BRIDGING DOCUMENTS

CDB #825-030-075
HEALTH SCIENCES BUILDING
SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE
EDWARDSVILLE (MADISON), ILLINOIS
CONTRACT: RENOVATION AND NEW CONSTRUCTION

State of Illinois

CAPITAL DEVELOPMENT BOARD

USING AGENCY: SOUTHERN ILLINOIS UNIVERSITY

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* * REFERENCE INFORMATION DOCUMENTS (RIDs) ARE NOT CONSIDERED CONTRACT DOCUMENTS. RIDs ARE PROVIDED TO PROPOSERS FOR INFORMATIONAL PURPOSES ONLY, AND ARE RELIED UPON AT THE PROPOSER'S/DESIGN-BUILDER'S OWN RISK. THE INCLUSION OF RIDs DOES NOT WARRANT OR REPRESENT THAT THE INFORMATION CONTAINED HEREIN IS COMPLETE OR ACCURATE OR THAT SUCH INFORMATION IS IN CONFORMITY WITH THE REQUIREMENTS OF THE PROJECT. DESIGN-BUILDER SHALL HAVE NO RIGHT TO ADDITIONAL COMPENSATION OR TIME EXTENSION BASED ON ANY INCOMPLETENESS OR INACCURACY IN THE RIDs.

1.01 EXECUTIVE SUMMARY

1.01.1 Introduction

The State of Illinois and the Capital Development Board (CDB) intend to develop a new health science education complex on the SIUE campus with the goal of expanding the University's leadership in health science education and improving the healthcare delivery in southern Illinois and beyond.

The Southern Illinois University – Edwardsville (SIUE), Health Sciences Complex is expected to be an approximately 222,00 gross square foot building. It will bring together the School of Nursing, School of Pharmacy, and portions of the Applied Health department into an interprofessional health science education facility on a prime location on the SIUE campus. The selected site is located in University Park, southeast of the University core campus, and includes (2) existing buildings. This project will serve as a connector to the main campus and create a new gateway from the south into campus.

1.01.1.1 Figure 1: Aerial View of Existing Campus and Project Site

The University's desire is for the new facility to utilize one or both of the existing buildings and was a driver in the site selection process. The School of Pharmacy currently occupies all of Building 220 and a portion of Building 200 and will need to remain operational during construction based on the academic calendar. All other occupants will be vacated from Building 200 by the University via separate projects.

1.01.1.2 Figure 2: Existing Building Views

The following documents will provide design-build teams with the information needed to create an overall design and cost proposal. The documents are divided into four (4) parts. 1.0 Planning and Design Criteria - to provide very broad, overall project information. 2.0 Basis of Design - to provide overall quality and performance expectations for the project, broken down by discipline. 3.0 Appendices - to provide detailed information related to the owner's project requirements, the project program, and the required medical education and laboratory equipment. 4.0 Reference Information Documents – to provide the existing condition work completed to date including environmental surveys, existing condition assessments, geotechnical, etc., to reduce the time needed for the design-build team's assessment. Parts 1.0 and 2.0 are included in this Bridging Document Report. Parts 3.0 and 4.0 are provided as separate electronic files included with the RFP package.

This information is intended to provide the backbone for the design-build teams as they begin their proposal work.

1.01.2 Concept Drawings

The Concept Drawings (4.13 in the RIDs), included as a separate electronic file, illustrate an Indicative Design derived from the project program. This Indicative Design represents explorations and discussions with the Using Agency (SIUE) during the course of program refinements and criteria development for the project. Proposers are not bound to the Indicative Design illustrated and are not required to conform to the indicated project solution. The Concept Drawings are provided solely as a reference that represents one possible preliminary configuration of programmatic elements.

1.01.3 Betterments

The Request for Proposals (RFP) prepared by the Illinois Capital Development Board describes the procedures for design-builders to propose betterments for the project. Proposers are free to develop and include betterments per the RFP. The Using Agency has requested two specific betterments be included in design-builder proposals:

1. Geothermal System
2. Double Electrical Power Feed

See sections 2.07 Mechanical and 2.08 Electrical for criteria related to these betterments.

1.01.4 Textbook Services Relocation

As a part of this project, the design-build contractor is to renovate approximately 7,000 square feet in the existing Morris University Center for the relocation of Textbook Services from existing Building 200. Additional information will be provided to the shortlisted design-build teams that advance to Phase II.

1.01.5 Existing Buildings 200 and 220 Renovation

Any renovation or reuse of either existing building 200 or building 220 shall comply with all criteria in the RFP, the Bridging Documents, SIUE Campus Standards, and CDB requirements and standards. For information on the existing site and buildings see Part 4.0 Reference Information Documents.

1.02 PROJECT OVERVIEW

1.02.1 Context

SIUE is a major public institution, one of two main campuses in the Southern Illinois University system. The university enrolls over 13,000 students of which 10,400 are undergraduates. The campus was started in 1965 on 2,660 acres of former farmland. The campus is located approximately 30 minutes from downtown St. Louis.

1.02.1.1 Figure 1: Original Campus Masterplan Presentation

SIUE offers Health Science education in three areas on the Edwardsville campus: Nursing, Pharmacy, and Applied Health. The schools are recognized for their comprehensive educational programs that include experiential learning, innovative simulation, interprofessional collaboration, research, and community outreach.

The School of Nursing offers the following degrees: Nursing, Health Care and Nursing Administration, Nurse Educator, Nursing Practice DNP, Nurse Anesthesia DNP, Family Nurse Practitioner DNP, and a post masters DNP. The school currently occupies approximately 24,000 NSF in Alumni Hall. As a result of increased enrollment over numerous years, the School of Nursing has significantly outgrown their current space.

The School of Pharmacy offers degrees in two areas: MS in Pharmaceutical Sciences, and a doctorate (PharmD) in Pharmacy. The school currently occupies 30,000 NSF primarily in two buildings located in University Park. Similar to Nursing, Pharmacy has experienced program growth and has outgrown their current space. The two existing buildings do not optimally serve the program requirements and are in need of upgrading and renovation. Furthermore, the distribution of the Pharmacy program across two separate buildings severely limits interprofessional collaboration in teaching and research.

The Public Health program, part of the department of Applied Health, offers degrees in two areas: Bachelor of Science and a Master's degree in public health.

The approved project program, developed in close collaboration with SIUE, will consolidate health sciences programs, currently located in multiple locations around campus and provide much needed growth in research, teaching and simulation.

1.03 SITE CRITERIA

1.03.1 Existing Architecture

Buildings 200 and 220 are existing buildings within the buildable area. It is important to the university for the design-build team to leverage one or both in the proposed design while leaving green space to the west for future expansion.

If demolition is proposed, design-build team must phase the project in a way that existing building operations are coordinated with demolition and new construction.

1.03.2 Campus Context

The proposed design shall orient toward the SIUE Core Campus by offering direct visual and pedestrian connection from the project site to the northwest. The main entry and primary views from the main lobby/circulation space shall establish this axis. Exterior glazing, pedestrian circulation, and landscaping shall orientate to this axis and reinforce this connection.

Though this building will acknowledge the Core Campus in its orientation, it is remote and must possess its own identity and entry sequence reflective of the program.

1.03.3 Site Access

Main access to the campus is via University Drive. Pedestrian access with be via paved walkways from the “fan lot” to the north of the proposed site. All vehicular access to the proposed site will be from University Park Drive.

The existing loading dock of building 220 can be leveraged as service access in the proposed design. Note that program requirements include a new service dock in the proposed design.

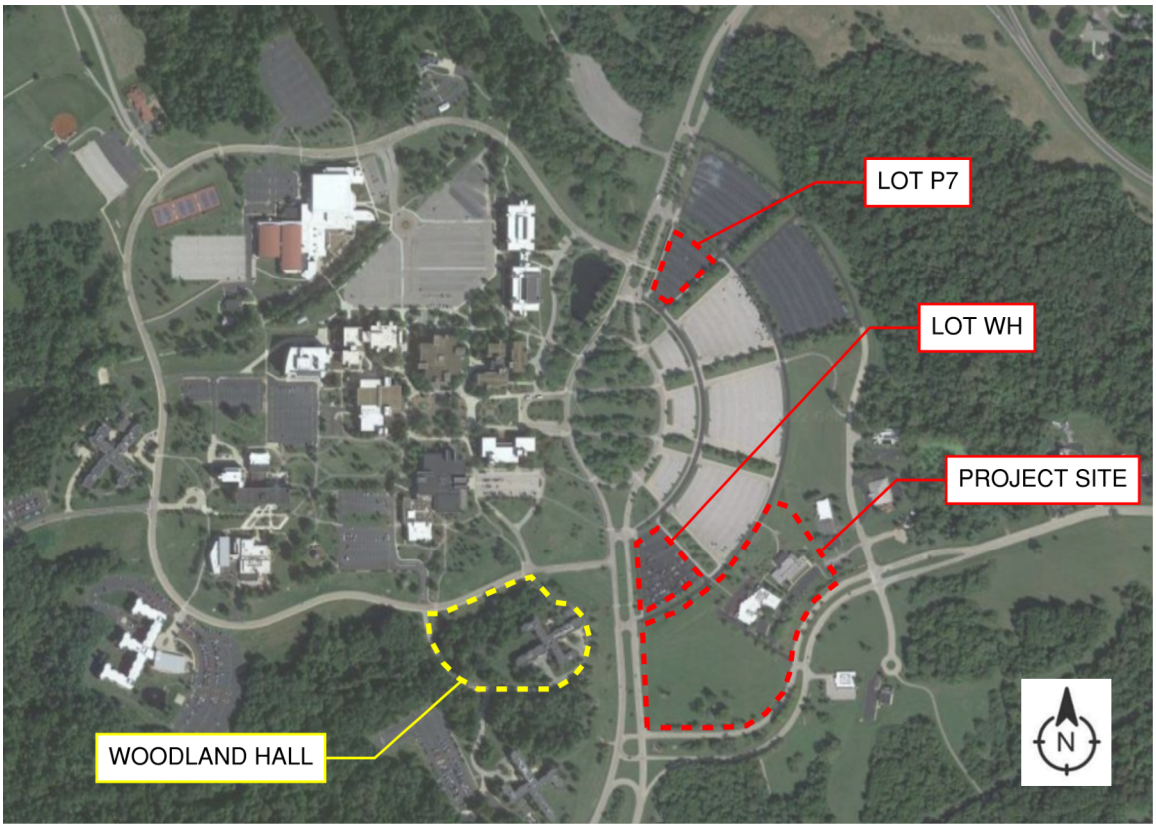
1.03.4 Parking

As part of the project, the existing parking lot “WH” servicing Woodland Hall Student Housing is to be re-developed including a full mill and overlay, striping, lighting, curb cuts and aprons, and signage.

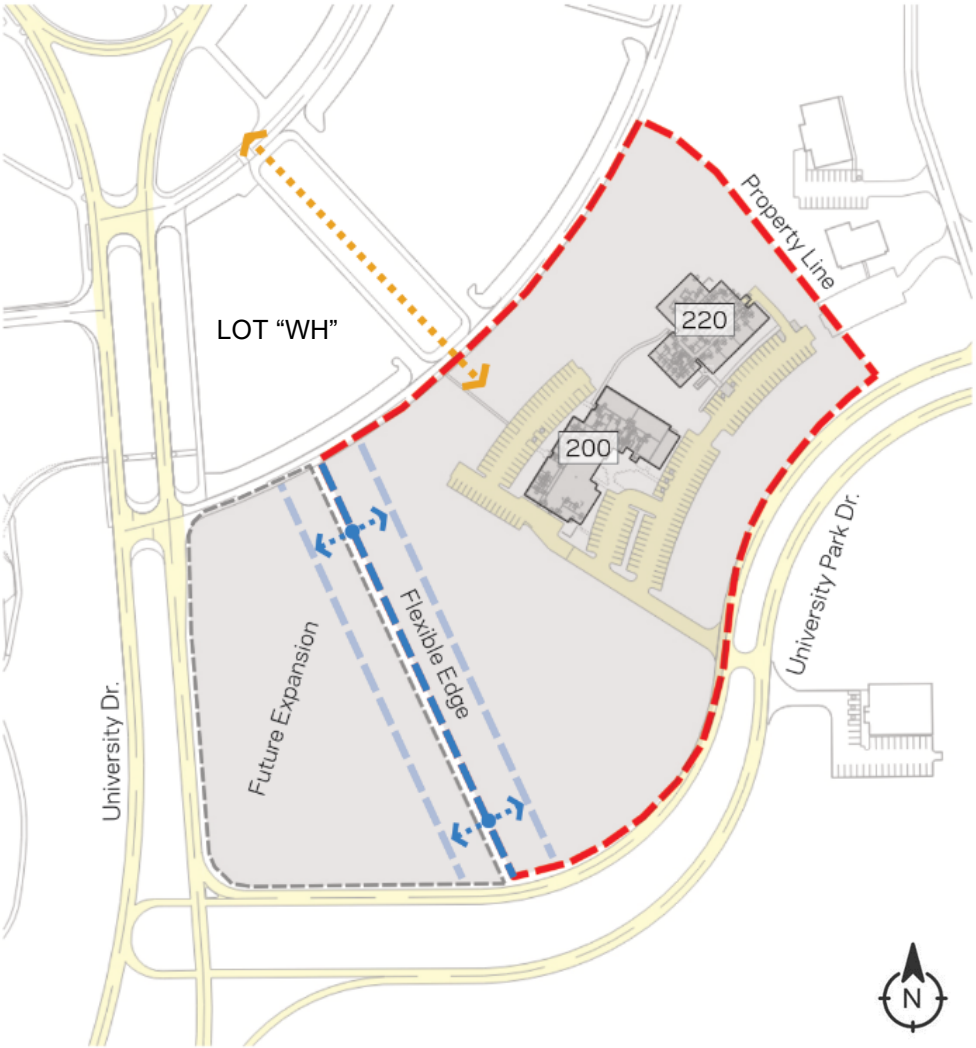
Additionally, the existing parking lot “P7” is to be re-developed including a full mill and overlay, striping, curb cuts and aprons, and signage.

Parking and access immediately adjacent to the building is to be provided to accommodate ADA/IAC code requirements, outpatient parking, public/visitor parking, maintenance, shipping and receiving, and emergency services.

1.03.4.1 Figure 1: SIUE Existing Campus Site Plan



1.03.4.2 Figure 2: Project Site Plan



Vehicular Access/Parking

Buildable Area

Connection to Campus

KEY ISSUES:

1. Utilize one or both Building 200 & 220
2. Phasing strategy required if demolition proposed
3. Area to West for Future Expansion

1.04 PROGRAM SUMMARY

1.04.1 Program Overview

The program of the project reflects the curriculum, pedagogy, and academic goals of the new Health Sciences Building as expressed and discussed during the programming meeting with key stakeholders. The initial schedule of spaces is captured in Appendix 3.02 Program Document.

Programmatic spatial requirements are listed by activity and space type to identify synergies. The program is composed of the following categories:

A. Public & Amenity Spaces: Lists spaces that are common and shared by most occupants of the building
B. Classrooms & Teaching Labs : Lists classrooms and teaching labs of various sizes
C. Nursing Med Ed/Simulation: Lists Simulation, Task training and Standardized Patient spaces as well as offices and workspaces for the same.
D. Research Labs: Lists all research laboratories and laboratory support spaces including an animal vivarium.
E. Workplace & Administration: Lists offices for the Deans, faculty, administration, staff etc.
F. Logistics, Building Support & Systems: Lists spaces for building infrastructure, supplies, waste, and storage.

1.04.2 Program Update

During development of the bridging criteria, SIUE stakeholders requested the addition of the following spaces resulting in a modification to the overall programmatic allocation for the building. These were:

- C2-9 - AR/ VR/ Immersion Lab – Increased to two spaces in lieu of one resulting in an increase of 400nsf
- C2-11- Medical Supplies room – Added an additional room for a total of 2 spaces at 125nsf each.

These spaces are highlighted in the program spaces list included in this section.

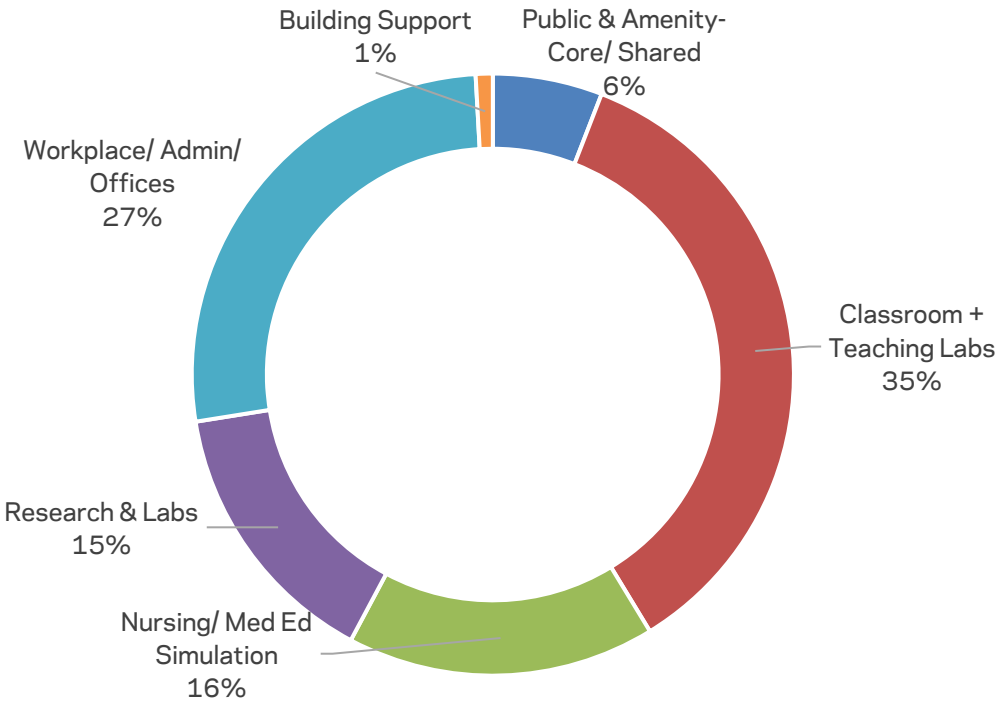
The following page includes a summary of the current program by space type. The total assignable area equals 124,360 net square feet (NSF). An appropriate utilization rate for this building typology is 56%, which allows for adequate mechanical, electrical, plumbing, restrooms, and building support, as well as public circulation and informal collaboration spaces in keeping with guiding principles and program drivers.

The resulting total project size is 222,071 gross square feet (GSF).

1.04.2.1 Figure 1: Program Distribution Summary

Please note that this program and list of spaces supersedes previous documented versions.

Space Category	Area- net square feet
A - Public & Amenity- Core/ Shared	7,325
B - Classroom + Teaching Labs	43,970
C - Nursing/ Med Ed Simulation	20,600
D - Research & Labs	18,260
E - Workplace/ Admin/ Offices	33,075
F - Building Support	1,130
Grand Total	**124,360**



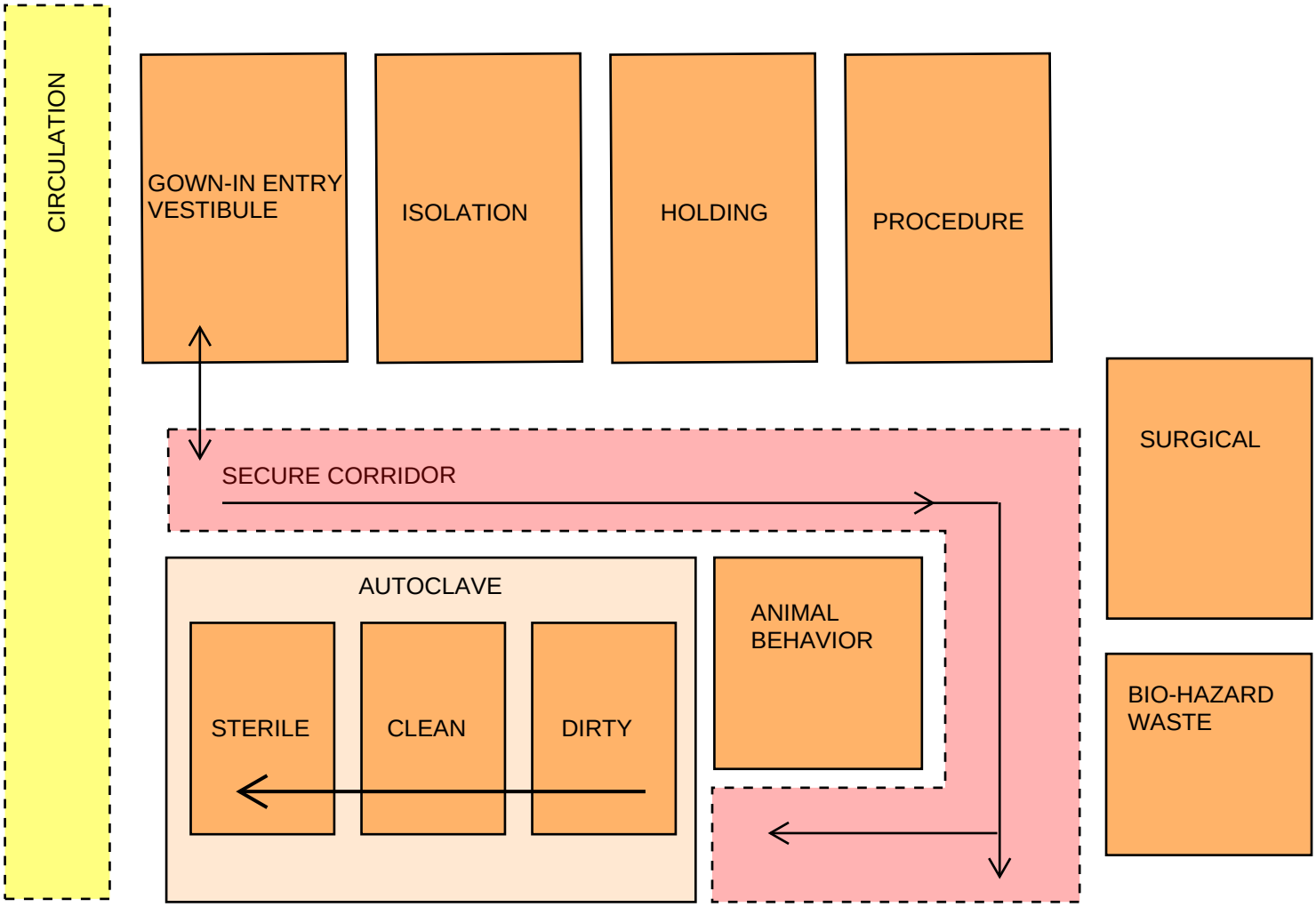
PROGRAM SPACES					
Space ID	Space	Quantity of Spaces	Program NSF	Total Net NSF	Notes
A - Public & Amenity				**7,325**	
A.1 Public & Amenity					
A1-1	Building Lobby	1	1500	1,500	Welcoming entry area; needs to accommodate public events and be AV equipped.
A1-2	Prefunction	1	500	500	Space adjacent to large classroom spaces
A1-3	Shared Student Lounge	1	750	750	Multidisciplinary student lounge with kitchenette, refrigerators, microwaves etc.
A1-4	Food Kiosk/ Vending	1	500	500	Source of healthy food with some seating. Space for vending machines
A1-5	Catering/ Staging	1	200	200	Food staging , warming area for large events
A1-6	Student Commons	1	1200	1,200	Student resource center and hub. Common open area with diverse seating options.-collaborative as well as focus/individual study areas. Include printers/copy nooks
A1-7	Student collaboration areas	3	200	600	Collaboration areas distributed throughout building
A1-8	Meeting Room (15p)	1	375	375	Adjacent to lobby
A1-9	Student Study rooms 2-5p	8	120	960	Small group, glass fronted study rooms equipped with technology. Include writable surfaces
A1-10	Media / Recording Room- One Button Studio	1	200	200	Multipurpose space- instructional video, podcast, recording, media room.
A1-12	Student Organization Storage	3	100	300	
A1-13	Wellness/ Quiet Rooms	1	120	120	Wellness spaces for quiet, respite, relaxation
A1-14	Lactation Room	1	120	120	Include sink, refrigerator
A.1 Public & Amenity				**7,325**	
B - Classrooms & Teaching Labs				**43,970**	
B.1 Classrooms					
B1-1	Large Classroom 100p	4	3000	12,000	Large, flat floor multipurpose space with robust educational technology, flexible furniture to allow for multiple configurations. Can be combined for larger classroom spaces with movable
B1-2	Medium Classrooms 50p	9	1500	13,500	Flat floor multipurpose space with robust educational technology, flexible furniture to allow for multiple configurations. Two classrooms prioritized for Public Health and one for Occupatinal
B1-3	Data Analytics/ Computer/ Testing Lab 50p	1	1500	1,500	
B1-4	Small classroom 30p	2	900	1,800	Nursing, Pharmacy
B1-5	Small Group Rooms 10p	10	300	3,000	Small group study spaces. Half of the rooms paired with operable partitioning between allowing for 20p occupancy
B1-6	Classroom Storage	3	100	300	
B.1 Classrooms				**32,100**	
B.2 Teaching Labs					
B2-1	Drug Information Center	1	300	300	Three student workstations for drug information and pharmacy practice. Director's office to be adjacent.
B2-2	Compounding lab	1	3000	3,000	Pharmacy teaching lab
B2-3	Sterile Compounds lab	1	600	600	Include 2 laminar flow hoods, sink
B2-5	Pharmacy Skills Prebrief/Debrief Room-40p	1	1200	1,200	
B2-6	Large Encounter Room	1	150	150	For families/ larger setup
B2-7	Encounter Rooms	7	120	840	
B2-8	Control Room	1	300	300	Remote monitoring of encounter rooms - 8 stations
B2-9	Storage	2	120	240	
B2-10	Occupational Therapy Lab - First Year	1	2500	2,500	40 students capacity
B2-11	Occupational Therapy Lab - Second Year	1	2500	2,500	40 students capacity
B2-12	OT Lab Storage	2	120	240	
B.2 Teaching Labs				**11,870**	
C - Nursing Med Ed / Simulation				**20,600**	
C.1 Standardized Patient Spaces					
C1-1	Simulation/ SP Lobby	1	250	250	Reception for simulation/ registration of standardized patients
C1-2	SP Ante Room/ Lockers	1	200	200	Include 5 lockers, changing areas, kitchenette, flat screen monitor for orientation
C1-3	SP Moulage/ Toilet	1	100	100	
C1-4	SP Exam Rooms	6	150	900	Provide cameras, speakers , microphones and two separate means of entry/ egress per space. Include charting area outside each exam room - nook/permanent countertop is preferred.
C1-5	SP Monitoring/ Control room	1	300	300	Recordings and monitoring of all Exam rooms
C1-6	Telehealth Teaching Lab	1	240	240	Learning environment conducive to telehealth encounters - 2 stations
C1-7	SP Storage	1	100	100	
C.1 Standardized Patient Spaces				**2,090**	

