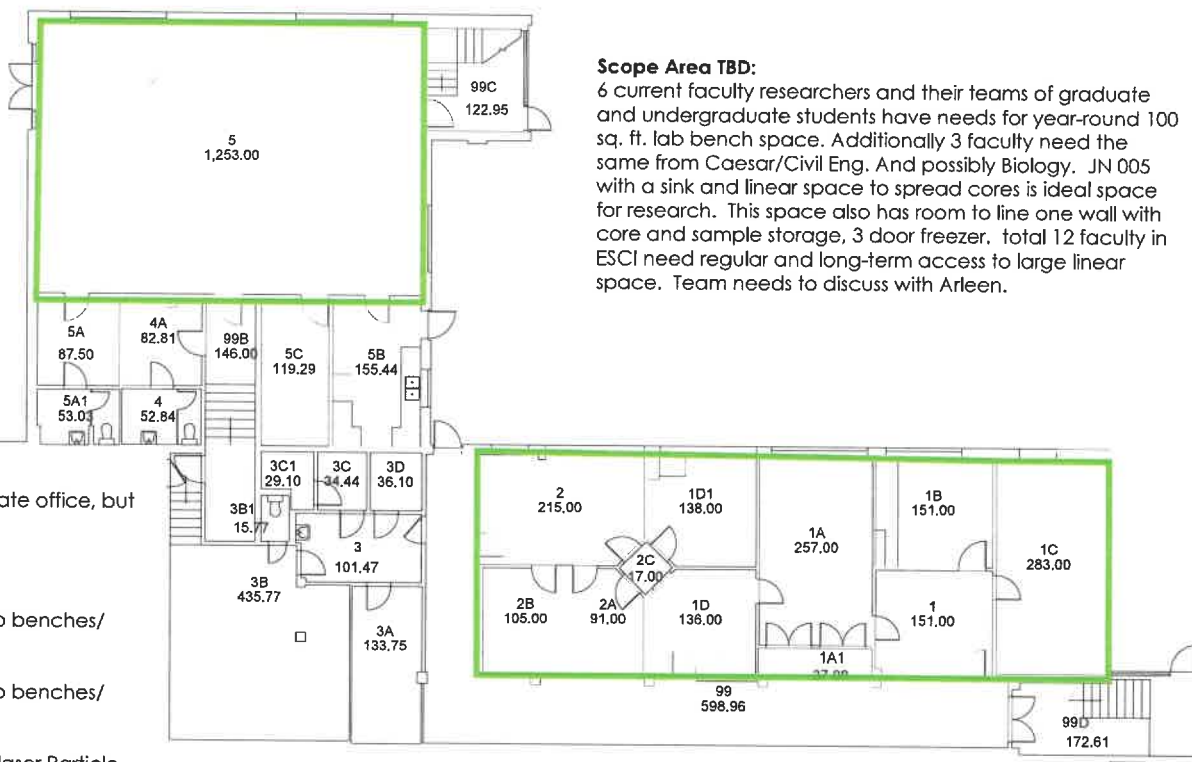
Wet Lab w/ 2 fume hoods, eyewash stations, shock resistant lab benches/counters w/ integrated storage to line wall, vented storage

**Scope Room 2B:**

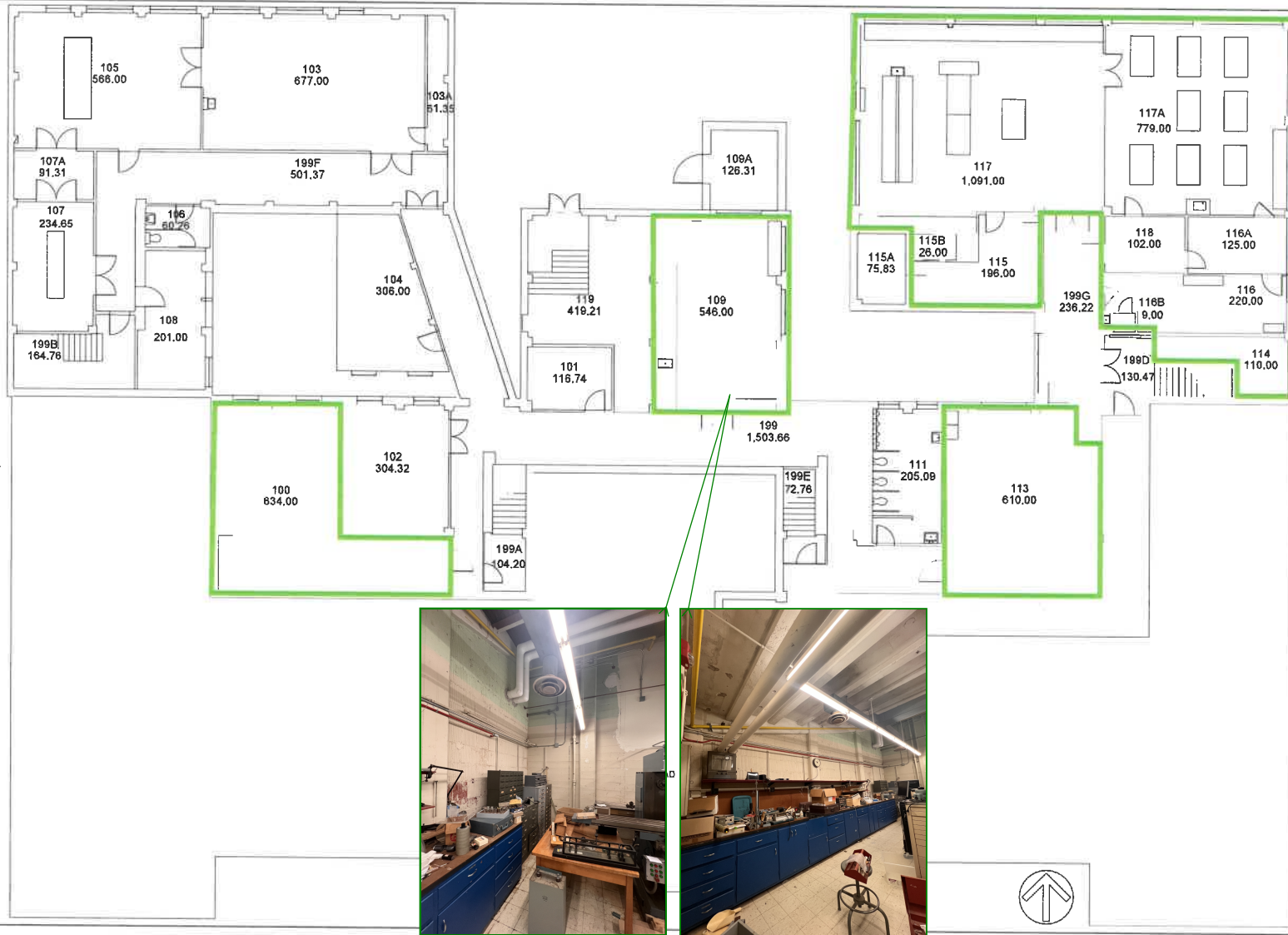
Ability to control temperature for instruments, Bettersizer S3 Plus laser Particle Analyzer will need direct DI water hookup and a temp controlled room. Currently research, but will become shared research

**Scope Room 1C:**

Former conference room unusable due to poor moisture control (mold grows on surfaces) current used as storage will move equipment to JN 103 after elevator renovation. Possible research if repaired??

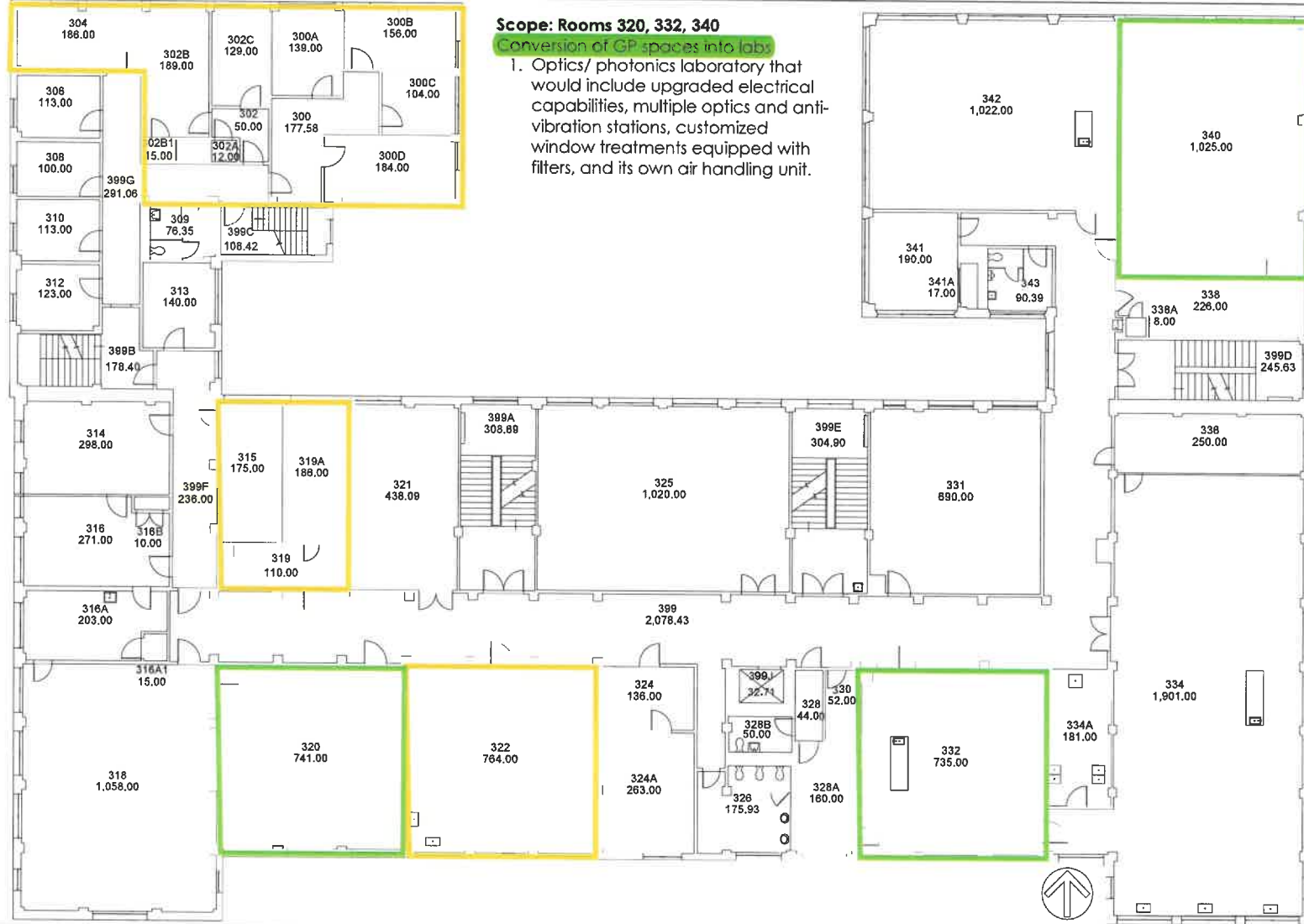


3. Upgrade electrical capabilities for labs in basement



**Physics and  
Material Sciences:  
Scope:  
Anthropology  
Spaces once  
vacated**

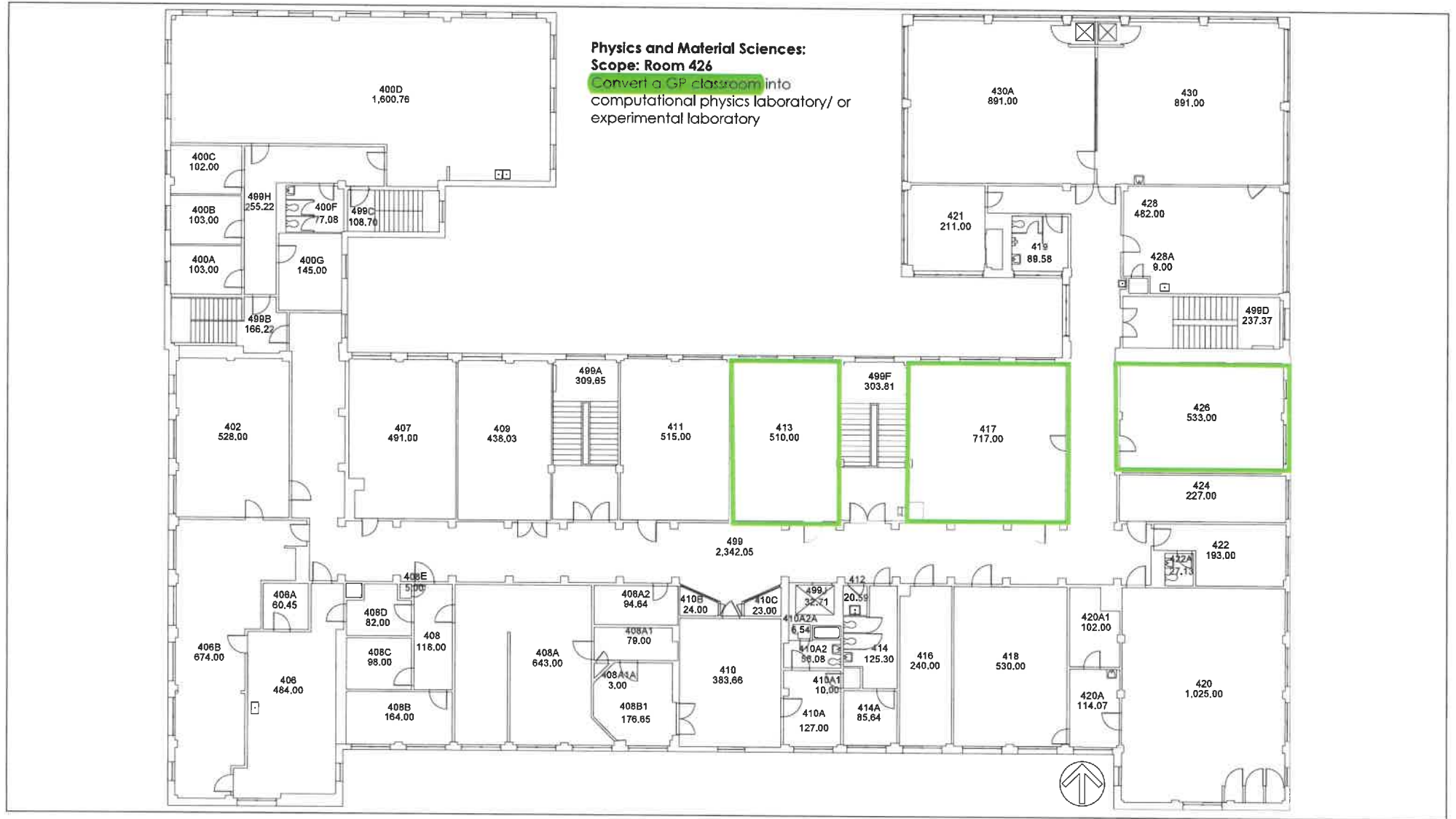
We request adding a shared wet lab/ chemical lab with epoxy floors to the 3rd floor of Manning Hall which would make it easier to install the duct work needed. This would be a shared space that faculty from physics and potentially faculty from other disciplines could also use. These offices will need to be combined into one large space equipped with a chemical floor, upgrades to the electrical wiring of the space, as well as installation of appropriate chemical benches and wet lab capabilities.



**Scope: Rooms 320, 332, 340**

**Conversion of GP spaces into labs**

1. Optics/ photonics laboratory that would include upgraded electrical capabilities, multiple optics and anti-vibration stations, customized window treatments equipped with filters, and its own air handling unit.



**College of Health and Sciences:**

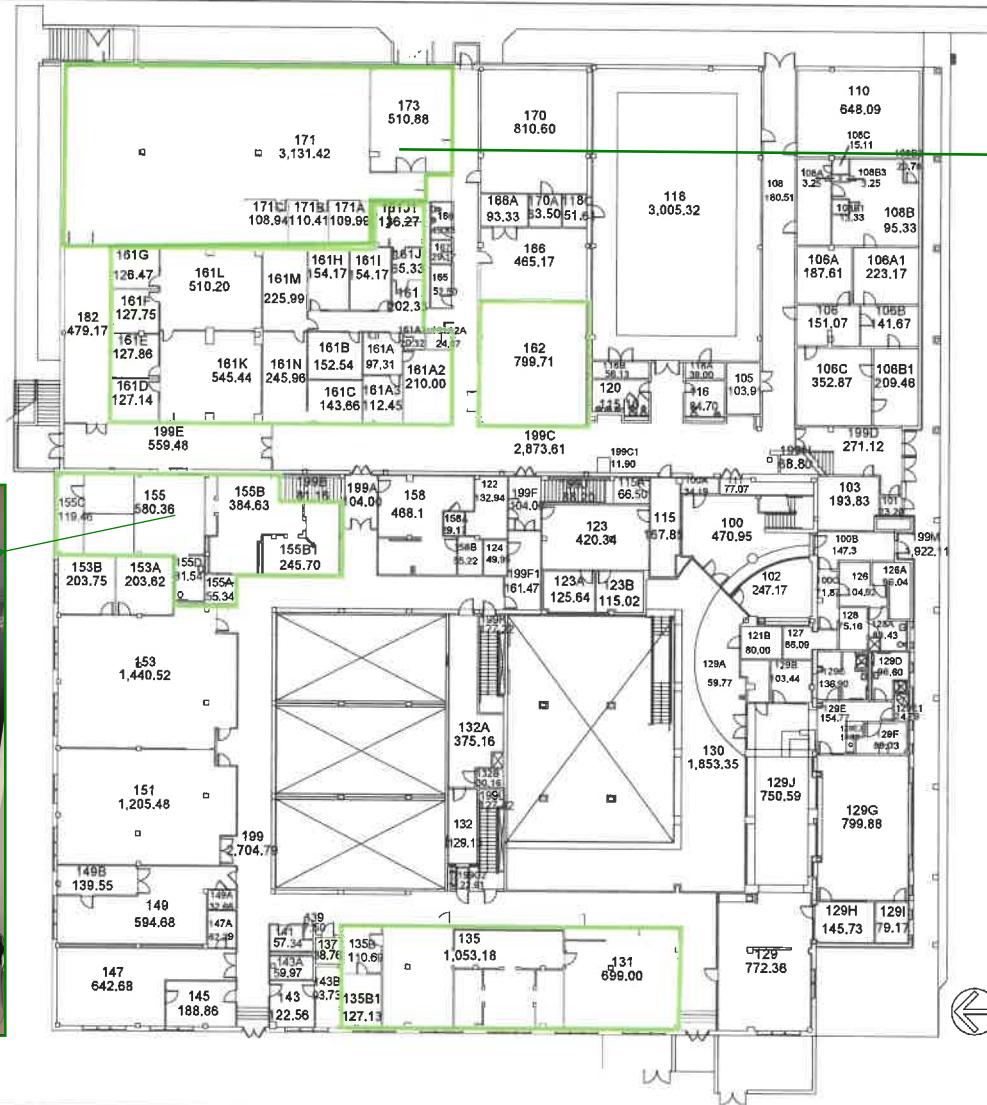
**Scope Room: 135**  
Built-in wall storage  
Built-in lab benches

**Scope rooms 155 Suites:**  
Total renovation

**Scope Room 161:**  
Built-in wall storage  
Built in lab benches  
Lab grade flooring

**Scope Room 162:**  
Total renovation

**Scope Rooms 171 Suites:**  
Built-in wall storage  
Lab grade flooring  
Embedded force plates



**Biological Sciences:****Scope: Throughout Bldg.**

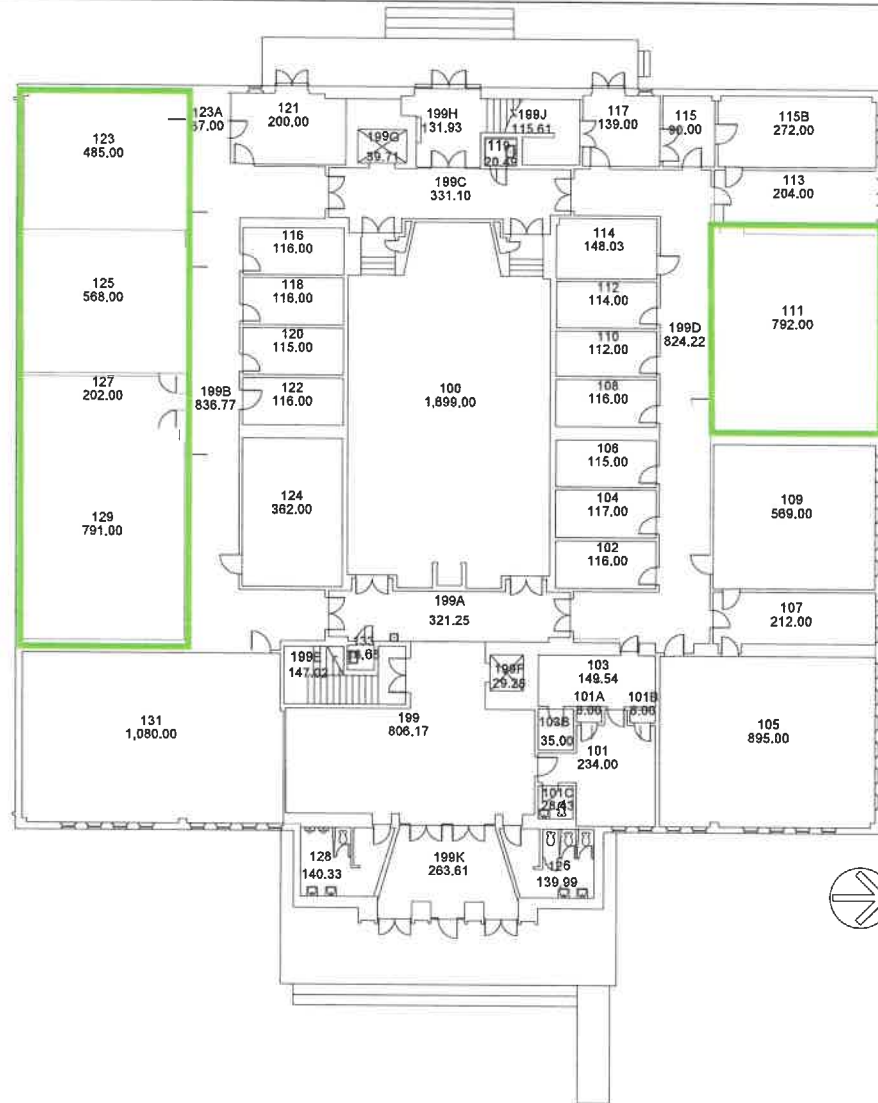
Install generator for building  
Install corrosive and flammable  
cabinets, plumb all eyewash stations  
that drain onto floors  
Discuss locations during walkthrough

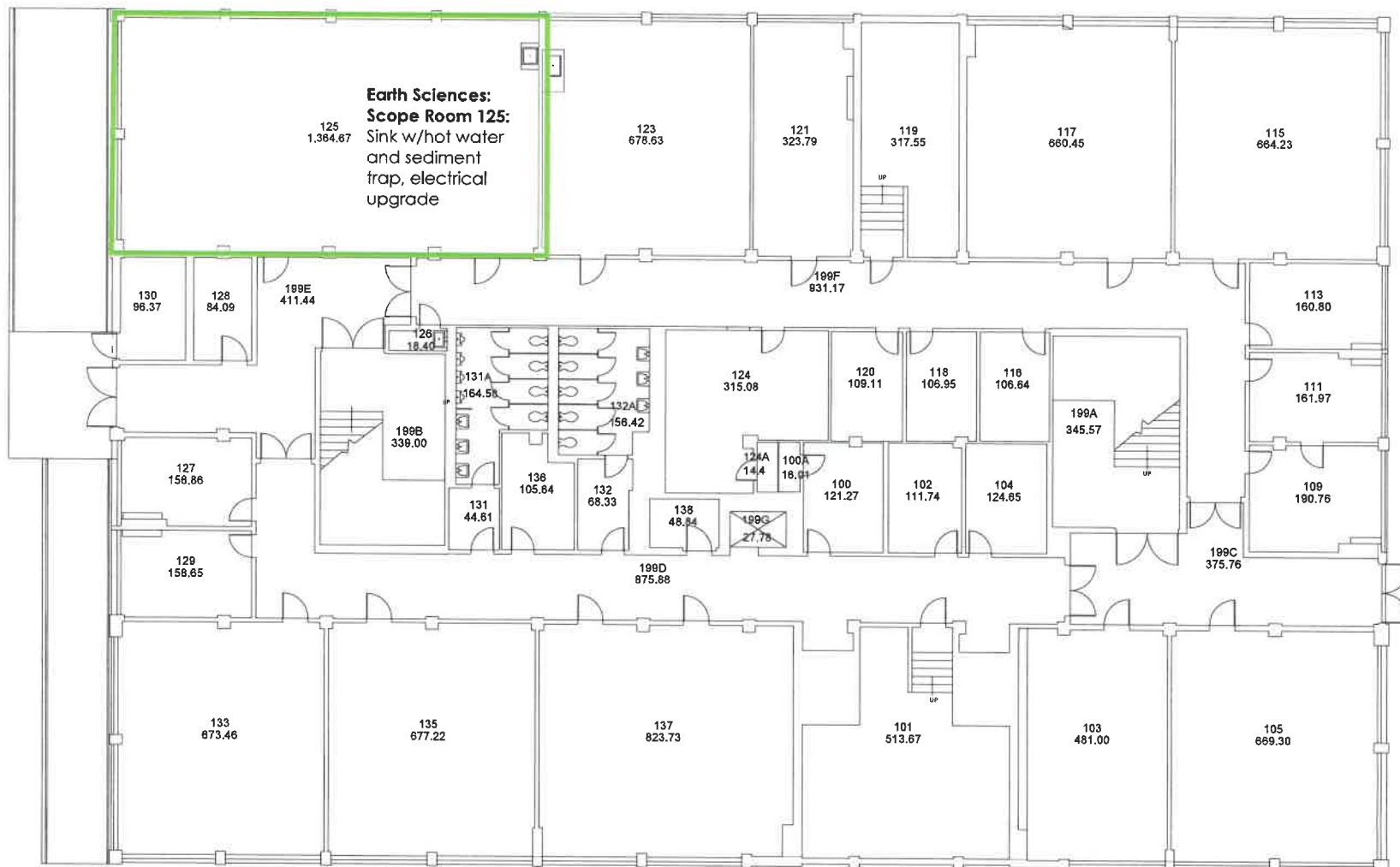
**Scope: Rooms: 123, 125 and 129**

Convert these spaces into a shared  
lab. Permanent A/C; fume hood with  
cabinets for flammable/corrosive  
materials, amp high-speed Ethernet  
access, card reader for access  
control, eyewash stations w/plumbing,  
all doors/door casings to labs need to  
be replaced w/large doors or double  
doors to accommodate large items, a  
loading dock on the west entrance to  
accommodate entrance and exit of  
larger equipment