PROGRAM SPACES					
Space ID	Space	Quantity of Spaces	Program NSF	Total Net NSF	Notes
C.2 Simulation Spaces					
C2-1	Simulation Rooms	4	400	1,600	ORs, PACU, LDR, Acute care simulation rooms. Large for a large student cohort/ IPE sessions. Multipurpose, flexible rooms for various scenarios. Two headwalls in each room.
C2-2	Patient/ Med-Surg Rooms	3	200	600	Patient simulation rooms
C2-3	Designated Agency Simulation Room	1	400	400	Patient simulation room for outside agency/ community partner
C2-4	Large simulation viewing room	1	2500	2,500	Combined simulation demonstration and lecture space for 50
C2-5	Restrooms	2	80	160	Simulated restrooms for training purposes
C2-6	Control Rooms	4	180	720	Control areas may be shared/ grouped and placed between two Simulation rooms.
C2-7	Debrief Rooms	5	300	1,500	
C2-8	Home Health Lab	1	500	500	Space to simulate an efficiency apartment with simulated kitchen appliances, restroom etc. Will be shared with Occupational Therapy students
C2-9	AR/ VR/ Immersion Lab	2	400	800	Flexible environment for use of AR.VR as teaching tools. Include space for existing Anatomage table.
C2-10	Light Board Room	1	150	150	
C2-11	Medical supplies room	2	125	250	Simulated pharmacy and medicine cart area
C2-12	Simulation Storage	2	400	800	
C2-13	Laundry/ Linen	1	120	120	
C2-14	Sim AV Room	1	120	120	Servers for simulation software
C2-15	Sim Mech Room	1	120	120	
C.2 Simulation Spaces				**10,340**	
C.3 Standardized Patient + Simulation Work/ Office Spaces					
C3-1	SON Simulation Lab Director	1	150	150	
C3-2	SON Simulation Lab Coordinator	1	120	120	
C3-3	Simulation Lab TAs	1	200	200	Shared office/ landing spot. Usually 5 students at a time
C3-4	Simulation Lab Technicians	1	100	100	Shared by 2 people
C.3 Standardized Patient + Simulation Work/ Office Spaces				**570**	
C.4 Task Training Spaces					
C4-1	Task Training Lab	3	1200	3,600	Space for students to practice skills, learn intubation, IV starts etc. on low fidelity manikins. Four beds and instructional space per
C4-2	Task training Storage	1	200	200	
C4-3	Acute Care Lab/ Advanced Practice Skills Lab	3	1200	3,600	Advanced Practice Lab. Four beds & instructional space/room
C4-4	Acute Care Lab/ Advanced Practice Skills Lab Storage	1	200	200	
C.4 Task Training Spaces				**7,600**	
D- Research & Labs				**19,820**	
D1 - Research Labs					
D1-1	Synthetic medicinal chemistry	1	1200	1,200	2PI Wet Lab, 2, 4ft hoods, close proximity to NMR. 300sf growth over existing - typical
D1-2	Med Chem Synthesis, analysis	1	300	300	Wet Lab, 2, 4ft hoods, close proximity to NMR. 100sf existing
D1-3	Synthetic medicinal chemistry	1	300	300	Wet Lab, 3, 6 ft hoods, BLI- close proximity to NMR.
D1-4	Microbiology, cell biology	1	1200	1,200	2PI Wet Lab, 2, 4ft hoods, Biosafety Cab., ideally close proximity to vivarium
D1-5	Microscopy, cell biology	1	300	300	Wet Lab, 2, 4ft hoods, Biosafety Cab., close proximity to vivarium
D1-6	Pharmacology research	1	1200	1,200	2PI Wet Lab, 2, 4ft hoods, close proximity to vivarium
D1-7	Pharmacology research	1	600	600	2PI Wet Lab, 2, 4ft hoods, close proximity to vivarium
D1-8	Pharmacology research	1	300	300	Wet Lab, 2, 4ft hoods, close proximity to vivarium
D1-9	Formulation, stability studies	1	1200	1,200	2PI Wet Lab, 2, 4-ft hoods, ideally close proximity to vivarium
D1-10	Biochemistry, pharmacogenomics	1	1200	1,200	2PI Wet Lab, 2, 4-ft hoods, ideally close proximity to vivarium
D1-11	Formulation, stability studies	1	300	300	Wet Lab, 2,4-ft hoods, biosafety cab, future considerations of close proximity to vivarium
D1-12	Computational Lab	1	400	400	8 workstations
D1-13	Epidemiology lab	1	450	450	Space for 4 workstations, meeting area+ large screens - 2 PH, 2 Nursing
D1-14	Nursing Community Research	1	300	300	Space for community research - 4 workstations and meeting area
D1-15	NMR Lab/ Support	1	225	225	NMR lab - matches existing space- may remain in building 220
D1-16	Nursing Wet Lab	1	600	600	Chaya Gopalan Research lab- additional animal behavioral lab in vivarium
D1-17	Nursing Wet Lab Prep/ Support	1	300	300	Support lab for above
D1-18	Freezer Room	2	120	240	Rooms for low temperature freezers with standby power
D1-19	Autoclave/ Glassware wash room	1	600	600	Includes medium glassware washer, sterilizer, ice machines
D1 - Research Labs				**11,215**	
D2 - Vivarium					
D2-2	Gown-In Entry Vestibule	1	100	100	
D2-3	Holding Room	4	180	720	2 double sided IVC cage racks per room, sink, floor drain
D2-4	Surgical Room	2	270	540	

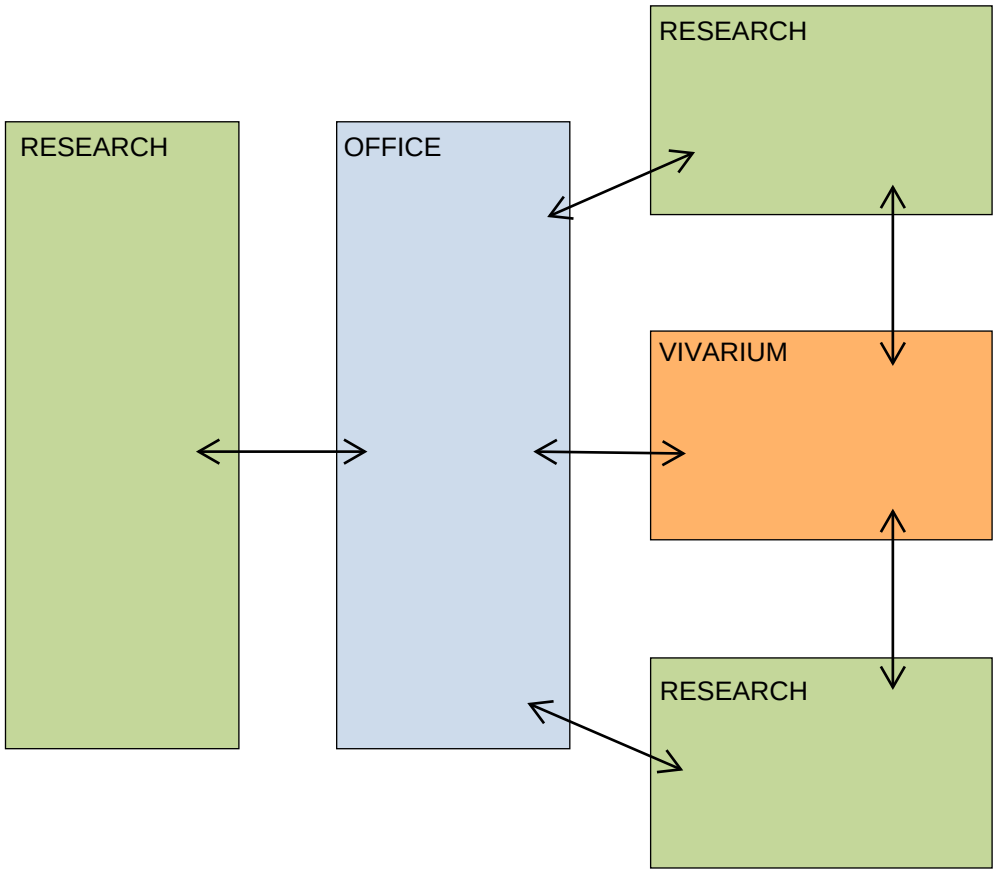
PROGRAM SPACES					
Space ID	Space	Quantity of Spaces	Program NSF	Total Net NSF	Notes
D2-5	Procedure Rooms	2	180	360	
D2-6	Isolation Rooms	1	180	180	
D2-7	Animal Behavior Rooms	2	180	360	One each for mice, rats.
D2-8	Autoclave +Cagewash-	1	1500	1,500	Confirm reusable versus disposable caging
D2-9	Food Bedding Storage	1	120	120	
D2-10	Waste/ Bio hazard storage	1	120	120	
D2-11	Housekeeping Room	1	80	80	
D2-12	Staging area	1	120	120	Near service elevator
D2 - Vivarium				**4,200**	
D3 - Research Offices & Workspace					
D3-1	Post Docs/ RAs	4	100	400	3- Pharmacy, 1 Nursing
D3-2	Grad Assistants	18	75	1,350	16-Pharmacy, 2-Nursing
D3-3	Undergrad students	15	40	600	12 Pharmacy, 3 Nursing
D3-4	PI/Faculty Offices	8	120	960	School of Pharmacy PI / Faculty offices near labs
D3-5	PI/Faculty Offices	4	120	480	School of Pharmacy PI / Faculty offices near vivarium
D3-6	PI/Faculty Offices	1	120	120	Nursing Faculty Office near vivarium
D3-7	Small Meeting room 5p	1	120	120	
D3-8	Medium Meeting Rooms-15p	1	375	375	
D3 - Research Offices & Workspace				**4,405**	
E- Workplace / Offices				**33,460**	
E1 - School of Nursing Dean's Suite + Other Offices					
EI-1	Dean's Office	1	300	300	
EI-2	Associate/ Assistant Dean Offices	3	150	450	Include in Dean's Suite
EI-3	Directors/ Advisors/ Asst to the Dean	13	120	1,560	Include in Dean's Suite
EI-4	Office Support Specialists	5	80	400	Include in Dean's Suite- open workstations
EI-5	Growth/ Future hires	1	120	120	Future hires/ growth for Dean's Suite
EI-6	Reception/ Waiting	1	200	200	For Dean's Suite
EI-7	Board Room	1	500	500	Adjacent to Dean's Office
EI-8	Kitchenette	1	100	100	Adjacent to Dean's Office, Board Room
EI-9	Workroom/ Storage	1	120	120	For Dean's Suite
EI-10	Copy/Mail	0	100	-	For Dean's Suite
EI-11	Department Chair Offices	3	150	450	Primary Care, Family Health, Anesthesia
EI-12	Faculty Offices	52	120	6,240	
EI-13	Shared Faculty Offices	21	180	3,780	3 people to an office- 60 nsf per person
EI-14	Office support specialists	3	80	240	open workstations
EI-15	Growth/ Future hires	11	120	1,320	
EI-16	Directors Offices	2	150	300	
E1 - School of Nursing Dean's Suite + Other Offices				**16,080**	
E2 - School of Pharmacy Dean's Suite + Other Offices					
E2-1	Dean's Office	1	300	300	
E2-2	Admin Support, Dean's Office	1	120	120	Include in Dean's Suite- adjacent to Dean's office
E2-3	Associate/ Assistant Dean Offices	2	150	300	Include in Dean's Suite
E2-4	Business Manager/ Directors/ Coordinator/ Advisors	5	120	600	Include in Dean's Suite
E2-5	Admin Support	2	80	160	Include in Dean's Suite- open workstation
E2-6	Reception/ Waiting	1	200	200	For Dean's Suite
E2-7	Board Room	1	500	500	Adjacent to Dean's Office
E2-8	Kitchenette	1	100	100	Adjacent to Dean's Office, Board Room
E2-9	Workroom/ Storage	1	120	120	For Dean's Suite
E2-10	Copy/Mail	0	100	-	For Dean's Suite
E2-11	Department Chair / Director Offices	3	150	450	Pharmacy Practice Chair, Directors- Drug Information Center (locate near Drug Information Center). Experiential Education
E2-12	Faculty Offices	22	120	2,640	
E2-13	Shared Faculty Offices	2	180	360	3 people to an office- 60 nsf per person
E2-14	Office support specialists	2	80	160	
E2-15	Growth/ Future hires	2	180	360	Adjunct faculty
E2-16	IT Workspace	1	300	300	Shared IT workspace space for 4 staff and 1 student employee
E2-17	Computer staging/ repair area	1	150	150	
E2-18	IT Storage	1	80	80	
E2 - School of Pharmacy Dean's Suite + Other Offices				**6,900**	
E3 - Shared Workplace areas					
E3-1	Hoteling / Touchdown Spaces	5	60	300	Space for visiting faculty, visitors, short term guests
E3-2	Copy/ Mail Area	2	150	300	
E3-3	Storage	2	120	240	
E3-4	Interdisciplinary Faculty/Staff Lounge	2	500	1,000	Include kitchenette, refrigerator, microwave, sink. Seats up to 25
E3-5	Medium Meeting Rooms-15p	6	375	2,250	
E3-6	Small Meeting Rooms- 5 p	4	150	600	
E3- Shared Workplace areas				**4,690**	
E4 - Applied Health/ SEHHB Workplace				3,845	

PROGRAM SPACES					
Space ID	Space	Quantity of Spaces	Program NSF	Total Net NSF	Notes
E4-0	Dean's Office- Hotelling	1	150	150	
E4-1	Faculty offices - Public Health	9	120	1,080	5 currently tenure track, 1 new approved, growth 9 faculty.
E4-2	Lecturer offices - Public Health	4	120	480	2 lecturers currently- will grow to 4
E4-3	Staff - Public Health	1	80	80	
E4-4	Grad Assistants - Public Health	2	75	150	RA/ TAs
E4-5	Faculty/ Staff Offices - OT	7	120	840	To be confirmed
E4-6	Office Manager - OT	1	120	120	
E4-7	Adjunct Offices - OT	1	120	120	Shared office
E4 - Applied Health/ SEHHB Workplace				**3,020**	
E5.0 - Shared Applied Health/ SEHHB Workplace					
E5-1	Reception/ Waiting area	1	150	150	
E5-2	Medium Meeting Rooms-15p	1	375	375	Assume that large faculty meetings can occur in an adjacent classroom
E5-3	Hoteling / Touchdown Spaces	2	60	120	
E5-4	Copy/ Mail Area	1	100	100	
E5-5	Storage Area	1	80	80	
E5.0 - Shared Applied Health/ SEHHB Workplace				**825**	
F- Building Support & Logistics				**1,130**	
F1	Loading dock	1	300	300	
F2	Receiving/ Staging/ Office	1	200	200	
F3	Chemical Storage	1	200	200	
F4	Cylinder storage	1	150	150	
F5	Waste/ Bio hazard storage	1	80	80	
F6	Building Storage	1	200	200	
F- Building Support & Logistics				**1,130**	
Core program net square feet				**124,360**	
Core program gross square feet				**222,071**	56% efficiency

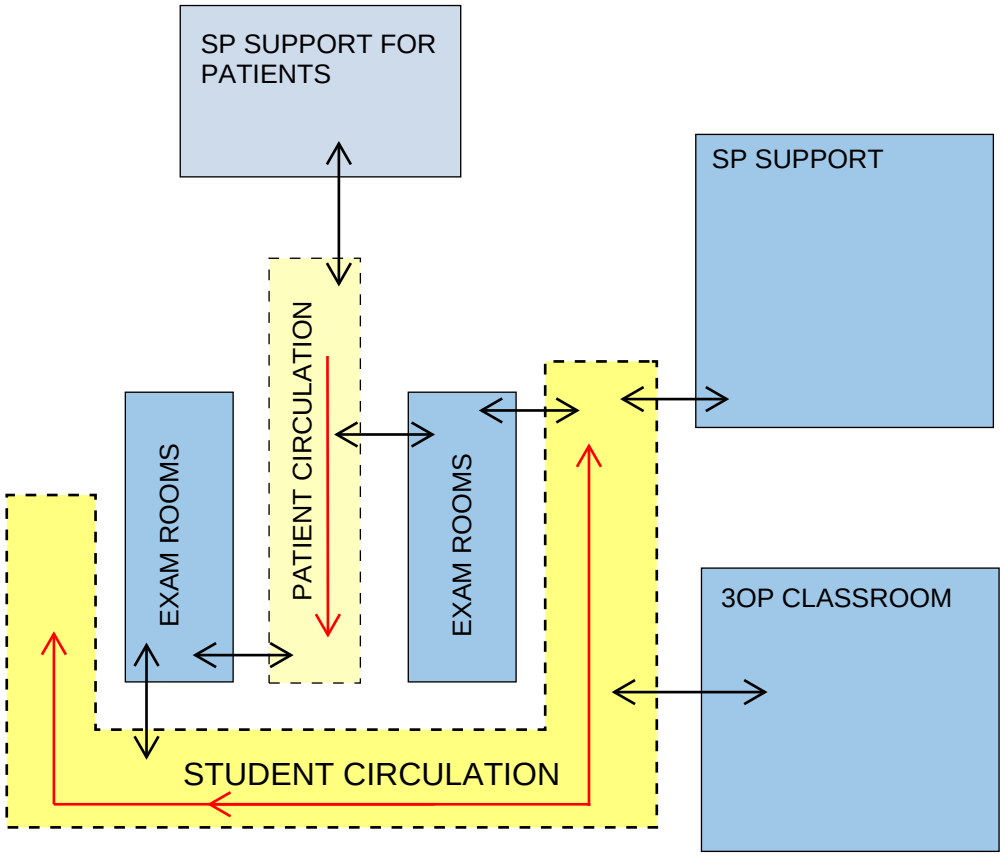
1.05 ADJACENCY DIAGRAMS



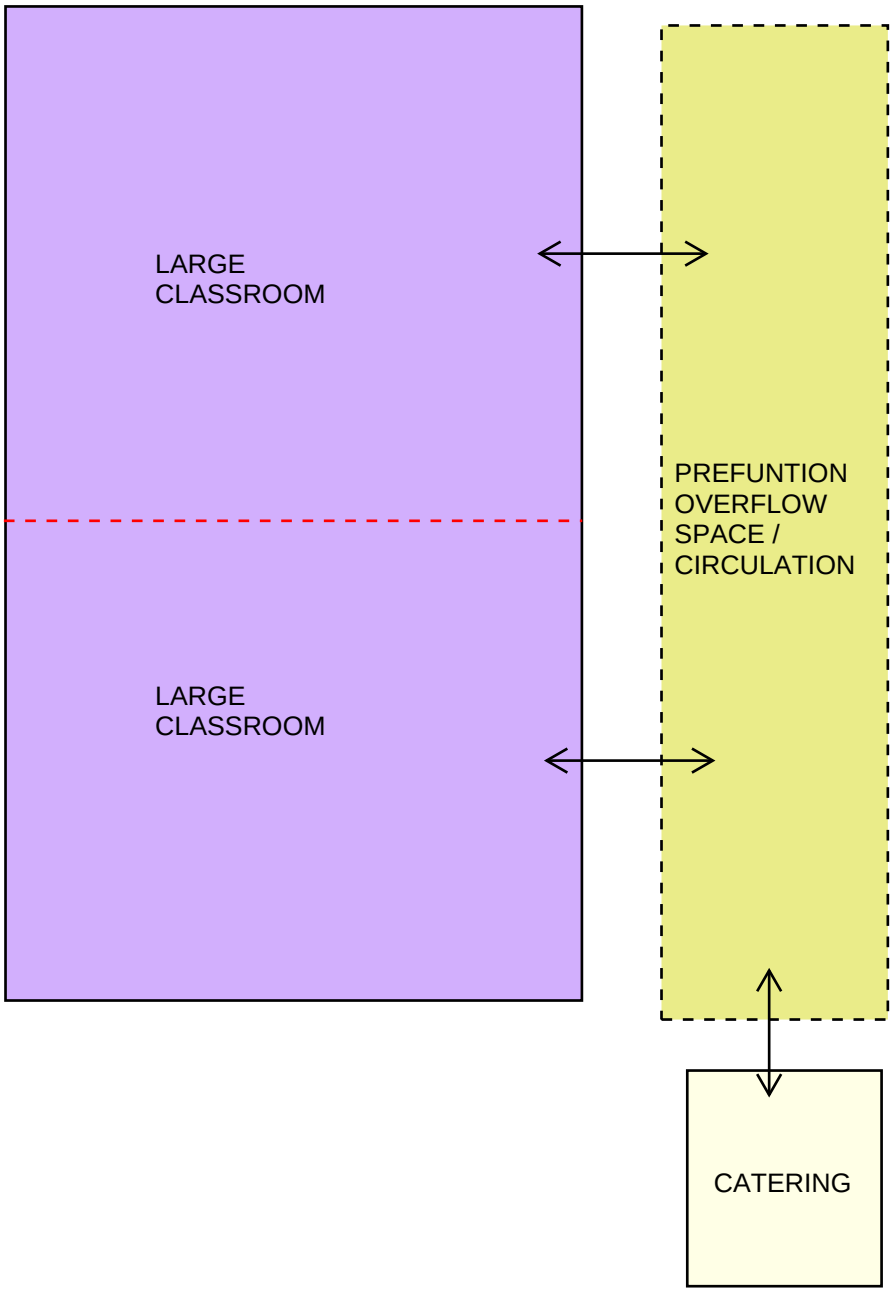
VIVARIUM DIAGRAM



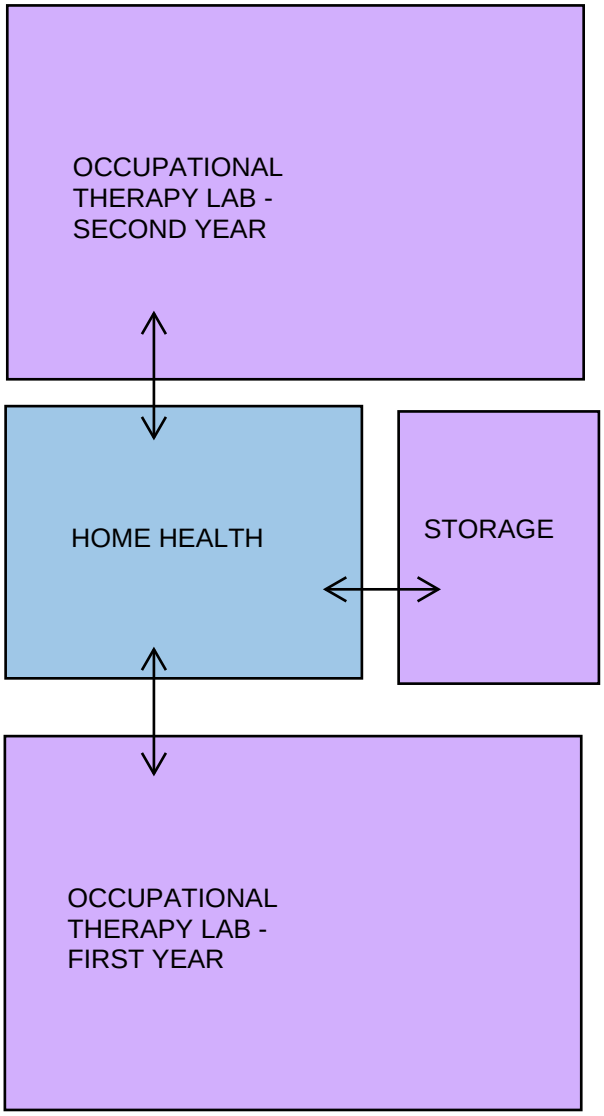
RESEARCH HUB DIAGRAM



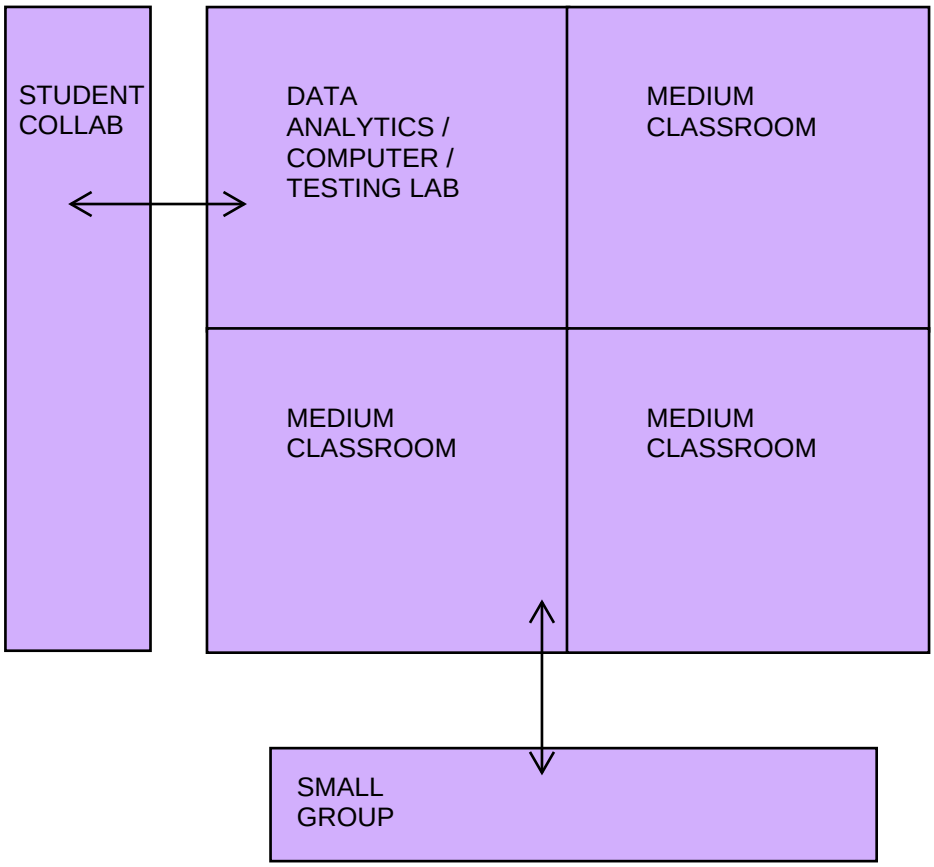
STANDARDIZED PATIENT DIAGRAM



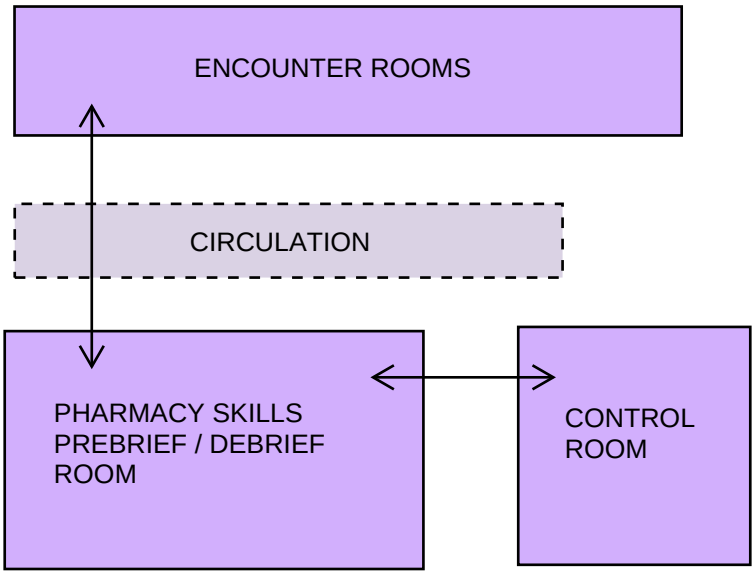
EVENT SPACE DIAGRAM



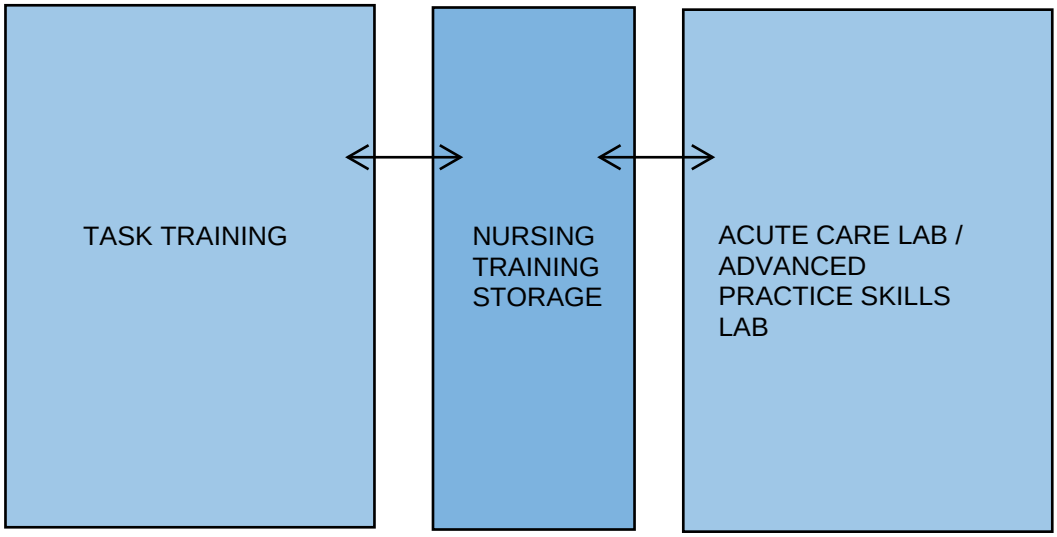
OCCUPATIONAL THERAPY DIAGRAM



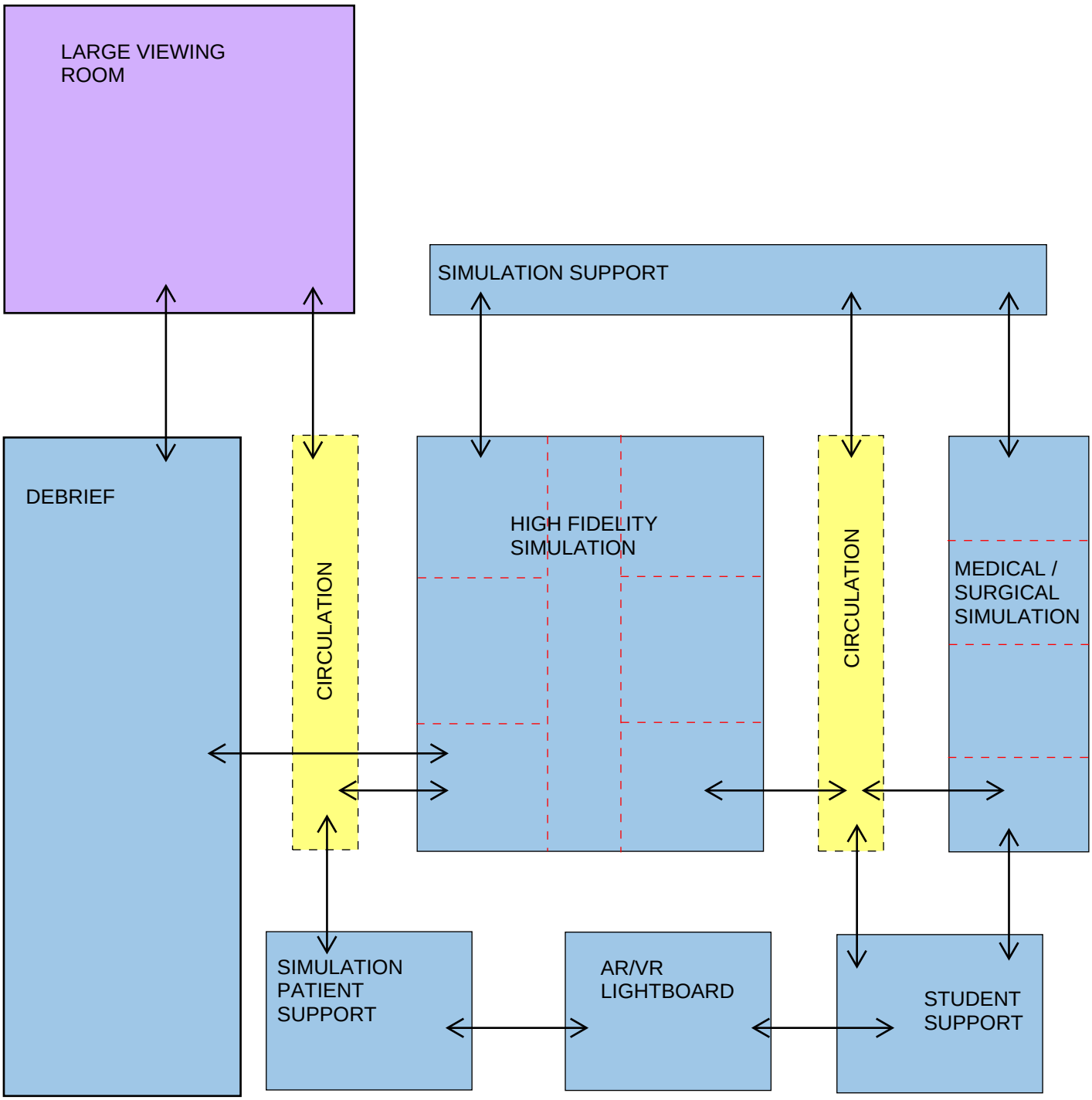
TESTING LAB DIAGRAM



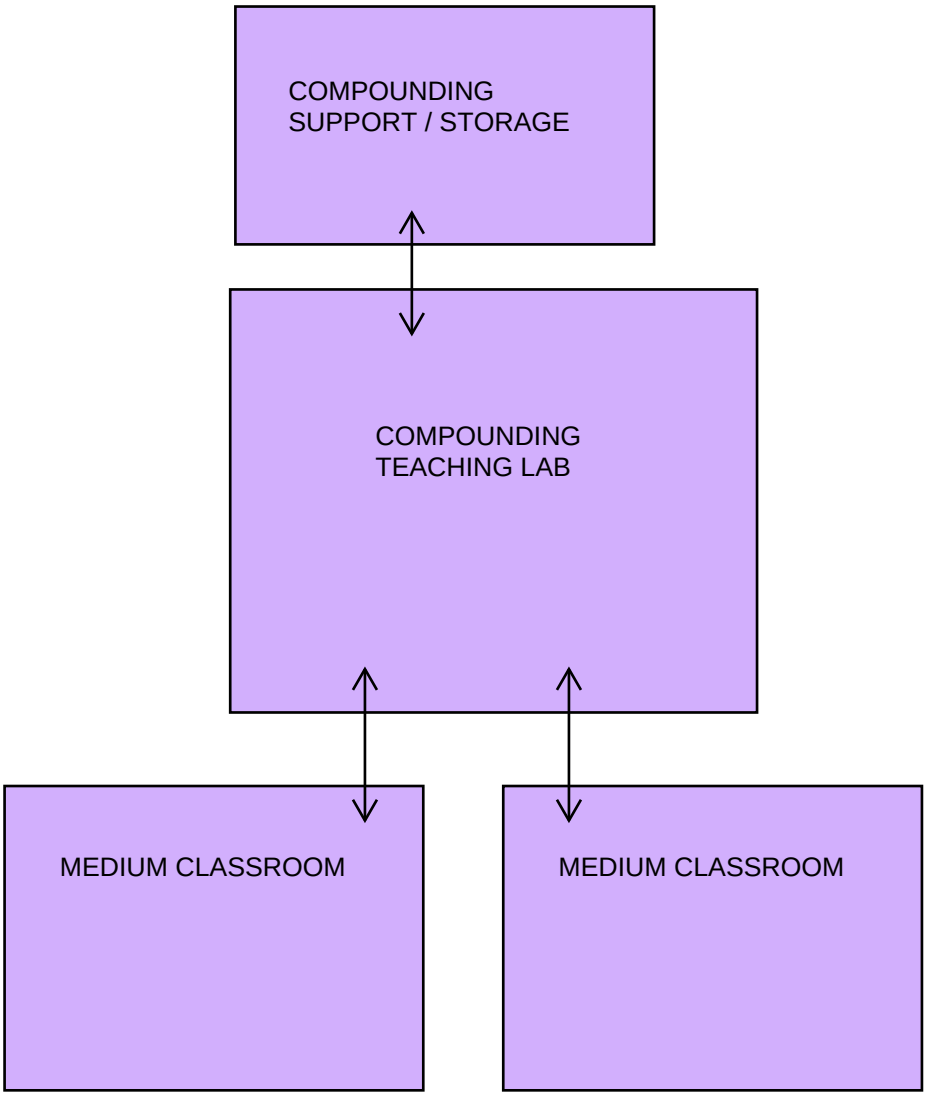
TESTING LAB DIAGRAM



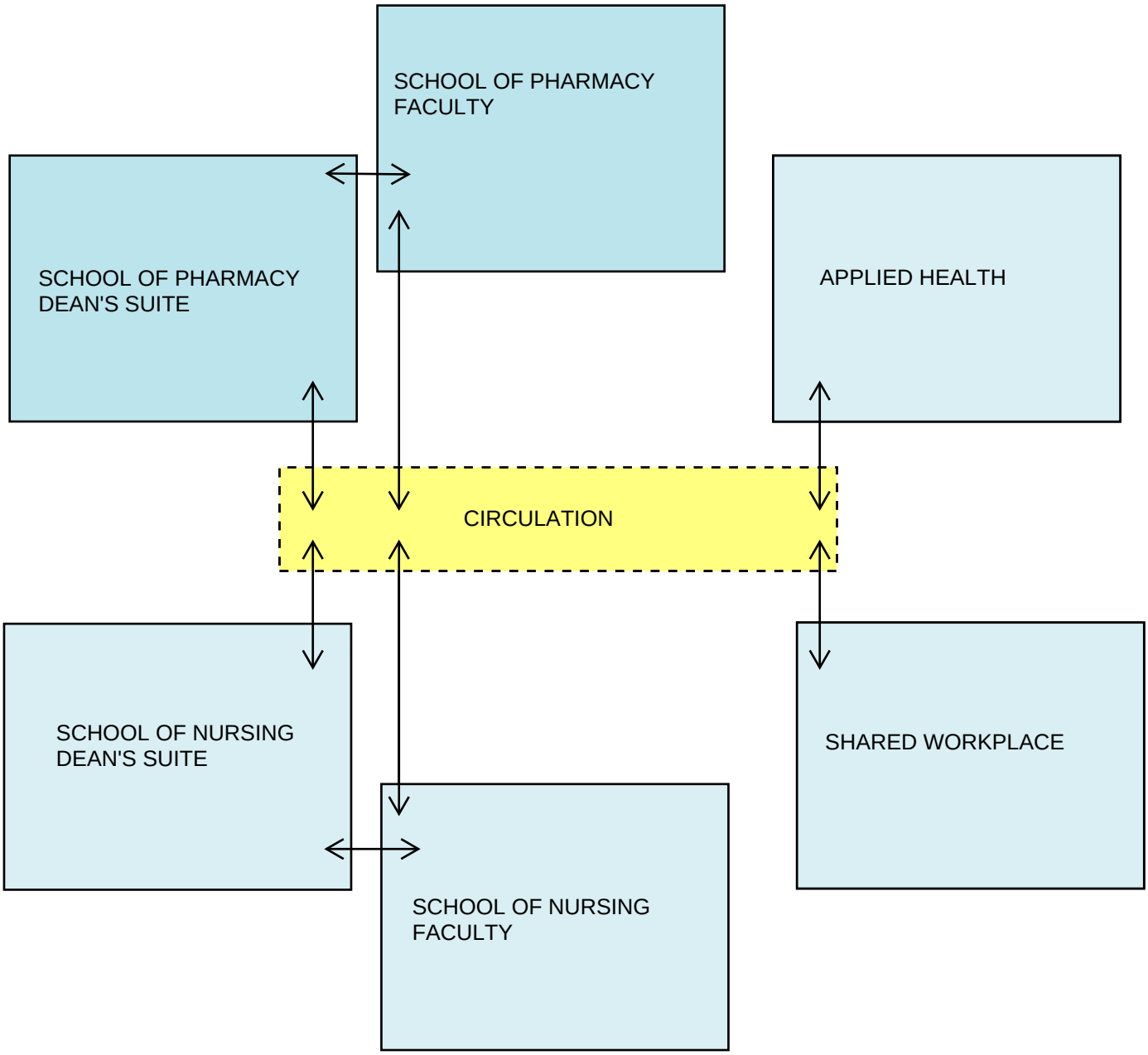
NURSING TRAINING DIAGRAM



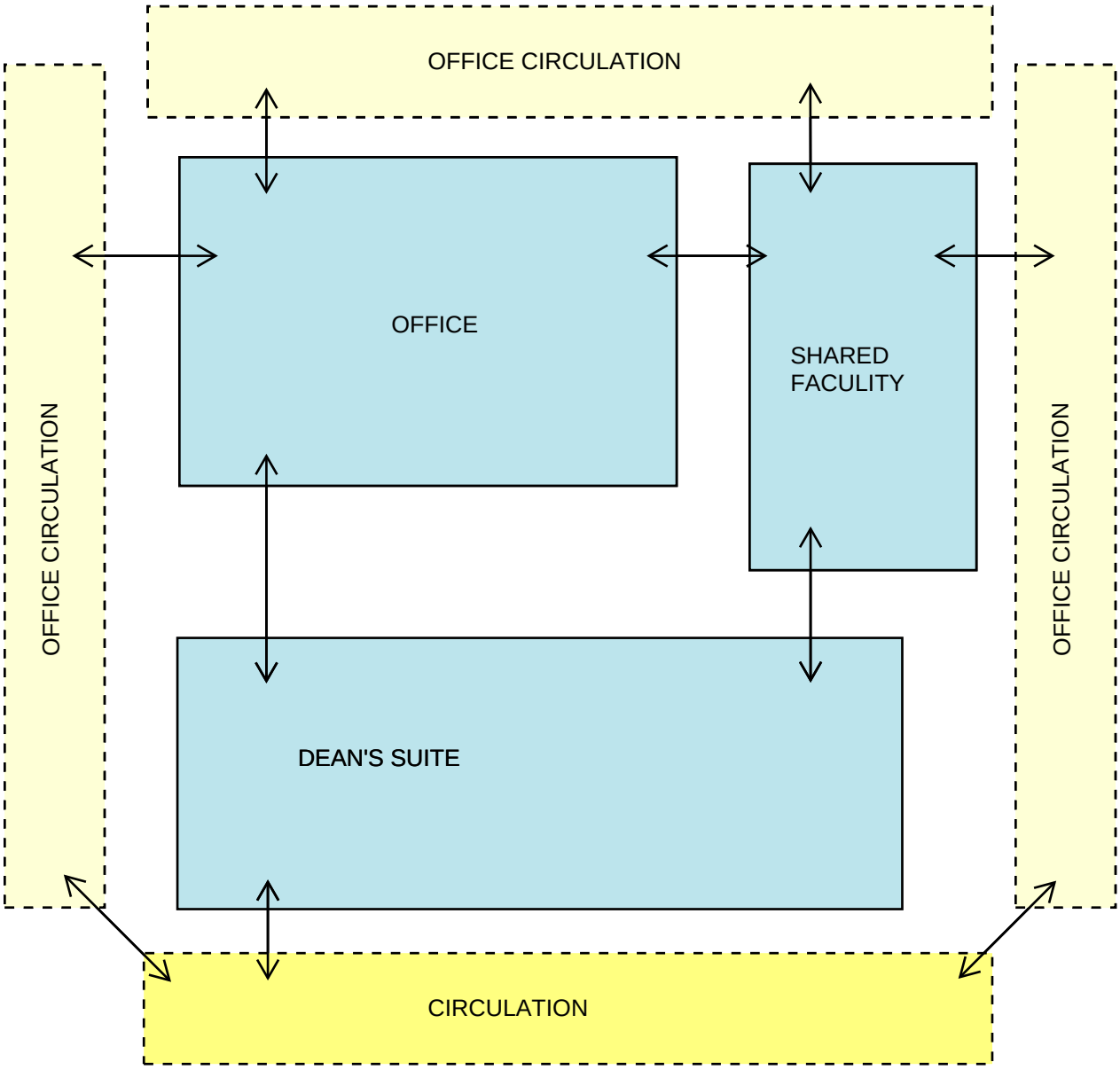
SIMULATION DIAGRAM



COMPOUND TEACHING DIAGRAM



FACULTY DIAGRAM



FACULTY OFFICE DIAGRAM

1.06 SIUE STANDARDS AND OPERATIONAL CONSIDERATIONS

1.06.1 SIUE Standards

Compliance with Southern Illinois University Edwardsville Facilities Construction Standards and Campus Design Guidelines is required for the project. See Appendix 3.01 Owner's Project Requirements (OPR) document for additional information on these requirements.

1.06.2 Academic Calendar

Coordination with the academic functions of the campus and the affected schools is crucial to the project. Each school has individual needs and calendars that may vary from the typical campus schedule. The school schedules and ability to continue operations must be considered in the proposed sequencing, phasing, and overall project execution.

1.06.3 Construction Site Access

Existing parking lot "WH" can be utilized during construction as a laydown area and parking for construction workers. Existing lot lighting will go offline as of 2023. Proposals are to include rehabilitation of this lot at/near the end of the project. See section 1.03 Site Criteria for additional information.

1.07 APPLICABLE DESIGN CODES AND STANDARDS

1.07.1 SIUE Code Requirements

The following Codes will be enforced at SIUE for projects as of September 1, 2020

- 2018 International Building Code
- 2017 National Electric Code
- 2018 International Mechanical Code
- 2014 Illinois Plumbing Code
- 2018 NFPA 101 *
- 2018 International Fire Code
- 2018 International Fuel Gas Code
- 2018 Illinois Energy Conservation Code
- 2018 Illinois Accessibility Code
- 2010 ADA Standards for Accessible Design

1.07.2 CDB Requirements

- CDB Design and Construction Manual

1.07.3 Jurisdiction

- Southern Illinois University Edwardsville Facilities Management
- Illinois State Fire Marshal
- Illinois State Plumbing Inspector
- Illinois Capital Development Board

NOTE: See CDB specification section 014100 – REGULATORY REQUIREMENTS, latest revision, for full listing of applicable codes and standards.

* Current Illinois State Fire Marshal standard is 2015 NFPA 101. Most restrictive requirements apply.

2.00 BASIS OF DESIGN

2.00.1 Description

The following narratives are provided to describe criteria for the project. The use of manufacturer names, products, basis of design examples, or any specific or proprietary terms is utilized to establish a level of quality and performance expectations for the project. The use of basis of design does not indicate sole or limited sourcing, or preference for a specific manufacturer. Basis of design allows alternates of equivalent quality and performance to be proposed as part of the project design solution.

Any instances of sole or limited sourcing will be identified by the Using Agency or CDB and are to be approved by CDB. Within the context of an existing campus, it is expected that some items in the new Health Sciences building will need to integrate with existing campus standards and systems. While extensive coordination has been performed with the Using Agency to develop these criteria, this does not relieve the design-build team from performing due diligence in the selection of all components, systems, products, assemblies, equipment, etc. for the project.

2.01 CIVIL

2.01.1 Site Demolition

Site demolition may include asphalt pavement removal of parking lot(s) and asphalt entrances and connectors, as well as concrete curbs and gutters associated with each parking area removed. Additional site demolition may include removal of concrete sidewalks of varying widths and existing retaining walls.

Many existing utilities on site currently serving the existing buildings may need to be removed and/or relocated to accommodate the new building placement and provide service connections at the desired locations. Utility removal/relocation may include storm sewer, sanitary sewer, water, electric, gas and telecommunications. Light poles and accompanying electric lines feeding the lighting fixtures may need to be removed and/or relocated to provide proper lighting throughout the site.

Tree removal will be required for existing trees of various types and sizes in select areas that impede the construction of the new building, pavements, and drainage improvements. Also, a large art sculpture on the site may need to be temporarily relocated.

2.01.2 Site Grading

Site earthwork will be necessary to produce the desired grade around the perimeter of the new building to provide positive drainage, proper parking lot and entrance grades, and ADA/IAC compliant slopes along accessible pathways.

Hydraulic calculations will need to be performed to determine necessary storm water detention characteristics including properly sized storm sewer structures and detention.

2.01.3 Site Utilities

A 6″ pvc water main on the west side of University Park Drive branches off to the west and serves both existing buildings 200 and 220. There are three existing fire hydrants, one being on the northwest side of Building 200 and southwest side of Building 220. The second fire hydrant is on the southwest side of Building 200 on the west side of the existing parking lot. The third fire hydrant is located on the east side of Building 200 in an island within the southernmost existing parking lot. The 6″ branch currently feeding Building 200 runs between the two buildings and may need to be removed to accommodate the new building footprint. The hydrants may also need to be relocated to provide new means of emergency vehicle access.

There is an existing 10" pvc sanitary sewer main in the northwest area of the site, with separate 6" pvc sanitary services connecting to the 10" main from the west side of each respective existing building. The sanitary sewer main flows to a manhole at the northwest corner of the site. A portion of the existing sanitary main may need to be removed/relocated from the current location if it is within the footprint of the new building.

There are currently several various storm sewer structures on site, many may need to be removed to accommodate the new building and new pavements. The site ultimately drains on the northwest side through twin 24" culverts, on the west side through underground storm sewer piping, and on the southwest side through a 30" culvert. Numerous culverts on site drain into swales along the perimeter of the site as well as two swales on the west side of the site which drain into a ditch on the west side of the site along the east side of S University Drive. There are two large berms along the northwest side of the site. Hydraulic calculations will need to be performed to determine required storm water detention.

Existing electric lines run along the west side of University Park Drive and currently supply power to both existing buildings and light poles on site. New construction and renovation of existing buildings shall address continued operation of the existing buildings, renovation of existing buildings, and eventual decommissioning or repurposing of these public utilities. Refer to section 2.08 Electrical for additional information.

An existing gas line running along the east side of University Park Drive currently serves both existing buildings on site with branches crossing west beneath University Park Drive. It is possible that the existing gas lines will be able to serve the new building. Refer to sections 2.06 Plumbing and 2.07 Mechanical for additional information.

It is possible that the current telecommunications lines serving both buildings will be able to be relocated to serve the new building as well. Refer to section 2.11 Integrated Communications Technology for additional information.

2.01.4 Site Pavement

New pavements added to the site will include a parking lot(s) with multiple entrances to access and service the new building. Concrete curb and gutter will also be included in select areas of the parking lot and entrances. New parking lot pavements will also require parking stall and crosswalk striping, accessible parking signage, and wayfinding signage. Additionally, rehabilitation of existing parking lots "WH" and "P7" is included in the project. See sections 1.03 Site Criteria and 2.02 Landscape Architecture for additional information.

Sidewalks of varying widths may be constructed throughout the site. New sidewalk pavements will require detectable warning mats at required locations. See SIUE standards and guidelines (see section 1.06) for additional requirements.

2.01.5 Regulatory Considerations

It is anticipated that construct activities related to the project could result in the disturbance of greater than 1 acre of land. As such, it will be necessary to submit a Storm Water Pollution Prevention Plan (SWPPP) to the Illinois Environmental Protection Agency. The SWPPP should meet the requirements set forth under Part IV of the National Pollution Discharge Elimination System (NPDES) permit No. ILR10 General NPDES Permit for Storm Water Discharge from Construction Site Activities. The SWPPP should include best practice erosion control measures implemented to mitigate construction activity related offsite sediment transport. Erosion control measures should be in accordance with the Illinois Urban Manual, including, but not limited to, inlet and pipe protection, perimeter erosion barrier, temporary ditch checks, temporary erosion control seeding, and slope stabilization where necessary.