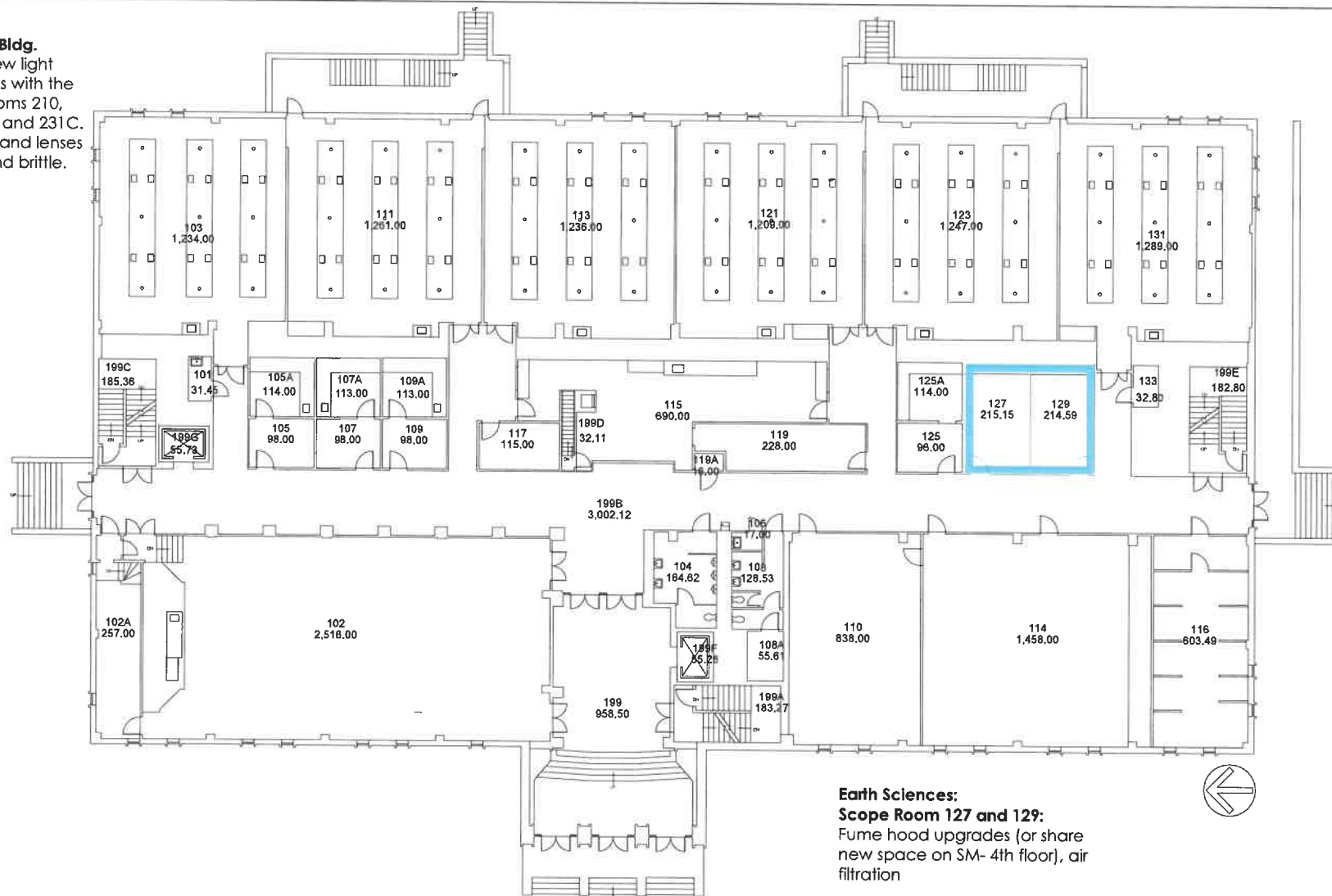
**Scope: Room 111**

Convert to research lab. Sinks, fume  
hoods, epoxy floor, eyewash station,  
infrastructure needed, new benches/  
cabinets, remove old ones, bio-safety  
cabinet, ample high-speed Ethernet  
access, 220 V electrical outlets

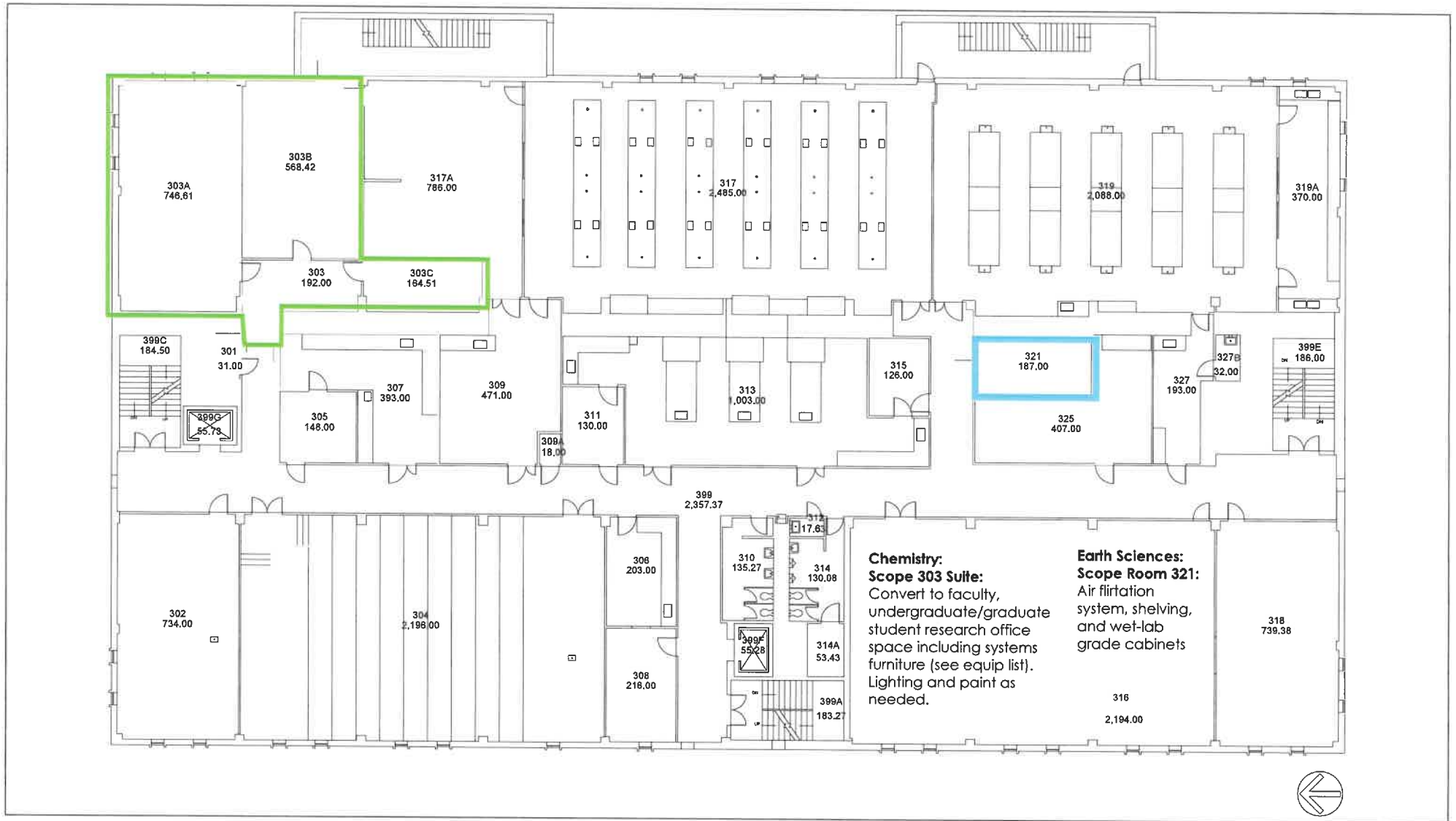




**Chemistry:**  
**Scope General Bldg.**  
 Need to add new light fixtures to all labs with the exception of rooms 210, 210A, 231, 231A and 231C. Current lighting and lenses are yellowed and brittle.



**Earth Sciences:**  
**Scope Room 127 and 129:**  
 Fume hood upgrades (or share new space on SM- 4th floor), air filtration



**Chemistry**  
**Scopes for Suites 414, 415 and**  
**425 See Spreadsheet**



**Room 414:** Convert to faculty, undergraduate/graduate student research office space including systems furniture (see equip list). Lighting and paint as needed.



### Chemistry

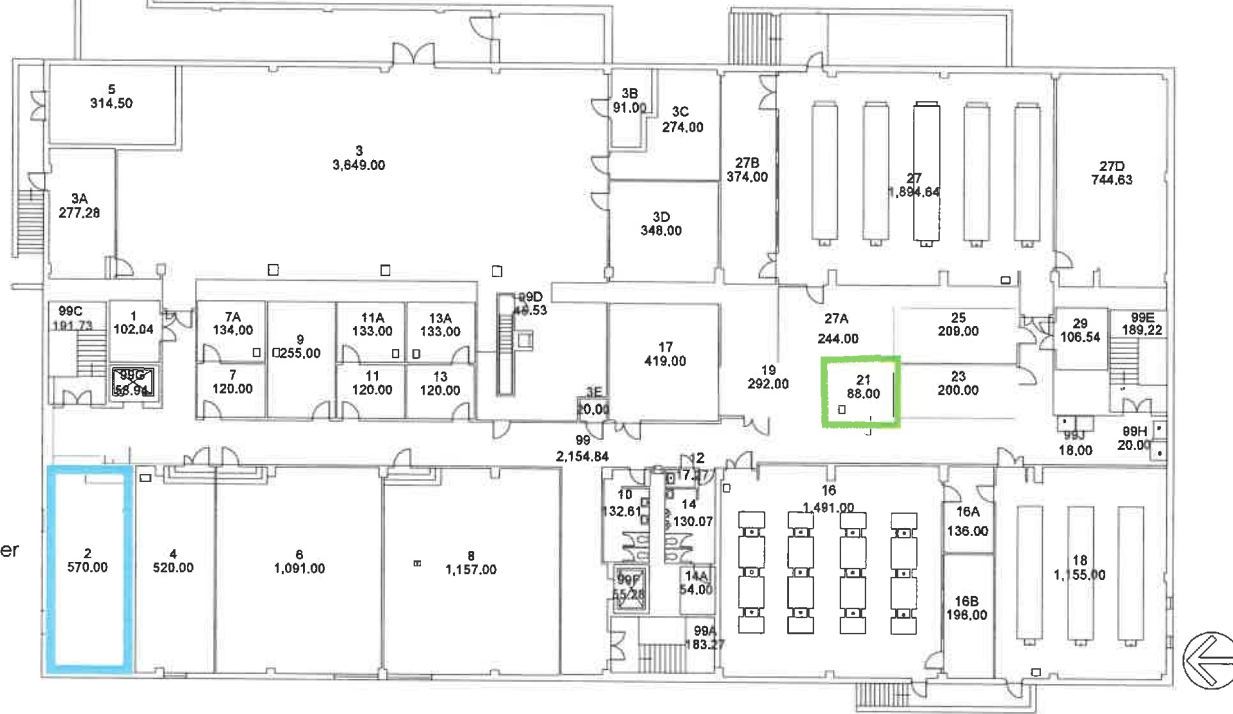
#### Scope Room 21:

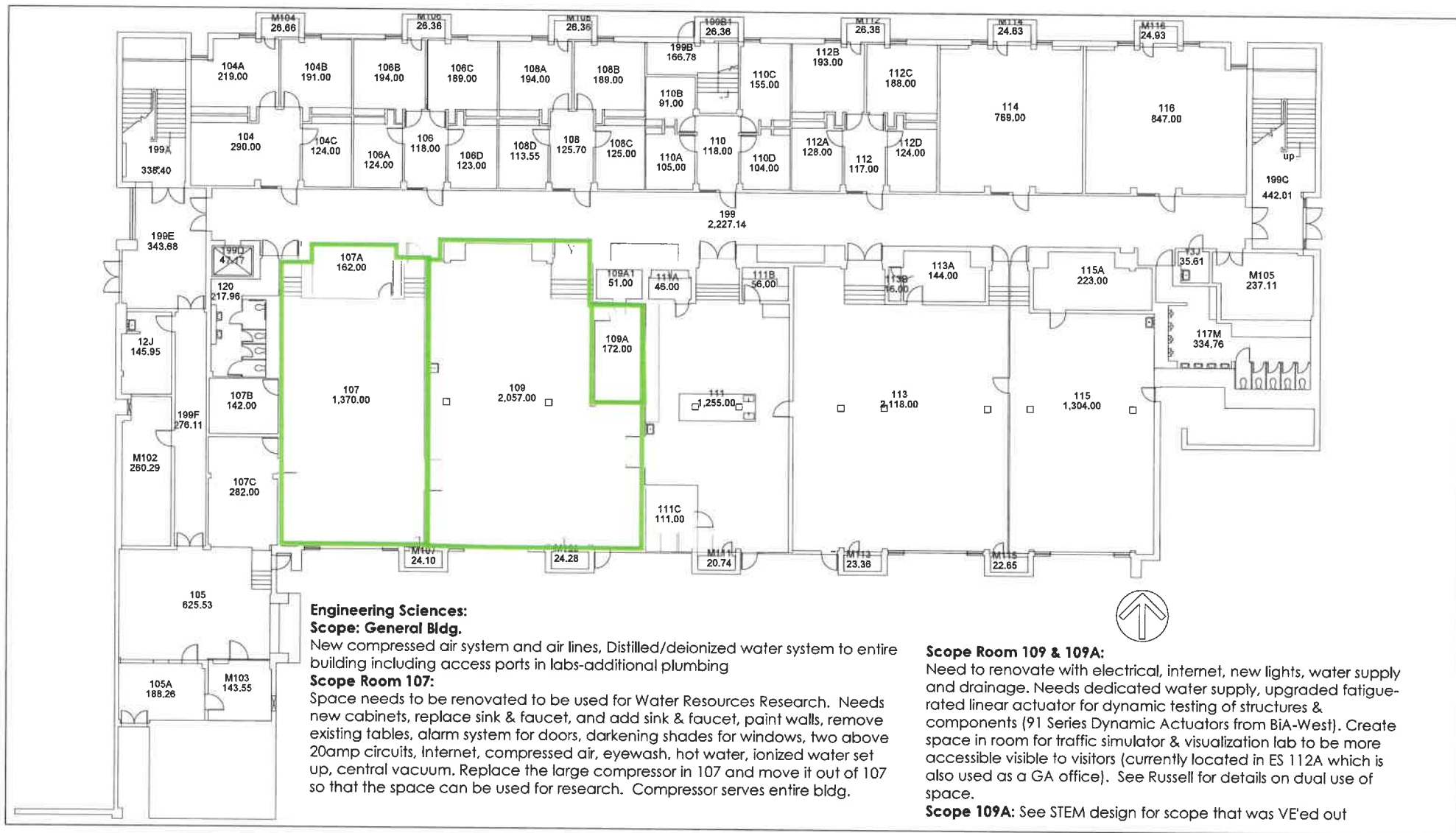
This room is fully refrigerated, but not currently functioning. Renovation includes insulating walls and door, lab benches, sinks, compressed air, natural gas, water lines, and cabinets within the room

### Earth Sciences :

#### Scope Room 2 :

Replace sink w/ larger sink and sediment trap, direct connect water supply for rock saw w/ sediment trap, paint, eyewash, electrical upgrades, replace/ repair lab benches







**Engineering Sciences:**  
**Scope: Room 309**  
 Renovate room - not  
 sure if renovations are  
 limited to furniture, see  
 furniture list tab.

**Cognitive Science:**

**Scope Rooms:** 349,351,353,  
355, 357, 359, 361, 376,379,  
381,383, 385, 387

Automated environmental  
controls for temperature  
and humidity, updated  
network ports, prominent  
signage, direction signage  
in halls,



**Animal Care Facilities: Scope:**  
Remove existing walls in J around cage-wash, replace cage washer, replace cage wash boiler, add wall in room I, add individual air controls to each room-12 units, add temperature monitoring to each room - 12 units, remove windows in room C1 & C2, add surgery lighting in C1, resurface floors with epoxy flooring in all rooms

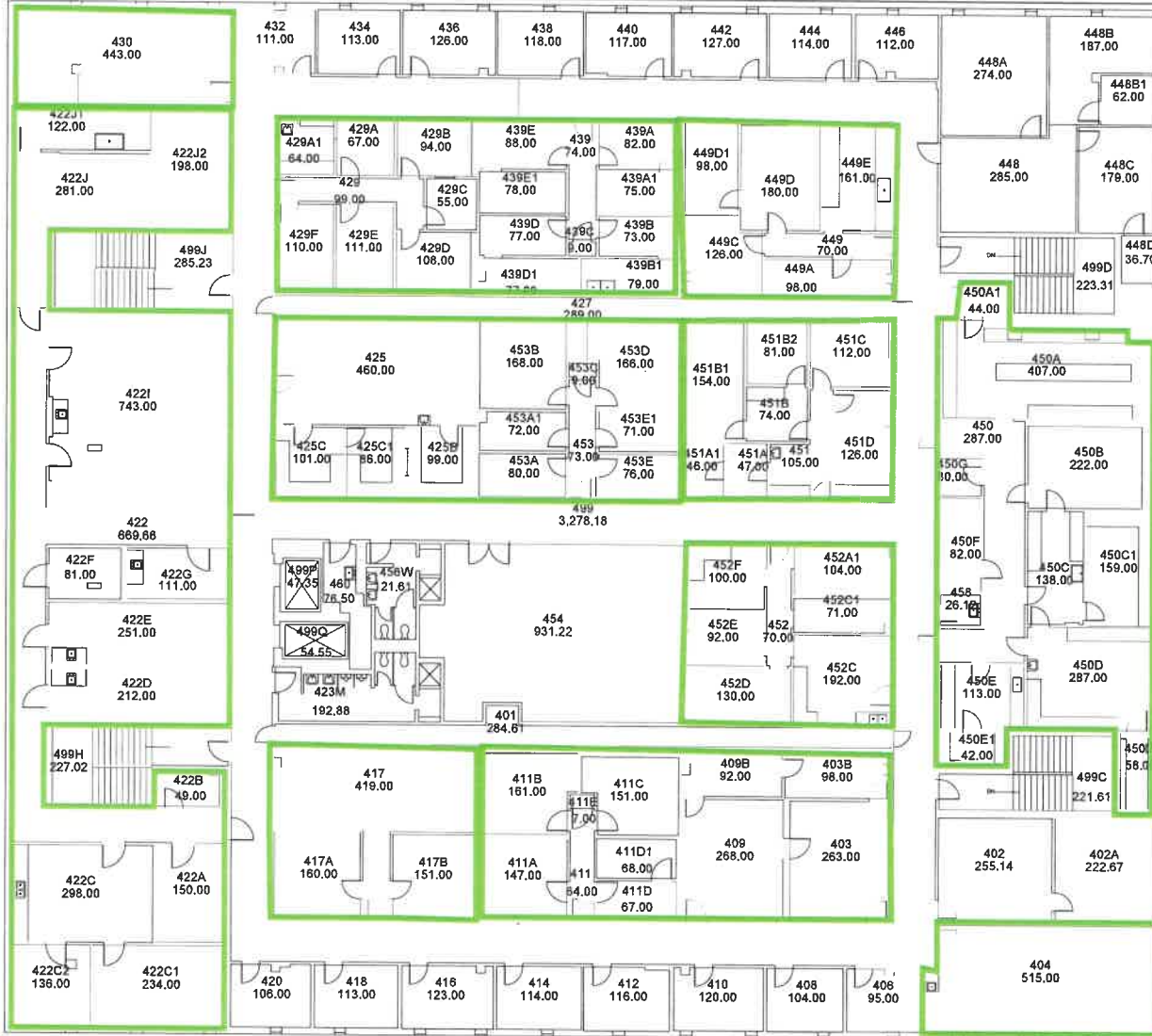
**Behavioral Neuroscience & Animal Care Biology: Scope rooms: 422A, 422C, 422C1, 422C2, 422D, 422G, 422F, 422E, 422I**

Updated lighting automated environmental controls for lighting in all animal rooms. Modernized rack/caging systems for animal rooms. Modernize sinks w/hands free or foot operated sinks, installation of work surfaces in rooms- stainless steel tables

**Scope Rooms: 422G & 422i** Noise abatement measures for animal rooms near entrance and foot traffic

**Scope Rooms 422J and 422J1:** Automated bedding dispensers, automated bottle fillers

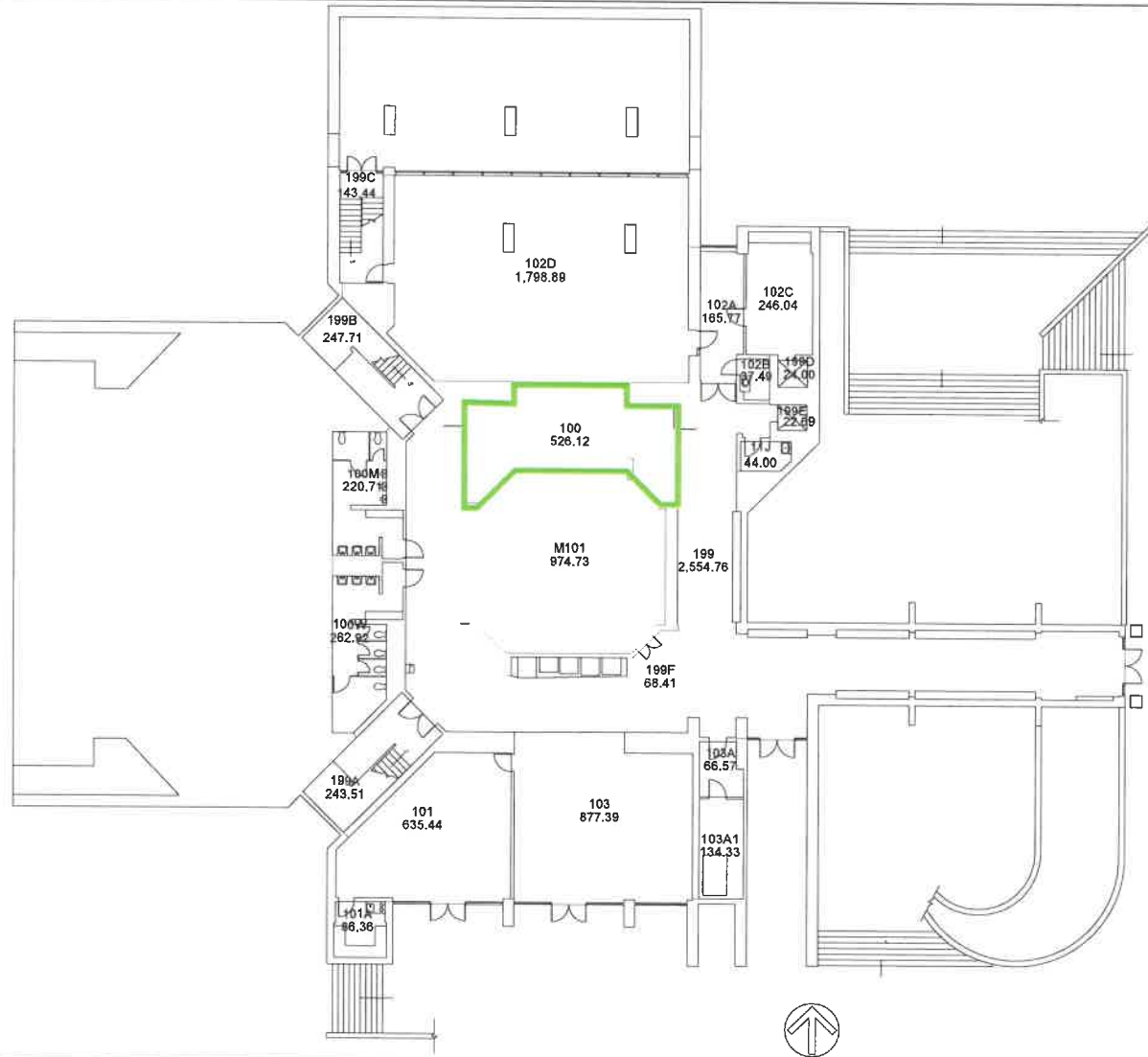
**Scope Room 422:** Install clean room. Designation of quarantine area for animals received from sources other than standard vendors, designation of storage - excluding animal rooms