The project location boundary was submitted for review by Illinois Department of Natural Resources through the EcoCAT tool as an informational only project planning submittal. The results from the EcoCAT review were such that no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves or registered Land and Water Reserves were found in the vicinity of the project location.

According to FEMA Flood Insurance Rate Maps (FIRM), no portion of the project area lies within a flood hazard zone. The entirety of the project site is denoted on the relevant flood map as an area of minimal flooding.

2.02 LANDSCAPE ARCHITECTURE

2.02.1 Site Description

The site design intent for the new Health Sciences Building is to place the Architecture at the edge of the campus, bridging the entry to the Core Campus with an inviting form, naturalized groundplane, and integration with existing built elements and topography. The selected site is flanked by large-scale radial parking lots to the north, existing Building 200 and Building 220 to the east, University Park Drive to the south, and University Drive with woodlands and Residence Halls to the west. An earthen berm screens view to the northern parking lot. The intent is to capitalize on these adjacencies, leverage the parking from the radial lots to the north, modify the earthen berms, and build upon the nearby woodland landscape typologies.

Subsequent sections will outline intent regarding Vehicular Access, Pedestrian Access, Site Program, Planting Strategies, Materials, and Amenities. These narratives provide guidelines for strategies that capture the desire to provide a cohesive design solution that integrates landscape architecture into the project. Proposals shall clearly illustrate the design-build team's interpretation of site elements and their relation to the complete proposed project design.

2.02.2 Vehicular Access

A designated new lot is required for limited parking to facilitate short-term visitor, bus circulator, and service vehicular access with a new, dedicated drop-off. This lot will have primarily Illinois Accessibility Code Analysis (IAC) and Americans with Disabilities Act (ADA) compliant parking spaces, prioritizing direct access to the building's main entry point along with a lay-by lane for visitor drop-off or the campus circulator bus embarkment and drop-off.

Parking for long-term visitors, students, faculty and staff, and vehicular access will be provided via the existing radial parking lots. Additional crosswalks and site connections will need to be added to facilitate connections to the new building site.

Views from vehicles traveling along University Drive, especially those traveling north into campus, shall be capitalized upon for the new building, and the site supports that view corridor through strategic planting strategies and topography.

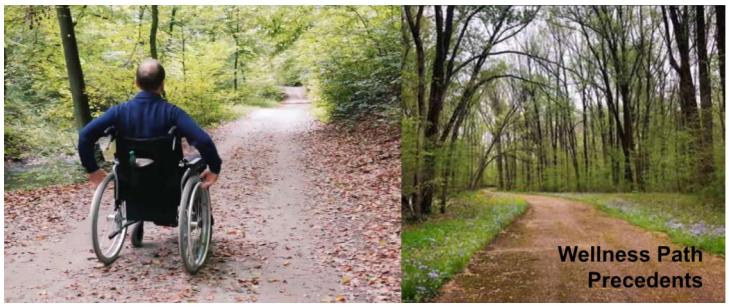
2.02.3 Pedestrian Circulation

To facilitate strong pedestrian access to the Core Campus, the new building shall be laid out so as to support a direct route through the radial parking lots and to the Core Campus beyond.

Supporting goals of student wellness and connection to the unique environment of this region, a Wellness Walk may be implemented on the site. The path will allow space for introspection, walking for health, and exploration of nature. Small outdoor classrooms and art locations shall be located along the wellness walk. Ample diverse tree coverage shall be used to create a comfortable shaded pedestrian environment along pathways.

2.02.3.1 Figure 1: Pedestrian Circulation – North Pedestrian Walkway

2.02.3.2 Figure: Pedestrian Circulation – West Wellness Path



2.02.3.3 IAC/ADA Access

All vehicular crossing, intersection, and connections are to comply with IAC and ADA codes and standards, and all applicable requirements including cross-slopes, pushbuttons, truncated domes, and appropriate site elements. Reference Civil section and campus standards for compliance requirements.

2.02.4 Site Program

Engaging students, faculty, and staff throughout the site will supplement interior programmatic goals while leveraging the ample site of the new building. The site layout shall offer opportunities for gathering, collection, collaboration, celebration, and synergy while also inviting quiet introspection, exploration, study, and respite. Programmatic site areas shall build upon the new building architectural form to indicate these use zones.

It is the intent that a large Student/Event space will be the heartbeat of the new building – inviting open flow into and out of the building. The pedestrian walkway from the main campus shall connect to the building. Breakout areas shall be implemented along with larger outdoor spaces for events, networking, or enjoying nice weather. Outdoor spaces shall host flexible and dynamic furnishings, shade elements, art, and plantings to create a sense of activity and excitement and be reflective of the main Core Campus active quad spaces.

An Entry and Memorial Plaza shall serve to create a sense of identity for visitors, declaring the building's name and address and inviting people to enter. The Entry Plaza aspects of this space shall double as a gathering place; a point of connection for people and places. Fixed furnishings, art, and plantings support the gathering and connection aspects of this space. A building sign, bus circulator amenities, plant material, and lighting cues will also help provide a clear sense of arrival for visitors.

A Memorial Plaza will need to be designed with aspects that will re-purpose the existing Memorial Garden and Memorial Pavers on-site, re-setting the pavers and trees to provide continuity of place and honor their history. The Memorial Plaza shall have amenities to encourage smaller groups to congregate, on a more intimate scale than the Student/Event Space. Signage here can be secondary, identifying the memorial nature of the plaza area. The Memorial Plaza design shall consider how additional memorial pavers, site furnishings and/or plant material can be incorporated in the future with future memorial donations.

As mentioned in the Pedestrian Circulation section, a Wellness Walk shall host some outdoor classrooms, offering a remote alternative to the aforementioned gathering spaces. These spaces invite collaborative learning, discussion, or private introspection.

2.02.4.1 Figure 1: Student & Event Precedent Images

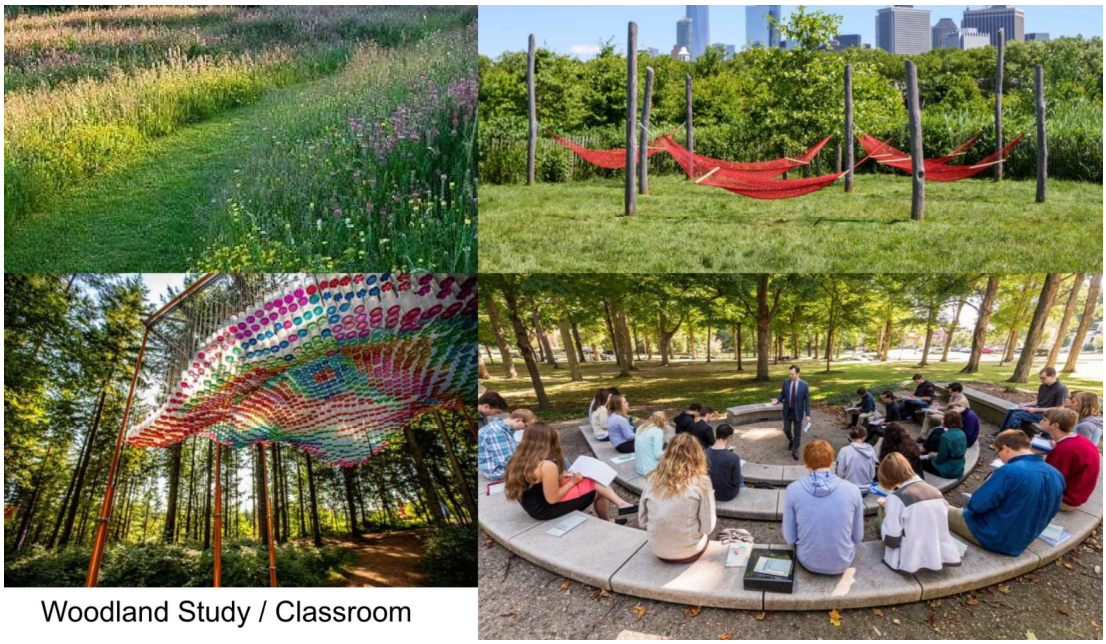
Student / Event Space

2.02.4.2 Figure 2: Precedent Imagery Entry / Memorial Plaza

Entry / Memorial Plaza

2.02.4.3 Figure 3: Woodland Outdoor Classrooms and Study Areas Concept

2.02.4.4 Figure 4: Woodland Outdoor Classrooms and Study Areas Precedent Images



Woodland Study / Classroom

2.02.5 Planting Strategies

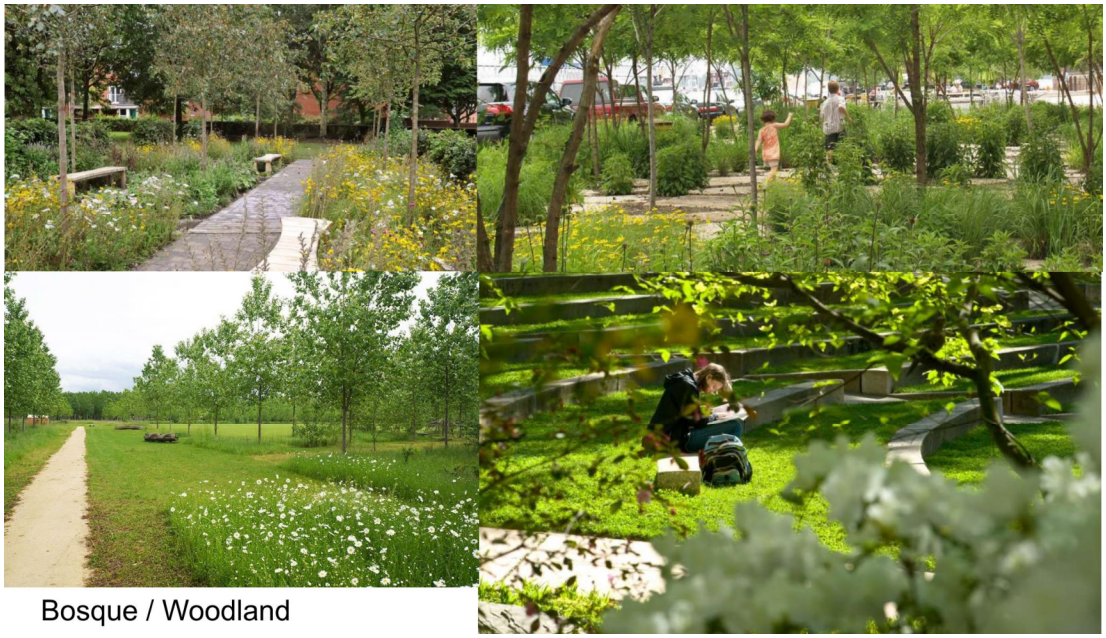
It is the intent of the planting strategies to reduce the amount of open mown lawn and evoke the native oak/hickory/maple woodlands of the region. Along with the visual benefits of woodland in this area, are the myriad ecological and sensory benefits. It is recommended to engage with the local experts at The Gardens and the SIUE Arboretum, in the hopes that this site location and implementation may flank the Core Campus, providing a north and south bookend to efforts on the northern location.

An additional plant strategy to the woodland restoration is to incorporate an all-native or adaptive layered plant palette. The design of the landscape is intended to offer seasonal interest and resiliency, and once established, to have lower maintenance needs than the current campus landscape. The use of native plants in this and all site areas will reduce irrigation water use and, over time, result in a new maintenance paradigm for the campus. Seasonal maintenance in lieu of weekly or bi-weekly turf maintenance is the goal – and supports the robust horticultural legacy at SIUE.

Green Infrastructure and Stormwater Management shall be considered and coordinated with the Civil Engineering team. These areas shall be planted with a blend of Rain Garden/Bioretention Feature species that will tolerate the inundation of rain events, as well as drought conditions brought on by porous soils mixes.

For Campus Standards on Landscaping Spacing and Plantings, reference SIUE Campus Standards (see section 1.06).

2.02.5.1 Figure 1: Wood & Bosque



Bosque / Woodland

2.02.5.2 Figure 2: Native Ornamental Landscape Precedent Imagery

2.02.5.3 Existing Trees

Existing trees to remain; protect in place with tree protection fencing during construction. For trees requiring relocation, confirm quantity and final location with the Using Agency.

2.02.5.4 Dedicated Memorial Trees

Relocate existing Dedicated Memorial Trees from existing Memorial Garden in accordance with the Using Agency. Direction: inclusive of off-site storage and caretaking; relocate dedication signage; protect trees during construction activities and re-establish in completion of sitework. Assume (6) Dedicated Memorial Trees to be relocated on the project site area.

2.02.5.5 Irrigation

Assume drip-line irrigation for all perennial and feature planting areas; assume temporary establishment irrigation for turf-lawn and seeded meadow areas. For all spaces, assume quick-coupler house bibbs in ground-box every 200' on-center for hose-down and temporary water access.

2.02.6 Site Hardscape Material Descriptions

Site Materials have been selected based on many factors, including maintainability, appropriateness to context, connection with the new building architecture, regional sensitivity, and to meet LEED silver requirements. Materials indicated in this package are to be robust, long-lasting, and authentic – reusing existing materials where possible. For Campus Standards on Circulation, Open Spaces, Public Art, and Signage, reference SIUE Campus Standards (see section 1.06).

The pavement on campus shall be designed with an appropriate width, thickness, and reinforcement in pedestrian walks to support maintenance vehicles and snow clearing equipment per SIUE Campus Standards (see section 1.06). Path design shall provide transitions at intersections for sufficient vehicle turn radius. 90 degrees intersections are not acceptable for vehicle maneuvering and snow removal. Pathways that cross the main roads shall have an accessible sloped concrete transition/ramp between the path and the roadway, built in accordance with the current version of the IAC. Both permeable and impermeable sub-base material is acceptable on campus, depending on the stormwater requirements in that particular area of campus.

Requirements for potential site hardscape materials are as described below.

2.02.6.1 Paving Type 1: Standard Pedestrian Concrete Sidewalks

Paving Type 1 shall be included to meet the SIUE Campus standards.

2.02.6.2 Paving Type 2: Concrete Pedestrian Plaza Pavement

5″ CIP Concrete with an exposed aggregate finish on a 4″ compacted aggregate sub-base. With a more specialty mix such as a Limestone or old Monroe aggregate with Meramec River sand, beveled saw-cut joints; cross slopes not to exceed 2% linear slopes to comply with IAC and ADA standards.

2.02.6.3 Paving Type 3: Paver Plaza

Paving Type 3 shall be included to meet the SIUE Campus standards.

2.02.6.4 Paving Type 4: Memorial Plaza Paver Area

Coordinate with the Using Agency. To relocate existing pavers, remove, clean, store, and reuse existing Memorial Paver atop a 4″ CIP concrete base 4″ compacted-aggregate subbase; assume 1″ sand setting bed and edge restraints.

2.02.6.5 Paving Type 5: Wellness Path

2-4" stabilized limestone screening surface over 4-8" compacted aggregate base with edge restraints, plastic ring vehicular reinforcement system; 8' average-wide pedestrian path to comply with campus standards for standard facility vehicle use; cross slopes not to exceed 2% linear slopes to comply with IAC and ADA requirements; enter-crowned, turf-lawn sloped shoulder.

2.02.6.6 Site Walls

CIP Concrete seat walls with decorative finish and integral steel signage; assume SIUE campus-style, custom signage to be incorporated into the wall, assume a wall height of 18".

2.02.7 Site Amenities

Amenities in the new building site area shall support the programmatic areas as described elsewhere in this document. Unless absolutely necessary, furnishings shall be flexible, not fixed, so as to encourage adaptability over time and for all users. This flexibility will allow sun exposure in colder months and shade-use in the heat of summer; gathering for large events, or an escape to quiet reading nooks as needed, and allow facilities to update and adapt as appropriate, depending on user needs. Site Amenities go beyond furnishings. Elements of user comfort and delight shall also be considered in the selection of site furnishings. lighting, safety equipment, signage, art – all are as necessary as litter receptacles for a dynamic outdoor environment that users will love and routinely occupy.

2.02.7.1 Bus Shuttle

Madison County provides bus shuttles and schedules. On campus there are several bus stops and shelters but none near the site. A proposed bus stop and shelter shall be provided for the expansion and connection to this southern portion of the campus, especially for accessibility.

Amenities for Shuttle Pick-Up Location to include a shelter with appropriate signage and lighting. (Potentially provided by Madison County Transit, assume (1) per project area.)

2.02.7.2 Emergency Call Button

A firehouse is located on campus, and the project design requires truck access to hydrants and buildings. CB-S call button to match SIUE Campus standards in Safety Red with SIUE Graphics.

2.02.7.3 Parking Lot Lighting

Parking lot lighting shall be included to meet the SIUE Campus standards.

2.02.7.4 Site Lighting

Pedestrian Lighting shall be included to meet the SIUE Campus standards.

2.02.7.5 Signage

Building identification signage shall be included to match SIUE Campus Standards.

2.02.7.6 Bike Racks

Embedded mount bicycle racks to accommodate student population per LEED or other campus standard calculations. Bike racks shall be included to match SIUE Campus Standards.

2.02.7.7 Trash and Recycling Receptacles

Trash and Recycling Receptacles shall be included to meet the SIUE Campus standards.

2.02.7.8 Tables and Chairs

Flexible furnishing to encourage students and faculty to use year-round; chairs shall be chainable for security but moveable for use and flexibility; tables to have solid surfaces, central bases, chain loops, and umbrella holes. Confirm current direction on flexible site furnishings preference with Using Agency prior to specifying.

2.02.7.9 Bench Seating

Relocate Commemorative Bench(es) existing on-site in accordance with the Using Agency direction; inclusive of off-site storage, cleaning, restoration as necessary; relocate dedication signage; protect during construction activities and coordinate relocation with the Using Agency.

Provide standard fixed embedded mount bench seating along paved amenity zones.

2.03 ARCHITECTURE

2.03.1 SIUE Campus – Original Design Concept

The design of the SIUE Health Sciences Building shall acknowledge, but not necessarily imitate, the overarching design aesthetic of the "Core Campus." This is the central portion of the campus bounded by Circle Drive. Within this area, all campus buildings reflect the original design concept.

2.03.1.1 Figure 1: SIUE Core Campus

Core Campus bound by Circle Dr. and site of the Health Sciences Building shown outside of the core campus in the dashed, red line.

2.03.1.2 Figure 2: SIUE Original Design Concept Realized

Original Design Concept as conceived by Gyo Obata. Of note are the three (3) story concrete masses with strong, horizontal datums as well as the prominent vertical circulation and service cores clad in red brick.

2.03.2 SIUE Health Sciences Building– Architectural Design

The Architecture of the SIUE Health Sciences Building shall achieve the client's vision and mission. There are three main categories of expectations: site context, exterior expression, and interior experience.

First, it must be acknowledged that the project site exists within a greater campus. Proportions, datums, and materiality of existing campus buildings shall be used as a reference for proposed designs at the discretion of the design-build team; however, direct visual and pedestrian path to and from the new facility is required.

The immediate site context consists of two existing buildings accessed from University Park Drive, referred to as buildings 200 and 220 herein (see locations of both in 2.03.1.1 Figure 1 and see facades of both in 2.03.2.1 Figure 1 and 2.03.2.2 Figure 2). Both buildings were originally commissioned by outside agents but have since come under ownership of the University. It is the desire of SIUE that one or both buildings be leveraged in the proposal of the new Health Sciences Building and thus one or both buildings shall have an impact on the design approach of the proposed building. Note that the area in the green field to the west must be preserved for future development and if demolition is proposed for either existing building, a phasing plan shall be provided.

Second, the exterior expression shall fit within the context of the overall campus as a means of preserving and enhancing campus identity. The Health Sciences building shall provide its own individual entry or "front door" experience as well as lending the building visibility and presence.

Third, consideration shall be given to the interior layout in order to achieve the client's vision of "Science-On-Display" or celebrating student work within the school. The design shall create clear and logical connections in circulation (horizontal and vertical) in order to promote collaboration and interdisciplinary interactions.

2.03.2.1 Figure 1: Building 200

Building 200: A two-story building comprised mainly of concrete with a ribbed finish and a characteristic sawtooth roofline for the second story.

2.03.2.2 Figure 2: Building 220

Building 220: A one-story building comprised of a combination of brick and Trespa panel.

2.03.4 Exterior Materiality

The Core Campus is characterized by the nearly exclusive use of brick and precast concrete. Both materials can be considered in the proposal of the Health Sciences buildings, but design-build teams shall consider how to incorporate building 200 and/or building 220 into the proposed design. Given that the proposed site is remote from the Core Campus, the material palette may be broader. Below is a list of potential materials. Design-build teams may offer alternatives. Whichever material palette is chosen it shall be noted that the client has specifically asked for the inclusion of limestone. The material palette should exhibit high quality, limited maintenance, and ensure long term durability. Material selection shall be approved by the Using Agency.

2.03.4.1 Figure 6: Possible Material Palette

2.03.4.2 Exterior Materials for Consideration

Brick
Concrete
Curtainwall and Storefront
Limestone
Limited use of Metal Panel cladding (Coreten not acceptable)

2.03.5 Glazing

Glazing offers two distinct and important amenities, daylight and views. Both have been shown to positively affect the health and well-being of users. Glazing shall be most prominent in circulation and public areas. In areas of expansive south/west facing glazing, solar gain intervention shall be illustrated and defined in proposed design solutions. Glazing shall also be in all classrooms with care taken not to interfere with requisite wall-mounted classroom equipment. Likewise, all administrative areas should have abundant glazing. Energy efficiency and code compliance are also important as well as filtering or blocking direct sunlight as required by the program.

2.03.6 Entry

The proposed site to the Health Sciences Building places it in a unique location on the campus. The main access to the site will be from University Park Drive to the south, but the main student and faculty parking will be to the north. Both points of access must be taken into consideration and expressed in a logical manner that will be easily navigated by students, faculty, staff, and public alike.

2.03.7 Interior Considerations

Openness and connectivity will be a major driver for the experience of this building. It is the Using Agency's desire to create a building with multiple, distinct disciplines that all share visually and physically connected spaces. This can be in the form of open stairs, floor openings, atria, etc. This is not only meant to make wayfinding easy and logical, but also to inspire spaces for "Interdisciplinary" activity areas.

2.03.8 Vertical Transportation

An analysis of the proposed design solution shall be performed to determine the number and location of egress stairs, communicating stairs, and elevators. A minimum of one freight/medical elevator, with the long axis perpendicular to the door(s), capable of moving medical beds and moveable equipment shall be provided. Passenger elevator analysis shall indicate population estimates, traffic patterns, peak demand, and elevator capacity. All elevator systems shall meet the design requirements of ADA/IAC. Egress stairs and elevators shall connect all floors and shall be located in a manner to facilitate easy wayfinding. All vertical transportation shall meet or exceed all building code and accessibility requirements. Roof access shall be by stair, roof hatches are not acceptable.

2.03.9 Equipment Screening

Both rooftop and ground-mounted equipment shall be screened by materials coordinated with and complementing building exterior materials. Equipment screens shall comply with all requirements included or referenced in the RFP and Bridging Documents. Screens shall consider visual and acoustical separations while maintaining appropriate access for maintenance and replacement of equipment.

2.04 INTERIORS

2.04.1 Lobby / Public Corridors

The Main Lobby shall provide a welcoming entry and identity to the building and allow for multipurpose use. When considered in conjunction with a pre-function space, events of substantial scale could be hosted here. It could also be considered as spill over space for the Large Classroom.

Ceilings at the Main Entry Lobby could be painted exposed structural ceiling and infrastructure with 50% coverage minimum 16' high ceiling system to match finish and performance requirements of Decoustics Claro style (NRC .90) with perimeter trim (but is not limited to this product), max. size 4' x 4' per SIUE standards. All adjacent corridors and spaces to Main Entry Lobby to have minimum 10' high, 2' x 2' smooth visual acoustical tegular ceiling tile (NRC per SIUE standards) and 15/16" grid per SIUE standards. Special attention shall be given to the ceiling design to assist with acoustical dampening. Gypsum partitions to be Level 4 finished and painted, using SIUE standard Sherwin Williams Promar 200 products. Use Level 5 finish as required due to paint sheen, lighting, specialty finishes, graphics, or dark accent colors.

At Main Lobby spaces allow for upgraded wall finish such as Forms + Surfaces Levelr Wall Cladding system with laminated glass infill panels. Provide semi-gloss paint finish at Corridors, eggshell finish at all other areas. Signage to be incorporated in alignment with SIUE Interior Signage Master Plan with Signage Addendum 1 + 2.

Unless otherwise specified, doors to be solid core with stained premium wood veneer finish in painted hollow metal frames with integrated 12" wide tempered glass sidelights, at 6" from floor per SIUE standards.

All exterior building windows to have soffit mounted manual roller shades, shade cloth with 3% openness, in a recessed pocket. At double height or hard to reach locations, as well as any large assembly spaces with AV capabilities, provide motorized roller shades integrated into AV or BMS system. Shade openness in these spaces shall be determined by the orientation of the design solution (such as south facing glazing) and/or Using Agency requests for blackout shades due to space type and location.

Student collaboration space to have custom solid surface reception and information desk, final requirements to be determined with SIUE. Building vestibule flooring per SIUE standards.

The Main Lobby, elevator lobby, corridors, and adjacent connected spaces on all levels coulud have up to 3-color pattern epoxy-resin terrazzo flooring with matching precast epoxy-resin terrazzo cove base. Monumental stair treads and risers to be precast epoxy-resin terrazzo to coordinate with Lobby. Monumental Stair rail system to have tempered glass panel + satin stainless-steel guardrail, provide satin stainless-steel supports and rails.

Provide 4' high flush/recessed satin stainless steel corner guards at all outside corners in high traffic areas. Provide stainless steel recessed/semi-recessed fire extinguisher cabinets for SIUE provided extinguishers. Refer to room data sheets (Appendix 3.02 Program Document) for more information.

2.04.2 Workplace

General Space Note: All spaces shall be ADA and IAC compliant or allow for easy modification to be ADA and IAC compliant. Refer to room data sheets (Appendix 3.02 Program Document) for more information.

All spaces within the Workplace have the following unless noted otherwise below. Spaces throughout workplace to have minimum 10' high, 2' x 2' smooth visual acoustical tegular ceiling tile (NRC per SIUE standards)) and 15/16" grid per SIUE standards.

Gypsum partitions to be Level 4 finished and painted, using SIUE standards Sherwin Williams Promar 200 products, eggshell finish. Use level 5 finish at areas with high paint sheen, accent or specialty lighting, specialty finishes, graphics, or dark accent colors.

Signage to be incorporated in alignment with SIUE Interior Signage Master Plan with Signage Addendum 1 + 2.

Unless otherwise specified, doors to be solid core with stained premium wood veneer finish in painted hollow metal frames with integrated 12" wide tempered glass sidelights, at 6" from floor per SIUE standards.

Provide gypsum board soffit at perimeter building windows with soffit mounted manual roller shades, shade cloth with 3% openness, in a recessed pocket. At double height or hard to reach locations, as well as any large assembly spaces with AV capabilities, provide motorized roller shades integrated into AV or BMS system, shade openness per space type based on configuration of the design solution.
Provide bio-based resilient floor tile, to match finish and performance requirements of Shaw Contract – Innate tile (but is not limited to this product), , with 4" rubber base throughout all Workplace areas, unless otherwise noted.

Provide 4' high flush/recessed satin stainless steel corner guards at all outside corners in high traffic areas.

Provide stainless steel recessed/semi-recessed fire extinguisher cabinets for SIUE provided extinguishers.

Enclosed private and shared offices to include door height, tempered glass wall system at office fronts to maximize day lighting, glass wall system shall consider and address any acoustic considerations (see section 2.10 Acoustics).

Board Rooms, Conference and Meeting Rooms to include wall mounted glass markerboards, fabric-wrapped tackable panels and wall space for AV requirements.

Workroom/Storage rooms to include plastic laminate overhead and base cabinets and drawers with solid surface countertops. Include integrated trash and recycling per SIUE standards. Provide wall mounted adjustable shelving. Allow required clearances for SIUE provided office equipment.

Copy/Mail rooms to include plastic laminate overhead and base cabinets and drawers with solid surface countertops. Include integrated trash and recycling per SIUE standards. Provide a wall mounted glass markerboard. Allow required clearances for SIUE provided office equipment.

Kitchenettes include plastic laminate overhead and base cabinets with solid surface countertops, unless otherwise noted. Include integrated trash and recycling per SIUE standards. Provide Energy Star stainless steel appliances as below.

- Refrigerator with freezer
- Microwave
- Dishwasher
- Undercounter Icemaker
- Coffee Makers – commercial grade with integral water line

Shared Staff Lounge to include plastic laminate overhead and base cabinets with solid surface countertops, unless otherwise noted. Include integrated trash and recycling per SIUE standards. Provide a wall mounted glass markerboard. Provide Energy Star stainless steel appliances as below:

- Refrigerator with freezer (two required, see room data sheets)
- Microwave
- Dishwasher
- Countertop icemaker + filtered water dispenser
- Coffee Makers – commercial grade with integral water line

2.04.3 Classrooms

General Space Note: All spaces shall be ADA and IAC compliant or allow for easy modification to be ADA and IAC compliant. See section 4.10 Acoustics for specific requirements associated with these spaces.

Large (100 person) Classrooms walls shall extend up to structure, painted in a zero VOC latex paint in "eggshell" finish.

Flooring shall be a resilient sheet good product that matches the finish and performance requirements of Nora Flooring Environcare (but is not limited to this product), with a 4 inch integral cove base.

Ceilings shall be a minimum 12'-0" AFF high (or higher as required for optimal sightlines) and shall match the finish and performance requirements of Armstrong Ultima (but is not limited to this product, NRC per SIUE standards), with a gypsum board bulkhead at exterior curtainwalls or other design appropriate locations.

Doors shall be a solid core wood door with a natural finish veneer with sidelights and painted hollow metal frames. Each door shall be prepared for electronic access.

Rooms shall allow for one operable wall to connect to adjacent Large Classroom. Operable Wall shall match the finish and performance requirements the Skyfold Zenith Premium 60 (but is not limited to this product) with a markerboard finish, operable walls must be electrically operated.

All windows on exterior of building to have soffit mounted manual roller shades, automatic roller shades shall be located in any double height or hard to reach locations.

The room shall be provided with ample markerboards, and projections screens or monitors as indicated in room data sheets. Coordinate specific AV items with room data sheets.

Medium (50 person) Classrooms walls shall extend up to structure, painted in a zero VOC latex paint in "eggshell" finish.

Flooring shall be a resilient sheet good product that matches the finish and performance requirements of Nora Flooring Environcare (but is not limited to this product), with a 4 inch integral cove base.

Ceilings shall be a minimum 10'-0" AFF high and shall match the finish and performance requirement of Armstrong Ultima (but is not limited to this product), with a gypsum board bulkhead at exterior curtainwalls or other design appropriate locations.

Doors shall be a solid core wood door with a natural finish veneer with sidelights and painted hollow metal frames. Each door shall be prepared for electronic access.

Rooms shall allow for one operable wall to connect to adjacent Medium Classroom. Operable walls shall match the finish and performance requirements (but is not limited to this product) of ModernFold Acousti-Seal Encore with a markerboard finish, operable walls shall be electrically operated.

All windows on exterior of building to have soffit mounted manual roller shades, automatic roller shades shall be located in any double height or hard to reach locations.

The room shall be provided with ample markerboards, and projections screens or monitors as indicated in room data sheets. Coordinate specific AV items with room data sheets.

Small (30 person) Classrooms walls shall extend up to structure, painted in a zero VOC latex paint in "eggshell" finish.

Flooring shall be a resilient sheet good product the matches the finish and perfomance requirements of Nora Flooring Environcare (but is not limited to this product), with a 4 inch integral cove base.

Ceilings shall be a minimum 10'-0" AFF high and shall match the finish and performance requirements of Armstrong Ultima (but is not limited to this product), with a gypsum board bulkhead at exterior curtainwalls or other design appropriate locations.

Doors shall be a solid core wood door with a natural finish veneer with sidelights and painted hollow metal frames. Each door shall be prepared for electronic access.

All windows on exterior of building to have soffit mounted manual roller shades, automatic roller shades shall be located in any double height or hard to reach locations.

The room shall be provided with ample markerboards, and projections screens or monitors as indicated in room data sheets. Coordinate specific AV items with room data sheets.

2.04.4 Restrooms

All walls to be finished to ceiling with porcelain tile.

All restroom ceilings to be 10' AFF high painted gypsum board. All floors to be large format porcelain tile with coordinating tile cove base.

Lavatory countertops are solid surface with integral sink bowls, provide plastic laminate ADA/IAC compliant panel below per SIUE guidelines.

Provide HDPE toilet partitions that matches the finish and performance requirements of ASI Global ceiling-hung partitions with minimal sightlines and wall-mounted urinal screens (but is not limited to this product).

Provide blocking as needed for SIUE provided/installed paper towel dispenser, toilet paper dispenser, soap dispenser, trash cans, sanitary napkin disposal and sanitary napkin dispenser.

Required grab bars to be stainless steel with slip-resistant grip area.

Mirrors to be laminated with stainless steel channel frame, held 4" off the wall to allow for indirect vanity lighting.

Provide ADA/IAC-compliant shelf for personal items near restroom entries.

Provide diaper changing stations in all restrooms and as indicated in SIUE standards.
A janitor's closet with service sink, mop sink hot and cold water, mop holders/hooks shall be provided for every restroom group. Janitor's closet to have fiberglass reinforced panel wall finish for a minimum of 4' at each wall adjacent to mop sink and sealed concrete flooring.

Provide porcelain tile wall protection at all drinking fountain locations.

2.04.5 Simulation Areas

All finishes shall be scrubbable and impact resistant.

Walls are to be painted in a water based catalyzed epoxy in "eggshell" finish. Wall protection shall be provided where walls are exposed to potential bumping from equipment (i.e. carts, patient beds, mobile furniture, etc.). Wall protection shall be Acrovyn panels at a minimum of 60" from floor to top of panel or shall align with the top of the light switch cover plates. Corner guards shall be provided at all exposed corners. Corner guards shall be Acrovyn and the top of the guard shall align with the top of the wall protection.

The ceilings shall be 10'-0" AFF high and shall match the finish and performance requirements of Armstrong Ultima Health Zone (but is not limited to that product) with a gypsum board bulkhead at exterior curtainwalls or other design appropriate locations.

Flooring shall be a resilient sheet good product that matches the finish and performance requirements of Nora Flooring Environcare (but is not limited to this product) with a 4 inch integral cove base.

Doors shall be a solid core wood door with a natural finish veneer with sidelights and painted hollow metal frames. Each door shall be prepared for electronic access.

All windows on exterior of building to have soffit mounted manual roller shades, automatic roller shades shall be located in any double height or hard to reach locations. Where one way windows occur between simulation and control rooms, they shall be one way mirror glazing.

Lighting at control rooms shall be dimmable. All millwork shall be HPL Chemical resistant plastic laminate product with a healthcare setting appropriate solid surface counter and solid surface integral sinks.

Equipment will be wall mounted horizontal headwalls and bed locators. PTZ cameras, ceiling speakers, and wall mounted monitors are to be located at all headwalls. Cubicle curtain tracks, cubicle curtain separation, ceiling mounted mannequin/patient lifts, surgical or exam lights are to also be provided.

2.04.6 Labs and Vivarium

All finishes shall be scrubbable, impact resistant, and chemical resistant.

Walls are to be painted in a water based catalyzed epoxy in "gloss" finish. Wall protection shall be provided where walls are exposed to potential bumping from equipment (i.e. carts, dewars, waste drop off alcoves, etc.). Corner guards shall be provided at all exposed corners. Corner guards shall be stainless steel. The ceilings shall be 10'-0" AFF high and shall match finish and performance requirements of Armstrong Ultima Health Zone (but is not limited to this product), with a gypsum board bulkhead at exterior curtainwalls or other design appropriate locations.

Flooring shall be a resilient sheet good product that matches the finish and performance requirements of Nora Flooring Environcare (but is not limited to this product), with a 4" integral cove base.

All doors are to be a solid core wood door in a natural finish veneer. Door protection (i.e. crash rails, steel kick plates, etc.) shall be provided at all applicable doors. Main lab entry doors are to be a minimum of 54" wide with a 36" leaf and an 18" leaf. Both

doors are to have a full length narrow lite. 36" wide doors for egress only are also allowed and are to have a full length narrow lite. Support labs are to have a door size appropriate for their use and full length narrow lites are to be used, unless support lab use dictates a need to not use a lite in the door.

For atypical laboratory types that require specialty conditions alternate materials may apply:

- When laboratory use requires it, a minimum of 9'-0" ceiling consisting of the material appropriate for the lab use may be used.
- CMU walls will be acceptable but when used, CMU walls shall have a smooth parging coat applied and are to be painted with water based catalyzed epoxy in "gloss" finish
- When laboratory use requires it a high-performance epoxy or urethane flooring maybe used. An 12" integral cove base is to be used when these flooring types are used.
- High performance epoxy or urethane wall coating, stainless steel panels or FRP are acceptable alternate wall materials when the laboratory use requires a more durable material than the water based catalyzed epoxy paint.

Casework at sinks and fume hoods is to be fixed, inset style, steel casework in white. Overhead storage can be either cabinets or open, adjustable height, steel shelving. No sliding doors will be permitted. All other casework will be mobile, adaptable, 'plug and play' type and shall be a single sided frame system with overhead services provided by ceiling interface panels with quick disconnect hoses. All countertops are to be phenolic resin in grey with the exception of fume hoods, fume hoods shall be epoxy resin in grey. All laboratory sinks shall be undermount epoxy resin. Stainless steel is an acceptable alternative when the lab function prefers it to be. Any standalone handwash sinks are to be wall hung stainless steel.

Safety stations will consist of a recessed unit with, safety shower, eyewash, and fire extinguisher. All safety stations will have a thermostatic mixing valve provided with the unit to provide temperate water. The unit shall be in compliance with ANSI Z358.1. Additionally, eyewash/drench hose units with a thermostatic mixing valve, shall be provided at remotely located sinks that are not adjacent to a safety station and in support labs where a safety shower is not located, (only required where a sink is provided).

Lighting levels shall be a minimum of 80 foot candles at bench level with 100 foot candles preferred. Where task lighting is noted, the basis of design is the Reed Premier light in the white frame with the occupancy sensor feature. Natural Light is preferred for laboratories where it can be achieved.

At Vivarium spaces, alternate materials shall be used.

Doors are to be galvanized hollow metal, 18 gauge heavy duty metal with rigid, honeycomb core. The finish of the doors shall be either stainless steel, FRP, or painted in a water based catalyzed epoxy in "high gloss" finish. The door finish shall be determined by the cleaning procedures outlined by the vivarium users and by the animal biological safety level. Doors shall have a small vision window at 54" AFF to bottom of glass. Door frames shall be galvanized hollow metal, 14 gauge heavy duty metal in accordance with the Steel Door Institute (SDI 100). Door frames shall be stainless steel or painted in a water based catalyzed epoxy in "high gloss" finish. The door frame finish shall be determined by the cleaning procedures outlined by the vivarium users and by the animal biological safety level. Door hardware shall include acoustic and door bottom seals and card access throughout the suite.

Exterior openings at the vivarium shall be analyzed for inappropriate glare and heat gain to these sensitive spaces. The proposed design solution shall indicate measures taken to avoid direct sunlight, glare, heat gain, or other affects incompatible with the vivarium.

Flooring shall be high performance or urethane resinous flooring with a 12" integral cove base. The top coat of flooring shall have an antislip grit, but maintain cleanability. Or, a sheet vinyl floor with a 12" integral cove base may be used. Flooring material shall be selected by end users and chosen based on cleaning and sanitizing protocols.

Stainless steel crash rails at 42" and 72" shall be located at all walls that have animal cage racks. Full height stainless steel corner guards shall be used at all exposed corners.

Gypsum Board ceilings with a minimum of 10'-0" AFF shall be used with appropriate lighting and mechanical fixtures that have been gasketed or sealed. All casework within space shall be stainless steel. All fixtures shall match what is specified within general lab spaces.

Entry to vivarium shall have a vestibule for gowning and donning appropriate PPE for vivarium use. Doors shall be interlocking and shall be on card readers to provide appropriate security. Vestibule shall be appropriately sized to allow for bringing in pallets of material. Vivarium shall maintain a clean/dirty flow of materials to minimize contamination.

To promote sustainable practices, the following items shall be considered baseline items in the laboratories.

- High efficiency water fixtures
- LED lighting at lab benches and in fume hoods
- Occupancy sensors for all laboratory lighting

To promote sustainable practices, the following design initiatives shall be considered.

- Group large, heat producing pieces of equipment into one room or area to conserve HVAC usage.
- Locate freezer farms and other rooms that produce lots of heat, inboard. This will make it easier to control the temperature of the room.
- If a freezer farm or equipment room is not utilized, locate all large heat producing equipment inboard of the lab, away from exterior windows.

Use automatic sensors on all handwashing sinks per SIUE standards.

2.04.7 Student Spaces

All collaboration spaces for students to have the following unless noted otherwise below. Ceilings to be minimum 10′ high, 2′ x 2′ smooth visual acoustical tegular ceiling tile (NRC per SIUE standards)) and 15/16″ grid per SIUE standards.

Gypsum partitions to be Level 4 finished and painted, using SIUE standards Sherwin Williams Promar 200 products, eggshell finish. Use level 5 finish as required due to paint sheen, lighting, specialty finishes, graphics or dark accent colors.

Signage to be incorporated in alignment with SIUE Interior Signage Master Plan with Signage Addendum 1 + 2.

Unless otherwise specified, doors to be solid core with stained premium wood veneer finish with glass insert in painted hollow metal frames with glass fronts to maximize day lighting.

Glass wall system must consider and address any acoustic considerations.

Space to include wall mounted glass markerboards, fabric wrapped tackable panels and wall space for AV requirements.

Provide bio-based resilient floor tile that matches the finish and performance requirements of Shaw Contract – Innate tile (but is not limited to this product), with 4″ rubber base throughout all Workplace areas, unless otherwise noted.

2.05 STRUCTURAL

2.05.1 General Design

The following basis of design is for the proposed new health sciences building on the campus of Southern Illinois University in Edwardsville, Illinois. The building will consist primarily of offices, classrooms, and laboratories. The building will primarily be occupied by staff and students attending Southern Illinois University Edwardsville.

2.05.2 Codes and Technical References

- International Building Code, 2018 (IBC 2018)
- American Society of Civil Engineers 7: Minimum Design Loads for Buildings and Other Structures, 2016 (ASCE 7-16)
- Illinois Capital Development Board Design and Construction Manual, 2009 with Supplements (CDB DCM)
- Southern Illinois University Edwardsville Design Guidelines for Architects and Engineers, 2016 with Amendments (SIUE DGAE)

2.05.3 Geotechnical Information

Geotechnical information is based on the Preliminary Geotechnical Engineering Report, SIUE Health Sciences Building, prepared by Terracon, Inc., dated September 15, 2021, and the Amendment 01 dated November 11, 2021. This information will be referred to as the "Geotechnical Report" through the remainder of this document.

Foundations are anticipated to consist of drilled piers, tie beams, and perimeter grade beams and slab-on-grade floor.

Except where otherwise protected from frost, foundation walls, piers, and other permanent supports of buildings and structures shall be protected from frost by one or more of the following methods:

- Extend 30 inches minimum below finished grade.

2.05.4 Risk Category

Risk Category III: per ASCE 7-16 Table 1.5-1.

2.05.5 Design Loads

2.05.5.1 Snow Loads

Snow load parameters are as follows:

Parameter	Value	Notes
Surface Roughness Category	C	ASCE 7-16: Section 26.7.2
Ground Snow Load, pg	25 psf	CDB DCM
Importance Factor, Is, all other buildings	1.1	ASCE 7-16: Table 1.5-2 & Section 7.3.3
Exposure Factor, Ce	1.0	ASCE 7-16: Table 7.3-1
Thermal Factor, Ct, all other buildings	1.0	ASCE 7-16: Table 7.3-2
Flat Roof Snow Load, pf, all other buildings	19.3 psf	ASCE 7-16: Eqn 7.3-1
Minimum Snow Load, pm, all other buildings	22psf	ASCE 7-16: Section 7.3.4
Snow Drift	Varies	ASCE 7-16: Section 7.7

2.05.5.2 Wind Loads

Wind loads parameters are as follows:

Parameter	Value	Notes
Basic Wind Speed, Vult	115 mph	ASCE 7-16: Section 26.5
Importance Factor	1.0	ASCE 7-16: Table 1.5-2
Exposure Category	B	ASCE 7-16 Section 26.7.3, Buildings with Surface Roughness B prevailing upwind
10 Year MRI, V	75	ATC Online Hazards by Location, for Drift

2.05.5.3 Seismic Loads

Seismic design parameters are as follows:

Parameter	Value	Notes
Importance Factor, Ie	1.25	ASCE 7-16: Table 1.5-2
Soil Site Class	D	Geotechnical Report
0.2 sec Acceleration, Ss	0.423	ATC online Hazards by Location
1.0 sec Acceleration, S1	0.153	ATC online Hazards by Location
Site Coefficient, Fa	1.461	ASCE 7-16: Table 11.4-1
Site Coefficient, Fv	2.294	ASCE 7-16: Table 11.4-2
Design Spectral Response Acceleration, SDS	0.412	ASCE 7-16; Section 11.4
Design Spectral Response Acceleration, SD1	0.234	ASCE 7-16; Section 11.4
Seismic Design Category	D	ASCE 7-16; Section 11.6

2.05.5.4 Dead Loads

Dead loads shall include the self-weight of structural members. Additional superimposed dead loads shall include the weight of non-structural components permanently attached to the structure, facade weights, flooring, ceiling, mechanical, electrical, and plumbing weights. General assumptions may include but are not limited to weights noted in 2.05.5.5 Superimposed Dead Loads Table.

2.05.5.5 Superimposed Dead Loads Table

Area	Zone	Loading [psf]	Notes
Floor Areas	MEP	7 / 25	Standard / Above MEP Rooms
	Flooring/Ceilings	5 / 5	VCT or Carpet / Acoustical lay-in ceiling
	Total	17 / 30	Standard / Above MEP Rooms
Roof Terrace Areas	MEP	7	
	Ceiling/Lighting	5	
	Paver System	40	
	Total	52	
Roof Areas	MEP	7	
	Ceiling/Lighting	5	
	Roofing Membrane / Insulation	12	
	Total	24	
Green Roof w/ Trays	Soil in Trays	40	Green Roof Trays (Include as Live Load for Design – see Table Below)
	MEP	7	
	Ceiling / Lighting	5	
	Roofing Membrane / Insulation	12	
	Total	64	
Roof with Photovoltaic Panel System	Ballasted Photovoltaic Panel System	32	7 psf Photovoltaic Panels + 25 psf ballast or per Manufacturer
	MEP	7	
	Ceiling/Lighting	5	
	Roofing Membrane/Insulation	12	
	Total	56	

2.05.5.6 Live Loads

Uniformly Distributed Live Loads

Area	Loading [psf]	Notes
Public and Assembly Floor	100	
Lobbies, Corridors, Balconies	100	Typical
Typical Roof	20	+ ASCE 7 Snow drift where applicable
Green Roof w/ Trays	100	(Assume No Public Access for Green Roof Trays)
Laboratories	125	
Classrooms	60	40 psf + 20 psf partition
Light Storage	125	
Heavy Storage	250	
Uniform live load reduction is permitted in accordance with ASCE 7-16.		

2.05.6 Overall Structural Serviceability Criteria

2.05.6.1 Deflection Limits

Deflection criteria per IBC (Table 1604.3) are shown below:

Member type	Loading	Deflection Limit	Notes
Roof Members Supporting plaster ceilings	L or S or W	$\Delta \leq L / 360$	
	D + L	$\Delta \leq L / 240$	
Roof Members Supporting non-plaster ceilings	L or S or W	$\Delta \leq L / 240$	
	D + L	$\Delta \leq L / 180$	
Floor Members	L	$\Delta \leq L / 360$	
	D + L	$\Delta \leq L / 240$	
Spandrel Members Supporting Metal Panel	SDL + L	$\Delta \leq L / 360$	
Members Supporting: Brick/Unreinforced CMU or Glass	D + L	$\Delta \leq L / 600$ or 0.3”	ACI 530-10: 1.13.1.4
Building Drift due to Wind Load	W	$\Delta \leq H / 400$	
Allowable Story Drift due to Seismic	E	$\Delta \leq 0.015hsx$	ASCE 7-10: Table 12.12-1

2.05.6.2 Vibration and Sound Criteria

The Health Sciences building structures will require analysis of floor vibrations and sound transmission. See section 2.10 Acoustics for additional information.

2.06 PLUMBING

2.06.1 Design Criteria

2.06.1.1 Domestic Water Systems

The domestic water system piping shall be sized based on the 2014 Illinois Plumbing Code requirements. All hot and cold water piping inside the building shall be sized to a maximum velocity of 5 and 8 feet per second respectively. All hot water recirculation piping shall be designed to a maximum of velocity of 2 feet per second. Systems shall comply with ASHRAE Standard 188.

2.06.1.2 Sanitary Waste and Vent Systems

The sanitary waste system shall be sized per the 2014 Illinois Plumbing Code requirements.

The waste pipe systems shall be sized to maintain a minimum flow velocity of 2 feet per second based on flow, pipe size and slope of pipe.

The vent pipe system shall be sized based the requirements of the plumbing code for the pipe size, drainage amount, and the length of run of the pipe. All vent piping shall have a minimum slope back to the drainpipe

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2.06.1.3 Storm Drain Systems

All roof drains shall be internal.

All storm drain piping shall be designed for a rainfall rate of 6.0 Inches per hour with a 60-minute duration and a 100-year return.

Overflow drains (Secondary drain system) shall be installed independently of the primary system and shall discharge visibly at grade.

2.06.1.4 Natural Gas Systems

All natural gas piping shall be designed and sized to meet the requirements of the 2018 International Fuel Gas Code.

2.06.1.5 Compressed Air, Vacuum and Specialty Gas Systems

All compressed air, vacuum and specialty gas systems and piping shall be designed and sized for the total demand of the building.

2.06.1.6 Sustainability

The plumbing systems shall meet the requirements of IECC 2018, the pre-requisites, and the targeted credits of LEED V4.0 to achieve a minimum of LEED Silver accreditation. Reference the OPR document for more information.

2.06.2 System Description

2.06.2.1 Domestic Water System

The domestic and laboratory cold water supply systems shall include the following: all piping, backflow preventers, pressure reducing valve, flow meters, valves, insulation, hose bibbs, thermal expansion tanks, and as required by other sections of this document. Extend to all plumbing fixtures and equipment requiring water.

Metering shall comply with the requirements of IECC 2018, the pre-requisites, and the targeted credits of LEED V4.0 to achieve a minimum of LEED Silver accreditation.

The building will have a domestic main that will enter the building coming from a minimum of 48 inches below the exterior grade. The water main shall be sealed watertight at the point of entrance to the building.

A preliminary water flow test and existing conditions report can be referenced in the Reference Information Documents (RIDs) Sections 4.01 Existing Conditions Reports and 4.07 Waterflow Test Results.

Once inside the building the domestic water shall immediately split with a pipe going to two reduced pressure backflow preventers each with upstream isolation valves to supply the domestic water for the building and the other pipe going to an additional set of two reduced pressure backflow preventers each with upstream isolation valves that will supply the laboratory water for the building.

1. The potable water main shall supply all the plumbing fixtures outside of the labs except emergency fixtures that are inside the lab.
2. The non-potable water system shall supply lab water to the lab plumbing fixtures and equipment required by the users inside the labs.
3. Construction phasing, if required, shall consider future connection(s) to both the potable cold water supply and a the non-potable cold water supply. These pipes shall be sized to accommodate supplying cold water to all fixtures.
4. A single reduced pressure backflow preventer shall be provided in the incoming water service room for an irrigation system.

5. The potable cold water shall be routed to a water softener system upstream of the water heaters. Size the water heaters to accommodate the hot water demand for the full building construction. Construction phasing, if required, shall consider future connection(s) to the potable hot water supply. These pipes shall be sized to accommodate supplying hot water to fixtures.
6. The non-potable cold water shall be routed to a water softener system upstream of the lab water heaters. Size the lab water heaters to accommodate the hot water demand for the full building construction. Construction phasing, if required, shall consider future connection(s) to the non-potable hot water supply. These pipes shall be sized to accommodate supplying non-potable hot water to select lab fixtures.