**Engineering Admin.:**

**Scope Room 100:**

Center needs renovations that include electrical, internet, lighting, and glass partition walls to better accommodate grad students & postdocs



**Scope Rooms 322B&C:**

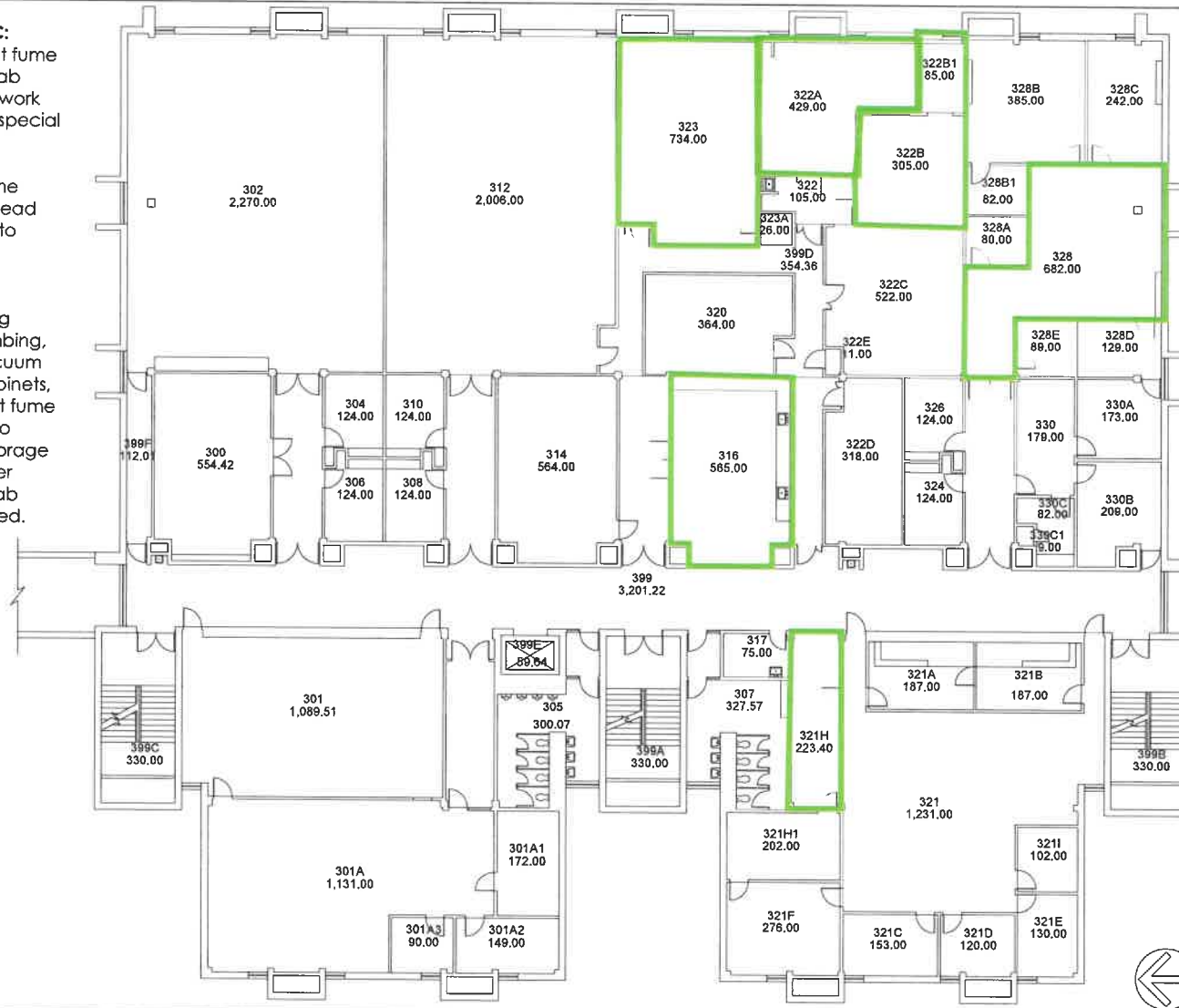
Add lab fume exhaust fume extraction arm, add lab bench furniture, new work benches, removal of special pipe connectors

**Scope Room 323:**

Lab fume exhaust fume extraction arm, overhead racks & attachments to fume hood

**Scope Room 328:**

Space needs to be reconfigured including moving sink and plumbing, Access to central vacuum close to biosafety cabinets, add lab fume exhaust fume extraction arm, floor to ceiling cabinets for storage of glassware and other supplies. Additional lab bench furniture needed.

**Engineering Technology:****Scope: General Bldg.**

New compressed air system and air lines, need distilled/Deionized water system (whole building)-would require additional plumbing & access ports in labs, with filter and dehumidifier. Access ports would need to be added to ET 119, 120, 121, 123, 301, 303, 316, 322 a,b,c, and 328

**Scope: Room 303 [Correct Room # needed]:**

Space needs to be reconfigured so that the biohazard research area and conference table area are not connected. Possibly a movable dividing wall, and moving the sink in the room closer to the research. Placement of power, access to central vacuum (closer to biosafety cabinets instead of continually running aspiration system that requires constant maintenance and the addition of a laboratory fume exhaust fume extraction arm are needed along with overhead racks & attachments. Plumbing needs to be installed for central vacuum, additional lab bench space is also needed.

**Scope Room 316:**

Remove hot water heater & replace with tankless hot water heater, add cabinetry, bench space and work space. Doors on cabinetry to be in compliance with earthquake safety regulations, update sink, plumbing to be acid compatible

**Scope Room 321H:**

Remove sink in corner

**Scope Room 322A:**

Install fume hood with vacuum & duct work gas & water, add lab fume exhaust fume extraction arm, additional lab bench furniture

**Computer Sciences:**

**Scope Room 215:**

Complete redesign and modernization of the space to allow for more effective research productivity & space for additional student researchers. New whiteboards, newly relocated proctor, virtual meeting technology, carpet, paint additional electrical outlets to accommodate additional desk locations.

**Scope Room 221:**

Reconfigure space to accommodate students and a software engineer

**Scope Room 247:**

New room alarm



**Animal Care Facilities:****Scope:**

Individual temperature controls for all rooms and cubicles [28 units], VAV system control boxes with reheat, temperature monitors for each room with alert system, building reheat boiler system, cage wash boiler steam system, resurface floors with epoxy flooring in all rooms, remove walls between cube F, G H, and I, add room for storage, remove safe walls & add storage, backup air handler system for animal labs, build area for dump and refill stations, remove and replace exhaust ventilation. Add water & sinks to the facility.

**LS Room: 115****Scope:**

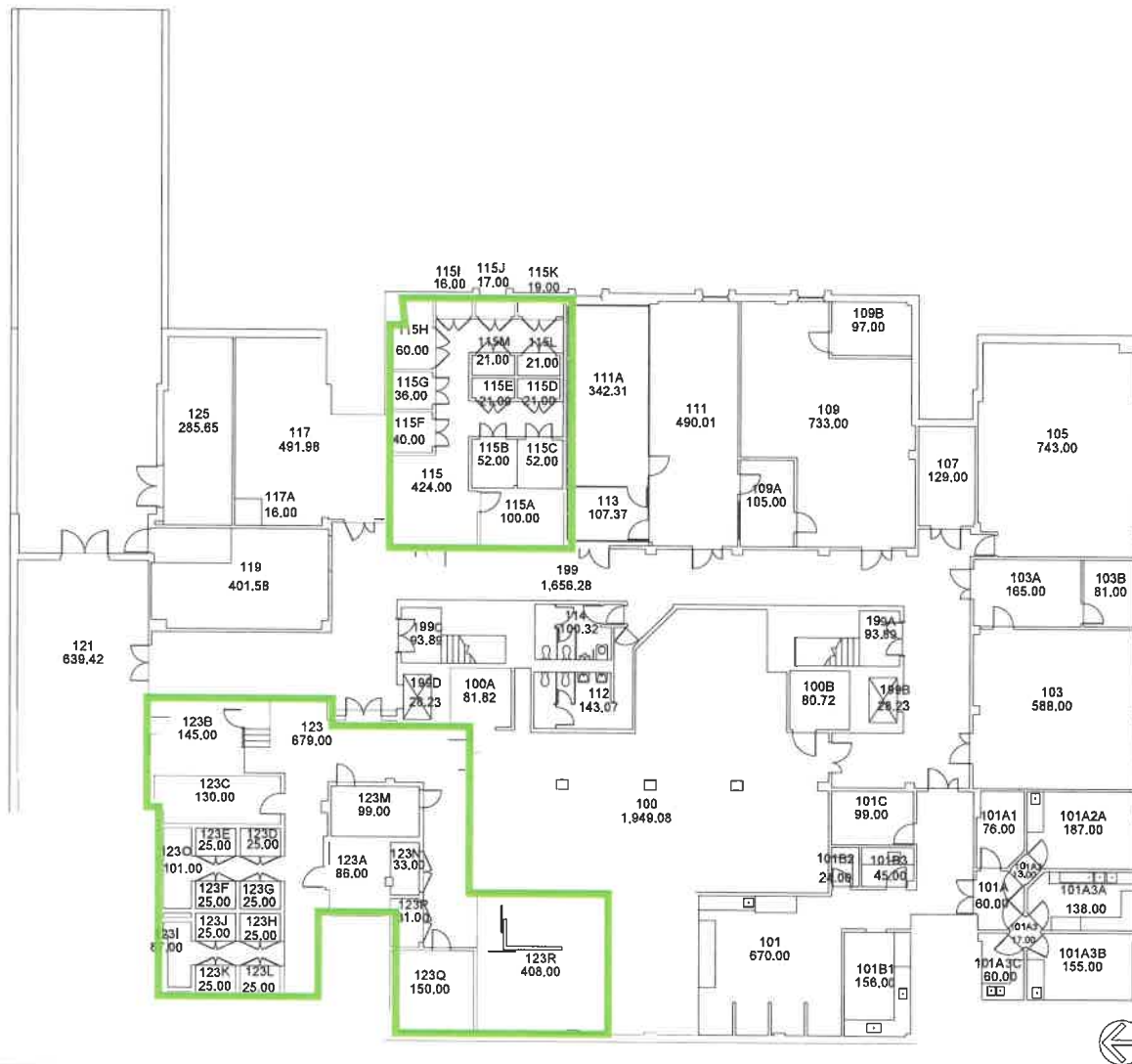
Add floor drains

**Biological Sciences:**

Throughout Bldg.

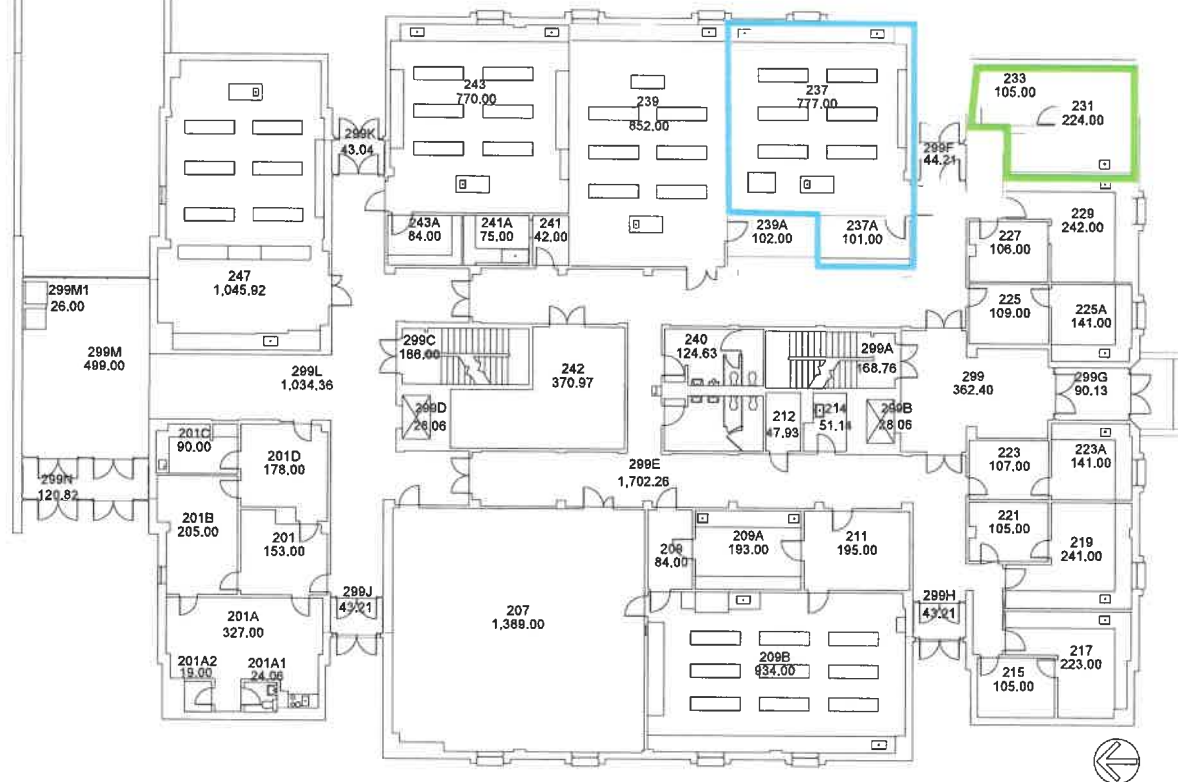
**Scope:**

Install corrosive and flammable cabinets, plumb all eyewash stations that drain onto floors. Discuss locations during walk-through



**Scope: Room 237**

Convert from office to lab space. Needs Sinks; fume hoods, epoxy floor, eyewash station, infrastructure needed, new benches/cabinets, remove old cabinets, Biosafety cabinet, ample high-speed Ethernet access, 220 V electrical outlets