Install potable water heaters with recirculation hot water pipe system and a non-potable water heater with recirculation hot water pipe system to serve the building.

The domestic and laboratory hot water supply systems shall include the following: all piping, valves, pressure and temperature relief valve, temperature control valves, insulation, and as required by other section of this document. Extend to all plumbing fixtures and equipment requiring water.

1. The potable water heaters shall be natural gas fired or electric. Heaters shall be high efficiency condensing type with expansion tank. This system shall utilize equipment redundancy that will not leave a single point of failure.
2. The potable water system in each building shall be designed to handle a minimum of 23 GPM of water at 85 degrees F for fifteen minutes to accommodate an eyewash and emergency shower being activated.
3. The non-potable water heaters shall be natural gas fired or electric. Heaters shall be high efficiency condensing type with expansion tank. This system shall utilize equipment redundancy that will not leave a single point of failure.
4. The water heaters will produce water at 160°F. The hot water shall be tempered to 140°F through a master thermostatic mixing valve for the building and then distributed and locally mixed down at each fixture further as required by additional thermostatic mixing valves.

If a geothermal heating and cooling system is chosen for building temperature control, then geothermal shall be considered for domestic and laboratory hot water supply.

The domestic and laboratory hot water supply systems shall include the following: all piping, balancing valves, air vents, circulating pumps, temperature controls, miscellaneous valves, insulation, connections and as required by other sections of this document.

Provide pure water systems that are specifically designed to serve the various program areas. Pure water producing equipment shall be supplied from the non-potable hot (softened) and non-potable cold (softened) supplies. Purity levels of pure water systems shall be in compliance with USP standards when intended for pharmaceutical use. The composition of pure water supply at other programs shall be determined by the SIUE standards or as recommended by equipment manufacturers whichever is more stringent.

The pure water supply system shall include the following: all piping, valves, insulation, and as required by other sections of this document. Extend the pure water piping loop to all plumbing fixtures and equipment requiring pure water. Piping shall be laid out so there are no dead legs or stagnations points in the pipe. Piping material, valves and fitting shall be suitable for use in pure water systems.

The vivarium domestic and non-potable water supply shall be protected with backflow prevention dedicated to the vivarium.

All domestic potable, non-potable hot water and hot water return shall be insulated to meet the energy code.

Domestic hot water distribution and recirculation piping shall meet the requirements of the IECC 2018 Section C404 Service Water Heating (Mandatory) for public lavatories and other fixture and plumbing appliances.

Hot water recirculation systems shall be designed to provide hot water within 10 seconds at each fixture.

Domestic water piping shall be routed such to minimize dead legs and provide short runouts to end uses.

All domestic potable and non-potable cold water shall be insulated to prevent condensation from forming on pipes.

All pipes shall be properly labeled by system type and direction of flow, and valve tags shall be installed to identify what the valves serve.

All exposed insulated pipe shall have a PVC protective cover.

2.06.2.2 Sanitary Sewer and Vent System

The building sanitary sewer shall collect wastewater from the entire building and discharge to the site sewer system. Construction phasing, if required, shall consider future connection(s) to the sanitary sewer system.

The sanitary waste and vent systems shall include the following: all piping, floor drains, hub outlets, plumbing fixture and trim, cleanouts, vents and as required by other sections of this document.

All wastewater discharge shall meet the site requirements when it leaves the building.

Provide a central acid waste collection and acid neutralization or dilution system to collect acid waste. Construction phasing, if required, shall consider future connection(s) to the acid waste collection system.

Provide an effluent decontamination system (EDS) for the vivarium waste, all vivarium waste shall drain to the system prior to connection to site sanitary waste.

Waste and vent piping serving the vivarium shall be separate from other building waste and vent piping. Provide HEPA filter at vivarium vents just downstream of the termination through the roof.

Install waste and vent stacks located throughout the building in strategic locations to allow for the connection of the first and upper floors' waste.

The vent stacks shall be collected in the upper-floor ceiling and extended to termination above the finished roof.

Sump pump(s) with oil detectors shall be installed in the elevator pit(s) per the requirements of the elevator code.

Sanitary piping shall collect and exit the building at a single location where it shall extend 5' outside the building and then connect to the site sewer system.

Horizontal waste piping from labs shall be routed to risers independent from other areas in chemical resistant piping materials.

Cleanouts shall be installed at the end of each bank of fixtures as required by code.

2.06.2.3 Storm Sewer System

The roof will drain storm water via primary roof drains and piping internal to the building. Storm piping shall collect and exit the building at a single location where it shall extend 5' outside the building and then connect to the site sewer system.

The roof will drain storm water overflow via secondary roof drains, piping internal to the building and downspouts that shall discharge overflow to grade in a visible location.

Internal horizontal and vertical storm and overflow piping, including roof drain bodies, shall be insulated with a minimum of ½-inch insulation.

All exposed insulated pipe shall have a PVC protective cover.

2.06.2.4 Natural Gas System

The building shall be provided with a natural gas pipe system that will supply gas to lab, plumbing, or HVAC equipment as required depending on the system selected by the design build team.

Install a gas meter outside the building and route piping either outside the building or inside the building. The gas meter shall be sized for the full load of the building.

Construction phasing, if required, shall consider future connection(s) to the natural gas system. These pipes shall be sized to accommodate supplying natural gas to supply gas fired equipment.

2.06.2.5 Compressed Air, Vacuum and Specialty Gas Systems

The building shall be provided with a compressed air system and vacuum system that will supply compressed air and vacuum to the lab areas.

Construction phasing, if required, shall consider future connection(s) to the vacuum air and compressed air system. These pipes shall be sized to accommodate supplying vacuum air and compressed air to the lab areas.

Ceiling utility panels with quick connections shall be utilized where applicable to promote flexibility.

Compressed air system will include but is not limited to a scroll compressor, wet receiver, filter, refrigerated filter dryer, dry receiver and associated valves, gauges, and regulators.

Vacuum system will include but is not limited to a rotary vacuum pump, receiver tank, exhaust to the exterior and associated valves, gauges, and regulators.

A specialty gas closet shall be included for storage of specialty gas tanks and a central gas manifold.

2.06.2.6 Piping Materials

All piping materials must meet the SIUE standards in addition to the following:

Domestic water main piping entering the building shall be ductile iron pipe and fittings with mechanical joints.

Once inside the building above grade the domestic potable and non-potable water pipe shall be type "L" copper with wrought copper fittings joined with "lead-free" solder.

Domestic water piping below grade shall be type "K" copper with wrought copper fittings joined with "lead-free" solder.

Pure water piping, valve and fitting shall be Polypropylene (PP) or Polyvinylidene fluoride (PVDF)

All water piping, valves, and fittings shall be insulated to meet ASHRAE Standard 90.1-2013.

Domestic water valves shall be ball or butterfly depending on size and application.

1. Ball valves shall be two-piece bronze body valves with full-port stainless steel ball and stem, quarter turn handle and engraved tags.
2. Exterior wall hydrants shall be exposed, self-drainable, non-freeze type, ¾-inch hose-end with polished brass finish.

The storm, overflow storm and sanitary waste and vent piping installed above grade shall be standard no-hub cast-iron pipe with DWV fittings and heavy-duty 4- or 6- band couplings, using neoprene gaskets and stainless-steel clamps.

Below-grade storm, sanitary, waste and vent piping shall be hub-and-spigot cast-iron with DWV fittings and rubber fitted push joints or schedule 40 PVC pipe with DWV fittings and solvent sealed joints.

Indirect waste pipe and fittings shall be DWV copper pipe with drainage pattern fittings conforming to ASTM B 306 and ASME B 16.

Waste pipe that will receive waste greater than 140°F shall be cast-iron up to the main building stack or lateral and shall be protected by drain coolers.

Piping shall be angle-cut at terminations above the floor drain or floor sink to minimize splashing. All material and installation practices shall conform to CISPI and ASTM A-74.

Backfill material below interior floor slabs shall be ¾ -inch minus clean gravel, compacted to 95% density.

The natural gas piping for 3" and smaller shall be schedule 40 black iron pipe with threaded malleable iron fittings or type "L" copper pipe with wrought copper fittings and brazed joints. Contractor shall verify the sulfur content of the locally available gas before specifying copper piping.

At all the equipment connections, a shutoff valve, pressure reducing valve, union, dirt leg and flexible connector shall be provided for final installation.
All external gas piping exposed on the roof shall be properly supported and painted.

Exterior roof pads shall be installed for the gas supports to protect the roofing material and to anchor the gas piping.

The compressed air and vacuum piping shall be type "L" copper with wrought copper fittings joined with "lead-free" solder.

The compressed air and vacuum ball valves shall be two-piece bronze body valves with full-port stainless steel ball and stem, quarter turn handle and engraved tags.

2.06.2.7 Plumbing Fixtures

All plumbing fixtures must meet the SIUE standards in addition to the following:

The plumbing systems shall meet the requirements of IECC 2018, the pre-requisites, and the targeted credits of LEED V4.0 to achieve a minimum of LEED Silver accreditation.

Plumbing fixtures shall be white, commercial grade, vitreous china and shall be low-flow design.

The water closets shall be low-flow wall-hung, with automatic, infrared sensor, hard-wired type flush valve and open-front seat.

The urinals shall be low-flow wall-hung, with automatic, infrared sensor, hard-wired type flush valve.
All automatic flush valves shall have manual override function.

The public lavatories shall be wall hung with integral bowls and low-flow chrome center-set, automatic infrared sensor type faucets and hard-wired type.

Electric water coolers shall be provided with unit mounted sensor operated bottle filling station with integral drain, automatic shutoff, and bottle counter.

All showers shall utilize a thermostatic, anti-scald mixing valve and low-flow, flow restrictor type showerhead.

A master thermostatic mixing valve will regulate the maximum hot water temperature to the showers.

Select all lab fixtures based on requirements of the user.

Emergency showers and Eyewashes shall be provided as required per code and room data sheets.

Emergency showers and Eyewashes shall be accounted for in the design of the domestic hot and cold water piping systems. Emergency showers shall supply 20 GPM and Eyewashes shall deliver 3 GPM.

Emergency thermostatic mixing valves shall be installed at all emergency showers and eyewashes.

2.06.2.8 Plumbing Specialties

All plumbing specialties must meet the SIUE standards in addition to the following:

Public spaces, such as toilet rooms, shall be floor drains with cast-iron bodies and round nickel-bronze grates.

Mechanical rooms shall be floor sinks with standard cast-iron body, removable strainer, and tilting grate or ½ loose set grate.

The standard roof drains shall be cast iron body with aluminum strainers, deck clamps. Overflow roof drains shall have an adjustable internal standpipe to adjust to a maximum of 2″ above the standard roof drain outfall.

Wall hydrants shall be installed at 100' intervals around the perimeter of the building. Wall hydrants shall be recessed freeze resistant type with integral vacuum breaker and stainless-steel box with cover.

2.07 MECHANICAL

2.07.1 Design Conditions

Cooling Design Outdoor Air Conditions: 98°Fdb/78°Fwb. (better than ASHRAE 0.4% DB/MCWB for nearest weather station).

Heating Design Outdoor Air Conditions: 0°F (better than ASHRAE 99.6% Heating DB).

Summer Space Environmental Requirements: 72°F ± 2°F, 50%RH high limit.

Winter Space Environmental Requirements: 70°F ± 2°F, 30%RH low limit for research labs.

Accessibility: Rooftop equipment shall be accessible by doorway (for low roofs with adjacent floors) or stair. Roof hatches are not sufficient.

2.07.2 Sustainability

The mechanical systems shall meet the requirements of IECC 2018, the pre-requisites and the targeted credits of LEED V4.0 to achieve a minimum of LEED Silver accreditation. Energy modeling shall be utilized as tool to guide design and ensure the EUI target stated in the OPR is achieved. Utilities and energy sources shall be metered as specified in the OPR. If the building is not initially designed as all electric, provisions shall be put in place to allow for the future conversion to all electric systems. Design build teams shall detail their approach to meet this requirement in their proposal.

2.07.3 New Health Sciences Building

2.07.3.1 General

The new site has been determined as being too far from the existing campus chilled water loop to be economically feasible to extend. Thus, a new stand-alone heating and cooling plant will be provided to serve the new Health Sciences Building.

Mechanical systems shall be designed and certified to withstand a seismic event based on the criteria for the area.

2.07.3.2 Controls

A new head-end DDC controls system shall be provided to serve the entire facility and connect to the existing campus Johnson Controls building automation system (BAS). All HVAC systems shall be monitored with BACNET (or similar) card integration on large equipment. Other systems to be provided with BAS monitoring shall include water heating and circulation, generator(s), utility metering, pure water systems, lab air compressors, gas alarms, drain pain water sensors, and global weather sensors. Refer to the OPR document for more information on building automation point and trending capabilities.

All equipment, installation, and materials shall meet the requirements of the latest SIUE campus standards.

2.07.3.3 HVAC

A life cycle cost and energy analysis of at least three systems shall be performed by the design build team to support the final selection of an HVAC system for the project. The selected system shall meet all LEED requirements and meet any energy targets specified in the bridging and OPR document. This analysis shall be provided in a report to CDB and the Using Agency.

All equipment, installation, and materials shall meet the requirements of the latest SIUE campus standards.

Heating and Cooling Systems

Building heating and cooling shall be provided as stand-alone new systems that are adequately sized to serve the entire new facility. Heating and cooling equipment configurations shall be designed to eliminate any single point of failure and allow for isolation in the event equipment needs to be replaced. Phasing and minimum load shall be analyzed to confirm that systems will operate smoothly during all phases and seasons. Cycle times shall meet manufacturer recommendations in all conditions.

Data and elevator equipment rooms cooling systems shall be stand-alone systems that are connected to generator power.

All chilled water control valves (if applicable) shall be pressure independent per SIUE campus standards.

If condensing boilers are utilized, condensate shall be neutralized prior to entering the sanitary waste system.

Equipment rooms shall be designed to allow for easy maintenance, meet all manufacturer required clearances, and shall be reviewed and approved by the Using Agency. All heating and cooling equipment shall be located indoors on a main building level that is accessible by elevator. Only air-cooled equipment is allowed to be located on the roof or exterior. Exterior equipment shall be properly secured.

Air Handling Systems

Exterior zone VAV boxes (if applicable, excluding labs) shall include fans that circulate room air through their heating coils without returning air to the central air handler, thus avoiding cooling and reheating this air.

When grouping rooms on the same temperature control zones, load profiles shall be carefully studied to allow for proper control. Interior and exterior zones shall not be grouped together. High occupancy and high internal load rooms shall have dedicated zones. No more than three rooms shall share a single temperature control zone.

Individual zone pressure and temperature control shall be provided in research labs via tracking venturi valves on the supply and exhaust. Each lab hood will be provided with a dedicated venturi valve. Negative pressure research labs and lab classrooms shall be served by a dedicated 100% outside air system with energy recovery tied back to the exhaust. Airflow in labs shall be designed to a minimum of 8 air changes per hour (ACH) with the exception of the vivarium space that shall be provided with 15 ACH. Air sampling DCV controls shall be considered to reduce energy use. Local fan coil units (FCUs) should be considered for high density cooling loads.

Indoor air handling units are preferred. Rooftop units (if utilized) shall be provided with a service vestibule to house all piping and control valves. Supply and return fans in the RTUs shall be plenum type fan arrays with individual VFDs and backdraft dampers. If hydronic heating is selected, the pre-heat coils shall be pumped, and an air blender provided in the unit to prevent freezing. The use of glycol is discouraged. Humidification to 30% shall be provided at the central air handlers for systems serving research labs. Local duct mounted humidifiers are not acceptable.

Dedicated outdoor air system (DOAS) units, if utilized, shall be able to meet demand control ventilation requirements of energy code and LEED. This may require a variable volume system in some areas. DOAS units shall be provided with total enthalpy wheels. Heating and cooling for the units shall be size to account for enthalpy wheel failure.

Exhaust fans shall be provided to serve general exhaust needs for restrooms, housekeeping closets, etc. Lab exhaust shall be separate from general exhaust and lab duct materials shall be compatible with the products being conveyed within the duct. This will likely require stainless steel construction. Exposed rooftop exhaust ductwork shall be round to prevent pooling of rainwater and stainless-steel construction or coated to protect against the elements. Lab exhaust fans shall be N+1 redundant and have a minimum stack height of 10' above roof level. Lab exhaust tip velocity shall be a minimum of 2,500 feet per minute. Hazardous exhaust shall discharge at least 50 feet from any building opening or outside air intake. Vivarium exhaust shall be filtered as required to address contaminants and/or odors. Plan to locate filter housings on the roof in a bag-in/bag-out arrangement or similar that avoids interruption to the system.

All interior ductwork construction (unless noted otherwise above) shall be galvanized sheet metal and shall meet SMACNA requirements. Exhaust air duct shall be externally insulated within 10 feet of the roof penetration.

Refer to the OPR document for additional information on commissioning.

2.08 ELECTRICAL

2.08.1 Existing Campus Electrical Distribution

The existing campus is currently served from an existing Ameren substation utilizing two 12.47kV Ameren circuits. The circuits are identified as Ameren 621 and Ameren 622. The two 12.47kV Ameren circuits terminate in existing 1,200 Amp, 15kV metal enclosed, customer switchgear located just outside the existing Ameren substation yard. Six 400 Amp, 12.47kV distribution feeders originating from the switchgear serve pad mount switches located throughout the campus in a loop configuration. Downstream transformers located at each building are fed from these pad mount switches in a radial configuration.

Existing Building 200 and Building 220 are not served from the existing campus distribution loop. Both buildings are fed from their own Ameren transformers from a separate Ameren service.

2.08.1.1 Health Sciences Building Electrical Service

The new Health Sciences Building shall be served from the existing 12.47kV campus loop. Based on discussions with SIUE's engineering department, two of the existing campus loop circuits have adequate capacity to accommodate the anticipated load for the new facility. The existing 12.47kV campus loop feeders are in underground concrete encased duct banks. All new 12.47kV feeders shall be in underground concrete encased duct banks and all new 480-volt secondary feeders shall be in underground conduit. A medium voltage pad-mount switch shall be set adjacent to the new facility. The pad-mount switch shall be interconnected to the existing campus loop. The medium voltage pad-mount switch shall serve a pad mount transformer sized for the planned load of this facility.

2.08.1.2 Normal Power Distribution System

The normal power distribution system shall be designed for the programmed space based on the current understanding of the project scope. The normal power distribution system and equipment will be designed to accommodate the full fit-out of the facility, as well as any planned future expansion. If the building is not initially designed as all electric, provisions shall be put in place to allow for the future conversion to all electric systems. Design build teams shall detail their approach to meet this requirement in their proposal. The equipment shall be switchgear type construction.

The normal power distribution switchgear shall be provided with one level of ground fault protection and transient voltage surge suppression.

Provision shall be made for a future photovoltaic system. Such provisions shall include additional space in the main service switchgear for a photovoltaic service connection as well as conduit stubs to the roof and site for photovoltaic cabling.

Metering shall comply with LEED V4.0 Silver requirements. Reference the OPR document for more information.

Normal power will be distributed from the normal power distribution switchgear to smaller electrical rooms located throughout the facility.

The normal power distribution system shall be provided with 25% spare capacity for future loads.

2.08.1.3 Emergency Power Supply System (EPSS)

The new facility shall be provided with an EPSS. The EPSS shall serve code-required life safety systems and optional standby systems. The life safety system shall include egress lighting, fire alarm and fire protection systems, and elevator cab ventilation and lighting. The included optional standby system shall serve exhaust hoods, make-up air units, IT equipment, research refrigerators and freezers, and building heating required for freeze protection.

The EPSS shall be designed for the programmed space based on the current understanding of the project scope. The emergency power distribution equipment shall utilize switchgear type construction.

The EPSS system will automatically provide emergency power to the fire pump and life safety systems within ten seconds. The optional standby system shall transfer at a predetermined time after losing power.

The emergency power supply system shall be provided with 25% spare capacity for future loads.

Generators

Standby emergency generator(s) shall be in a weatherproof, sound attenuation enclosure. Sound attenuation enclosure shall comply with local and state requirements. The generator(s) shall be diesel fueled and shall provide a minimum of 24 hours of operation.

Acceptable Manufacturers: Per SIUE standards.

Automatic Transfer Switches (ATS)

All ATS's shall be closed transition, bi-pass isolation with serial communications port, remote annunciator, and in-phase monitoring. The life safety ATS shall have engine exerciser capability and the mechanical equipment ATS shall have transfer inhibit and load shed capability.

Communications: Provisions to be provided to communicate with the campus SCADA system.

Acceptable Manufacturers: Per SIUE standards.

2.08.4.1.4 Lightning Protection System

Class II system consisting of copper air terminals and conductors on the roofs, roof-mounted mechanical equipment, parapets, penthouse roofs, and counterpoise system.

The roof-mounted system shall be bonded to the building structural steel or down conductors.

Install in accordance with ANSI/NFPA 780, UL 96A, Lightning Protection Institute LPI-175 and LPI-176.

Certification: Obtain the services of Underwriters' Laboratories, Inc. to provide inspection and certification of the lightning protection system under provisions of UL 96A to obtain a UL Master Label for the system.

2.08.1.5 Power Monitoring and Metering

Power monitoring shall be provided per SIUE standards.

Metering shall be provided per LEED V4.0 requirements with an option for separate panels with segregated loads. Refer to the OPR document for more information.

2.08.2 Lighting

2.08.2.1 General Luminaire Information

Project site classification as defined in IESNA RP-33 LZ2.

LEED Requirements

Light Pollution Reduction Exterior Luminaires: Submit manufacturer data showing percentage of light lumens emitted at or above 90° from nadir for each luminaire type.

Toxic Material Reduction: Submit manufacturer published data for each lamp type being furnished, indicating mercury content in milligrams per lamp.

Interior Lighting: The interior lighting shall comply with the IECC as directed by the level of the LEED scorecard.

Interior Luminaires and Accessories - General

Luminaires shall utilize LED source wherever possible; any deviations shall be approved by the Using Agency. Actual light fixtures shall be selected by the project Architect and approved by the Using Agency at Schematic Design. All lighting densities in all areas shall comply with the latest adopted IES (Illuminating Engineering Society) recommendations and the IECC (International Energy Conservation Code).

Acceptable Manufacturers: Per SIUE standards.

Exterior Luminaires and Accessories - General

Luminaires shall utilize LED source wherever possible; any deviations shall be approved by the Using Agency. Actual light fixtures shall be selected by the project Architect and approved by the Using Agency at Schematic Design. All lighting densities in all areas shall comply with the latest adopted IES (Illuminating Engineering Society) recommendations and the IECC (International Energy Conservation Code).

Listed for wet or damp location as required.

Exterior luminaires shall be dark sky compliant.

Provide low temperature LED drivers with reliable starting to -20°F.

Acceptable Manufacturers: Per SIUE standards.

2.08.2.2 Emergency Lighting

Emergency egress lighting and exit signage shall be provided as required by code and the local jurisdiction.

Battery-powered emergency lighting will be provided in primary electrical, mechanical, and generator spaces to accommodate code-required "instant-on" illumination for these spaces.

Acceptable Manufacturers: Per SIUE standards.

2.08.2.3 Lighting Controls

Interior Lighting: Lighting controls will consist of Web accessible networked central lighting control systems composed of networked integrated power switching systems, networked integrated dimming systems, standalone power switching and dimming systems, automation controls with occupancy sensors, vacancy sensors and daylight sensors. Lighting controls shall conform to LEED and the International Energy Conservation Code/ASHRAE 90.1 requirements. Automation controls can exceed these requirements to maximize building energy efficiency. User interfaces shall consist of keypads, touch screens and virtual touch screens.

The vivarium space shall have automatic lighting controls, but also manual controls for each holding room and procedure room. Automatic controls shall not utilize ultrasonic devices within the vivarium space. Manual controls shall have the ability to be scheduled.

Exterior Lighting: Exterior lighting will be controlled by photocell and time clock permitting schedule administration through the networked central lighting control system and sharing of photocell inputs across multiple zones.

Acceptable Manufacturers: Per SIUE standards.

2.08.3 Fire Alarm and Detection System

A complete NFPA 72 compliant addressable fire alarm system will be provided. It will include, but is not limited to, alarm initiating devices, voice evacuation equipment, control panels, auxiliary control devices, annunciators, and power supplies. Notification appliance circuit panels will be sized for 24 hours of standby operation and 15 minutes of alarm. System notification will consist of ADA- and NFPA-compliant audio (voice), visual, and combination audio/visual devices. System initiation will consist of individually addressable analog smoke and heat detectors, addressable fire pull stations, and sprinkler system flow switches. A two-way talk path shall be provided for the fire department's use.

Follow NFPA 150 for the vivarium space.

The fire alarm system will require a Bosch B465 dual path communicator with a Bosch B444-A cellular communicator. The system shall be programmed to communicate with the local campus police station Bosch receivers utilizing central station software.

Ceiling mounted devices shall be white in color with red letters and wall mounted devices shall be red in color with white letters.

All duct detectors shall provide a supervisory notification in lieu of an alarm.

Acceptable Manufacturers: Per SIUE standards.

2.08.3.1 Seismic Requirements

The electrical systems associated with the project are required to be seismically braced as required by the building code.

2.08.3.2 Electric Vehicle Charging Stations

Electric vehicle charging stations shall be provided per LEED V4.0 requirements. Refer to the OPR document for more information.

Charging Stations shall be pedestal mounted.

2.09 FIRE PROTECTION

2.09.1 Design Conditions

The flow test results noted in the program analysis report show a static pressure minimum of 45 psi and residual minimum pressure of 25 psi at a flow of 840 GPM. Additional safety factor shall be considered in the system design due to the pressure drop witnessed during the testing as a result of being near the end of a long dead-end run.

2.09.2 Existing Buildings 200 and 220

Building 200 does not have a fire sprinkler system. Building 220 does have an existing fire sprinkler system. If one or both buildings are connected or renovated as part of the new Health Sciences facility, consideration shall be given to serving them from a new combined fire sprinkler system for the facility.