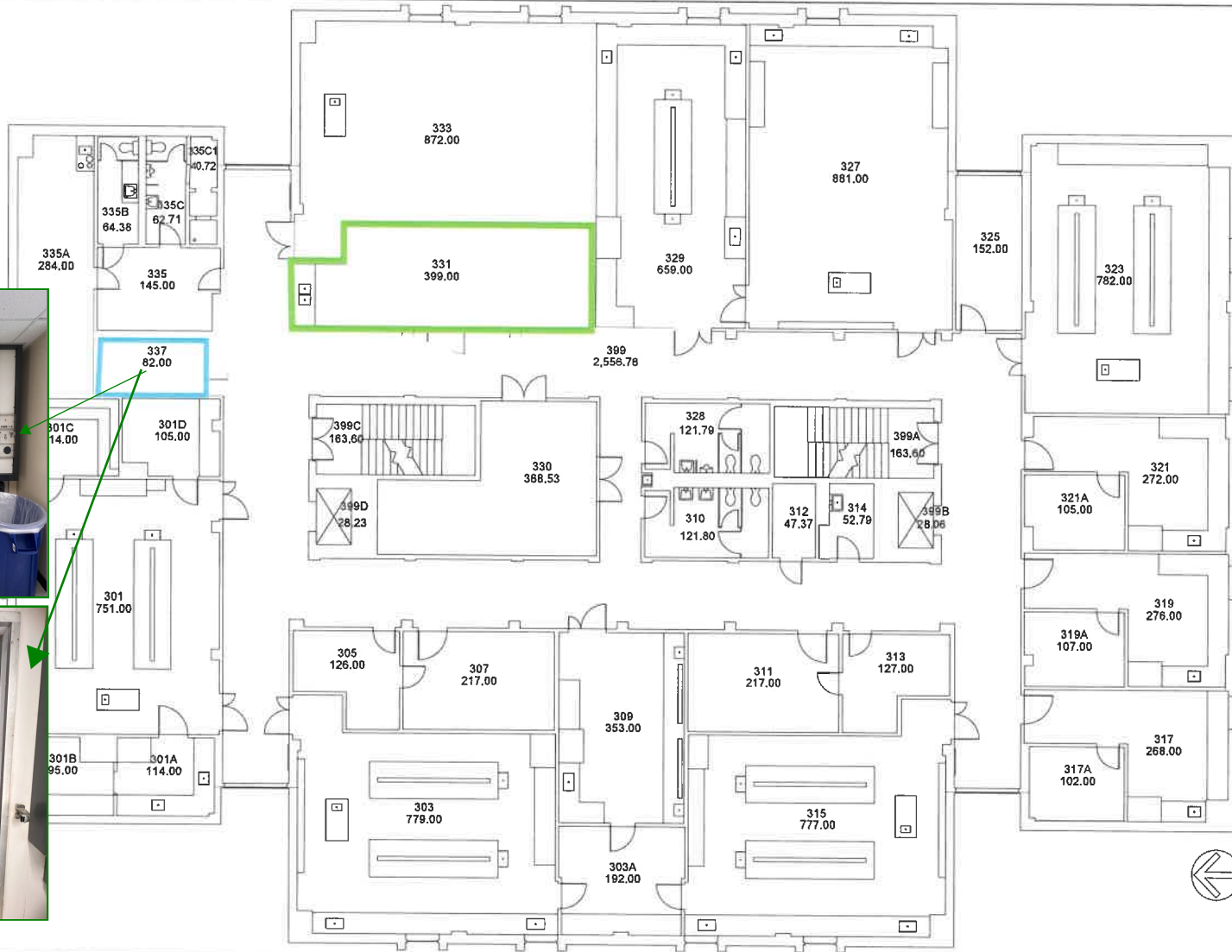
203 RAY HERZOG BLDG. MEMPHIS, TN 38152

## Floor 2

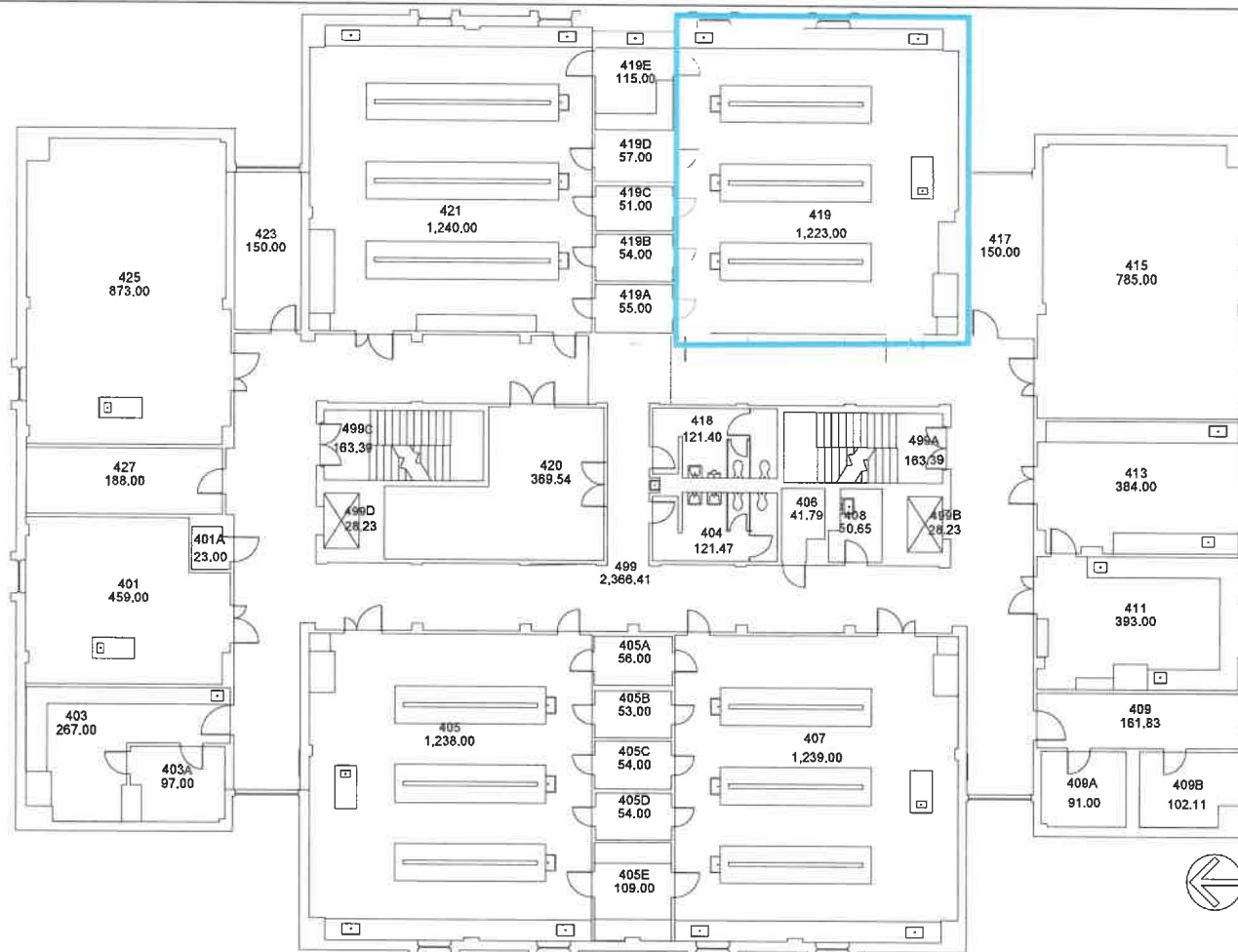
044-2-afm.dwg

**Animal Care Facilities:**  
**LS Room: 331 Scope:**  
 See 1st floor scope

**Biological Sciences:**  
**Scope: Room 337**  
 Repair cold chamber



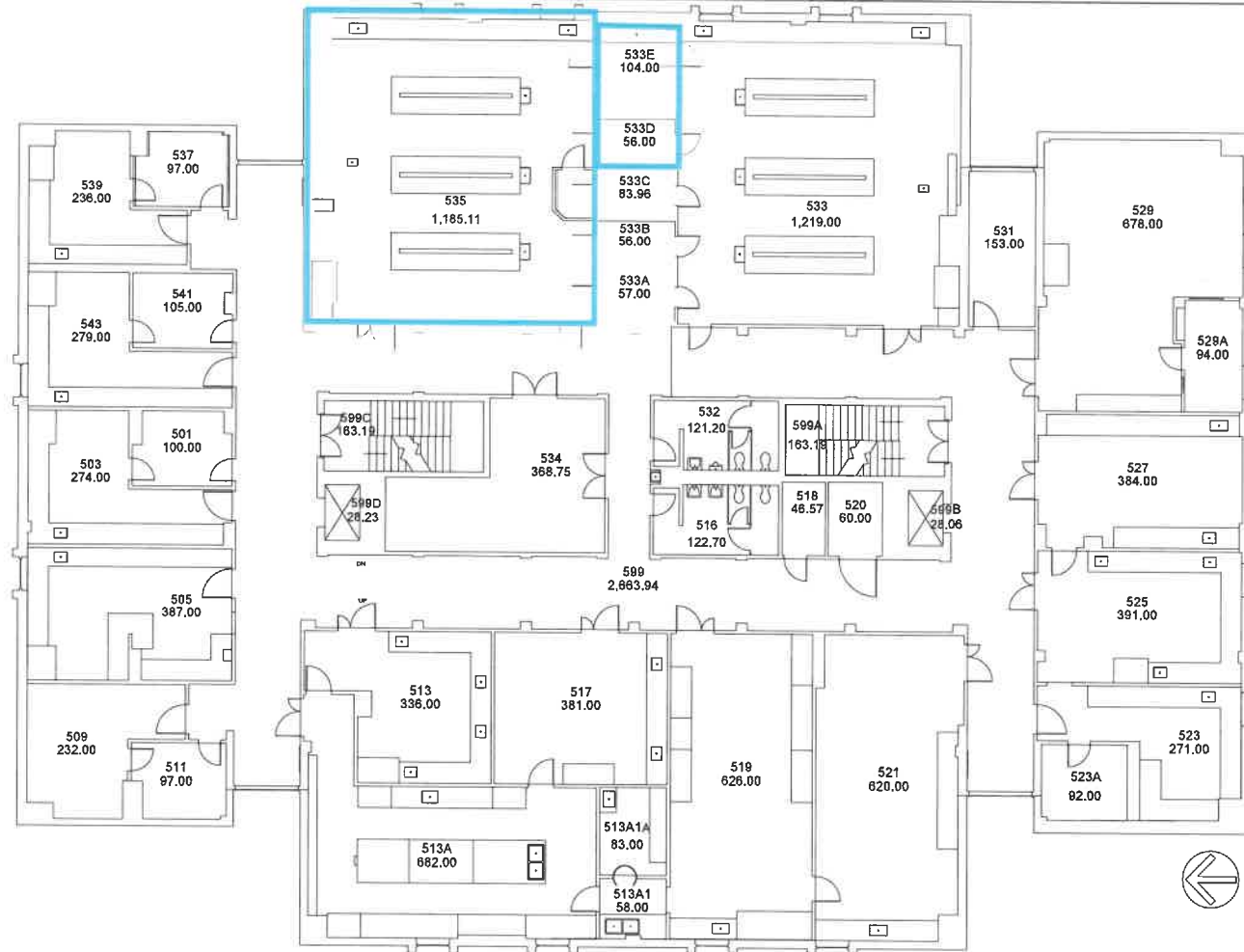
Repair cold chamber



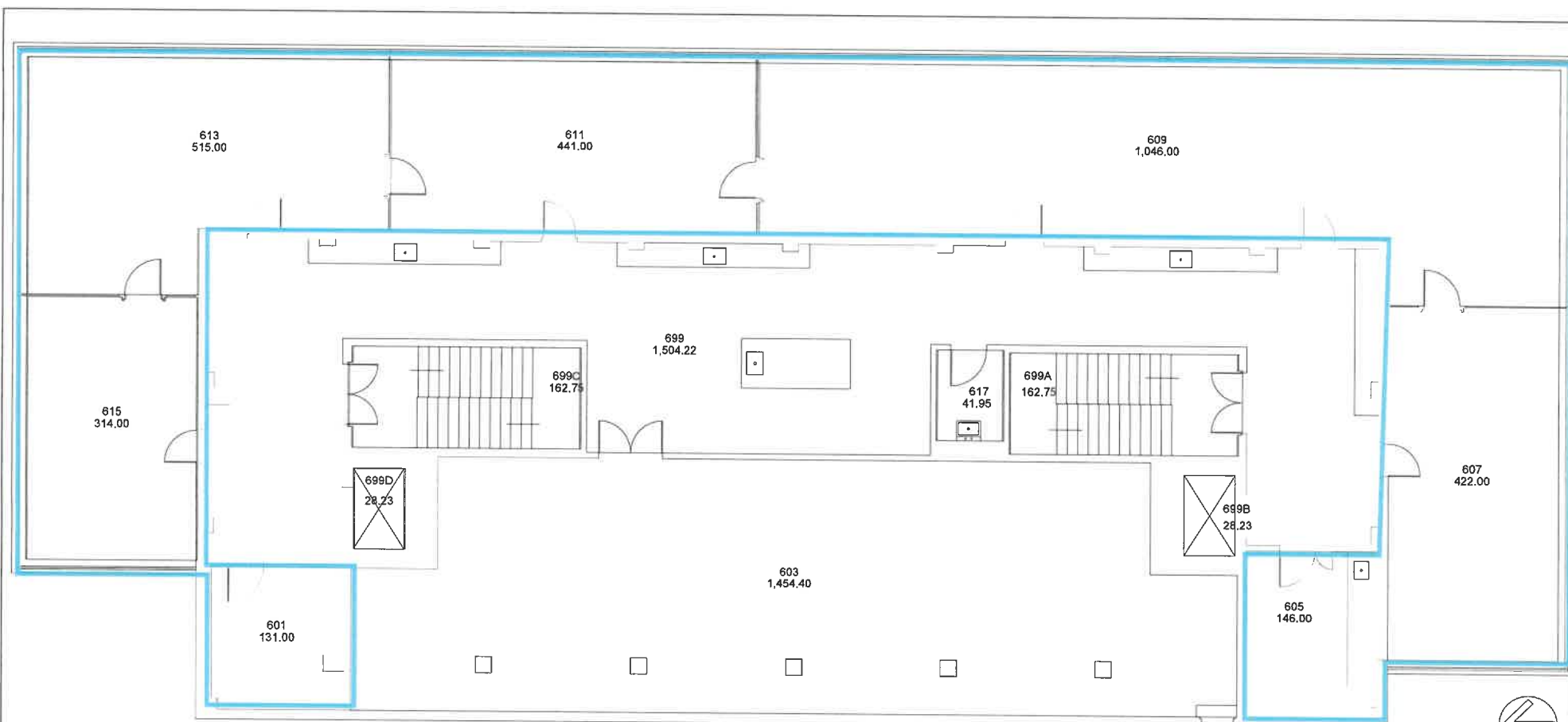
203 RAY HERZOG BLDG. MEMPHIS, TN 38152

044-4-afm.dwg

**Scope: Rooms 553D & 533E**  
Repair cold chamber



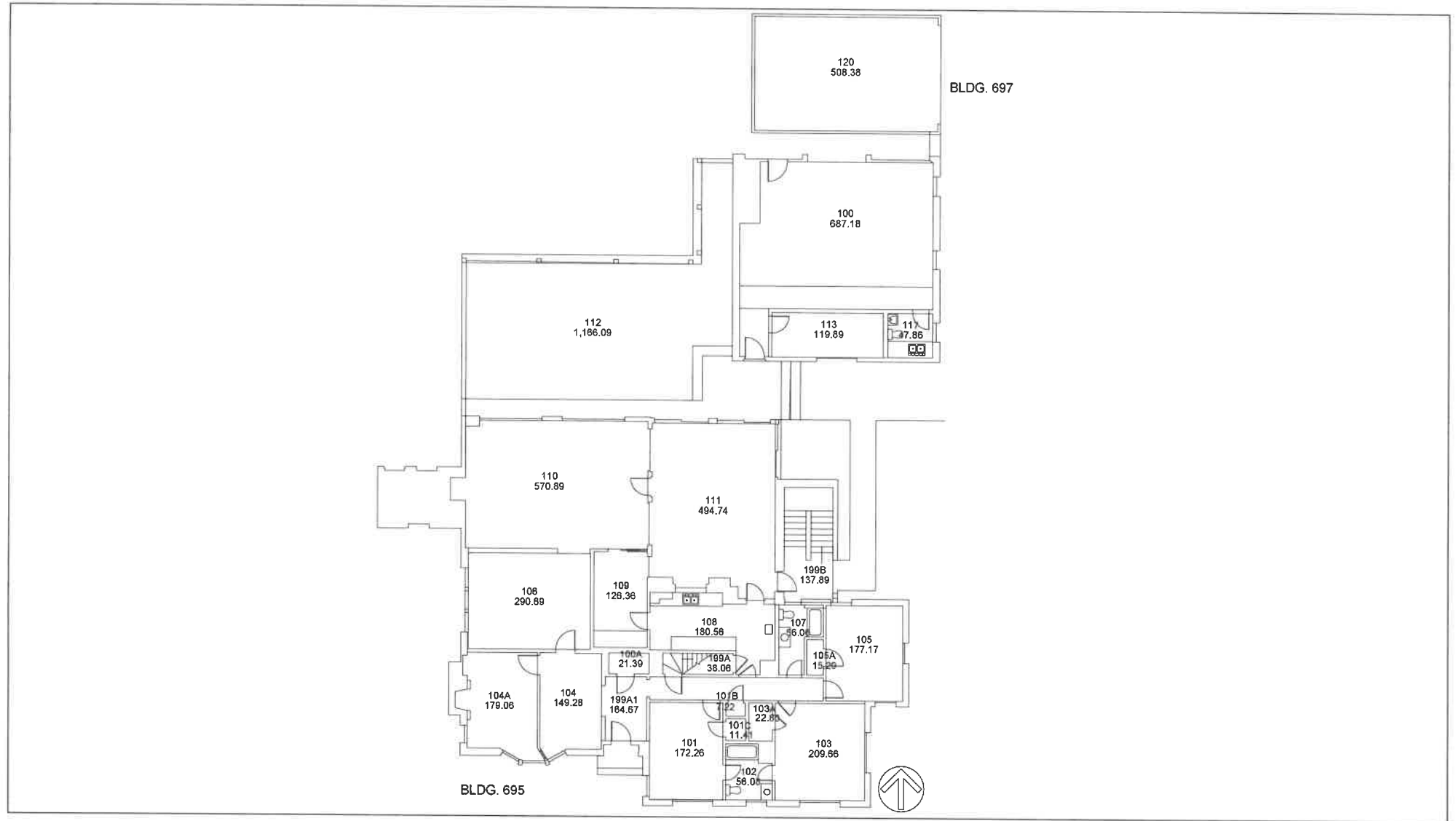
044-5-afm.dwg

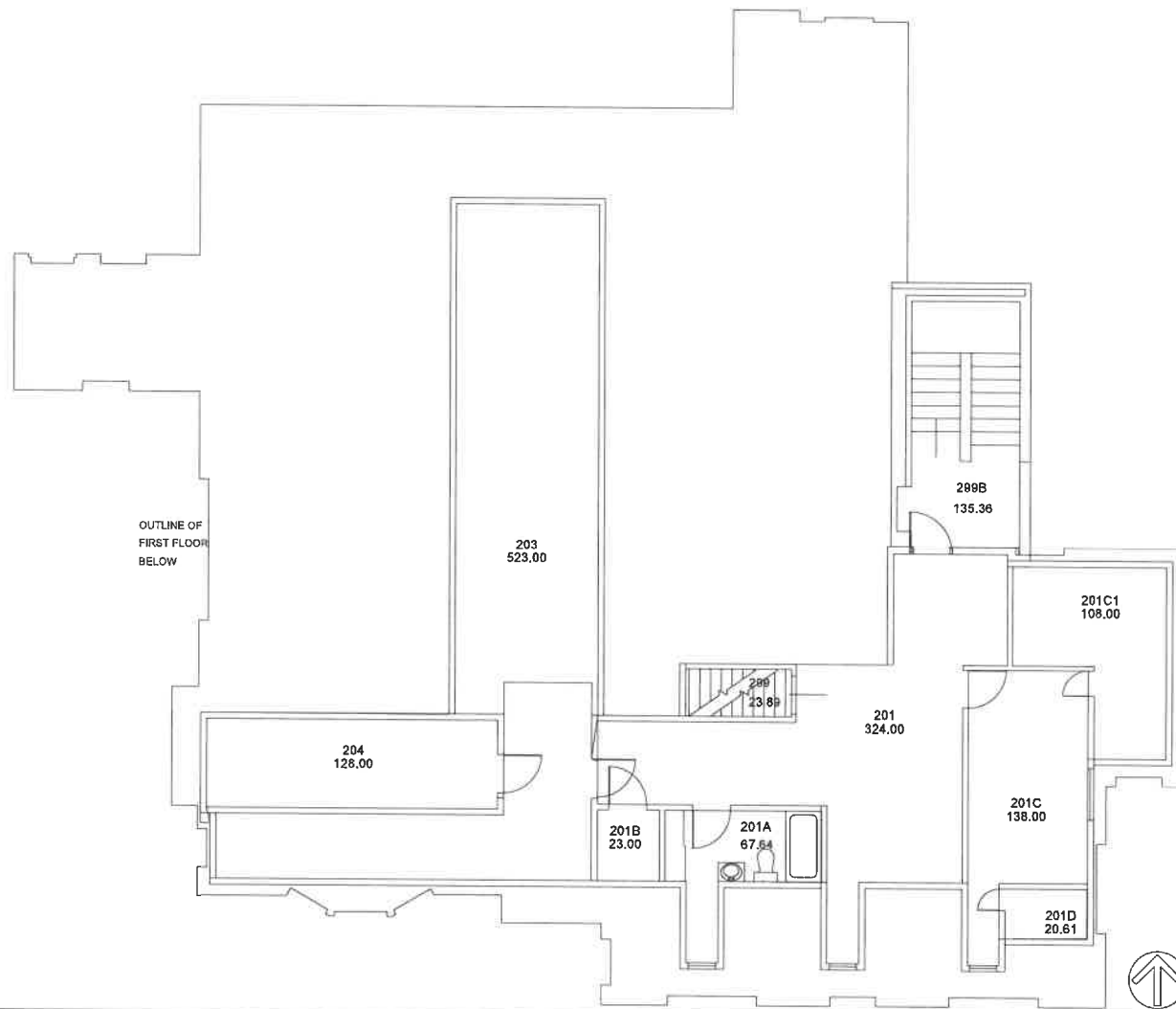


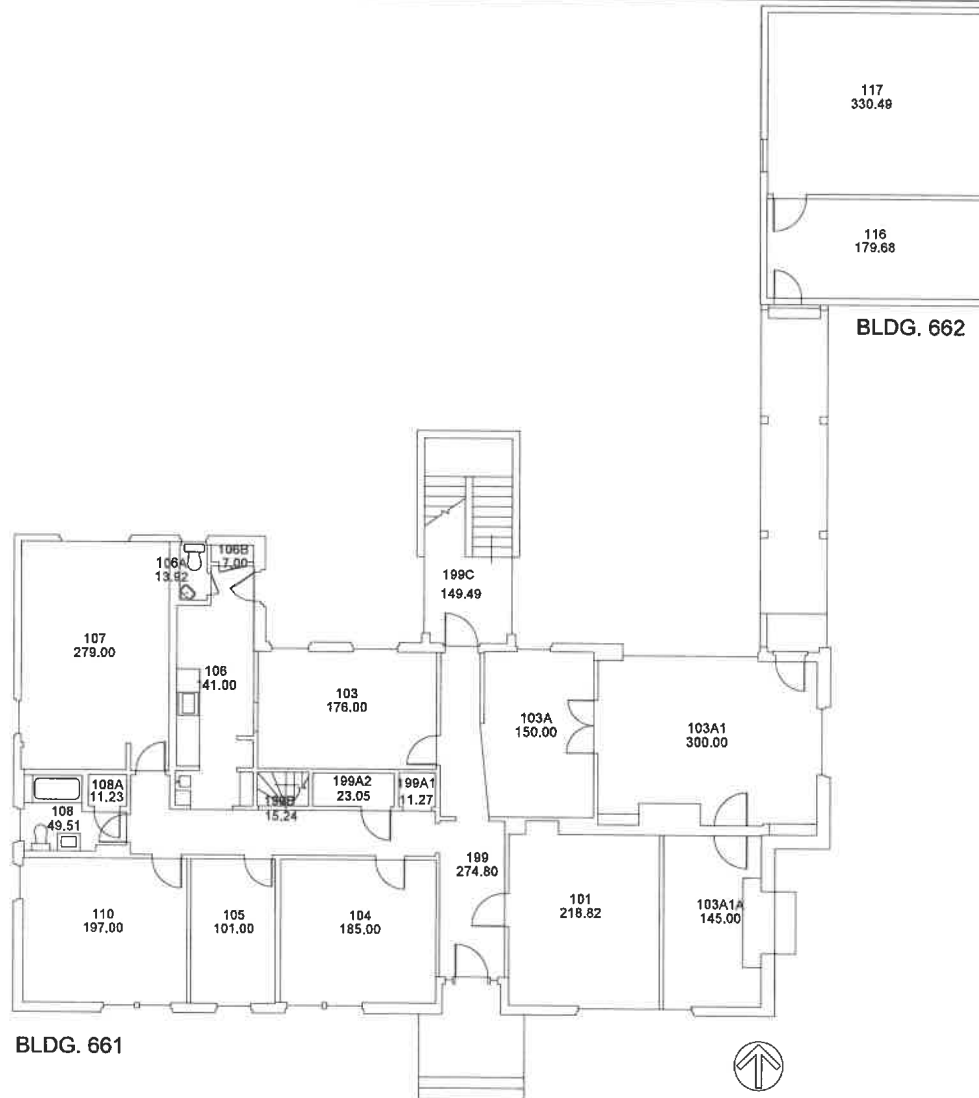
**Biological Sciences:**

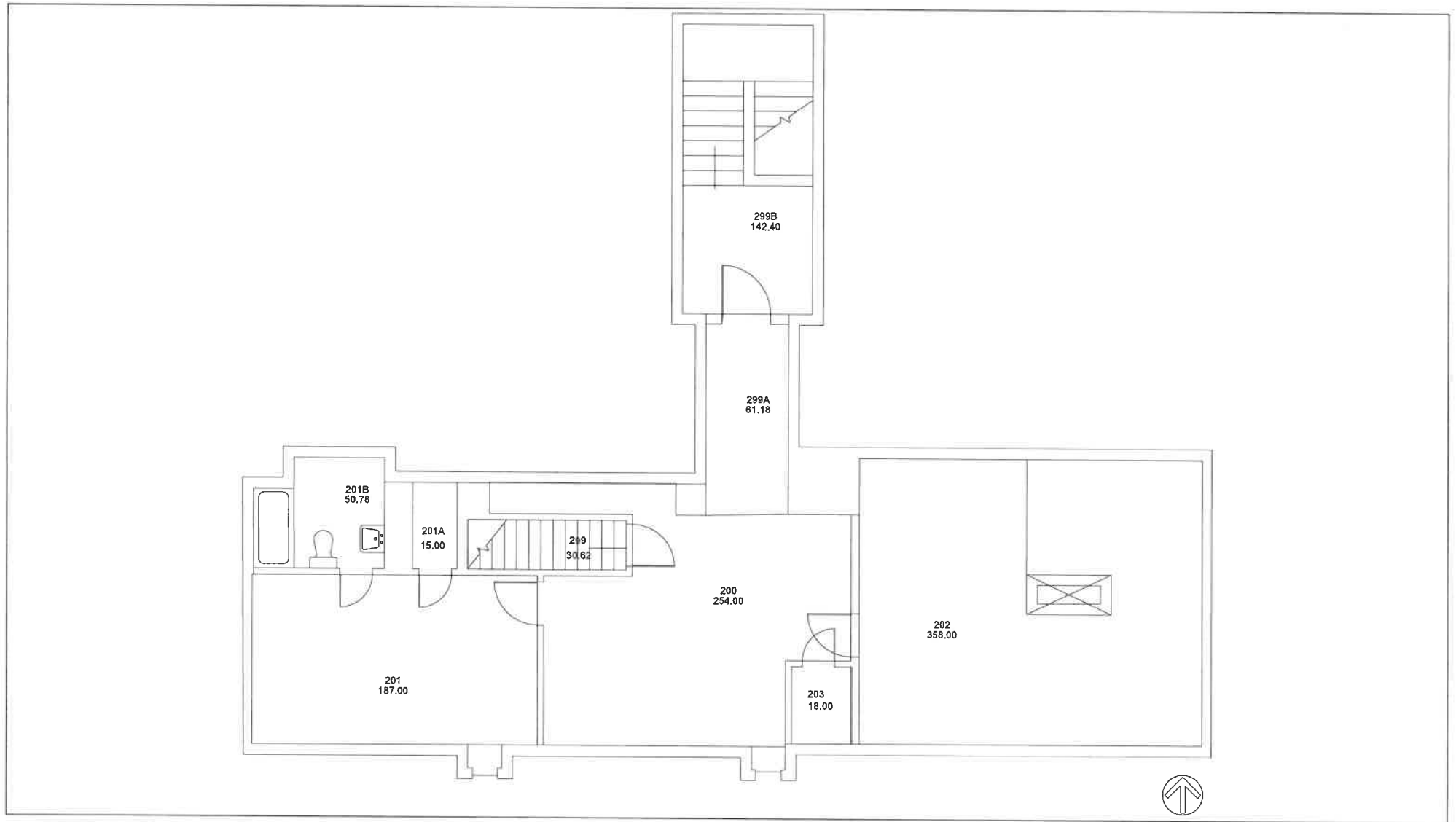
**Scope: Greenhouse/ Headhouse**

Epoxy floor in head house, drains in head-house, replace existing wooden shelving, cabinets, and backslashes (rooting) with stainless steel in head-house. Replace doors/door casing from head-house to greenhouse. Replace wood tables-including irrigation. Irrigation system needed for each room. Wireless Internet routers for greenhouse and head-house, circulation fans for greenhouse, evaporative cooler









**CERI****Scope:**

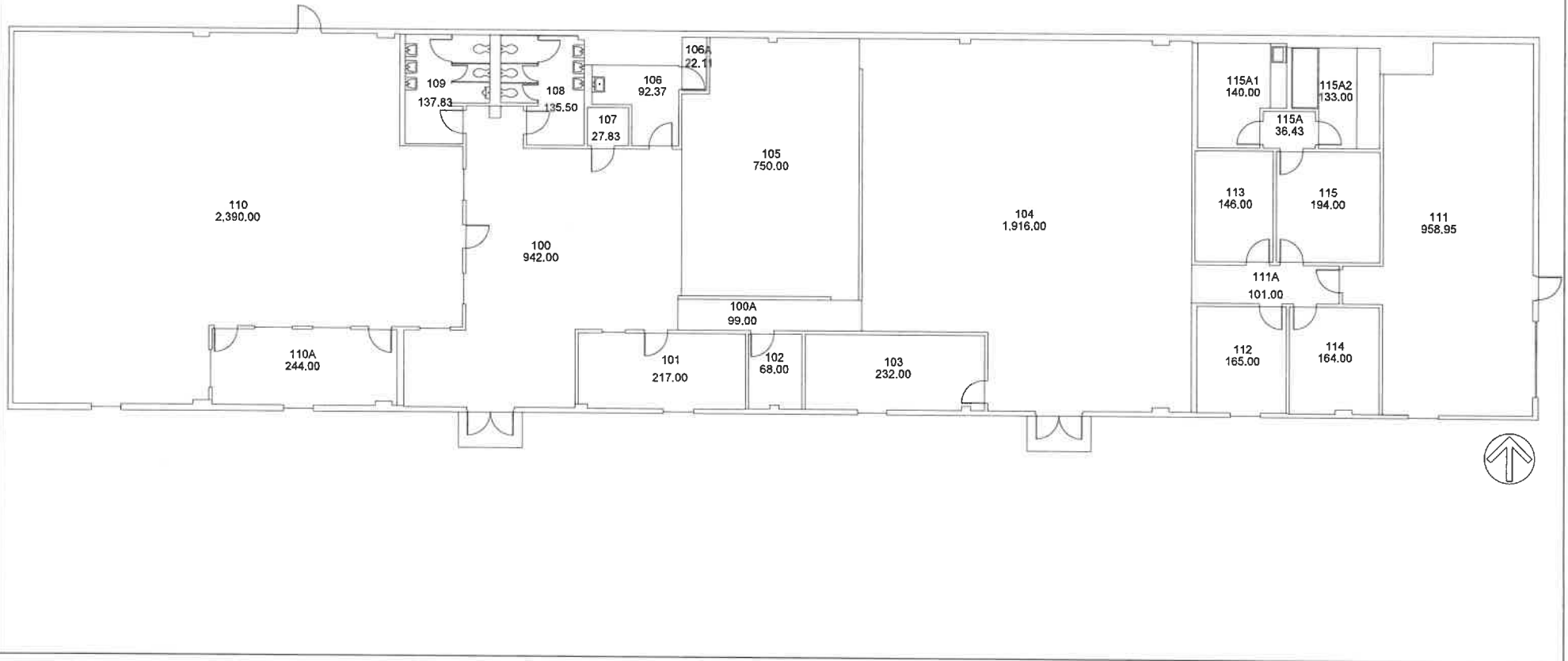
Construct a loading dock

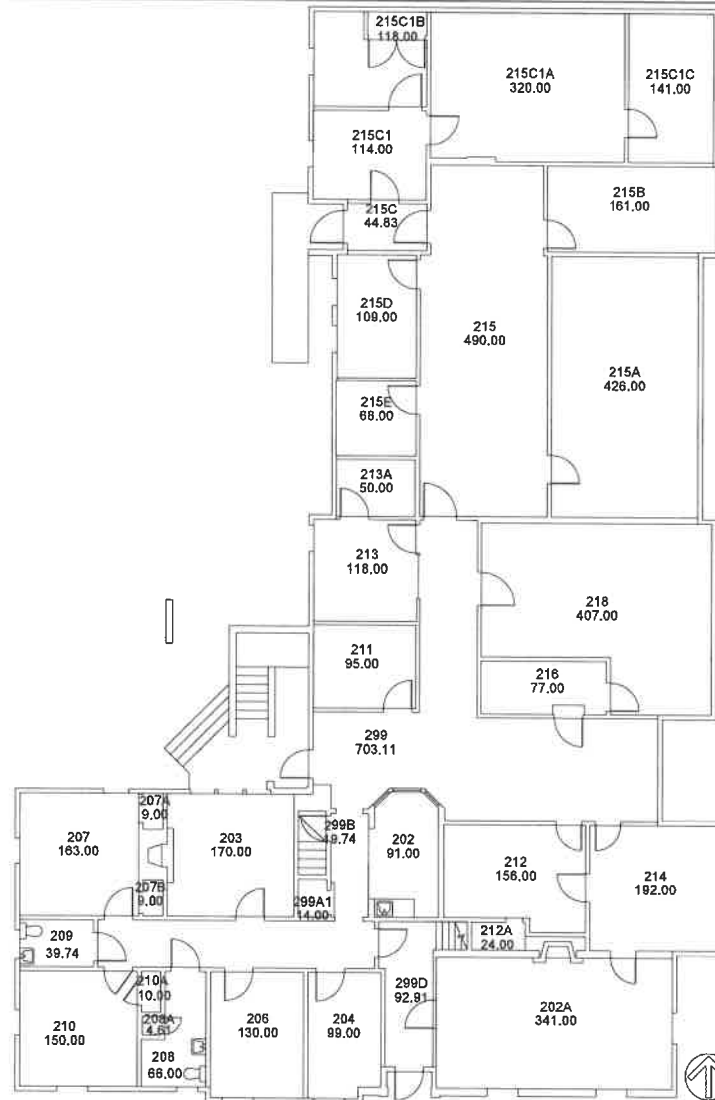
**Scope Northeast Part:**

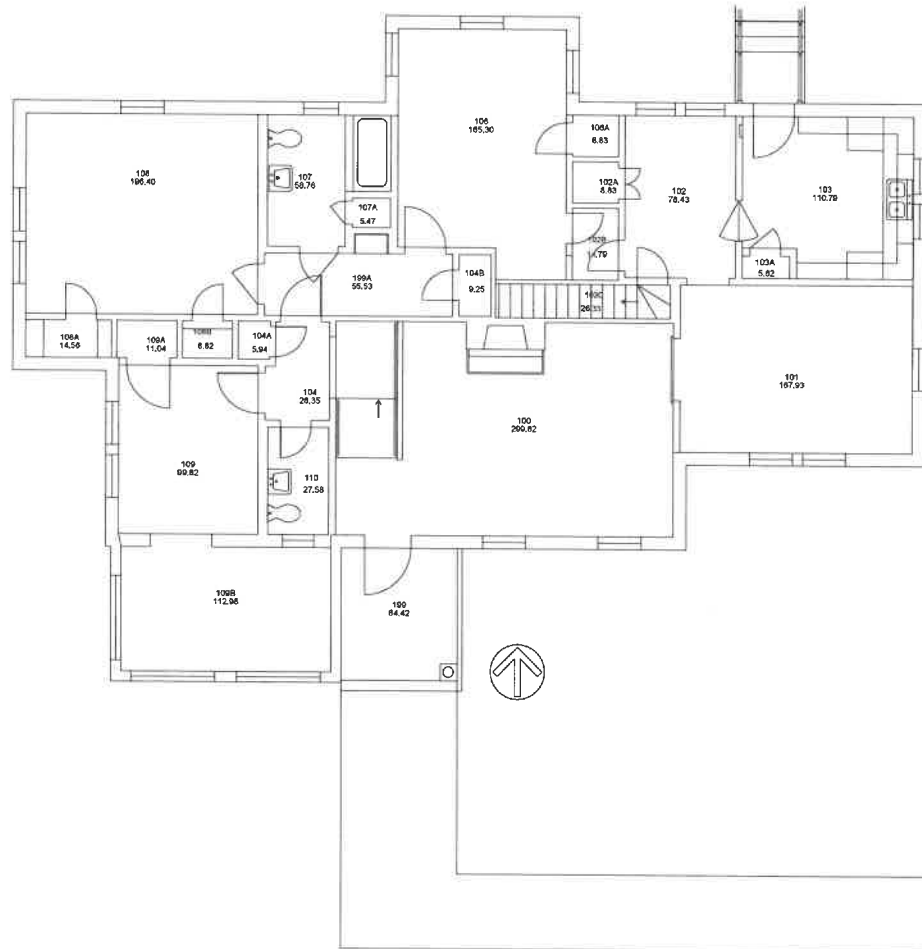
Rearrange walls to  
increase useful lab space

**Scope West Part:**

Rearrange and partition  
into modern Visualization  
Lab & research computer  
lab







**DA2 Building:**  
**Scope of Work: Temporary Space**  
**(to ensure research activities are not**  
**disrupted during construction)**



**Office of Space Planning Utilization and Administration**

203 RAY HERZOG BLDG. MEMPHIS, TN 38152

## Defense Audit Building 2 - 1827

## Floor 2

1827-2-afm.dwg

## **B2 Other Support Documents**

### **Departmental Support Documents** **(16 pages follow)**

#### **Biological Science**

The Department of Biological Sciences has a pressing need to modernize its research spaces, both shared spaces and individual faculty research laboratories

With each new faculty hire over the past 10-15 years the department has had to cover the costs of laboratory modernization (average cost/lab space renovation~\$40k, with a range from \$20K- to one over \$100K). The department also recently invested ~\$90k to renovate a shared space that will house a new autoclave to be shared with all in the department as well as other units on campus. In the current market it has become increasingly difficult for our department to compete for faculty hires given the state of our aging research space and equipment. Another area that has been difficult to keep up in has been faculty start-up packages, as the cost of new, cutting-edge equipment is prohibitive. One way to combat the cost of start-ups is to create shared research spaces in both of our buildings (EH and LS) which would allow us to stop duplicating commonly used expensive equipment and resources with each hire. We have begun that process and have found that in addition to our own faculty, researchers from 19 different units on campus, comprising more than 40 researchers, have used our shared space and equipment. Creating and maintaining shared research spaces is expensive but the investment is very much worth the effort. Biological Sciences expects to add a minimum of one new tenure-track faculty/year that will be in areas of research that will benefit from the proposed modernization. The modernized laboratory spaces and equipment will allow us to train and increase research productivity of students, postdocs, and visiting researchers on phylogenomic/comparative genomic, microbiological, physiological, behavioral, ecological, and molecular/cell science techniques. We plan to also host conferences/workshops to bring in researchers from across the globe to learn these valuable research techniques. The modernization of our research spaces will also allow us to keep up with the development of workforce needs of local and international employers in the area of biological sciences (e.g., Cognate Bioservices, Indigo ag, St. Jude Research Hospital, and many more). With modernization, our graduate and undergraduate students will gain valuable research experience through our Biology 4000 research courses as well as our course related undergraduate research experience (CURE) sections. These experiences allow students to engage in real scientific experiments that teach them research skills and can result in publication of their scientific results. We also house a rapidly growing number of postdoctoral researchers that will benefit from the modernized research spaces.

## **Center for Earthquake Research and Information (Earth Science)**

The Center for Earthquake Research and Information (CERI) is a Tennessee Center of Excellence at the University of Memphis. At present, it has a staff of 48 consisting of 4 tenure track faculty, 3 research track faculty, 1 Postdoctoral Associate, 4 emeriti faculty, 13 scientific, technical and clerical staff members, and 23 Masters and PhD students. CERI is the successor of the Tennessee Earthquake Information Center chartered in 1977 by the Tennessee Legislature to conduct research on the causes and consequences of earthquakes and to provide seismic safety and mitigation information to citizens and government units. CERI's State-mandated mission consists of research, education, and public service. CERI is also an academic unit offering Master of Science and Doctoral degrees in Earth Sciences with a Concentration in Geophysics. CERI has strong ties with the Herff College of Engineering at the University participating in the Engineering Seismology graduate program between Civil Engineering and CERI. CERI faculty mentor graduate students, teach graduate courses in their specialties, and maintain externally funded, internationally recognized research programs. Faculty and scientific staff at the Center have averaged over \$1.6M per year in external grants and contracts over the past 3 years. CERI graduates an average of 2 M.S. students and 3 Ph.D. students per year who go into research and teaching positions at other Universities, positions in geotechnical engineering companies, federal government research programs (DoD, DoE, USGS), and the energy industry. As a partner with the U.S. Geological Survey, CERI maintains and operates the seismic network within the Central Region of the Advanced National Seismic System (ANSS). ANSS is a national program designed to provide the United States with definitive information about the occurrence of earthquakes within its territories. CERI's seismic network spans 10 states and is comprised of over 140 seismic stations that are serviced by CERI technical staff. Data from an additional 200+ stations operated by the USGS are also transmitted to CERI's campus and are used by technicians in determining definitive locations and magnitudes of earthquakes throughout the region. The seismic network is a focal point for a vigorous education and outreach program that serves the public of Tennessee and surrounding states. CERI outreach staff members have a busy schedule of speaking to numerous public school and general citizen groups throughout the region, although this schedule has been curtailed because of pandemic restrictions over the past year and a half. CERI faculty and graduate students also participate in outreach activities by giving presentations and serving as science fair judges. CERI has formed working relationships with other state entities to serve the public more effectively. In particular, the executive director of the West Tennessee Seismic Safety Commission (WTSSC) is also the Director of CERI's education and outreach program. The WTSSC was formed in 2006 by the Tennessee Legislature through TCA Title 58, Section 4, to initiate a comprehensive program to prepare the state's response to a major earthquake. The WTSSC and CERI often leverage costs of public activities such as with important scientific workshops and special events like the annual Great Central US Shakeout. CERI also interacts with the Tennessee Emergency Management Agency (TEMA) for earthquake related matters and worked with the Tennessee Department of Economic and Community Development (TDECD) in preparing a \$50M HUD proposal for community disaster resiliency in northwest Tennessee.

## Chemistry

The chemistry scope of renovation will convert research space on the fourth floor of Smith Chemistry building from research office space to wet-laboratory space and adding a high-density of chemical fume hoods for researchers. The origins of this renovation request stem from a 2001 – 2002 era renovation of chemical fume hoods in the building. The renovation replaced every chemical fume hood in the building. Over the next two decades, many laboratories were converted from instructional laboratories to research laboratories. The converted laboratory space was not immediately upgraded or further built out with additional chemical fume hoods to be ideal for research. Where possible, the Department of Chemistry used department funds to incrementally upgrade and renovate laboratory space from instructional to research. However, renovation funds were and continue to be severely limited. The Department of Chemistry needs to renovate existing space to add high quality research space with sufficient chemical fume hoods as part of a comprehensive overhaul of research space. This addition is necessary because Chemistry is losing high-quality research faculty due to lack of adequate research space. Approximately five years ago, Chemistry hired Dr. Kensha Clark as a promising researcher who returned to academia after a decade in chemical industry as a researcher for Chevron-Phillips. The Chemistry department and College of Arts and Sciences invested nearly \$400,000 in start-up funds for her research and was placed in a re-purposed instructional laboratory with two chemical fume hoods. Dr. Clark requested four chemical fume hoods in her start-up requirements. To reach this number, the department assigned non-permanent, shared chemical fume hood space. In December 2022, Dr. Clark was awarded a prestigious National Science Foundation Faculty Early Career Development Grant (NSF CAREER) totaling \$690,000. In January 2022, Dr. Clark informed me that she had accepted an offer at the University of Mississippi (Oxford, MS) for Fall 2022 and her NSF CAREER award will be going with her. Her frustrations related to high-quality, research laboratory space and overall facilities was a significant factor in Dr. Clark's decision to leave. For chemistry, a loss of a successful faculty member results in lost opportunity of expendable research funds, further research funds awarded, and degree production. The earliest replacement possible for Dr. Clark would be hired in Fall 2023. Adequate research space is the first step in recruiting and retaining faculty members, and this renovation request will put chemistry on a path towards achieving that goal. The renovated research space would provide much needed room for researchers to expand undergraduate research efforts. This will improve the number of chemistry majors and improve post-graduate degree production.

The specific divisions of chemistry that will be affected by the renovations are: Analytical chemistry, Organic synthesis chemistry, inorganic synthesis chemistry, physical chemistry, and biochemistry. Each of these divisions require adequate chemical fume hood space to conduct their research in a safe manner. With the addition of chemical fume hoods, each of the divisions will be able to increase the number of tenured/tenure-track research faculty who will mentor an increased number of undergraduate and graduate student researchers in their groups. Chemical fume hood space is a limiting factor in these divisions ability to conduct research. In addition, modern facilities will allow us to recruit high-quality new hires. At the time renovation is completed, the chemistry department will expect to be able to use it with the addition of new hires expected over the coming 7-10 years based on retirements and growth. Thus, the renovated space will be critical to continue growth of the chemistry department for research purposes. These purposes include graduate and undergraduate student mentoring, publication of peer-reviewed manuscripts, and pursuit and award of external research funds.

## Computer Sciences

**Faculty** The Department has 22 full-time faculty, 18 of whom are tenured or tenure-track. Our faculty include 2 IEEE Fellows, an ACM Distinguished Speaker, the first state-endowed chair of excellence in computer science in Tennessee, and the Sparks Family Chair of Excellence in Global Research Leadership.

Faculty have been recognized extensively for their accomplishments. The awards conferred on individual faculty have included the Willard R. Sparks Eminent Faculty Award, Dunavant Professorship, Thomas W. Briggs Foundation Excellence in Teaching Award, College of Arts and Sciences Meritorious Faculty Award, and Early Career Research Award.

### Students

The Department has 777 students, including 48 PhD students, 224 MS students, and 511 undergraduate students. Both undergraduate and graduate students have earned a number of accolades at the local, national, and international levels.

**Research** The Department is involved in three major national research initiatives: the Learner Data Institute with University of Colorado - Boulder, University of Wisconsin - Madison, University of North Carolina, University of Pittsburgh, 5 companies including Carnegie Learning, SoarTech, Aptima, WorkBay, and Gooru, and the Army's GIFT team; the MD2K Center of Excellence with Cornell, Georgia Tech, University of Michigan, Northwestern, Ohio State, University of Utah, UCLA, UCSD, UCSF, UMass Amherst, and West Virginia, along with Open mHealth; and Named Data Networking: Next-Phase with Colorado State, University of Arizona, UCLA, UCSD, UIUC, University of Michigan, and Washington University.

With millions in active grants, we have the highest per-capita research funding of any department on campus. We were recently ranked 55th among nationwide CS departments in federally funded research expenditures.

**Interdisciplinary Institutes and Centers** · Center for Information Assurance We are designated as a National Center of Academic Excellence in Cyber Defense Education and Research (CAE-CDE, CAE-R) by the NSA/DHS. · Institute for Intelligent Systems · Systems Testing Excellence Program

## College of Health & Human Services

There are currently five research labs in the Roane Fieldhouse. All of these labs have been created from existing *non-laboratory* space. Two areas (FH 135 and 155) are former shower/locker rooms. One space (FH 161) is the former Athletics academic study room, with the final space (FH 162) being a former computer lab. While the faculty have made the best of the existing space, there are many problems that need to be addressed if we are to continue performing high-level research within the Fieldhouse. Aside from lack of storage, inappropriate flooring, and “run down” facilities, one main problem we face is lack of temperature regulation. The temperature and humidity fluctuate considerably throughout the year and can actually change many degrees throughout a given day. This negatively impacts our biochemical/molecular physiology work, as incubation temperatures need to remain constant for accuracy in data. Because we do a good amount of work with live cells, regulation of the air temperature and humidity is of crucial importance. On many occasions, cells have died because of these inconsistencies. This costs students and faculty significant time and money and can sometimes delay experiments and extend graduation time. The fact that our existing rooms were not created as laboratory spaces often means that the correct electrical needs are not included. This results in routine loss of power, equipment shutting down temporarily, and delays in work productivity. Inappropriate flooring is also a concern, in particular in spaces in which chemicals and human samples (blood and urine) are being used and collected. Finally, lack of support for modern and necessary equipment needs to be addressed. We have received zero support for equipment purchase or maintenance and are expected to cover 100% of this from our college budget—the operating portion of which has not increased in ~20 years. Renovating the lab space will help greatly with recruitment of new faculty scientists, as well as graduate students. Individuals expect a R1 institution to meet certain expectations. Currently, the labs in the Fieldhouse need significant renovations and upgrades to meet such expectations.

## Herff College of Engineering

In the Herff College of Engineering, lack of appropriate research spaces limits research productivity of existing faculty, limits the college's ability to recruit top faculty and graduate student talent, precludes research in important areas like semiconductors, and puts our investigators at a disadvantage for research funding. Existing research spaces in Engineering Science (ES) and Engineering Technology (ET) are converted instructional spaces that are old and lack appropriate infrastructure. This request is meant to modernize ES and ET, bringing them up to a minimum acceptable level. The STEM Research and Classroom building, which is under construction, will alleviate but not solve the research space issues in the college. Because of cuts in the SRCB budget, many pieces of critical equipment to sustain engineering research are no longer part of the project. In short, the research modernization requests for engineering would bring our facility closer to that of other colleges of engineering at Carnegie R1 institutions. The proposed renovations to the engineering physical plant impact research at all levels in the college from undergraduate to post-doctoral. Much of the request involves building critical systems. The deficiencies noted in the buildings, especially Engineering Technology (ET), have a direct, day-to-day negative impact on research activities. In Engineering Technology, Biomedical Engineering (BME) is primarily affected. HVAC issues make labs and offices uninhabitable. BME has had to leave doors open for cooling, which creates safety and security issues. Debris from HVAC and leaks in the roof have ruined experiments. Mold, fungi, and yeast are present in the ceiling tiles and HVAC system. Particulates from the HVAC frequently end up on lab benches, contaminating experiments that take months to complete. The requested improvements to ET building would make it a more suitable space to conduct biomedical research, and include repairs to the roof, HEPA filters for the HVAC system, a new compressed air system, and a whole building distilled/deionized water system. Improvement of several building systems are also requested for Engineering Science (ES) building. The compressed air system in the college is old and serves both ES and ET. The systems are noisy, which impacts nearby classes, and the old lines are contaminated. A distilled/deionized water system would enhance research in water resources, environmental engineering, and biomedical research. Clogged drains impact research in structural, earthquake, and water resources engineering.

Other improvements include renovations to existing research labs, as well as better furniture. Spaces that are more conducive to graduate research enhance the college's ability to attract top faculty and graduate students and their research productivity.

Finally, equipment for student fabrication labs, the advanced manufacturing lab, and biomaterials lab are requested. Much of this request was "value engineered" from the budget for the new STEM Research and Classroom Building (SRCB). The fabrication labs consist of a maker space with 3D printing, wood shop, and metal shop. Most top colleges of engineering already have this type of facility, which would positively impact research across the college, but also education of undergraduate students. Both the advanced manufacturing and biomaterials lab are slated for the SRCB, but research labs are useless unless properly equipped.

## Physics and Materials Science

The physics and materials science department at the UofM embraces the University's mission to sustain the R1 status and to continuously perform research at a world-class level to contribute to the high visibility of our institution nationally and internationally. Key to the success of the proposed plan is a substantial increase in the available office and appropriate laboratory space, which is currently a major bottleneck for all future growth and has substantially stifled the growth, success, and performance of our existing faculty. Severe lack of suitable space and infrastructure has led to faculty retention issues and is a major setback for any department or university. Had we had appropriate basic space, infrastructure, and support, we would have been able to retain our faculty at a much better rate. Faculty of the Physics and Materials Science Department are well-recognized for their high caliber research and mentoring capabilities and are funded for research at a rate of 100%. To sustain this outstanding performance by our faculty, and to be able to attract outstanding talent in the near future, facilities have to be substantially improved otherwise we risk losing our existing faculty also. Other physics departments in peer institutions offer significantly better working conditions, facilities, access to shared services and instrumentation, as well as modernized laboratory space which is more compatible with state-of-the-art instrumentation that faculty will be acquiring through external funding. Over the years we have experienced many lost opportunities to secure external funding not because the grant application was not competitive or did not contain good science, rather due to poor facilities and lack of infrastructure. This easily adds up to millions of dollars which we could have secured if we had the improvements that we are requesting already in place.

The Physics and Materials Science Department as well as our discipline is a highly multidisciplinary and interdisciplinary program and serves as an important resource for many other STEM departments. Subpar facilities have severely compromised our ability to support our colleagues in other departments and no doubt has adversely affected their ability to secure external funding and advance the UofM. The funds we are requesting are critical to the future of our department and our university.

## Psychology Department

Historically, the Psychology Department has been among the top earners of external funding at the University of Memphis and, in past years, has even ranked nationally among the top earners. The Psychology Department's Center for Applied Psychological Research (CAPR) is one of the original Tennessee Centers of Excellence, established in 1984. CAPR is now designated an Accomplished Center of Excellence, in recognition of the Center's consistently high quality of research, teaching, and service over the years. During the last decade, faculty in the CAPR have brought in and expended over \$32 million in external funding, published over 1550 scholarly works, and graduated hundreds of masters and doctoral students. For every \$1 invested in CAPR by the State of Tennessee, the faculty have brought in another \$5.50 as PI's on external grants. The 32 faculty in CAPR cover five areas of specialization: (1) behavioral medicine and community psychology, (2) behavioral neuroscience, (3) child, adolescent, and family studies, (4) cognitive psychology, and (5) psychotherapy research. The Psychology Department has one of the largest numbers of undergraduate majors (863 students) at the University of Memphis. We currently have approximately 100 master's and doctoral students enrolled across our programs. Thus, we are a large department with sustained research and academic successes. Our department has been highly productive for almost 40 years; however, our facilities and resources have not kept pace with our growth or with the technological advances needed to keep pace with research intensive Psychology departments at comparable institutions. Now that the University has achieved R1 status, in order to keep pace with other R1 institutions and put us at the cutting edge of research, it is necessary to (1) increase available technology and equipment and (2) improve the functionality of our laboratory spaces in the Psychology Department. The items listed in our modernization request would facilitate these goals. Renovations and improvements to our animal facility would have a significant impact on research opportunities for our Behavioral Neuroscience (BN) faculty as well as faculty from other disciplines (e.g., Bioengineering, Biology) who use the animal facility. Important to the research of BN faculty is the ability to breed and rear animals in conditions that would promote valid, uncompromised, and reproducible results. To this end, noise abatement, updated lighting, and automated environmental controls, modernized caging systems, among other changes, included in our request would help to (1) promote consistent facility conditions, (2) increase capacity in the facility, (3) increase the pace of current research, and (4) increase the number of concurrent studies that could occur. In turn, this would all have positive implications for the national and international visibility of faculty, the number and impact of their publications, and their ability to recruit both undergraduate and graduate students into the laboratories. Furthermore, it would strengthen our foundation to support their future grant funding and enhance the recruitment of additional BN faculty. In addition, basic electrical upgrades, including surge protection are needed in BN laboratory spaces to prevent disruptions in data collection and equipment damage caused by electrical surges or outages. To prevent data and sample loss, backup generators are necessary to power equipment and freezers in the event of electrical outages. Older equipment (i.e., secondhand -80° freezer and cryostat) needs to be replaced to support research needs. Adding new equipment like a calcium imaging system would complement methodologies BN faculty currently use. Such additions would also put us at the cutting edge of neuroscience research. Other requests (video systems) would allow us to continue using older equipment for which there is no longer software support or updates and to utilize equipment for which necessary laboratory equipment (i.e., fume exhaust) or equipment components (i.e., necessary interfaces) are not available.

### **Psychology Department (continued)**

BN faculty members are currently funded or have grants currently under review. To promote renewal of grants and make them more competitive on applications, we need to have functional spaces that will allow them to do cutting edge neuroscience research. The modernization needs of our Clinical Psychology faculty laboratories are mostly aesthetic. The comfort of human subjects is essential in laboratories that work with human subjects; thus, reliable HVAC in our building, particularly in laboratory spaces, is critical. The difficulty some participants experience locating laboratories could be mitigated by adding prominent directional signage throughout the building and prominent signage on laboratory doors. Improving the overall look of our building (hallways and elevators included) would go a long way in making a good impression on study participants. Of significance, two of our Clinical Psychology faculty are among the top earners of external funding at the University. Their continued success depends, in part, on the continued participation of subjects in their studies. Importantly, we would like to bring our facilities in line with other R1 institutions so that we can retain these faculty. In summary, our department has been among the top earners of external funding at the University for some time. Modernization is necessary in order for us to continue the rich research legacy of the department. The requests we have submitted are necessary for us to remain competitive in (1) attracting and graduating both undergraduate and graduate students, (2) providing more research opportunities for students, (3) attracting and retaining highly productive faculty, and (4) securing grant funding.