2.09.3 New Health Sciences Building

The new facility shall be fully sprinklered with a new automatic fire protection system per NFPA 13. If the top floor level is greater than 30 feet above exterior grade, a standpipe system meeting NFPA 14 requirements shall be provided in each exit stairwell.

Based on the building program and flow test data, it is anticipated that the building will require a fire pump if it is multiple story construction. A redundant double check style backflow preventor shall be provided at the fire service entrance. The fire service room ideally should be accessible directly from the building exterior and the location coordinated with the Using Agency and AHJ.

Location of the FDC shall be coordinated with the Using Agency and approved by the AHJ.

All equipment, installation, and materials shall meet the requirements of the latest SIUE campus standards.

2.10 ACOUSTICS

2.10.1 Introduction

The following narrative includes proposed design criteria and conceptual guidelines for key acoustical design aspects on the above noted project. Information provided is primarily based on a review of the SIUE Program Document dated July 16th, 2021 and preliminary discussions with the project team. The following areas of acoustical design are discussed within:

1. Floor Vibration Control
2. Acoustical Separation
3. Room Acoustics
4. Mechanical Noise and Vibration Control

2.10.2 Floor Vibration Control

The building structure will largely dictate the building's response and susceptibility to vibration sources. A heavy and stiff concrete structure without long column spans will generally achieve the desired sound and vibration performance goals. However, special consideration may be required for the design of floor slabs supporting sensitive medical equipment. The table below includes typical design criteria per the Facilities Guidelines Institute (FGI) and industry best practices. Design goals are expressed as maximum 1/3 octave band velocities in the units of RMS (root mean square) micro-inches/second between 8-80 Hz (with slightly higher levels at frequencies less than 8 Hz). Higher vibration criteria are less stringent and visa-versa. Project specific floor vibration criteria is also referenced in the table below per information contained within the Program Document.

2.10.2 Figure 1: General Vibration Criteria for Sensitive Equipment		
Vibration Classification	**Description of Use**	**Maximum Vibration Velocity, rms**
Residential (ISO)	*Threshold of human perception* Microscopes up to 20x magnification	8000 µinches/sec (200 µmeters/sec)
Operating Theater (ISO)	*Vibration not perceptible* CT Scanners Microscopes up to 100x magnification	4000 µinches/sec (100 µmeters/sec)
VC-A	**Vivarium Surgical Rooms*** **Vivarium Procedure Room*** **Vivarium Isolation Room*** **Vivarium Behavior Room*** Microscopes up to 400x magnification Optical and micro balances Proximity and Projection aligners, etc.; Clinical Laboratories	2000 µinches/sec (50 µmeters/sec)
VC-B	Micro surgery, eye surgery, neuro surgery Microscopes up to 400x magnification Inspection and lithography equipment to 3µm line-width	1000 µinches/sec (25 µmeters/sec)
VC-C	Magnetic resonance imagers Microtomes Inspection and lithography equipment to 1µm line-width	500 µinches/sec (12.5 µmeters/sec)
VC-D	Mass Spectrometers(e.g. NMR Rooms) Cell implant equipment	250 µinches/sec (6.25 µmeters/sec)

* Vibration criteria per July 2021 Program Document

Compliance with floor vibration design goals contained in the FGI Guidelines is determined using the American Institute of Steel Construction (AISC), Steel Design Guide Series 11, "Floor Vibrations Due to Human Activity", Chapter 6 "Design for Sensitive Equipment and Sensitive Occupancies".

The obvious sources of structural vibration are MEP and conveying equipment (elevators), but the worst-case source that typically shall be considered in the analysis is walking and material handling within the area of the occupancy. The speed of walking determines the amount of impact or vibrational energy imparted into the structure.

The specific walking speed for individual areas shall be established based on corridor and space orientations with respect to the referenced AISC Guidelines (or other applicable design standard). In some areas, walking may be off-center from the occupancy. 'Fast' walking speed (~125 paces per minute or greater) typically

imposes significant cost, and thus may not be practical or possible within project constraints. Lastly, structures supporting any suspended, vibration sensitive equipment shall also consider vibration levels.

Structural Design Considerations
The following are some structural design considerations that may be needed or beneficial to achieving floor vibration design criteria for the project:

1. Locate main circulation corridors within separate structural bays from laboratories and animal holding and procedure areas.
2. Provide girders and/or beams along column lines deeper than mid-span beams. This helps interrupt transverse waves within an otherwise common-member floor plate.
3. Limit structural bay dimensions. A typical 30ft x 30ft bay can be impractical to design to certain vibration limits. Maintaining at least one dimension in the 20-23 ft range is typically desirable.
4. Locate main mechanical and electrical room spaces slab-on-grade and away from acoustical sensitive spaces. In situations where this is not possible, the use of heavier and/or stiffer floor and ceiling slabs may need to be considered to provide a stable base for vibration isolation devices and a barrier for air-borne sound transmission.
5. Strategic location of building expansion joints can also help mitigate vibration transmission through a building.

2.10.3 Acoustical Separation

Acoustical separation primarily addresses the control and mitigation of airborne noise transmission between spaces. The standard metric for acoustical separation performance is in terms of Sound Transmission Class (STC) which is a rating on the ability of a construction element, such as a partition or window, to reduce sound transmission. Published acoustical performance ratings and reference tables from manufacturers are typically provided in terms of STC.

Higher STC ratings correspond to lower degrees of sound transmission through the construction. STC ratings also focus on sound reduction for frequencies in the human speech range, so there is a direct correlation between the STC rating of the partition and the speech privacy provided. The table following provides a subjective description for general speech privacy expectations between spaces separated by various STC rated constructions when combined with a relatively low background noise level:

2.10.3 Figure 1: Speech Privacy Expectations

STC Rating	Speech Privacy Expectations (with solid partitioning and low background noise)
STC 40	**'Fair' Privacy** Normal voices in adjacent space audible and intelligible part of the time. Raised voices and amplified audio mostly intelligible.
STC 45	**'Good' Privacy** Normal voices in adjacent office space audible but unintelligible most of the time. Raised voices and amplified audio partially intelligible.
STC 50	**'Excellent' Privacy** Normal voices in adjacent space barely audible. Raised voices and amplified audio are audible but mostly unintelligible.
STC 55	**'Confidential' Privacy** Normal voices in adjacent space are not audible. Raised voices and amplified audio are barely audible but not intelligible.
STC 60+	**'Isolated' Acoustical Separation** Renders most typical interior sounds to inaudible or just barely audible levels. Amplified low frequency sounds may still be partially audible.

It is important to note that the above speech privacy descriptions are with respect to spaces with typical room finishes that are separated by solid demising partitioning without doors or openings. Doors can severely limit acoustic separation and significantly degrade the privacy condition unless high-performance acoustic door seals or full sound rated door packages are specified. Ambient background noise levels produced by building mechanical systems and other noise sources can also strongly influence perceived degrees of subjective speech privacy and acoustical separation.

2.10.4 Design Criteria

The table following includes typical STC design goals for separation of acoustically sensitive space types referenced within the program documents in effort to achieve general speech privacy design goals noted in the previous section. STC design criteria referenced within the main program document are marked with an asterisk.

2.10.4.1 Figure 1

Space Type	Typical Demising Partition STC Rating
Standard Private Office Growth* Future Hires*	STC 40 to 45
Classroom Research Lab Sim Surgical and Patient Rooms Sim Viewing Rooms Standard Meeting Room	STC 45 to 50
Executive or High Speech Privacy Office Debrief Rooms A/V Conference Room SP Monitoring and Control Restroom Locker Room	STC 50 to 55
Vivarium Media Recording – One Button Studio Main Mechanical/Electrical Rooms	STC 55 to 60

*Design criteria per July 2021 SIUE Program Document

Review and discussion with the appropriate user group representatives should be undertaken as the design is further developed to ensure that project specific acoustical design criteria are consistent with subjective sound control expectations and budget parameters.

2.10.5 Vertical Sound Transmission Control

Airborne Sound Control

Typical floor slab construction between acoustically sensitive spaces on the project is initially recommended to meet a minimum STC 50 rating to maintain a baseline degree of vertical sound transmission control through the floor-ceiling assembly. This would normally equate to a floor slab with a minimum surface mass of approximately 60 PSF (e.g. 5-inch thick normal weight concrete). Typical upper-level floor slabs composed of 4-½" thick normal weight concrete on 2" deep metal deck (6-½" total thickness) should meet this requirement.

The STC 50 recommendation is with respect to the mass of base floor structure by itself. Areas which incorporate continuous suspended ceilings as part of the overall floor-ceiling assembly can achieve higher STC ratings, however, it is typically advisable to achieve design STC criteria with the floor slab by itself since infrastructure and service penetrations through the finished ceiling can create acoustical weak-points that reduces sound separation unless they are properly detailed.

Potential areas that may need to consider higher degrees of vertical sound control will require review and evaluation as space layouts, programmatic requirements, etc. are developed.

Footfall Impact Sound Control

Controlling footfall impact noise between vertically adjacent, occupied spaces is also an important design consideration. Impact isolation performance of floor-ceiling assemblies are defined in terms of single number IIC ratings which are similar to laboratory measured STC ratings except that it measures the amount of structure-borne noise transmission as opposed to airborne noise transmission. Higher IIC ratings correspond to lower degrees of impact noise transmission through a floor-ceiling assembly. To maintain appropriate degrees of impact isolation, it is recommended that floor-ceiling assemblies between typical occupied spaces be designed to meet a minimum IIC 45 rating.

Meeting sufficient IIC performance is an important consideration when hard surface flooring finishes are planned above sound sensitive spaces and often requires the use of an appropriate resilient underlayment material. Areas with carpeted flooring will usually achieve relatively high IIC ratings. Additionally, impact isolation between non-acoustically sensitive adjacencies such as stacked bathrooms, corridors, etc. is typically not a needed consideration.

Any potential areas with a carpet finish should typically meet a minimum IIC 45 rating in combination with previously noted floor slab construction. Areas with sheet flooring or similar harder surface materials may require a thin acoustical pad or backing material to achieve recommended IIC criteria. Specific approaches will require review based on flooring types and space adjacencies that are developed during subsequent design efforts.

2.10.6 Exterior Noise Control

The existing and potential new building locations are located on the main Edwardsville campus and appear to be far removed from major exterior noise sources such as highways, train lines, etc. Thus, potential concerns for exterior noise transmission and control are expected to be relatively minimal. However, performing an on-site noise assessment to document and verify typical exterior noise levels at the project site would be required for confirmation. Some consideration may be required for noise control of outdoor mechanical equipment depending on its noise level and proximity to acoustically sensitive areas within the building.

The main acoustical weak point in typical exterior wall construction are the glazing assemblies. A standard 1" thick insulating glazing unit (IGU) can achieve an STC 35, while more 'solid' exterior wall construction composed of masonry, brick, etc. construction will typically achieve significantly higher STC ratings. An STC 35 level of performance is often sufficient to reduce noise from more typical exterior noise sources to acceptable levels in sound sensitive spaces types with 'normal' degrees of sensitivity (e.g. private offices, meetings rooms, etc.). Higher STC rated assemblies or alternate design approaches are often a needed consideration in more acoustically critical space types and/or spaces that may be subjected to relatively loud or 'tonal' exterior noise sources. When the noise source is stationary mechanical equipment, it is typically most effective to incorporate any required noise control measures at the source, either by specifying maximum noise levels for unit selections and/or incorporating supplemental noise control elements (e.g. acoustical screen walls or equipment shrouds). A more detailed evaluation shall be required as space layouts and equipment selections are being developed.

2.10.7 Drywall Partition Types and Detailing

It is assumed that typical partitioning for sound sensitive spaces on the project will consist of drywall on metal stud construction. It should be noted that acoustical performance data published for drywall partition types are typically based on laboratory tests using light 25-gauge (18 mil thickness) metal studs spaced at 24" on center. Modern drywall partitioning is often constructed using 20-gauge (30 mil thickness) or heavier metal studs, spaced at 16" on center, which do not perform as well for reducing sound transmission and can reduce overall STC ratings by approximately 3-7 points. It will therefore be important to consider all aspects of the partition design and may require additional upgrades to maintain appropriate STC ratings between spaces. Typical options to effectively improve the sound isolation performance of a partition are as follows:

1. Additional layer(s) of drywall
2. Double stud or staggered stud partition constructions
3. Acoustical clips or resilient channels for attaching drywall to studs.
4. Acoustically enhanced gypsum board (e.g. QuietRock)

It should also be noted that Sound Transmission Class (STC) ratings of partitions are the ideal laboratory rated values measured in highly controlled environments where careful attention to detail is ensured. In actual field construction, the comparable rating methodology is in terms of Noise Isolation Class (NIC) which inherently considers all acoustical imperfections and weak points in the construction (e.g. ceiling conditions, wall receptacles, perimeter/exterior/mullion conditions, etc.). Field measured acoustical separation will almost always be lower because of these acoustical weak points and are highly dependent on the quality of materials and craftsmanship. STC ratings cannot be determined empirically for field-built partitions and should only be used as a basis for design and construction intent.

To achieve the best installed acoustic performance possible, partition construction details must be consistent with good acoustical design practice. All acoustical partition types should generally conform to the instructions outlined in Section III of the latest version of the Gypsum Association Fire Resistance Design Manual (GA-600). Project specific partition details will require review and coordination during subsequent design phases.

2.10.7.1 Operable Partitioning

It is understood that operable partitioning will be used to sub-divide some classrooms. In order to maintain a good degree of acoustical separation between spaces, it is recommended that operable partitioning with minimum STC 52 rating be specified. A minimum Noise Isolation Class (NIC) rating of NIC 42 should also be required of the operable partition manufacturer to provide some guarantee of field-installed acoustical performance.

An STC 52/NIC 42 degree of performance is generally deemed sufficient for separation of standard classrooms. Loud events on one side of the wall will still be audible and partially intelligible on a 'quiet' adjacent side. However, if occupants within adjacent rooms are involved in functions with similar levels of noise or acoustic sensitivity, there is typically little concern with the acoustical separation.

With respect to the type of operable partitioning that is specified, the acoustically preferred approach is to incorporate vertical folding operable partition systems similar to those manufactured by Skyfold, or using manually operated, single panel horizontal systems with retractable top and bottom compression seals. These types of system has found such options tend to provide superior acoustical performance and longevity over the life of the installation as compared to other operable wall types, though it is acknowledged that alternate partition configurations may be desired for other non-acoustic reasons. The basis of design Skyfold Zenith and Modernfold Acousti-Seal Encore operable partition systems should have the potential to meet recommended acoustical design parameters.

2.10.8 Doors and Interior Glazing

Doors and interior glazing assemblies are usually the main acoustical weak points in partition constructions that limit the degree of acoustical separation between spaces. A standard door without acoustical gasketing can reduce the overall rating of the partition construction by 10 or more STC points. Sound will take the path of least resistance and travel through the gaps around the door which must be acoustically sealed to reduce sound leakage.

Similarly, more standard ¼" to ½" thick interior glass lites can only achieve maximum STC ratings in the 30 to 35 range. Field performance tends to be even lower due to mullions or joints between glazings which can serve as additional weak points. Thicker lites of laminated glass and/or insulated glazing units (IGUs) can increase the STC rating, but the upper STC limit of most standard systems will still not achieve the same level of acoustic separation as the surrounding drywall partition construction can provide. The acoustic performance of any smaller side-light glazing assemblies adjacent to entrance doors should generally not be important

since sound leakage through the entrance door will typically be the limiting factor to achievable sound separation regardless of the side-light glazing type.

Project requirements or desires for function and circulation may take precedence over design goal acoustical separation in which case lower degrees of acoustical separation should typically be expected. For spaces or areas where controlling sound transmission and maintaining speech privacy at the entrance condition will be more critical, the use of acoustically upgraded doors and glazing assemblies may be a needed consideration.

2.10.9 Room Acoustics

Room acoustics refers to the shaping and finishes of a room as they affect sound. The standard metric for determining how "live" or "dead" a room behaves is called the Reverberation Time (RT). RT measures the time in seconds that it takes sound energy to decay by 60dB. It is officially measured as the decay time within the 500 Hz frequency band; however, it is important to consider reverberation times in other frequencies as well.

A room's volume and interior finishes primarily control the degree of reverberation. Hard materials, such as gypsum board, glass, or concrete reflect sound, which increases reverberation time. The longer the reverberation time, the longer sound persists before dying out, and the more difficult speech intelligibility becomes. Adding sound absorptive materials can help to reduce reverberation times, mitigate the build-up of sound energy, control unwanted sound reflections, and/or permit good speech intelligibility to maintain environments that are comfortable and conducive to intended programmatic functions.

2.10.10 Design Criteria

The following table includes typical Reverberation Time (RT) criteria for acoustically sensitive space types currently anticipated on the project per industry standard best practices and past experience:

2.10.10.1 Figure 1

Space	Reverberation Time (RT) Criteria
Media Recording/Studio	≤ 0.5 seconds
Classroom Private Office Study/Huddle room A/V Conference Room Debrief Room Monitoring and Control Room Observation Room Wellness/Quiet Room	≤ 0.6 seconds
Meeting Room Med Simulation Room VR/Immersion Room	≤ 0.8 seconds
Open Office Resource Center Instructional Lab	≤ 1.0 seconds
Student Commons Food Service Area	≤ 1.5 seconds
Lobby Corridor	RT criteria is not applicable, however, providing a sound absorptive ceiling finish is often a beneficial consideration to help reduce footfall circulation and activity sounds

2.10.11 Acoustical Finish Guidelines

Noise Reduction Coefficient (NRC) is the standard metric that rates the ability of finish materials to absorb sound reflections within the typical speech frequency range and is based on a scale of 0 to 1.00. Materials with a 0 NRC represent a completely sound reflective surface while a material with 1.00 NRC rating will theoretically absorb 100% of the reflected sound energy.

All normally occupied, sound sensitive spaces should ideally plan to incorporate some amount of sound absorptive finishes. The most effective surface to provide sound absorptive treatment is typically the ceiling since it tends to be equidistant from all sound sources and provides uniform coverage with a substantial surface area. Wall treatment tends to be more beneficial in controlling specific sound

reflections, such as front-to-back reflections, and for controlling sound reflections in large volume, sound sensitive spaces. However, wall treatment typically does not help control the overall build-up of sound energy and reverberation to the same degree. Likewise, carpeted flooring can reduce noise generated due to footfall impacts, but typically provides little sound absorptive value for controlling reverberation.

Specific acoustical finish approaches to achieve reverberation time design goals will likely depend on several other factors such as the aesthetic intent or budget parameters and will require review and coordination during subsequent design phases.

2.10.12 Mechanical Noise Control

Noise produced by new mechanical systems will need to be controlled to appropriate levels in terms of overall Noise Criteria (NC) ratings and devoid of any undesirable tonal sound qualities (e.g. whine, hum, or rumble) so that it does not interfere with space functions or acoustical comfort. NC is a standard, single-number rating system developed by ASHRAE that is used to define maximum limits on background noise levels in occupied spaces due to the operation of building MEP systems. It is calculated by combining the weighted octave band noise levels based on the ear's sensitivity to the perceived loudness of sound energy across the audible spectrum. Lower NC levels correspond to lower levels of ambient background noise within a space.

The sections following include background noise criteria and design guidelines for new HVAC systems serving acoustically sensitive spaces on the project.

2.10.13 Design Criteria

Background Noise Criteria (NC) design goals, as produced by the normal operation of mechanical, electrical, and plumbing equipment, are initially recommended for acoustically sensitive space types tabulated below:

2.10.13.1 Figure 1

Space	Maximum Noise Criteria (NC)
Large Classroom Media Recording – One Button Studio(1) A/V Conference Room(1) SP Telehealth Teaching Lab(1)	NC 25 to 30
Sim Surgical and Patient Rooms Sim Viewing Room SP Monitoring and Control Room Wellness/Quiet Room(1) Simulation Room Simulation Viewing Room Debrief Rooms Home Health Lab VR/Immersion Room Light Board Room	NC 30 to 35
Typ. Open Office Area(1) Medium Classroom(2) Computer Lab Teaching/Testing Lab Private Office (2) Growth(2) Future Hires(2) Small Group (2) Drug Information Center Control Room Lab Without Fume Hood	NC 35 to 40
Meeting Room (2) Lobby/Prefunction Resource Center Student Commons Food Service Area Study/Huddle Room(2) Lab With Fume Hood (3)	NC 40 to 45

Notes

1. Design criteria recommended by SM&W
2. Design criteria per SIUE Program Document. SM&W typically recommends lower background noise criteria of NC 30 to 35 for space type.

3. Design criteria may be limited to NC-45 to 50 range depending on equipment selections, room size and finishes, etc.

2.10.14 General Noise Control Approach

The use of internal fibrous duct liner in supply and return ductwork for noise control of air handling equipment has proven effective in most applications, both in terms of cost and acoustical performance. Per a review of SIUE campus standards, it is noted that duct lining is only permitted within return air transfer ducts where required for noise control purposes.

The primarily alternate means of mechanical noise control is using sound attenuators. It should be noted that sound attenuators will impart more static pressure than duct lining, thereby reducing system efficiency and consuming more energy. Sound attenuators also typically require appropriate lengths of straight duct and larger ductwork sizing to avoid generating excessive turbulence induced noise. The following are general guidelines regarding the selection and implementation of in-duct sound attenuators for initial planning purposes:

1. Incorporate placeholders for sound attenuators early in the HVAC design process; straight sound attenuators for noise control of main air handling equipment are usually around 5 to 7 feet in length. Sound attenuators should be located as close to the air handling equipment they serve, located within the mechanical space or above other non-acoustically sensitive space.
2. Incorporate appropriate lengths of straight duct at the inlet and oulet of each attenuator per manufacturer guidelines; typically at least 2 duct diameters of straight duct.
3. Sound attenuators located within medium pressure ductwork should generally be sized for a maximum face velocity of 1500 FPM and a maximum pressure drop of 0.25" w.g for noise control purposes, or lower as required by the mechanical design
4. Sound attenuators located in low-pressure ductwork downstream of terminal boxes should generally be sized for a maximum pressure drop of 0.10" w.g, or lower as required by the mechanical design. Integral sound attenuators offered by terminal box manufacturers tend to provide relatively limited degrees of noise reduction and should generally be avoided.
5. Elbow sound attenuators are also a potential option in cases where there is not sufficient space for straight sound attenuator sections, however, elbow attenuators typically result in significantly higher static pressure drops that must be carefully considered.
6. Minimum dynamic insertion loss and maximum self-generated octave band noise performance requirements should be determined for each sound attenuator and included on the mechanical equipment schedules.

2.10.15 Main Mechanical Equipment Noise Control

There are several noise control options that can be implemented for main air handling units as they are being selected which may reduce sound attenuator performance requirements or other noise control measures. These include the following:

1. Careful selection and specification of fans at the lowest comfortable design system pressure. The largest, lowest speed fan is typically desired, as long as the fan curve selection point is reasonable
2. Select units with plenum or fan-wall type supply fans which tend to exhibit quieter noise output as compared to other fan types of similar capacity and speed. Current unit selections are noted to incorporate plenum fan arrangements.
3. Casing panels of the air-handling unit should consider double wall perforated with plastic film between perforated metal and insulation, with the exception of "wet" sections (cooling coil and humidifier).
4. Variable speed to ensure the lowest sound output at any given time.
5. Long runs of duct in mechanical or support spaces before entering occupied areas (dependent on fan operating conditions and type of occupied space, but 15 to 20 feet is typically a good base approach for noise control.
6. Sizing of main ductwork should generally comply with velocities guidelines in latest version of ASHRAE HVAC Applications Handbook, Chapter 49: Noise and Vibration Control. It is recommended to use the lowest practical air velocities consistent with air change requirements to minimize airflow turbulence generated noise.

2.10.16 Terminal Box Noise Control Best Practices

1. Do not locate terminal units or fan coil units above spaces with a Noise Criteria of NC 30 or less. Instead, locate the units in corridors. If this is not possible, an acoustical enclosure or wrap may be required.
2. If terminal units are used, it is recommended to 'valve-only' VAV terminals as a basis of design as opposed to fan-powered boxes. If fan-powered terminal units must be used, it is recommended to select series-flow boxes over parallel boxes. The intermittent operation of parallel box units is more perceptible from an acoustic standpoint. Individuals tend to notice noise less if it is constant.
3. Select air diffusers at least five points below the NC rating of the room they serve.
4. Do not exceed 1" static pressure at VAV box inlets, if possible.
5. Do not use face dampers. Locate volume dampers as far upstream from diffusers as possible, and at least 10 feet in room with NC criteria of NC 35 or less.

6. Allow for at least 3' of insulated-type flexible ductwork, such as the Thermaflex M-KE, prior to each supply diffuser and return grille, where possible. The flexible ductwork should be free from configurations that constrict the airflow in any way.
7. Lining within terminal boxes and downstream ductwork is also typically used to control regenerative airflow noise through the valve/damper. Since fiberglass duct liner will not be permitted, it is advised that sound attenuators or longer lengths of flex ductwork may be required to control discharge noise appropriately. The following design considerations may reduce the potential need for supplemental sound attenuation of terminal boxes:
    a. Careful selection and specification for the lowest discharge sound level possible within normal operating ranges of specific units. This typically requires selection within the low operating range of the units (largest valve and fan size for the air flow and anticipated inlet and discharge pressures). Small boxes or dampers (+/- 500 CFM) may not need additional discharge noise control with proper selection (the spaces served and duct configuration must be reviewed).
    b. Duct lining with special facing, such as perforated metal and/or special plastic films (typically TedlarTM or similar special formulated film). Lengths of specially faced lining typically must be 35-50% longer to obtain similar noise control results.
    c. Flexible duct to diffusers (insulated vinyl or foil; not metal flexible duct). Minimum effective length is typically 5 feet with an elbow. Local code restrictions and installation procedures and details (pressure drop) are typically an issue. Some codes and engineer's specifications restrict flexible duct lengths.