## Research Modernization

College	Department	Building	Room/Location	Scope	Scope PP
CAS	Biological Sciences	Life Science	Throughout bldg.	Install corrosive and flammable cabinets, plumb all eyewash stations that drain onto floors-discuss during walkthrough	Fix plumbing/leaking water issues in LS. Some leaks originate from the rooftop. We can discuss during the walkthrough
RESEARCH & INNOVATION	Animal Care	Life Science	LS Animal Research Areas	Individual controls for temin all rooms and cubicles 28 units, VAV system control boxes with reheat, temperature monitors for each room with alert system, building reheat boiler system, cage wash boiler steam system, resurface floors with epoxy flooring in all rooms, remove walls between cube F, G H, and I, add room for storage, remove safe walls & add storage, backup air handler system for animal labs, build area for dump and refill stations, remove and replace exhaust ventilation. Add water & sinks to the facility.	
RESEARCH & INNOVATION	Animal Care	Life Science	LS 115	Add floor drains	
CAS	Biological Sciences	Life Science	Headhouse/ Greenhouse	Epoxy floor in head house, drains in headhouse, replace existing wooden shelving, cabinets, and backslashes (rooting) with stainless steel in headhouse. Replace doors/door casing from headhouse to greenhouse. Replace wood tables-including irrigation. Irrigation system needed for each room. Wireless internet routers for greenhouse and headhouse. circulation fans for greenhouse, evaporative cooler	Drains in Headhouse, New/updated control panel(s) for temperature control (heating/cooling vents) (controllers run \$100 - 400 and may vary room-to-room. 5 rooms prent. I do not know how to estimate installation cost and the cost to tie the new controllers to the old vents. Vent motors may need replacement (estimate \$100 -200 per motor and probably around 10 motors). Glass panels need to be sealed, shade slats need replacing and reanchoring.
CAS	Biological Science	Life Science	LS 237	Convert from office to lab space. Needs Sinks; fume hoods, epoxy floor, eyewash station, infrastructure needed, new benches/cabinets, remove old cabinets, Biosafety cabinet, ample high-speed Ethernet access, 220 V electrical outlets	
CAS	Biological Science	Life Science	LS 337	Repair Cold Chamber	
CAS	Biological Sciences	Life Science	LS 535	Conversion of 535 to shared lab: New benches/cabinets (remove old ones), partition walls, better lighting, electrical and data to each cubicle New chairs; Biosafety cabinets; Ample high-speed ethernet access; Card reader for access control Eyewash stations; 220 V electrical outlets	
CAS	Biological Science	Life Science	LS 419	Repair Cold Chamber	
CAS	Biological Science	Life Science	LS 533d	Repair Cold Chamber	
CAS	Biological Science	Life Science	LS 533e	Repair Cold Chamber	
CAS	Biological Science	Ellington Hall	General	Install Generator	
CAS	Biological Science	Ellington Hall	EH 123, 125, 129	Convert these spaces into a shared lab. Permanent A/C; fume hood with cabinets for flammable/corrosive materials, amp high-speed ethernet access, card reader for access control, eyewash stations w/plumbing, all doors/door casings to labs need to be replaced w/large doors or double doors to accommodate large items, a loading dock on the west entrance to accommodate entrance and exit of larger equipment	
CAS	Biological Sciences	Ellington Hall	Throughout bldg.	Install corrosive and flammable cabinets, plumb all eyewash stations that drain onto floors-discuss during walkthrough	Fix plumbing/leaking water issues in EH Some leaks originate from the rooftop. We can discuss during the walkthrough
CAS	Biological Sciences	Ellington Hall	EH 111	Convert to research lab. Sinks, fume hoods, epoxy floor, eyewash station, infrastructure needed, new benches/cabinets, remove old ones, biosafety cabinet, ample high-speed ethernet access, 220 V electrical outlets	

CAS	Physics & Material Sciences	Manning Hall	4th floor	We request adding a shared wet lab/ chemical lab with epoxy floors to the 4 <sup>th</sup> floor of Manning Hall which would make it easier to install the duct work needed. This would be a shared space that faculty from physics and potentially faculty from other disciplines could also use. Space in Manning Hall is expected to become available after the Anthropology Department has been relocated.. This will free up a significant amount of usable space for physics, after renovations have been completed. These offices will need to be combined into one large space equipped with a chemical floor, upgrades to the electrical wiring of the space, as well as installation of appropriate chemical benches and wet lab capabilities.
CAS	Physics & Material Sciences	Manning Hall	MH 426	Furthermore, classroom 426 on the 4th floor of Manning Hall is underutilized and can be easily converted into a computational physics laboratory/ or experimental laboratory with minimum cost. It is situated close to another physics research laboratory and will allow faculty and graduate students to seamlessly and safely transition from one research lab to another.
CAS	Physics & Material Sciences	Manning Hall	TO BE DETERMINED	We request a customized dedicated optics/ photonics laboratory that would include upgraded electrical capabilities, multiple optics and antivibration stations, customized window treatments equipped with filters, and its own air handling unit. Space that is to be vacated by the Anthropology Department would be an ideal space to be upgraded to house these needs. Furthermore, some existing physics controlled space in the basement of Manning Hall could be further invested in to bring the existing space to a higher standard that could be used towards this need, though it will not completely address the deficiencies we have identified.
CAS	Physics & Material Sciences	Manning Hall	TO BE DETERMINED - Possible future space opportunities in current Anthropology area	We request additional office and theoretical research space so that our theoretical and computational research of existing faculty is not further stymied. Specifically, two current faculty lack appropriate research space and are currently forced to perform their work remotely. The need for research space for these to faculty is immediate. Since physics does not have any free space for these faculty, it is needed that physics is given additional space in Manning Hall. Since their research area is Astrophysics, the structure of a computer laboratory would be adequate for these two faculty and no major upgrades are needed to an existing space, such as a classroom.
CAS	Physics & Material Sciences	Manning Hall	?	In order to enable research driven towards experimental quantum information sciences (QIS), the ability to perform property measurements under a wide range of external stimuli, including at low temperatures and high magnetic fields, is essential. The <u>physical property measurement system (PPMS)</u> is a <u>workhorse tool</u> well-suited for the measurements necessary in this rapidly emerging field that is also capable of coexisting with current research.
CAS	Physics & Material Sciences	Manning Hall	?	Transmission Electron Microscope. The TEM was housed in the IMC and has not been functional for a number of years due to needs for substantial repair. Cost of a TEM can be of the order of 1 million dollars, and depends on the features needed.
CAS	Physics & Material Sciences	Meeman Biological Station	Meeman Biological Station	Observatory and Planetarium Center on the grounds of Meeman Biological Station.
CAS	Physics & Material Sciences	Manning Hall	Basement	Upgrade electrical capabilities for labs in basement Improve HVAC (current capital maintenance?). Upgrade and repair stairs and railing on stairs, Remove mold from building, repair the flooring in 3rd floor astrophysics research lab, add additional electrical outlets in manning hallways and corridors, clean and repair broken windows on all 4 floors (check all windows)
ENGINEERING	Mechanical Engineering, Civil Engineering, Electrical & Computer Engineering	Engineering Sciences	General	New compressed air system and air lines, Distilled/deionized water system to entire building including access ports in labs- additional plumbing
ENGINEERING	Water Resource Lab - Civil	Engineering Sciences	ES 107	Space needs to be renovated to be used for Water Resources Research. Needs new cabinets, replace sink & faucet, and add sink & faucet, paint walls, remove existing tables, alarm system for doors, darkening shades for windows, two above 20amp circuits, internet, compressed air, eyewash, hot water, ionized water set up, central vacuum. Replace the large compressor in 107 and move it out of 107 so that the space can be used for research. Compressor serves entire bldg. Floor drains clogged. Drains impact research. Several drains need to be cleared for existing water-cooled hydraulic pump and dedicated water supply is required

ENGINEERING	Traffic Simulator Lab-Civil/Earthquake lab	Engineering Sciences	ES 109	Need to renovate with electrical, internet, new lights, water supply and drainage. Needs dedicated water supply, upgraded fatigue-rated linear actuator for dynamic testing of structures & components (91 Series Dynamic Actuators from BiA-West). Create space in room for traffic simulator & visualization lab to be more accessible visible to visitors (currently located in ES 112A which is also used as a GA office). See Russell for details on dual use of space.	Floor drains clogged. Drains impact research. Several drains need to be cleared for existing water-cooled hydraulic pump and dedicated water supply is required
ENGINEERING	STEM-Geotechnical Lab	Engineering Sciences	ES 109A	See STEM building early design for scope - already done as part of STEM project, but value engineered out; see RFP in that project for scope and costs	
ENGINEERING	C-Tier Center	Engineering Sciences	ES 309	Renovate room	
ENGINEERING	Biomedical Engineering	Engineering Technology	ET 303	Space needs to be reconfigured so that the biohazard research area and conference table area are not connected. Possibly a movable dividing wall, and moving the sink in the room closer to the research. Placement of power, access to central vacuum (closer to biosafety cabinets instead of continually running aspiration system that requires constant maintenance and the addition of a laboratory fume exhaust fume extraction arm are needed along with overhead racks & attachments. Plumbing needs to be installed for central vacuum, additional lab bench space is also needed.	
ENGINEERING	Biomedical Engineering	Engineering Technology	ET 316	Remove hot water heater & replace with tankless hot water heater, add cabinetry, bench space and work space. Doors on cabinetry to be in compliance with earthquake safety regulations, update sink, plumbing to be acid compatible	
ENGINEERING	Biomedical Engineering	Engineering Technology	ET 321H	Remove sink in corner	
ENGINEERING	Biomedical Engineering	Engineering Technology	ET 322A	Install fume hood with vacuum & duct work gas & water, add lab fume exhaust fume extraction arm, additional lab bench furniture	
ENGINEERING	Biomedical Engineering	Engineering Technology	ET 322B/C	Add lab fume exhaust fume extraction arm, add lab bench furniture, new work benches, removal of special pipe connectors. Replace old and cracked flooring	
ENGINEERING	Biomedical Engineering	Engineering Technology	ET323	Lab fume exhaust fume extraction arm, overhead racks & attachments to fume hood	
ENGINEERING	Biomedical Engineering	Engineering Technology	ET 328	Space needs to be reconfigured including moving sink and plumbing. Access to central vacuum close to biosafety cabinets, add lab fume exhaust fume extraction arm, floor to ceiling cabinets for storage of glassware and other supplies. Additional lab bench furniture needed.	
ENGINEERING	Engineering Technology, Biomedical Engineering	Engineering Technology	General	New compressed air system and air lines, need distilled/Deionized water system (whole building)-would require additional plumbing & access ports in labs, with filter and dehumidifier. Access ports would need to be added to ET 119, 120, 121, 123, 301, 303, 316, 322 a,b,c, and 328	Room needs to be repaired. Leaks have caused mold on 3rd floor - Biomedical Engineering. HEPA filters are needed in labs, condensation leads to leaks that contaminate experiments, HVAC system needs to be updated/repared. Dirt in ducts leads to contamination of experiments,
ENGINEERING	CIRBE Center	Engineering Admin	EA100	Center needs renovations that include electrical, internet, lighting, and glass partition walls to better accommodate grad students & postdocs	
RESEARCH & INNOVATION	Animal Care	Psychology	Psychology	Remove existing walls in J around cagewash, replace cage washer, replace cagewash boiler, add wall in room I, add individual air controls to each room-12 units, add temperature monitoring to each room - 12 units, remove windows in room C1 & C2, add surgery lighting in C1, resurface floors with epoxy flooring in all rooms	
CAS	Behavioral Neuroscience, Animal Care, Biology	Psychology	Psych 422A, 422C, 422C1, 422C2, 422D, 422G, 422F, 422E, 422I	Update lighting including automated environmental controls for lighting in all animal rooms,	
CAS	Behavioral Neuroscience, Animal Care, Biology	Psychology	Psych 422G, 422I	Noise abatement measures for animal rooms near entrance and foot traffic	
CAS	Behavioral Neuroscience, Animal Care, Biology	Psychology	Psych 422A, 422C, 422C1, 422C2, 422D, 422G, 422F, 422E, 422I	Modernized rack/caging systems for animal rooms	

CAS	Behavioral Neuroscience, Animal Care, Biology	Psychology	417, 422D, 422E, 422F, 422G, 422I, 422J1, 450A, 452,	Modernize sinks w/hands free or foot operated sinks, installation of work surfaces in rooms-stainless steel tables	
CAS	Behavioral Neuroscience, Animal Care, Biology	Psychology	Psych 422J, 422J1	Automated bedding dispensers, automated bottle fillers	
CAS	Behavioral Neuroscience, Animal Care, Biology	Psychology	Psych 422	Install clean room. Designation of quarantine area for animals received from sources other than standard vendors - - Designation of storage -excluding animal rooms	
CAS	Behavioral Neuroscience	Psychology	Psych 417	Install sink with cabinets underneath, eyewash station, chemical hood, fume exhaust hood	
CAS	Psychotherapy	Psychology	Psych 488		Replace HVAC wall units
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 417, 449, 450, 451, 452	Electrical updates including commercial surge protection	
CAS	Behavioral Neuroscience, Child & Family	Psychology	Psych 404	Installation of backup generator for requested freezer	
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 449D		Sink needs to be attached/fixd to wall
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 499E		Restoration of Hot water
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 450A	Installation of new water filtration (3x distilled & de-ionized), installation of modernized lab tables & cabinets	Modernized plumbing, replace pipes for floor drain
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 451		Replace faucet (broken hot water handle)
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 430, 451A1, 451B1, 451B2, 451C, 449D1		Replace light timers
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 449D1		Replace/repair red light ballasts
CAS	Behavioral Neuroscience (Psych)	Psychology	Psych 106, 108, 136, 302, 307, 311, 346,		Reliable HVAC
CAS	Cognitive science, Psychotherapy, Social Psych, Clinical Health, Child & Family, School Psych	Psychology	Psych 349, 351, 353, 355, 357, 359, 361, 376, 379, 381, 383, 385, 387, 403, 409, 411, 417, 425, 429, 430, 439, 449, 450, 451, 452, 453	Automated environmental controls for temperature and humidity, updated network ports, prominent signage, direction signage in halls,	paint, replace lab doors
CAS	Child & Family	Psychology	Psych 409	Installation of one-way mirror	
CAS	Psychology Building	Psychology			
CAS	Psychology Building	Psychology	All labs 4th floor	Electrical grades, surge protection, keypad entry, acid proof plumbing,	
CAS	Behavioral Neuroscience	Psychology	451C	Install fume hood, epoxy floor	
CAS	Computer Sciences	Dunn Hall	DH 215	Complete redesign and modernization of the space to allow for more effective research productivity & space for additional student researchers. New whiteboards, newly relocated proctor, virtual meeting technology, carpet, paint additional electrical outlets to accommodate additional desk locations.	
CAS	Computer Sciences	Dunn Hall	DH 221	Determine if the space can be reconfigured to accommodate students and a software engineer	Ceiling leaks need to be repaired (check tiles), better ventilation, additional electrical outlets, paint
CAS	Computer Sciences	Dunn Hall	DH 247	New room alarm	Replace old chalkboards with new whiteboards
CAS	Computer Sciences	Dunn Hall	TBD	Need new space for additional research-need clarification.	

CAS	Earth Sciences	Johnson	Johnson 114	Electrical upgrades (specifically south wall), fume hood installation in this room or JN 1C and JN 2, Bruker D8Advance X-ray Diffractometer, plumbing upgrade, install sink w/sediment traps, air handling, either install window A/C unit to balance temps when ovens & furnaces are running or relocate ovens & furnaces to JN1C and design the air handling and HVAC to meet lab space requirements as part of the summer 2023 HVAC renovations
CAS	Earth Sciences	Johnson	Johnson 216A	Remove the plumbing from the original dark room, install electrical outlets for microscopes, air filtration to control dust, shock resistant lab benches,
CAS	Earth Sciences	Johnson	Johnson 1C	Create Soils Analysis Lab - fume hood, eyewash station, shock resistant lab benches/counters w/integrated storage to line wall. Battersizer S3 Plus Laser Particle Analyzer will need water hook-up
CAS	Earth Sciences	Johnson	Johnson 1B	Create Dendrochronology Lab. Exhaust fans, sink if possible (or locate in JN 005 where a sink exists)
CAS	Earth Sciences	Johnson	Johnson 1	Shelving, currently an office, but will be converted to research
CAS	Earth Sciences	Johnson	Johnson 1A	Create USDA Regulated Soil Lab dedicated for quarantining samples. Fume hood, eyewash station, shock resistant lab benches/counters with integrated storage to line walls. Currently an office but will be converted to research
CAS	Earth Sciences	Johnson	Johnson 1D1	Create PC Lab for Research. Shelving. Currently shared graduate office, but will convert to research
CAS	Earth Sciences	Johnson	Johnson 1D	Shelving, cabinets with sample trays
CAS	Earth Sciences	Johnson	Johnson 2	Wet Lab w/ 2 fume hoods, eyewash stations, shock resistant lab benches/counters w/ integrated storage to line wall, vented storage
CAS	Earth Sciences	Johnson	Johnson 2A	Wet Lab w/ 2 fume hoods, eyewash stations, shock resistant lab benches/counters w/ integrated storage to line wall, vented storage
CAS	Earth Sciences	Johnson	Johnson 2B	Ability to control temperature for instruments, Battersizer S3 Plus laser Particle Analyzer will need direct DI water hookup and a temp controlled room. Currently research, but will become shared research
CAS	Earth Sciences	Johnson	Johnson 1C	Former conference room unusable due to poor moisture control (mold grows on surfaces) current used as storage will move equipment to JN 103 after elevator renovation.
CAS	Earth Sciences	Johnson	TBD-New space	6 current faculty researchers and their teams of graduate and undergraduate students have needs for year-round 100 sq. ft. lab bench space. Additionally 3 faculty need the same from Caesar/Civil Eng. And possibly Biology. JN 005 with a sink and linear space to spread cores is ideal space for research. This space also has room to line one wall with core and sample storage, 3 door freezer. total 12 faculty in ESCI need regular and long-term access to large linear space.
CAS	Earth Sciences	J.M. Smith	Smith 002	Replace sink w/larger sink and sediment trap, direct connect water supply for rock saw w/sediment trap, paint, eyewash, electrical upgrades, replace/repair lab benches
CAS	Earth Sciences	J.M. Smith	Smith 127	Fume hood upgrades (or share new space on SM-4th floor), air filtration
CAS	Earth Sciences	J.M. Smith	Smith 129	Fume hood upgrades (or share new space on SM-4th floor), air filtration
CAS	Earth Sciences	J.M. Smith	Smith 321	Air filtration system, shelving and wet-lab-grade cabinets
CAS	Chemistry	J.M. Smith	Smith 413, 413A & 413B	Convert these spaces into a single high-quality, chemistry research wet laboratory space from graduate assistant research work space to research spaces. Include laboratory benches, cabinets, other standard chemistry facilities and a high density of fume hoods. Demolition of interior walls and redivision of space to produce three rooms of wet-laboratory space, each with eight chemical fume hoods. Will need 3 lab benchtops with cabinet space and shelves as needed. Two fume hoods will be on each of the three laboratory bench tops and cabinets will be "standard" and should include sinks, compressed air, water, and natural gas lines, painting of the walls and ceiling. Improved lighting.

CAS	Chemistry	J.M. Smith	Smith 415, 415A, 415B, 415B1, 415B2, 415B3	Convert these spaces into a single high-quality, chemistry research wet laboratory space. Include laboratory benches, cabinets, other standard chemistry facilities and a high density of fume hoods. Demolition of interior walls and redvision of space to produce three rooms of wet-laboratory space, each with eight chemical fume hoods. Will need 3 lab benchtops with cabinet space and shelves as needed. Two fume hoods will be on each of the three laboratory bench tops and cabinets will be "standard" and should include sinks, compressed air, water, and natural gas lines, painting of the walls and ceiling. Improved lighting.
CAS	Chemistry	J.M. Smith	Smith 425	Liebert air-conditioning unit will need to be removed or addressed during renovation. Modernize and renovate this space to accommodate 8 chemical fume hoods, new laboratory benches, cabinets. Space will need 3 lab benchtops with cabinet space and shelves as needed. Two fume hoods will be on each of the three laboratory bench tops and cabinets will be "standard" and should include sinks, compressed air, water, and natural gas lines, painting of the walls and ceiling. Improved lighting.
CAS	Chemistry	J.M. Smith	Smith 414	Convert to faculty, undergraduate/graduate student research office space including systems furniture (see equip list). Lighting and paint as needed.
CAS	Chemistry	J.M. Smith	Smith 303	Convert to faculty, undergraduate/graduate student research office space including systems furniture (see equip list). Lighting and paint as needed.
CAS	Chemistry	J.M. Smith	Smith 303A	Convert to faculty, undergraduate/graduate student research office space including systems furniture (see equip list). Lighting and paint as needed.
CAS	Chemistry	J.M. Smith	Smith 303B	Convert to faculty, undergraduate/graduate student research office space including systems furniture (see equip list). Lighting and paint as needed.
CAS	Chemistry	J.M. Smith	Throughout bldg.	Need to add new lighting fixtures to all labs with the exception of rooms 210, 210A, 231, 231A and 231C. Current lighting and lenses are yellowed and brittle.
CAS	Chemistry	J.M. Smith	Smith 021	This room is fully re-furnished, but not currently functioning. Renovation includes insulating walls and door, lab benches, sinks, compressed air, natural gas, water lines, and cabinets within the room.
CAS	Earth Sciences	Clement	Clement 25	Sinks without water and sdr rent trap, electrical upgrade
CAS	CERI	Northeast part of 3892 Central Ave.	Earthquake Physics Lab	Rearrange walls to increase useful lab space
CAS	CERI	Vicinity of 3832 Central Ave.	CERI	Construct a loading dock
CAS	CERI	3890 Central Ave.	CERI	Modern/upgraded electrical service-ungrounded and insufficient
CAS	CERI	3876 Central Ave.		Basic Repairs - holes in patio roof allow squirrels to enter the house causing extensive damage to books and other items. Patio door windows are leaky/clouded. Flat roof leaks harming faculty research lab
CAS	CERI	West part of 3892 Central Ave.	CERI	Rearrange and partition into modern Visualization Lab & research computer lab
CAS	CERI	All CERI Bldgs.	CERI	Upgrade internet wiring to 1 Gb
				<p>There are currently five research labs in the Roane Fieldhouse. With the exception of one space (FH 171), all of these labs have been created from existing <i>non-laboratory</i> space. Two areas (FH 135 and 155) are former shower/locker rooms. One space (FH 161) is the former Athletics academic study room, with the final space (FH 162) being a former computer lab. While the faculty have made the best of the existing space, there are many problems that need to be addressed if we are to continue performing high-level research within the Fieldhouse.</p> <p>Aside from lack of storage, inappropriate flooring, and "run down" facilities, one main problem we face is lack of temperature regulation. The temperature and humidity fluctuate considerably throughout the year, and can actually change many degrees throughout a given day. This negatively impacts our biochemical/molecular physiology work, as incubation temperatures need to remain constant for accuracy in data. Because we do a good amount of work with live cells, regulation of the air temperature and humidity is of crucial importance. On many occasions, cells have died because of these inconsistencies. This costs students and faculty significant time and money, and can sometimes delay experiments and extend graduation time.</p>

				<p>The fact that our existing rooms were not created as laboratory spaces often means that the correct electrical needs are not included. This results in routine loss of power, equipment shutting down temporarily, and delays in work productivity. Inappropriate flooring is also a concern, in particular in spaces in which chemicals and human samples (blood and urine) are being used and collected.</p> <p>The inadequate ventilation is an ongoing problem. Not only is the air temperature and humidity variable, but the ventilation (air turnover) in all labs is very poor. A complete overhaul of the HVAC system is necessary for all spaces, to meet laboratory standard—in particular in areas in which chemicals are being used heavily (FH 135, 161, 162).</p>	
College of Health Sciences	Nutrition Science, Exercise, Sport, and Movement Sciences	Fieldhouse	131, 135, 162, 171	155, 161,	
END	END	END	END	END	END

# **Request Research Modernization**

## **University of Memphis School of Public Health**

### **Ashish Joshi Dean School of Public Health**

#### **I. ESTABLISH PUBLIC HEALTH INNOVATION LAB**

##### **PROPOSED ROOM ROBISON 106**

- **Purpose:** The Public Health in Action Collaborative Prevention Lab will educate and train high school students on how to accurately and effectively use various prevention screening methods to aid in facilitating early disease detection in underserved communities (TRAIN). Upon completion of training, students will be able to go into community spaces and utilize the skills attained regarding prevention screening, e.g. providing blood pressure screening and glucose monitoring (ACTion). This University-wide initiative would be housed in the School of Public Health actively collaborating with other schools within the university, e.g., School of Business, School of Engineering, and School of Health Sciences. Additionally, community partnerships would include e.g. Memphis-Shelby County Schools, Shelby County Health Department, and other community organizations (COLLABoration).
- **Equipment:** Blood pressure machines, Durable Infrared Forehead Thermometers, Glucose Monitors, Pulse Oximeters, Digital Thermometers, Digital smart scale for body weight, peak flow meters, spirometers, SMART board. We will need some cost for reconfiguration of the space as we are already limited in space here at SPH.
- **Sustainability Plan:** With our increasing public health outreach and research with high schools locally, nationally and globally, and other strategic innovative initiatives over the last 2 years, we strongly feel that we need to establish “Public Health Innovation Lab” that will enhance our ability to secure external grant funding, increase enrollment and expand community outreach for overall societal impact. We already recently received funding from ASPPH/CDC to establish the first high school pathway to Disease Intervention Certification.
- **Cost requested: \$500,000**

## II. Center for Responsible AI in Public Health

### PROPOSED ROOM ROBISON 107

- **Purpose:** The center will serve as an infrastructure to expand collaboration, build capacity, and engage communities to conduct transdisciplinary and transnational research addressing the complex societal and ethical implications of artificial intelligence. The center focuses on promoting equitable and responsible AI solutions that address challenges faced by high-risk populations in the Greater Memphis Area and beyond, fostering inclusivity and innovation in the development and application of AI technologies.
- **Research Equipment:** AI Video booths, Mobile Video Walls and Projector, Wireless camera, Broadcast grade cameras, multi camera control and editing suite, motion capture systems, eye tracking devices, AI wearable and biometric sensors and portable digital lab kits
- **Sustainability Plan:** We have already applied a grant to NIH around AI and Public Health and we feel confident about the grant submitted and we will continue to expand opportunities to apply for grant funding to NIH, NSF, Amazon and CDC. The dedicated space and infrastructure will provide an opportunity to become an academic hub that is advancing responsible use of AI in Public Health and also training students with the essential skills to be employment ready. Further the research will allow us to apply for training grant as well as establish multiple projects around AI and public health to be the leader in this rapidly growing research field.
- **Cost Requested: \$750,000**

### **III. Establishing a Virtual Reality Simulation Lab (VRS-Lab) to Prevent Alcohol and Substance Use Among Young People**

**PROPOSED ROOM 308**

- **Purpose:** The rapid evolution of virtual reality and artificial intelligence tools represents a largely underutilized opportunity to take preventative health programs to a new level. Similarly, gamification, which refers to the process of engaging participants in game-design elements such as rankings and points in non-game scenarios, is also emerging as an effective public health primary prevention intervention strategy. Both virtual-reality and game-based interventions for substance and alcohol-use prevention among adolescents and youth adults are emergent, novel approaches that are showing promising outcomes in current literature, with results indicating better engagement with prevention material, increased comprehension of risk, and reduced tendency toward risky and violent behavior
- **Justification:** This proposal seeks funding to establish a state-of-the-art Virtual Reality Simulation Lab (VRS Lab) dedicated to preventing alcohol and drug use among young people. By leveraging immersive virtual reality technology and game-based digital interventions, we aim to provide realistic simulations that educate and empower young adults to make informed decisions, resist peer pressure, and understand the consequences of substance misuse. The lab will also provide students at the University's School of Public Health with hands-on opportunities to work on a public health intervention in the community. The requested funding of will cover the establishment and implementation of the lab. The lab will utilize the expertise of the School of Public Health and other multi-disciplinary units on campus to continue to innovate, implement, and evaluate advanced technological prevention strategies with the intent to develop scalable, adaptive primary prevention programs with a strong evidence-base. The proposed program has the potential to set a new standard in prevention of substance use tailored to meaningful engagement with younger generations while addressing the critical public health problem of substance and alcohol use among youth in the Memphis community and nationally.
- **Sustainability Plan:** To ensure the long-term viability of the VR Simulation Lab, we will establish partnerships with other units, including the University's Institute for Intelligent Systems, public health organizations, and technology companies. These collaborations will facilitate resource sharing, expand funding opportunities, and promote the continuous development of VR content. We will recruit support from governmental and private institutions including the National Institute of Drug Abuse (NIDA), National Institute on Alcohol Abuse and Alcoholism (NIAAA), the Foundation for Opioid Response Efforts (FORE), and other federal agencies and foundations. We will also explore avenues for integrating the program into standard curricula, securing its place as a viable component of prevention efforts.
- **Cost Requested: \$300,000**

#### **IV. SCIENCE OF PUBLIC HEALTH COMMUNICATION INITIATIVE**

##### **PROPOSED ROOM 202**

- **Justification:** Need video equipment for community interviews, editing capabilities, soft sound barriers to create public health communication channel for disseminating research outcomes.
- **Cost requested: \$100,000**

#### **V. RESEARCH COLLABORATIVE CONFERENCE ROOM**

##### **PROPOSED ROOM Robison 235**

- **Justification:** This is one of the only conference rooms that can host nearly 12-14 individuals for collaborative research discussions, and upgrades will facilitate research collaboration with our community, national and international partners. We need cameras, computer upgrade, smart boards so that we can a robust collaborative conference room.
- **Cost requested: \$100,000**

#### **VI. COMMUNITY COLLABORATIVE SPACE**

##### **PROPOSED ROOM Robison 302**

- **Justification:** Research upgrades to conduct face to face and virtual focus group interviews, digital outlets to support international collaboration including digital smart boards.
- **Cost requested: \$50,000**

#### **VII. PUBLIC HEALTH DIPLOMACY LAB**

**Presently we have no space but, if possible, ROTC 324 can be provided to create this state-of-the-art lab.**

**Justification:** We received internal funding and were able to establish the nation's first public health diplomacy lab. We organized successfully the first public health diplomacy summit inviting 15 countries and the framework has been advancing both nationally and internationally. It is very important strategic initiative that can help us garner significant

April 8 2025

resources and funding to advance this critical area of research at the intersection of AI and public health diplomacy.

**Research Equipment:** AI Video booths, Mobile Video Walls and Projector, Wireless camera, Broadcast grade cameras, multi camera control and editing suite, motion capture systems, eye tracking devices, AI wearable and biometric sensors and portable digital lab kits

**Sustainability Plan:** We will create multiple approaches here to generate funding including, research collaborations globally, offering executive programs, foundation and federal and international funding and corporate funding sources.

**Costs requested: \$750,000**

## **VIII. ENVIRONMENTAL HEALTH LAB**

### **ROBISON 333, Environmental Analytical Laboratory 1**

The Environmental Health Laboratory (EH Lab) in the School of Public Health (SPH) is equipped with multiple instruments for environmental public health research and training. Following SPH's Strategic Plan, the following new equipment purchases, and equipment upgrades are requested.

Equipment: Purchase of a handheld Niton™ XL5 Plus XRF analyzer, Upgrade of the current Markes Thermal Desorption system to the latest model, upgrade of the source and column of Agilent 7890-5977, purchase of a Markes Micro-Chamber, Upgrade of the source and column of Agilent 7890-5975, Purchase of a primary flow meter, Purchase of two personal air sampling pumps

### **Robison 332, Environmental Analytical Laboratory 2**

Equipment: Upgrade of an Agilent HPLC by adding a 1260 Infinity II Fluorescence Detector and smoking chamber

**Costs requested: \$300,000**

## **IX. Community Stress and Well-Being Lab**

### **Space needed**

**Justification:** The Community Stress and Well-Being Lab, located at the University of Memphis School of Public Health, was founded in 2025. The inspiration for the lab was driven by a timely need and place for mental health in a public health setting. As one of the first labs to be housed in

April 8 2025

the School of Public Health, the lab was created to improve outcomes to stress and mental health throughout the Midsouth, train graduate researchers, contribute to the School of Public Health CARES mission, and further increase the visibility and outreach of the School and the University. Community and solution-based research projects housed in the lab, explore interpersonal, institutional, environmental, and community related stressors impacting campus community members and Memphis-Shelby County residents. The projects aim to understand and highlight the social determinants patterning outcomes to stress and mental health among community members. Rigorous and creative methodological design and analysis are lab pillars, built to ensure accurate project findings and appropriate intervention.

**Equipment:** Five tablets, 3 to 5 digital dictation recorders for interviews/focus groups, Digital display board for lab events, blood pressure finger monitors for participants, electronic toothbrushes for participants for potential project on oral health care stress

**Costs requested:** \$15,000

## Research Modernization Request by Priority

### Center for Earthquake Research and Information (CERI)

Buildings: 3904 Central, 3890 Central, 3876 Central and 3892 Central

Dr. Vadim Levin – Director

1. CERI upgrades to electric wiring, climate control, floors, roofs and upgrade network wiring (if needed)
  - a. All buildings listed above require electrical wiring upgrades
  - b. All buildings listed above require maintenance and possible replacement of existing equipment related to HVAC needs
  - c. Buildings 3876 Central and 3904 Central require updated and new flooring
  - d. Buildings 3876 Central require an updated roof (asphalt and flat) and 3892 roof needs a thorough review of any existing leaks in the metal roof and fix them before the interior renovation can begin.
  - e. Upgrade Network wiring for all buildings if this has not already been completed.
2. Full Renovation and reconfiguration of spaces within 3892 Central Avenue
  - a. Buildout media/Virtual Reality center/ Visual Wall for research and public outreach
    - i. The space to envision this upgrade will be in room 110, the old defunct Earth Science / CERI library
    - ii. Add exterior windows, if possible, to bring in natural light
  - b. Create a modern classroom
    - i. The space to envision this upgrade will be in room 110, the old defunct Earth Science / CERI library
  - c. Research Collaborative community space for students
    - i. Create a collaborative space for research dedicated for students' use, with work desks, whiteboard/smart board (?), projector, screen
    - ii. The space to envision this upgrade can be room 105 – which we call the seminar room
  - d. Computer system backup server space
    - i. Possibly look at moving the server from room 102 to a possible new location within the building (e.g., to room 112?).
    - ii. When server backup is moved, reclaim space in room 102 for Education and Outreach learning materials, informational materials, etc.

- e. Reconfigure Earthquake Physics lab space
  - i. Remove the wall between rooms 115A, 115A1 and 115A2
  - ii. Create one big open space
- f. Move seminar room
  - i. Renovate room 104 (presently occupied by student cubicles) to the new seminar room with a door, updated A/V equipment, camera, computers, etc.
  - ii. This will also create a larger multipurpose space for larger research collaborations and gatherings.

### 3a. Create new/ updated workshops

- a. Create separate workshop
  - I. for metal & wood
  - II. electronics
  - III. 3D printing
- b. Reconfigure existing workshops located on the east side of 3892 Central, room 111 and located in 3904 Central, rooms 215C1(A and B)
- c. Replace obsolete/unnecessary equipment

### 3b. Reclaim, restore and fully renovate building 3918 Central into a dedicated for Education and Outreach activities and research

- a. Restore habitability
- b. Renovate for the hosting visiting group events of students and community groups
- c. Conduct Education and Outreach collaborative research
- d. Space for Education and Outreach learning, informational materials, etc.

### 4. Expand and reconfigure space used for Field Deployment Lab (FDL)

- a. Better infrastructure in the existing Field Deployment Lab located at 3876 Central outside garage area - room 120
- b. Possible expansion of FDL into 3876 Central rooms 100 or 112
  - a. If move into room 100, remove patio glass doors and replace with door access and enclose with wall. Possibly reconfigure inside of building to create a room and shelving.
- c. Additional space for broadband seismic instruments, nodal system, magneto-telluric instruments

### 5. Upgrade conference room in 3876 Central room 112

12" SOLID POURED  
IN PLACE EXTERIOR  
CONCRETE WALL

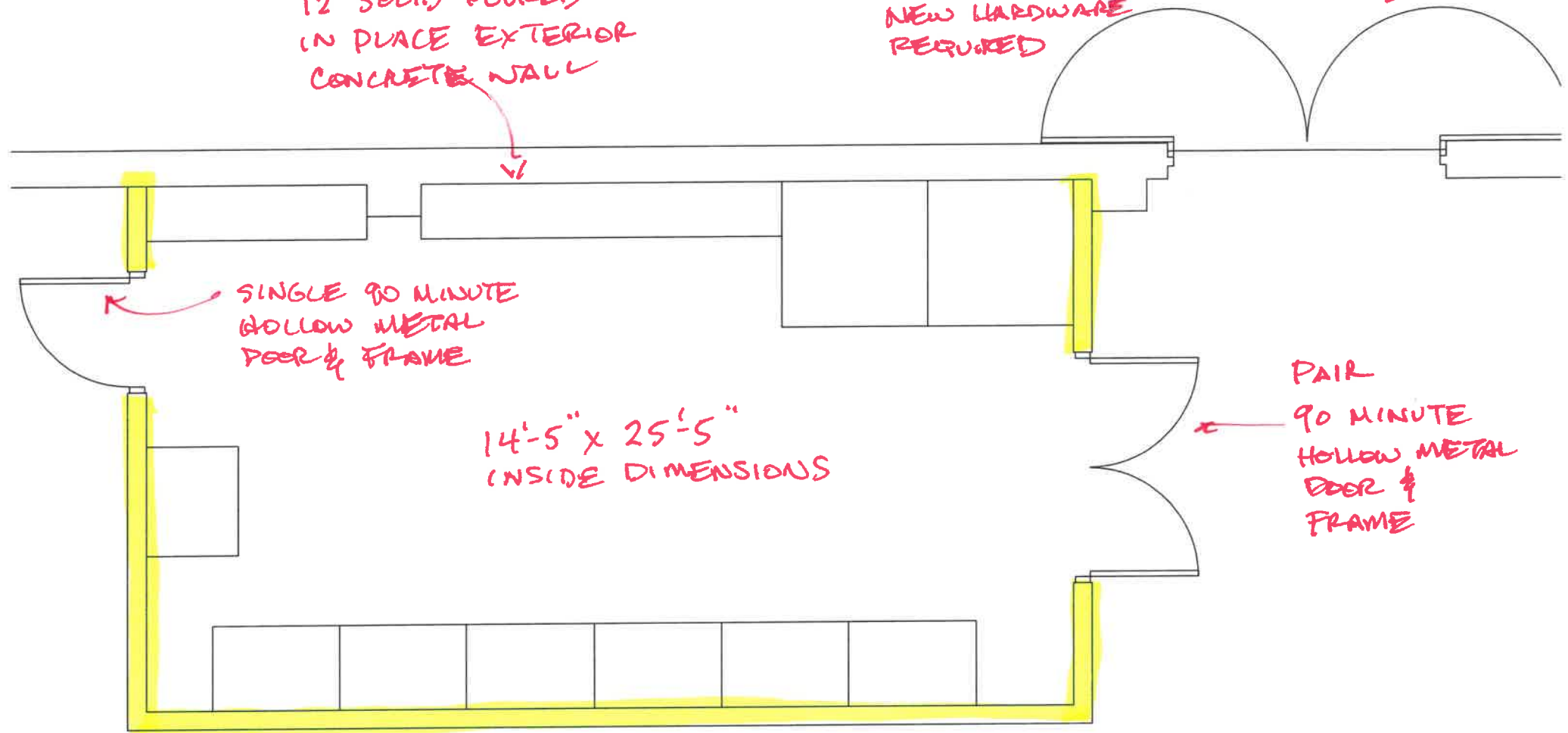
NEW, INSULATED, NON-RATED, HOLLOW METAL  
DOUBLE DOOR 6'-8" WIDE X 7'-0" TALL  
W/ 2" JAMBS AND 4" HEAD  
NEW HARDWARE REQUIRED

SINGLE 90 MINUTE  
HOLLOW METAL  
DOOR & FRAME

14'-5" X 25'-5"  
INSIDE DIMENSIONS

PAIR  
90 MINUTE  
HOLLOW METAL  
DOOR &  
FRAME

90 MINUTE METAL  
STUD & SHEET ROCK  
WALL





February 27, 2024

University of Memphis  
J.W. Smith Hall – Chemistry Building  
3744 Walker Avenue  
Hazardous Waste Room

**RE: Local Fire Marshal Conclusions**

4FDesign (formerly Fleming Architects) and their consulting engineers were tasked with the schematic design phase work for determining the potential of adding a secure room in the basement of J.W. Smith Hall (Chemistry Building) to house used chemicals from around the campus. This space is a temporary holding area for spent chemicals until an environmental company can come to collect them for proper disposal. This typically happens on a quarterly basis. Several site visits took place, an area in the basement was identified, and code research was conducted. The U of M determined that they wanted the proper ventilation, but also wanted to have the room heated and cooled. A sketch plan was produced and the engineers generated narratives and schematic plans identifying the needs for the space. One of the main unknowns still is where the mechanical unit will be set. Information was provided to a cost estimator so that a rough order of magnitude cost could be presented. All of these documents are provided within this packet. One outstanding item that needed to be addressed was whether, or not, the Local Fire Marshal would allow this space to be built, and whether, or not, the space needed to be sprinklered. 4FDesign made a visit to the Local Fire Marshal and presented the plan and request for the room. Additional information was requested and Robert Clark provided that information to them. The summary of that meeting is below.

The space can be built with the proper scheduling of hazardous materials to be stored, and with regular inspections. Code Enforcement will allow this space to be built with the Fire Marshal's input. Per the conversation I had with the Fire Marshal, if we are not storing non-compatible materials and we are staying under the allowable amounts, there is no change in occupancy or use, and the room does not need to be sprinklered. The room would still need to be rated 2-hours. It does need to be ventilated.

The Local Fire Marshal has asked for several items to be addressed in writing by the U of M:

1. The fire inspectors will have access to all university safety data sheets via CampusOptics. Robert Clark is working on getting them access to this information.
2. There is no time limit on storage of hazardous waste in each lab. If the hazardous waste room is at capacity for a particular hazard category, additional materials will not be brought to this room until the other hazardous materials that are in the room are removed.
3. In an emergency situation where an incoming material would exceed the quantity in the room, The U of M will have their hazardous waste vendor remove the materials directly from the space where they were generated rather than bringing them into the storage room.

4. The U of M will keep an inventory of what is in the room in real time. While The U of M may not know ahead of time what will be in the room for each quarter, The U of M can ensure that it is something for which fire officials will have access to safety data sheets and that the amount of material will not exceed allowable limits.

Again, if we do not exceed the allowable quantities, have no incompatible materials, are storing in the proper containers, and have the proper wall ratings and ventilation, The U of M can have the space designed and built. The room will not need to be sprinklered as, it would not be designated a Hazardous Occupancy.

4FDesign, P.C.



Steve Landwehr

Vice President

**TOTAL ESTIMATING +**

Construction Consulting Services

University of Memphis  
Smith Hall Chemistry Building  
Hazardous Waste Room



October 18, 2023

**Opinion of Probable Cost**  
**Schematic Design Cost Estimate**

prepared for:



**University of Memphis  
Smith Hall Chemistry Building  
Hazardous Waste Room  
Memphis, TN**

October 18, 2023



THE UNIVERSITY OF  
**MEMPHIS**

**OPINION OF PROBABLE COST**

**Schematic Design Cost Estimate**

DESCRIPTION	SF 393	\$TOTAL	%Total Cost
<b>BASE ESTIMATE</b>			
General Conditions	\$74.24	\$29,176	8.09%
Allowances	\$1.91	\$750	0.21%
Job Requirements	\$41.13	\$16,164	4.48%
Concrete	\$42.54	\$16,719	4.64%
Rough Carpentry	\$10.06	\$3,955	1.10%
Miscellaneous Metals	\$12.01	\$4,722	1.31%
Thermal and Moisture Protection	\$5.78	\$2,273	0.63%
Frames, Doors and Finish Hardware	\$39.77	\$15,629	4.34%
Finishes	\$66.68	\$26,206	7.27%
Specialties	\$1.35	\$530	0.15%
Fire Protection (NIC)	\$0.00	NIC	0.00%
Plumbing, HVAC and Controls	\$282.70	\$111,100	30.82%
Electrical, Fire Alarm, Light Fixtures, Generator	\$103.82	\$40,800	11.32%
<b>SUBTOTAL</b>	<b>\$681.99</b>	<b>\$268,023</b>	
<b>Fees &amp; Other Costs</b>			
Building Permit	\$3.41	\$1,340	0.37%
Builders Risk	\$4.43	\$1,742	0.48%
General Liability Insurance	\$3.75	\$1,474	0.41%
Subcontract Default Insurance (SDI)	\$8.52	\$3,350	0.93%
Payment & Performance Bond	\$5.97	\$2,345	0.65%
Estimate Contingency (12%)	\$84.97	\$33,393	9.26%
Escalation (6%)	\$40.92	\$16,081	4.46%
Contractor Overhead & Fee (10%)	\$83.40	\$32,775	9.09%
<b>TOTAL CONSTRUCTION COST</b>	<b>\$917.36</b>	<b>\$360,524</b>	

**BASIS OF ESTIMATE**

Sketch provided by FourFront Design - not dated

Mech Narrative by BCM dated 10/2/2023;

Electrical Narrative by DePouw Edwards, LLC dated 10/10/2023

**University of Memphis  
Smith Hall Chemistry Building  
Hazardous Waste Room  
Memphis, TN**

October 18, 2023

**OPINION OF PROBABLE COST**



THE UNIVERSITY OF  
**MEMPHIS**

**Schematic Design Cost Estimate**

**ESTIMATE QUALIFICATIONS**

**Estimate Exclusions:**

Building Commissioning  
Special Inspections  
Quality Control Testing Services  
Owner and Design Contingency  
Latent Conditions  
Architectural and Engineering Fees  
FF&E, Graphics, and Artwork (furnishings and equipment)  
Chemical Storage Cabinets  
Refrigerator or other appliances  
Fire Protection Sprinkler System  
Access Control, Security Systems and Cameras

**Estimate Conditions:**

Escalation is based on bid and award of construction contract by 2nd Quarter 2024

Market Conditions and Inflationary Escalations are unprecedented and can't be accounted for or anticipated. The Cost Estimate includes a 6% inflationary escalation contingency for mitigating material increases or disruptions in deliveries. Should increases in materials be experienced and not accounted for in the cost estimate, adjustments to the project cost estimate will be required. Costs incurred or schedule extensions caused by disruptions in material deliveries will have an impact on the cost estimate.

# University of Memphis

## Smith Hall Chemistry Building

### Hazardous Waste Room

### Memphis, TN

October 18, 2023

Opinion of Probable Cost

### Schematic Design Cost Estimate

Description	QTY	U/M	Unit Cost	Extended Cost	Total Cost	Comments
<b>BASE ESTIMATE</b>						
<b>General Conditions</b>	<b>393</b>	<b>gsf</b>	<b>74.24</b>	<b>/sf</b>	<b>\$29,176</b>	
<b>Corporate Office</b>						
Project Executive	1	ls	1,200	1,200		
Project Manager (50% Allocation)	3	mo	1,707	5,121		
<b>Project</b>						
Superintendent	2	mo	5,225	10,450		
Vehicle	2	mo	1,000	2,000		
Fuel & Maintenance	2	mo	650	1,300		
Cell Phone	2	mo	210	420		
Health Insurance & 401(k)	2	mo	1,150	2,300		
Safety Consultant	1	mo	635	635		
Personal Protective Equipment	2	mo	235	470		
Safety Signs	1	ls	250	250		
First Aid Supplies	2	mo	295	590		
Software Technology	2	mo	750	1,500		
Printing & Office Supplies	2	mo	500	1,000		
Small Tools	2	mo	495	990		
Project Closeout	1	wk	950	950		
<b>Allowances</b>	<b>393</b>	<b>gsf</b>	<b>1.91</b>	<b>/sf</b>	<b>\$750</b>	
Grounded Storage Cabinets <b>OFOI</b>	1	allow	0.00	<b>OFOI</b>		owner furnished, owner installed
Signage	1	allow	750.00	750		
<b>Project Requirements</b>	<b>393</b>	<b>gsf</b>	<b>41.13</b>	<b>/sf</b>	<b>\$16,164</b>	
Project Turnover, As-Built, Acceptance	1	ls	2,500.00	2,500		
Construction Utility Consumption		sf	0.75	0		use existing utilities
Temporary Electrical Power		sf	0.45	0		use existing utilities
Progressive Construction Clean-Up	393	sf	5.30	2,083		
Final Clean Building	393	sf	2.75	1,081		
Dumpsters and Disposal Fees	2	mo	4,500.00	9,000		
Construction Layout	1	ls	1,500.00	1,500		
<b>Concrete</b>	<b>393</b>	<b>gsf</b>	<b>42.54</b>	<b>/sf</b>	<b>\$16,719</b>	
<b>Supervision &amp; Equipment</b>						
Supervision	1	wk	1,704.00	1,704		
<b>Subgrade Pest Treatment</b>						
Subsoil Termite Treatment	393	sf	1.50	590		
<b>Concrete Cutting</b>						
Sawcut 12" wall for Exhaust Duct Penetration	1	ea	2,250.00	2,250		
Sawcut 12" wall for Supply Air Duct	1	ea	2,250.00	2,250		

# University of Memphis

## Smith Hall Chemistry Building

### Hazardous Waste Room

### Memphis, TN

October 18, 2023

Opinion of Probable Cost

#### Schematic Design Cost Estimate

Description	QTY	U/M	Unit Cost	Extended Cost	Total Cost	Comments
<b>BASE ESTIMATE</b>						
Core Opening in 12" Wall	3	ea	550.00	1,650		
<b>SOG Patch/Repair</b>						
Patch for Condensate/Drench Shower Drain	1	ls	3,500.00	3,500		
<b>Mechanical Concrete Bases</b>						
Mechanical Equipment Pad	1	ls	1,500.00	1,500		
Mechanical House Keeping Pads	1	ls	3,275.00	3,275		
<b>Miscellaneous Metals</b>	<b>393</b>	<b>gsf</b>	<b>12.01 /sf</b>		<b>\$4,722</b>	
Pipe Bollards, concrete filled	4	ea	925.00	3,700		at MAU unit
Miscellaneous Metals	393	sf	2.60	1,022		
<b>Rough Carpentry</b>	<b>393</b>	<b>gsf</b>	<b>10.06 /sf</b>		<b>\$3,955</b>	
FTWD Wall Blocking	791	sf	5.00	3,955		
<b>Thermal Moisture &amp; Protection Insulation</b>	<b>393</b>	<b>gsf</b>	<b>5.78 /sf</b>		<b>\$2,273</b>	
Insulation	791	sf	1.85	1,463		
<b>Firestopping</b>						
Firestopping (head of wall)	57	lf	8.00	456		
<b>Caulking and Joint Sealants</b>						
Caulking	393	sf	0.90	354		
<b>Frames, Doors and Hardware</b>	<b>393</b>	<b>gsf</b>	<b>39.77 /sf</b>		<b>\$15,629</b>	
<b>Hollow Metals</b>						
Unload and Store Frames, Doors	3	ea	75.00	225		
Layout Door Frames	3	ea	80.00	240		
3068 HM frame 90 min	1	ea	446.88	447		
6068 HM frame 90 min	1	ea	597.13	597		
6870 HM frame 4" Head, Galv.	1	ea	697.50	698		
3068 HM slab 90 min	3	ea	1,230.93	3,693		
3470 HM slab Galv., Insulated	2	ea	1,392.50	2,785		
Remove Existing Exterior Door	1	ea	750.00	750		
<b>Door Hardware</b>						
Door Hardware	5	ea	1,200.00	6,000		
Construction Cores	3	ea	65.00	195		
<b>Finishes</b>	<b>393</b>	<b>gsf</b>	<b>66.68 /sf</b>		<b>\$26,206</b>	
<b>Gypsum Board and Metal Stud Framing</b>						

**University of Memphis**  
**Smith Hall Chemistry Building**  
**Hazardous Waste Room**  
**Memphis, TN**

October 18, 2023

Opinion of Probable Cost

**Schematic Design Cost Estimate**

Description	QTY	U/M	Unit Cost	Extended Cost	Total Cost	Comments
<b>BASE ESTIMATE</b>						
Wall 3.625 2 layers drywall both sides, 2-hour rated	791	sf	12.5	9,888		
Acoustical Sealant at Top and Bottom of Wall, 1/4"x1/4"	1	ls	500.00	500		
Supervision	393	sf	4.65	1,827		
Progressive Cleanup	393	sf	0.55	216		
Dumpsters	1	mo	4,500.00	4,500		
Punch & Acceptance	393	sf	0.75	295		
Equipment, man lifts	393	sf	0.65	255		
Waste Contingency	393	sf	1.75	688		
<b>Flooring</b>						
Base - rubber 4"	114	lf	4.05	462		
<b>Floor Treatment</b>						
Floor Patching and Preparation	393	sf	0.65	255		
Sealed Concrete Floor	393	sf	2.95	1,159		
<b>Painting</b>						
Wall Painting	1,582	sf	1.25	1,978		
Paint Door Frames	3	ea	150.00	450		
Paint Door Leaf	5	ea	250.00	1,250		
Paint Exterior Duct/Piping	1	lf	1,500.00	1,500		
Ceilings, open to structure	393	sf	2.50	983		
<b>Specialties</b>	<b>393</b>	<b>gsf</b>	<b>1.35 /sf</b>		<b>\$530</b>	
<b>Signage</b>						
Signage - See Allowances		ea		allow		allowance
<b>Fire Extinguishers and Cabinets</b>						
Bracket mounted extinguisher	2	ea	265.00	530		
<b>Storage Cabinets</b>						
Grounded Chemical Storage Cabinets OFOI		units		OFOI		owner furnished, owner installed
<b>Equipment</b>	<b>393</b>	<b>gsf</b>	<b>0.00 /sf</b>		<b>\$0</b>	
<b>Appliances</b>						
Appliance - Refrigerator OFOI	1	ea	-	OFOI		owner furnished, owner installed
<b>Fire Protection</b>	<b>393</b>	<b>gsf</b>	<b>0.00 /sf</b>		<b>\$0</b>	
Fire Protection System	393	sf		NIC		existing space not sprinkled
<b>Plumbing</b>	<b>393</b>	<b>gsf</b>	<b>282.70 /sf</b>		<b>\$111,100</b>	

**University of Memphis**  
**Smith Hall Chemistry Building**  
**Hazardous Waste Room**  
**Memphis, TN**

October 18, 2023

Opinion of Probable Cost

**Schematic Design Cost Estimate**

Description	QTY	U/M	Unit Cost	Extended Cost	Total Cost	Comments
<b>BASE ESTIMATE</b>						
Emergency Drench Shower	1	ea	15,000.00	15,000		
Condensate Drain Piping	1	ea	3,850.00	3,850		
<b>HVAC</b>						
Exhaust Fan - In-Line	1	ea	4,750.00	4,750		Greenheck BSQ-90
Exterior Duct for Exhaust Fan	1	lf	2,500.00	2,500		
Makeup Air Unit w/ Elec Heat	1	ea	67,500.00	67,500		Greenheck RV-10-41-1 Package DX
Elec Heater - Explosion Proof	1	ea	5,500.00	5,500		INDEECO
Relocate Existing VAV	1	ea	5,000.00	5,000		
<b>Controls</b>						
Controls - Allowance	1	ls	4,500.00	4,500		Tie to Existing Trane BAS System
Testing and Balance	1	ls	2,500.00	2,500		
<b>Electrical</b>						
	393	gsf	103.82 /sf		\$40,800	
Ark-Gard Explosion Proof Receptacles - Convivence	3	ea	1,200.00	3,600		
Ark-Gard Explosion Proof Receptacles - Refrigerator	1	ea	1,200.00	1,200		
3-way Switches	2	ea	1,500.00	3,000		
Demo Existing Lighting	1	la	2,500.00	2,500		
Power for New Light Fixtures	3	ea	1,500.00	4,500		
Exhaust Fan Power - 120v	1	ea	1,500.00	1,500		
Makeup Air Power - 480v	1	ea	7,500.00	7,500		
Electric Heater Power	1	ea	2,500.00	2,500		
2"x10" Grounding Bar for Storage Cabinets	1	ea	2,500.00	2,500		
<b>Fire Alarm</b>						
Fire Alarm - Explosion Proof Heat Detector	1	ls	7,500.00	7,500		
<b>Light Fixtures</b>						
Vapor Tight C1D2 Light Fixtures	3	ea	1,500.00	4,500		
<b>Light Control System</b>						
Lighting Management Control System	1	NIC		NIC		not included
<b>Communications, Security, Sound, Access</b>						
<b>Data / Communications / CTV</b>	393	gsf	0.00 /sf		\$0	
<b>Access Control</b>						
Access Control Devices		NIC	2.50	NIC		not included
<b>SUBTOTAL</b>						
	393	gsf	\$681.99 /sf		\$268,023	

# Schematic Electrical Systems Narrative



THE UNIVERSITY OF  
**MEMPHIS**

## NEW CHEMICAL WASTE STORAGE ROOM

Smith Hall Chemistry Building

October 10, 2023

Prepared By:



**DEPOUW EDWARDS, LLC**  
ELECTRICAL DESIGN CONSULTANTS

9056 South Corporate Edge Drive  
Germantown, TN 38138  
(tel) 901-754-2535  
(fax) 901-754-2536

## Schematic Electrical Systems Narrative New Chemical Waste Storage Room

Electrical Systems will be designed in accordance with the International Building Code, National Electrical Code, and all local Building Codes presently in force.

### **Scope**

A new chemical waste storage room to be constructed in the open basement area of Smith Hall Chemistry Building. Storage room to be constructed to avoid existing generator feeds to prevent relocation. The basis of design is for all new storage room loads to be fed from "emergency" power. All new loads not within new storage room shall be fed from "normal" power.

### **Electrical Service**

The existing electric service, as furnished by MLG&W is rated 480Y/277 volts. The switchboard serving the building is located in the main electrical room on the ground level. The switchboard is rated 480/277V, 3 Phase, 4W, 4000A with a 4000A main breaker. There are various existing 480Y/277V panels serving existing lighting and mechanical loads. There are also various 208/120 volt electrical panels and step down transformers serving outlets, equipment and other miscellaneous loads.

### **Emergency Electrical System**

An existing emergency generator rated 480Y/277 volts, 350KW with two (2) 250A-3 sub feed breakers serves as an optional standby emergency system. One 250A/3 sub feed breaker feeds an existing 250A 4-pole automatic transfer switch. The transfer switch feeds various emergency panels throughout the building.

### **Surge Protection**

Transient voltage surge suppression doesn't appear to be provided at the main switchboard or any associated panels located in the main electrical room.

### **Building Wiring**

The wire and cable used in this project will be stranded copper. Aluminum cabling and MC type cable are not approved for this project. Connections to mechanical equipment, elevators and similar equipment that are UL Listed for copper conductors only, shall be wired with copper conductors.

All conduit and wiring within the new Class 1, Division 2(C1D2) storage room shall comply with NEC Article 501. Conduit seals shall be used where raceways pass through the new storage room. Conduits seals shall be installed within 10' on either side of the C1D2 boundary. The conduit run between the seal and the point at which the conduit leaves the C1D2 location shall contain no union, coupling or box, or fitting unless specially listed for use in a C1D2 area.

### **Wiring Devices**

New Ark-Gard explosionproof outlet shall be installed within storage room for owner furnished refrigerator. Additional outlets will be provided within the storage room for convenience and as required. Outlets shall be Ark-Gard ENR type, installed at 48" AFF and shall be provided with mating plug.

New outlets will be installed on the new exterior wall of the storage room as requested by the owner. Outlets shall be heavy duty type, installed at 18" AFF and shall be provided with stainless steel device plates.

New three (3) way switches shall be installed on the exterior of the storage room. Switches shall be heavy duty type, installed at 48" AFF and shall be provided with stainless steel device plates.

### **Lighting & Controls**

Fully gasketed, vapor tight, C1D2 LED fixtures with diffused glass lens will be installed within the storage room. New fixtures shall be equal to Holophane #HEXS-L2-MV-4K-T4M-FG. Fixtures shall be controlled by three (3) way switches installed at both doors entering the space. The new storage room is exempt from IECC occupancy requirements therefore none will be provided.

Existing lighting in the area of the new storage room to be removed and turned over to owner. Modify all circuiting as required for remaining lighting and switches to operate.

### **Fire Alarm System**

Existing ceiling mounted notification device will be removed and turned over to the owner. A new explosion proof system heat detector, UL listed for C1D2 spaces, shall be added, and connected to the existing building Simplex fire alarm system. All new wiring and programming shall be provided for a complete operational system.

### **HVAC Connections**

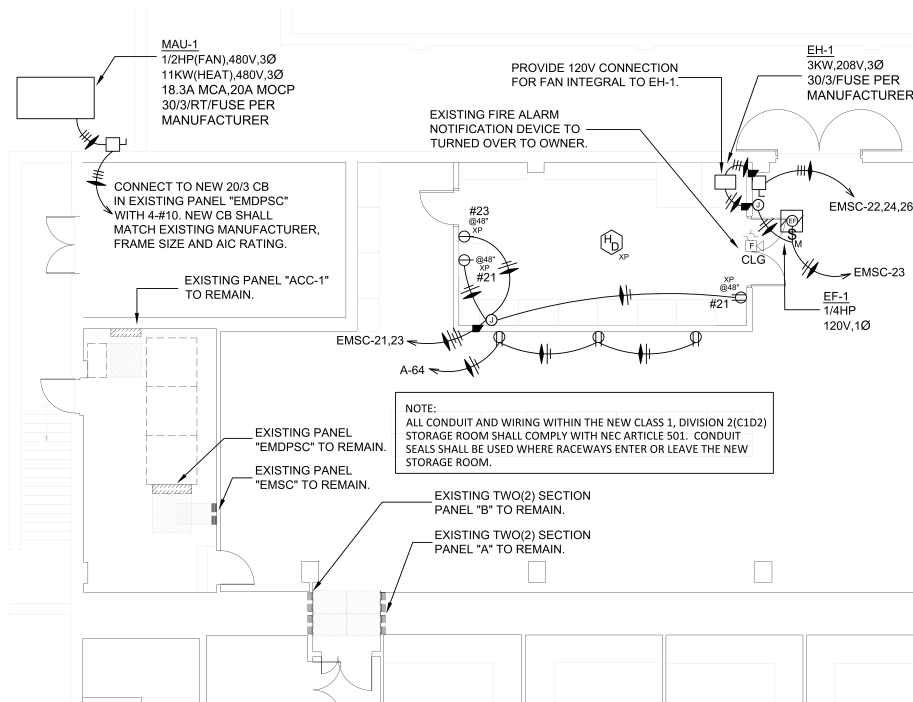
A new dedicated 120V circuit shall be provided for the new exhaust fan and heater fan. Mechanical "snap" switches shall be installed at exhaust fan for local disconnecting means. New circuits shall come from existing spare 20/1 circuit breakers in existing emergency panel "EMSC".

New dedicated 480V, 3 Phase circuit shall be provided for new MAU-1. A new heavy-duty type disconnect shall be installed adjacent to MAU, fused per manufacturer, for local disconnecting means. The new MAU circuit shall come from a new 20/3 circuit breaker, installed in existing space, in existing panel "EMDPSC", located in the main electrical room. The new circuit breaker shall match existing manufacturer, frame size and AIC rating.

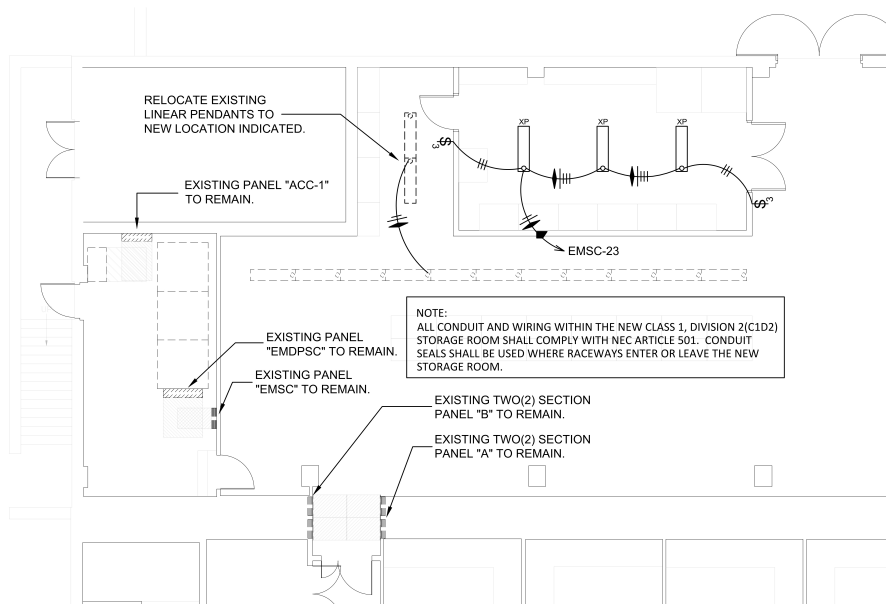
### **Storage Cabinets**

New storage cabinets to be provided with grounding lug. Install new 2"x10" ground bus bar outside new storage room. Connect all cabinets with #6 copper ground wire to bus bar. Install #2 copper ground wire from bus bar to building service entrance ground.

# Schematic Electrical Systems Narrative New Chemical Waste Storage Room



**Figure 1: Power and Auxiliary**



**Figure 2: Lighting**

## Schematic Mechanical Narrative



THE UNIVERSITY OF  
**MEMPHIS**®

### **NEW CHEMICAL WASTE STORAGE ROOM**

**Smith Hall Chemistry Building**

**October 2, 2023**

**Prepared By:**

**BCM**

**BARHAM/CAIN/MYNATT**

*incorporated*

Consulting Engineers

1015 Cordova Station Rd. Cordova, Tennessee 38018

Phone: (901) 685-2371 Fax: (901) 682-0233

**Schematic Mechanical Narrative**  
**University of Memphis Chemical Waste Storage Room**

**Heating, Ventilating & Air Conditioning**

**Room Exhaust**

The new chemical storage room will be continuously ventilated. A dedicated exhaust fan will be provided for continuous exhaust from the space. The proposed fan would be in-line and located outside of the storage room high in the existing basement space so as to be readily accessible for service. Fan shall be suspended from the existing building structure and seismic cable bracing shall be provided for the fan. The inlet air for the exhaust fan shall be taken low in the storage room from within 12 inches of the floor. The proposed exhaust fan would be as follows:

Greenheck Model BSQ-90 In-line Centrifugal Exhaust Fan  
Belt Drive  
Insulated housing  
585 CFM @ 0.60" SP  
¼ HP (115/1/60)  
1,521 RPM  
Max Sones = 11.3 Inlet / 6.7 Radiated  
Industrial Epoxy Coating on all portions of the fan exposed to the airstream.

The exhaust air shall be ducted to the building exterior so as to be a minimum of 10' above grade and a minimum of 10' away from any openings or fresh air intakes into the building. Some exterior exposed ductwork may be required on the outside face of the rear wall of the Smith Chemistry building to achieve the required clearances. Coordinate exact termination point with U of M Facilities and the Architect. All exterior exposed ductwork visible on the rear of the building shall be painted as directed by the architect.

The exhaust fan would operate continuously and would be tied to the existing Trane Building Automation System (BAS) currently in use in this building. The Trane BAS shall monitor the status of the fan and shall alarm the BAS should the fan fail.

**Fresh Air Make-Up**

Fresh air for exhaust make-up will be provided by a dedicated outside air unit. This would be a specialty unit by Greenheck, AAON or Valent suitable for 100% outside air with electric heat. The unit would be mounted outside the building slab-on-grade in the exact location directed by the University. The makeup air supply shall be ducted into the storage room and discharged low (within 12" of the floor) on the opposite side of the room from the low exhaust inlet noted above.

The unit would heat the make-up air supply in winter and cool/de-humidify and reheat the air in summer. In addition to neutral de-humidified air operation, the unit would also provide air conditioning to the space as needed to maintain the room cooling setpoint in summer. The proposed unit would be as follows:

Greenheck Model RV-10-41-1-F1 Packaged DX unit with electric heat  
575 CFM @ 0.50" SP  
DX Cooling Coil: 96.0/79.0 EAT 53.5/53.2 LAT  
52,600 BTU/H Total / 26,400 BTU/H Sensible  
Modulating HG Reheat  
11 KW Electric Heater 0 Deg F EAT / 60.4 Deg F LAT  
Modulating SCR Electric Heat  
460/3/60  
18.3 MCA / 20 MOCP

Unit shall be furnished with integral factory mounted and wired microprocessor controls with BACnet capability for integration into the Trane Building Automation System currently in use in this building.

The unit supply fan shall operate continuously to provide outdoor make-up air to the storage room to offset the exhaust.

During winter operation, the electric heat shall modulate to maintain minimum 65 Deg F supply air discharge to the space. BAS contractor shall furnish and install discharge air thermostat and locate in the supply duct main inside the building.

During spring and summer operation the unit shall operate as a neutral air ventilator, delivering de-humidified and re-heated make-up air to the space at neutral room temperature (70 degrees F adjustable). A remote space over-ride thermostat shall over-ride neutral air operation and provide cooling (53 deg F air) to the space to maintain the room cooling setpoint (75 degrees F – adjustable). BAS contractor to furnish and install all required room/discharge air sensors to accomplish this sequence per the unit manufacturer.

The Trane BAS shall monitor the operation of the unit supply fan as well as the unit discharge air temperature and the temperature/relative humidity in the new storage room. Bas shall be alarmed should the unit supply fan fail. All room and discharge air setpoints shall be fully adjustable thru the BAS.

#### Supplemental Heat

An explosion proof electric unit heater shall be provided in the space to offset the exterior wall heat loss in winter. Unit shall be equal to INDEECO Compact explosion proof heater with Type 304 stainless steel finned tubular heating elements in NEMA 7, 9 cast aluminum enclosure with 16 Ga. stainless steel shroud and adjustable stainless steel louvered outlet grille. Integral controls and wall mounting bracket. 3 KW (208/3/60).

#### Modification to Existing HVAC in Basement

The proposed footprint of the new storage room in the basement is in an area served by an existing VAV terminal with hot water reheat and exposed ductwork with exposed round diffusers. The existing VAV Box is to be relocated as necessary to avoid the new storage room. Ductwork and diffusers downstream of the VAV terminal will be removed within the footprint of the storage

room so there are no duct penetrations of the new storage room walls. The supply main from the existing (relocated) VAV Box shall be re-routed to connect to the existing rectangular main outside the footprint of the new storage room. Contractor to verify exact location and size of main. All existing ductwork and exposed diffusers in the basement - outside of the footprint of the new storage room - shall remain. Existing VAV Box thermostat to remain.

### General

Make-up and exhaust air ductwork would be G90 galvanized sheet metal per SMACNA standards and International Mechanical Code requirements. All duct joints will be sealed with mastic sealant to minimize air leakage. Fire dampers are not permitted to be installed in the ventilation ductwork and all duct penetrations of the storage room walls will be continuous and caulked full perimeter to be completely 'smoke tight'.

All supply air (make-up air) ductwork from the packaged unit on grade shall be externally insulated to prevent condensation and to minimize heat gain/heat loss. All make-up air ductwork external to the building shall be insulated with 2" thick Elastomeric External sheet Insulation finished with 4-ply white Laminate Cover to be completely weatherproof. Flexible elastomeric duct wrap sheet insulation with exterior laminate weatherproof, UV resistant **white** covering having zero permeability. Venture Clad 1577CW-T, ArmaCell Arma-Tuff or equivalent. Laminate cover shall carry a 10-year warranty against breakdown of the membrane due to ultra-violet radiation.

Make-up air ductwork inside the building shall be insulated with 2" thick rigid fiberglass duct board insulation with foil vapor barrier jacket.

Exhaust air ductwork need not be insulated.

The scope of work for the building HVAC will include a complete system test and balance. Test and Balance contractor shall be an independent contractor, certified by AABC or NEBB. Test & Balance contractor shall balance the exhaust air and make-up air to the space. Room should be maintained at a very slight negative pressure with respect to the adjacent space.

Condensate from the packaged unit on grade will need to be disposed of in the manner approved by the local authority having jurisdiction so as to not be a nuisance.

### HVAC Controls

This building is currently served by a Trane Building Automation System. All controls for the ventilation and heating system shall be by Trane (no exceptions) and integrated into the current BAS in this building. Furnish and install all required duct mounted sensors, room sensors, temperature control wiring, operator system software and graphics necessary to accomplish the sequence of control.

All control and interlock wiring shall comply with the National, Local Electrical Codes,

and Division 26 Electrical. All wiring shall be installed in conduit except that plenum rated wiring (without conduit) may be allowed in concealed but accessible locations. All plenum rated wiring shall be properly tied and supported. All exposed wiring shall be installed in conduit. Exposed conduits and supports shall be painted as directed by the architect. All concealed wiring (including drops in walls) and all control wiring exterior to the building shall be in conduit.

The exhaust fan and make-up air fan shall operate continuously to ventilate the storage room space. The BAS shall monitor the status of each fan and shall alarm the BAS should either fan fail. A manual shut-off control shall be provided outside of the room in a location adjacent to the access door to the room or an approved location to permit the fans to be manually stopped. The switch shall be break-glass or other approved type per the authority having jurisdiction and shall be labeled "VENTILATION SYSTEM EMERGENCY SHUTOFF" in minimum 1" tall white engraved letters on red contrasting background.

Controls contractor to fully commission the system and confirm all programming, sequences of operation, alarms and graphics after the installation is complete.

#### HVAC Testing and Owner Training

At the completion of the project the contractor shall provide up to eight (8) hours training for the owner on the complete operation of all HVAC systems and controls. Review intended sequence of operation as well as regular maintenance and service requirements. Owner training session shall be video-taped for owner's future reference.

### **Plumbing**

#### Cold and Hot Water System

The domestic cold and hot water system shall make connection to existing domestic cold and hot water systems in the basement. A 1-1/4" Type L copper water pipe will be required to supply hot and cold water to a new emergency drench shower in the storage room. A shut-off valve shall be provided at each connection. The domestic water piping in the building shall be Type L, ASTM B88 hard drawn copper piping with ASTM B32 soldered joints.

#### Condensate System

The air conditioning condensate for the new make-up air unit shall be piped to the existing indirect waste system below the ground floor slab. The condensate piping shall be routed from the make-up air unit along the breezeway and parallel with ductwork. The exposed condensate piping shall penetrate the existing basement wall and drop down to the floor. The piping shall increase to two-inch diameter and penetrate the basement floor. The contractor shall sawcut the concrete and excavate for the new condensate pipe. The new condensate pipe shall connect to the existing indirect waste pipe below the floor. The condensate pipe shall be copper DWV hard drawn piping with ASTM B32 soldered fittings.

Plumbing Fixtures

A new emergency drench shower shall be installed in the new storage room. The drench shower shall be equal to Guardian G1950P emergency drench shower and eye/face wash with plastic shower head, plastic bowl, and pull down stay-open valve. Install thermostatic mixing valve equal to Guardian G6040 and tempered water supply to emergency shower.

# **Additional Program elements**

## **Research Modernization**

**-Student Ventures Hub – Park Campus (this is part of the swing space that will also be built in number 18 defense audit, those two buildings are connected)**

**-McWherter Library (research pods): Relocation of materials from second floor to upper floors to enable collaboration spaces to be developed.**

**-FIT (for defense research) ; Modifications to existing space for defense related projects.**

**-Items from Donny Ray indicating the scope of work in Life Sciences and Psychology for the animal care items:**

in room 331 in Life sciences on the research modification project. Doctor Lessman has been using the room for many years for his fish research. The space belongs to animal care and has always housed fish as long as I've been here. Doctor Lessman plans to retire next year so he is shutting down his lab. I have another researcher that wants to use the space for Aquatics, but the space needs some renovation. There is a floor drain on the side that is higher than the floor. Basically the room needs a floor drain, a new floor covering and some new ceiling tile

The following list is for Psychology and Life Sciences. Unless noted the items will be needed in both buildings:

Boilers

Cage washer X 1

Bulk carts

Hall Bumpers/guard rails

Door guards

Stainless corners

Metal doors

Sight glass door covers

Cage fill stations

Bottle fill station X 1

Remove incinerator Psy

New floors

Washable ceiling tile

Paint walls

Surgery lights moveable X 4

Surgical heat therapy pump

Isoflurane O2 generators X 3

Monitor/Alarm system/light timers

HVAC controls/humidity controls

Backup HVAC

Sinks in rooms/hallways

Eyewash stations

Working carts

Cage racks

Cover windows in Psy C1 and C2

Surgery tables

PPE cabinets

Updated lights

Add wall in room I Psy

Remove walls in Psy J

Remove walls in LS 123

Euthanasia lids

Animal cages

**-Field House HVAC:**

We want to add air conditioning to two gyms in the Fieldhouse .

Both Fieldhouse gyms 254 and 258 are without air conditioning and, to a large extent, heat. The gyms are far too hot in the summer months (80+ degrees; June-September) and far too cold in the winter months (~50 degrees; December-February). There are cases when activities need to be cancelled or modified due to the improper temperature. The spaces are used by multiple campus groups, including the College of Health Sciences, University Schools, ROTC, and RSOs. While data collection is not the same in these spaces as compared to traditional research labs, the former three groups do conduct regular assessments of student physical performance, and we know that performance can be greatly impacted by the temperature within these facilities. This is particularly problematic when serial testing is done over the course of many days or weeks, which is often the case, where temperature and other environmental factors such as humidity can dramatically impact the results and lead to erroneous conclusions.

**Hazardous Waste Material storage:**

-There is a need for a hazardous materials storage area in chemistry that has been planned and estimated.