2.10.17 Plumbing Noise Control Best Practices

1. Primary and secondary pumps should have the following considerations for noise & vibration control purposes:
   a. Select impellers for 85+/- percent of the maximum diameter.
   b. Provide ~18" long bolt-in spool sections of pipe immediately after/before elbows or reducers into the pump (suction and discharge side) prior to any valves or pipe fittings. This is to facilitate the eventual insertion of special flexible connectors should they be needed for noise control after commissioning.
   c. Mount pumps on spring isolated concrete inertia bases. If there are many pumps in close proximity, alternatively vibration isolate the entire pump platform using a spring isolated concrete floating floor system.
2. Contact of piping to studs or the back of drywall in a typical partition easily transmits noise into occupied areas. Therefore, a minimum ½" nominal distance between the outside of any pipe and a building element is recommended.
3. Resilient piping attachments are recommended to isolate supply the plumbing piping and fixtures from the structure when the plumbing runs adjacent to occupied noise-sensitive spaces. Acousto-Plumb or Holdrite mounts are recommended for pipes 1" and smaller and Stoneman Trisolator Sleeves for pipes larger than 1" in diameter.
4. All pipe velocities should follow the design guidelines stated in ASHRAE. "Flow noise and vibration in piping can be reintroduced by turbulence, sharp pressure drops, and entrained air; however, this can be minimized by sizing pipe so that velocities are 4 fps maximum for pipe 2 in and smaller and using a pressure drop limitation of 4 fps of water per 100 ft of pipe length, with a maximum velocity of 10 fps for larger pipe sizes.
5. Limit pressure at fixtures to 70 psi to reduce noise generation.
6. Pipes and conduits should not be routed through sensitive spaces to service other spaces.
7. Toilet rooms should be away from sensitive spaces such as conference rooms. Do not put plumbing in walls next to or common with these spaces. If toilet rooms are unavoidably next to sensitive spaces, siphon-jet, tank-type water closets with adjustable flow valves should be considered.
8. Install air chambers or shock-absorbing devices to prevent water hammer in lines subject to abrupt shut-off.
9. Sprinkler piping should be routed along corridors with a single airtight penetration into each room.
10. It is not typically necessary to vibration isolate vent piping or fire protection piping.

2.10.18 Vibration Isolation

All rotating mechanical equipment and electrical equipment (transformers) should be resiliently mounted to the building structure on appropriate vibration isolation devices and should generally comply with ASHRAE guidelines. Once the equipment selections and specifications has been sufficiently determined, a complete vibration isolation schedule should be developed. Initial guidelines for vibration isolation are as follows:

1. Locate major equipment on grade or near structural columns and above main girders. Support suspended equipment from major structural members. Avoid mid-span locations whenever possible.
2. All rotating mechanical equipment and large piping to have some form of vibration isolation mounting. Exact requirements to be coordinated as equipment selections are developed.
3. All piping connected to vibration-isolated equipment must be vibration-isolated from the building structure within mechanical rooms or a distance of 50 feet from the equipment, whichever is greater. For noise critical spaces, all pipe runs require resilient mounts.
4. All ductwork is to be connected to air handling equipment with flexible connections.
5. All transformers are to be resiliently mounted or suspended from the building structure.
6. Conduit connections to vibration-isolated equipment should include a 360-degree turn of flexible conduit.
7. Allow 6-inch minimum clearance between any vibrating equipment and building structure.
8. Provide adequate clearance under mechanical equipment for vibration isolators.
9. Seismic restraints, if required on the project, are to be separate from vibration isolation devices and shall not degrade vibration isolation efficiency. Determining the requirements, detailing, and specifications for seismic restraint is the responsibility of others.

2.11 INTEGRATED COMMUNICATIONS TECHNOLOGY CONCEPTS

2.11.1 Audiovisual

2.11.1.2 Project Description

This narrative outlines the various spaces to receive audiovisual technology to support the SIUE systems and activities. The narrative will describe each space type and the intended function for the audiovisual equipment. Currently each of the space types are being treated as "typical," meaning all rooms within that type will have the same functionality and level of AV technology. Design Build contractor is required to confirm all space type requirements with Agency to determine final systems design and any atypical space types not listed in this report.

This project will leverage AV over IP (AVoIP) technology for transport of video and audio around the facility for use in med sim environments. This technology allows AV signals to be distributed over the campus IT network to allow flexible routing of AV signals to med sim control rooms, debrief rooms, meeting spaces, and lecture spaces. AV spaces shall be design to allow feeds from Med Sim Capture systems to be routed for display and assessment. AV display technology shall be capable of accurately displaying medical images and colors.

Dante networked audio shall also be the baseline for all audio signal transport.

Assisted listening systems shall be fixed installed in larger room and spaces. Portable use IR based systems will be used in smaller rooms. Contractor to verify all assisted listening system requirements and types with Agency.

The use of a fiber backbone for AVoIP transport should be considered as it allows low latency and maintains high quality of video images, which is important when medical imagery is being transported to rooms for debrief and viewing.

All AV design criteria and calculations shall follow current AVIXA standards. Designer shall be CTS certified with project management holding CTS-D or CTS-I. The final design and installation shall meet all applicable codes for safety, fire protection, and electrical codes.

Projection screens shall be ceiling recessed, motorized and tab tensioned. Ceiling mounted laser projectors shall be used. Projectors and display devices shall be capable of control over IP connection.

Crestron (or approved equal) shall be used as the campus standard for control and video switching. Any approved equals must be vetted through SIUE prior to procurement.

2.11.1.3 Contractor Scope

All AV systems are Design Build. Contractor is required to coordinate with Agency representatives to confirm all design intent and system specifics. This includes confirming all space types, AV requirements in each space, display and equipment sizing, infrastructure, and network coordination.

Contractor required to coordinate with Agency regarding all current campus standards.
Contractor required to coordinate with Agency on all product selection, AV design, network requirements and all other aspects of the AV design and installation.

Contractor to coordinate with Agency on all equipment that may be purchased and provided by the Agency for the contractor to install and commission.

Contractor shall design, furnish, install, and commission all AV systems in the project. Coordination with Agency and other trades shall be done throughout the design and installation process. All technology, unless otherwise noted, is to be provided and installed by the Contractor. Contractor is required to also install Agency Provided equipment. Contractor shall coordinate with Using Agency on all Agency Provided Items.

2.11.1.4 Digital Signage and PreFunction

Flat Panel Displays will be placed in areas of circulation, lobby, student commons, lounges and will be used to display content such as but not limited to: wayfinding, announcements, IPTV, and event information. Contractor to verify with Agency all signage locations, and sizing

Signage will consist of a Flat Panel Display and network connected signage player located behind the display. Signage players will be funded by the project but provided by SIUE.

2.11.1.5 PreFunction

In addition to digital signage, the PreFunction will also include ceiling mounted loudspeakers and wireless microphones for use in PreFunction events and announcements. Loudspeakers shall be sized and placed for even coverage and speech intelligibility.

2.11.1.6 Student Study Rooms and Small Group Rooms

These spaces will be used for small group discussions and study sessions. The intent is to allow groups to connect a laptop to a display to share content. The rooms will consist of a Flat Panel Display with wireless and HDMI connectivity,

a small button control panel for power, source selection, and volume. Rooms will also have an all-in-one USB sound bar/camera/microphone combo. This unit will connect to user laptop via USB to be used in conferencing platforms.

Displays will be wall mounted and allow for small equipment to be placed behind. Cable cubbies or grommets shall be placed in tables for HDMI connectivity. Cameras shall be sized for proper viewing depth, horizontal angles, and microphone pickup coverage.

2.11.1.7 Classroom Spaces, Teaching Spaces, and Seminar Rooms

Classroom and Seminar spaces will be set up with technology intended for lecture and discussion. These spaces will accommodate a range of source devices from laptop, in room computer, wireless video, and feeds from the medical simulation capture system.

The equipment in these spaces will be located with each room inside a small AV equipment rack. Given the size of these spaces, projection systems are anticipated to be used. However, Flat Panel Displays can be used in some Seminar Rooms that are smaller in size and occupancy. Larger rooms will require dual projection screens and projectors. Projectors shall be capable of mirroring the same image, or display independent images on each screen.

Each room will include a touch panel controller for controlling the room's AV functions such as: power, source selection, volume, camera control. Room control shall be tied into the lighting system and shade control to allow for the AV system to recall lighting and shade presets. Coordinate all preset requirements with Using Agency.

Rooms that need to be outfitted for distance learning or lecture capture will include cameras and microphones that feed to a USB interface. This interface can connect to a computer for use in lecture capture software or web conferencing platforms.

Wireless microphones and loudspeakers will be used for voice amplification, and amplification of video content's audio. In smaller Seminar Rooms, microphones for voice amplification may not be needed.

In larger rooms, assisted listening will be required per ADA. These will consist of a transmitter with receiver packs and headphones/neckloops. These systems are for those that may be hard of hearing.

2.11.1.8 Lab Spaces and Encounter Rooms

Technology in the lab spaces will be similar in function to the Classrooms, with less technology requirements. The technology in these spaces will be intended to allow users to connect a source device to the projection or flat panel display. Loudspeakers will be used to amplify audio from the video content.

Each Lab space will also have a button control panel for controlling the display and speakers.

Lecture capture, distance learning, or wireless microphones for voice reinforcement are not anticipated.

2.11.1.9 Meeting Rooms

These spaces will have similar technology and functionality as the small group rooms. Larger displays will be used to accommodate the larger rooms.

Each room will include a flat panel display with speakers and connections for HDMI, wireless sources.

Each room will include a feed from the medical simulation capture system for viewing during debriefs and meetings.

Each room will also include a control panel for controlling the source selection, volume, and power of the system.

Each room will also include a USB based conferencing camera/soundbar/microphone for use in web-based conferencing platforms. Cameras shall be sized for proper viewing depth, horizontal angles, and microphone pickup coverage.

Larger meeting rooms will be scaled up to achieve the same functionality, but include standalone cameras and speakers to cover the larger room size.

2.11.1.10 Media Recording Studio

This space is intended to be a simple recording studio for recording video and audio from a user. Content will be recorded to capture device and can also be connected USB to computer for local recording or streaming.

The space will include studio quality microphone with stand, and wireless wearable microphones to allow flexible use. A high-quality studio camera will be used for video capture. The intent is to make this studio a “one button” record function. Users will be able to enter the space, power on the system, and press one button to start recording audio and video.

Should they want to also connect to their own laptop for streaming, they can do so via the USB interface. This will allow a single USB cable to connect to a laptop to use the high-quality camera and microphones on streaming/web conferencing platforms.

The space will include all the necessary audio/video mixing and processing to clean up audio and make it ready for recording and streaming, without any input needed from the user.

2.11.2 IT Infrastructure

2.11.2.1 Introduction

The overall technology philosophy proposed for the project demands that the infrastructure have the technical flexibility to allow the facility the capability to deliver the highest quality technology today and in the future.

2.11.2.2 Purpose

The purpose of this narrative is to provide valuable information to the architects, engineers, technical and non-technical readers for the coordination efforts required for a successful project.

As such, it defines the standards and criteria for the design, documentation, and specification of a technology infrastructure to support the project.

Note that this report is not designed as a specification or design, but rather as an outline to provide information on the technology infrastructure system requirements. The intention is to describe the telecommunications infrastructure to support the various voice, data and media systems to be deployed within the new facility.

These guidelines address pathways, spaces and cabling designs necessary to sustain various information transport systems, including a telephone system for voice and voice grade services, local area network (LAN) and wide area network (WAN) systems, wireless systems, storage area networks (SAN), video distribution, audio distribution and the like.

Specific areas covered by these guidelines are:

1. Definition of the required technology spaces and pathways to house the technology systems and their associated cabling infrastructure.
2. Definition of backbone cables between the Main Telecommunications Room (IDF) and the Floor Telecommunication Rooms (FDFs) located on each floor and their distribution and termination methods.
3. Definition of horizontal cables and their distribution and termination methods.
4. Definition of patching philosophies and methodologies.
5. Definition of a unified signal grounding (Earthing) system.

2.11.2.3 Codes and Standards

Applicable portions of the following codes, standards, regulations and recommendations shall be observed in the design of the telecommunications cabling system, technologies and supporting facilities:

Telecommunications Industry Association (TIA)

1. ANSI/TIA-568-C.0 - Commercial Building Telecommunications Cabling Standard - Part 0: Generic Telecommunications Cabling for Customer Premises
2. UIC ACCC/ Telecom Building Standards
3. ANSI/TIA-568-C.1 - Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements
4. ANSI/TIA-568-C.2 - Commercial Building Telecommunications Cabling Standard – Part 2: Balanced Twisted-Pair Cabling Components
5. ANSI/TIA-568-C.3 - Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling Components
6. TIA-568-C.4 – Broadband Coaxial Cabling Components Standard
7. ANSI/TIA-569-C - Telecommunications Pathways and Spaces
8. ANSI/TIA-570-B - Residential Telecommunications Infrastructure Standard
9. ANSI/TIA-606-B - Administration Standard for Telecommunications Infrastructure
10. TIA-607-B – Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises,
11. ANSI/TIA-758-A - Customer-owned Outside Plant Telecommunications Infrastructure Standard
12. ANSI/TIA-942 - Telecommunications Infrastructure Standard for Data Centers
13. International Telecommunications Union – Telecommunications (ITU-T)
14. International Organization for Standardization (ISO)
15. Building Industry Consulting Service International (BICSI)
16. Local/National Electrical codes
17. Local/National Health & Safety codes
18. Southern Illinois University Edwardsville IT Services Standards Version 1.1.1 June 2021 or revisions thereafter

2.11.2.4 Physical Infrastructure

The physical infrastructure is comprised of three elements:

1. Technology spaces (telecommunications rooms and equipment room, with appropriate environmental HVAC, UPS power, Generator Power, etc.).
2. Pathways for the cable to be distributed (cable tray, in-floor conduit, horizontal and vertical conduit and raceways, etc.)
3. Cable that interconnects devices

Infrastructure is often the easiest of the variables to predict and implement, because there are industry standard methods and generally accepted principles upon which to base the design process. Simply stated, the goal of an infrastructure is to provide a structured, applications independent scheme that is tailored not to a particular technology, but to supporting a wide range of current and future technologies.

2.11.2.5 Structured Cabling System

The concept of a telecommunications infrastructure as an applications-dependent design customized for telephone, data and video networking is no longer valid. Today's technology environment is increasingly IP (Internet Protocol)-based. IP is the dominant communications protocol for data networking and is increasingly dominating the worlds of voice and video transmission. Convergence of data, voice and video into the IP realm is rapidly proceeding.

2.11.2.6 Standards, Criteria and Assumptions

This section defines the standards, criteria and assumptions that will be used for the design, specification and documentation of the telecommunications infrastructure. This infrastructure addresses pathways, spaces and cable media designs which support various service-provider information transport systems, including but not limited to telephone equipment to support voice and voice-grade services, wireless LAN connectivity and local area network (LAN) systems.

Specific areas covered herein include:

1. Definition of the intra-building pathway and space systems which will house the telecommunications cabling infrastructure and associated transport electronic equipment
2. Definition of horizontal and backbone cable distribution and termination methods, which will define a "ubiquitous" cabling system, capable of

supporting the majority of information transport requirements over the life cycle of the facility

2.11.2.7 Telecommunications Spaces

Intermediate Distribution Frame - IDF
The Intermediate Distribution Frame - IDF serves as the point of demarcation for incoming telecommunications services from service providers and will stand as the transition point between outside plant (OSP) cabling and the premise cable plant.

It is intended that there will be (1) IDF for routed services and carrier equipment to serve the facility.
The IDF will be connected via a conduit pathway so that services from service entrance path can be routed through multiple diverse paths within the facility.

The IDF provides space for carrier equipment and termination of carrier circuits such as trunk terminals, multiplexers and fiber optic terminals. The purpose of this space is to facilitate the termination, splicing, rearrangement and distribution of incoming telecommunications (copper or fiber) cables which ultimately service the facility.

Additionally, the IDF may serve as a pass-thru for some carrier services that are delivered directly to any of the other Technology Rooms. Copper and fiber optic cable will be provided for the extension of circuits from the IDF to the other FDFs.

The IDF should be arranged so that it is not susceptible to flooding from sources inside or outside the building. The area should not be traversed by wet pipes, neither run overhead or along the walls.

All incoming copper and optical fiber termination, cross-connection and voltage surge protection equipment within the IDF should be furnished, installed and maintained by the service provider with the exception of cabling ties to the other FDFs provided by the owner. The connections from the other building will be a single route to the telecommunications building in university park behind chamber of commerce estimated 2000 feet.

The recommended provisions for the IDF are defined as follows:

Telecommunications Rooms (TR) –or FDFs
The Telecommunications Rooms (TRs) or FDFs are defined as the interface between the backbone cabling system and the horizontal cabling system. The FDFs shall provide space for backbone and horizontal cable terminations,

patching and cross-connect equipment, LAN/WLAN electronics and interfaces between the cabling backbone, transport electronics and end user devices.

Criteria established under the TIA 568C standard set forth distance limitations on high performance cabling systems, which will be discussed in the Cabling Systems section below, but has a direct effect on the placement of these distribution rooms. The FDFs must be located so that installed and terminated horizontal cable lengths do not exceed 295 ft. (90 m).

Where possible, the entrance doors should open outwards to increase the available usable space within the FDFs.

The FDFs will be arranged to accommodate the following systems and equipment:

1. Termination and patching facilities for horizontal cabling
2. Termination and patching facilities for voice, data and video backbone cabling
3. Hardware and racking for LAN cabling switches, PBX switches, video cabling hubs, converters, and other device sharing equipment
4. Wireless LAN networking equipment
5. Building Management Systems
6. Security Systems
7. CATV equipment
8. Vertical riser pathways

Power outlets for any transmission and terminal equipment located within the FDFs should be fed from the generator and the electrical panel dedicated to these loads, ideally located within each FDF.

Environmental provisions for the FDFs should be as defined below

Dedicated cooling, electrical and fire suppression provisions are recommended for the FDFs, to allow the network and associated electronics to operate efficiently and reliably over the life cycle of the building. The installation shall be in accordance with TIA 569A.

2.11.2.8 Building Pathway Systems

Conduits, cable tray and other fixed containment that support data/telecommunications cabling within the facility are a key component in the telecommunications infrastructure. Proper sizing, placement, routing and integration with other routed services will ensure connectivity and flexibility,

which becomes a benchmark in the determination of a truly successful infrastructure. Design parameters established herein follow standards established in the TIA standards and related documents. These standards have been established in reference to the dynamic, changing nature of telecommunications cabling systems and provide guidelines to enable maximum cabling flexibility to accommodate change over time.

Backbone Cabling Pathways, Vertical Risers
The pathways shall be three (3) 4″ conduits from the IDF to each FDF.

Horizontal Cabling Pathways
The Structured Communications System (SCS) cable distribution from the FDFs to each outlet position will require a flexible pathway of appropriate dimension to accommodate day one and future cabling installations to the SCS outlets. Also, ease of installation and cable maintenance are important in the selection of the appropriate pathway.
The horizontal pathway will be provided within accessible ceiling areas wherever possible. The provision of a properly sized cable tray will provide flexibility in installing, modifying, adding or deleting any portion of the cable plant.

All pathway routes shall be coordinated with other building services (electrical, mechanical, etc.) to ensure proper clearance and access, as well as to avoid impact from heat, electro-magnetic interference or leakage from other building services.

The pathway system should be coordinated with the electrical distribution system in order to maintain a minimum 12-inch separation between parallel runs of telecommunications and electrical cabling. Where 12-inch separation is not possible, the telecommunications cabling should be separated from electrical cables by a ferrous material to minimize interference. Where electrical and telecommunications cabling cross, it should be at right angles only.

2.11.2.9 SCS Cable Types

The SCS cabling infrastructure has been defined above as the cabling system that interconnects all technology spaces in the facility, from the IDF to each on-floor FDF, and ultimately out to the user outlets and subsequently to network-connected devices.

In order to attain this definition, proper design and engineering must be done to ensure that the SCS provides an “applications independent” cabling system, allowing any technology to be utilized over the cabling infrastructure. Design parameters established herein and in the future follow standards established in the TIA 568-C Commercial Building Standard for Generic Cabling Requirements

document. These standards have been established by a decision team, which includes cabling and telecommunications equipment manufacturers from the largest and best-known companies in the industry. This inherently gives endorsement to the design parameters set forth herein.

To follow is a description of how the telecommunications cabling should be designed for the facility.

In conformance with the above referenced standard, the telecommunications cabling system should be designed in a hierarchical star topology, in the following manner:

1. Horizontal cabling shall be home run from each telecommunications outlet to its respective FDF.
2. No intermediate termination or patching facilities will be allowed.
3. Inter-floor backbone optical fiber cabling should be home-run from the IDF to each respective FDF.
4. Inter-floor backbone copper cabling should be home-run from the IDF to each respective FDF.
5. All cable is to be of PVC, LSZH or Plenum construction depending on local codes and standards.
6. Cable length limitations should be as follows:

Horizontal Cabling – 295 ft. (90 m) from the workstation outlet to the termination point located within the TRs.

The cabling system should be designed to support digital and analogue voice grade services, basic and primary rate integrated service digital network (ISDN) services, LAN, Wireless LAN, WAN, synchronous communications, information display terminals, simplex and multiplex video distribution.

The owner requests to have competitive bids by Panduit, Commscope, and General cabling and shall provide a 25 year channel warranty.

2.11.2.10 Fiber/Copper Backbone Cabling

The fiber backbone cables, consisting of multiple-strand, single-mode (OS2) optical fiber cables should be provided from the IDF to the FDFs.

The primary backbone infrastructure shall be, a minimum 24-strand, single-mode (OS2).
The individual strands of the fiber optic cables should be terminated with the relevant LC connectors or pigtails and housed in rack mounted fiber patch panels in the 4-post rack located within the IDF and FDFs.

Internal copper backbone cables, consisting of a minimum of 50 pair Cat 5 riser cables, should be provided from the IDF to the FDFs. This will provide copper based analogue and digital voice grade services to each of the floors.

The copper backbone cables should be terminated onto rack mounted "resource" patch panels in the FDFs.

Patching and cross connects between cable terminations and transport electronics must be accommodated with the least amount of termination and cross connect hardware that is practical. When feasible, connections between horizontal cable terminations and transport electronics will be made directly, through the use of an appropriate patch cord.

2.11.2.11 Horizontal Cabling

The horizontal cables connecting the user device to the network at a minimum should consist of the following Category 6A compliant 4-pair unshielded twisted pair (UTP) cables.

To create an applications independent cabling system, reference the following:

(Specific outlet locations will be defined as the design for each space is finalized.)

All 4-pair UTP cables should be terminated at the outlet utilizing Category 6A, 8-pin modular connectors with the 568A wiring configuration.

All 4-pair UTP cables are to be terminated within the IDF and FDF cabinets and racks on rack mounted 24 or 48 port angled patch panels utilizing the 568A wiring configuration. The termination method should be identical for voice, data or video connections.

2.11.2.12 Telecommunications Grounding (Earthing) System

The SCS cabling system must be provided with a reference signal grounding system, provided in accordance with the ANSI/TIA Joint Standard 607A, EN 50310 Bonding and Earthing standard at a minimum. This system is an important component of the telecommunications infrastructure, maintaining ground continuity over the entire analogue and digital transmission network throughout the building. The following guidelines are provided for the design of the system:

1. A telecommunication main grounding busbar (TMGB) should be located in the Telecommunications Service Entrance Room (TSER). The TMGB should be bonded to the master grounding busbar (MGB) at the electrical service entrance facility.
2. A telecommunications grounding busbar (TGB) should be located in each IDF and SERVER ROOM this bar shall have two hole predrilled taps.
3. A telecommunications bonding backbone (TBB) cable should be run from the TMGB through the telecommunications backbone risers, connecting the TGB in each TR to the grounding backbone.
4. A grounding equalizer (GE) conductor should be installed from each TMGB and / or TGB, linking all technology rooms on the lowest floor, the highest and a minimum of every 3rd floor.
5. A copper grounding cable should connect each grounding busbar (TGB) to the electrical distribution board serving the respective TR.
6. A copper grounding cable should connect each TGB to the nearest point of building steel (if available).
7. TBBs should be installed in continuous lengths.
8. The TMGB and TGBs should be solid copper or electro-tin plated, and insulated from their supports.

2.11.2.13 Pathway, Space and Media Identification

Due to the all-encompassing nature of the SCS, an identification system should be developed to uniquely identify each pathway segment, main communications room, telecommunications room, cabinet, rack, termination panel, grounding component and cable installed within the facility.

All horizontal and backbone cables should be assigned a unique alphanumeric designation for identification purposes.

Appropriately marked labels should be provided at both ends of each cable.

Labels having the appropriate cable designation should be provided in the following locations for each cable:

On the outlet face plate in the work area.

On the termination patch panels in the FDFs and IDF.

Cable designations should be designed for easy identification of point-of-origin and point-of-termination location.

2.11.2.14 IT Equipment

The following items shall be project funded, but procured and installed by SIUE:

- Ethernet Switches
- Wireless Access Points
- Digital Sign displays (addressed in 2.1.11.1.3)
- Computers (in some cases)
- Uninterruptible Power Supplies (UPS) for network switch rooms
- Phone handsets

2.11.2.15 Distributed Antenna System

The Distributed Antenna System shall be supported by a neutral host system. This system will expand the wireless network footprint by adding coverage and capacity in hard to reach areas, resulting in increased quality.

The neutral host system shall support the following carriers/spectrums and be able to add /remove carriers with limited modifications of antennas:

1. AT&T – GSM/UMTS – 850/1900MHz
2. Verizon – CDMA/EVDO – 850/1900MHz
3. Sprint/Nextel – iDEN/CDMA – 800/900/1900MHz
4. Future Provider
5. First Responder Radio/ Public Safety

The system may also support network-based systems such as SpiderCloud for Dual-Band 4G small cells.

Singlemode fiber optic cabling shall be used to distribute the neutral host system from the headend to fiber remotes installed in each of the telecom rooms. From that point the fiber remote will convert the signal to an analog signal and distribute the cellular service over coaxial cable to antennas throughout the facility. This should provide a minimum of 95% coverage in all public spaces.

2.11.3 Healthcare Information Technology (Simulation)

2.11.3.1 Project Description

The following narrative will discuss the various spaces and technologies anticipated in the SIUE nursing simulation center. This document will describe each space and its intended function for simulation and technology fit-out. There will be some cross-over systems and technologies that will be shared with conventional AV systems. A clear distinction between vendor responsibilities and support will be imperative.

The simulation systems will be network-based and require rack-based conventional servers (Dell/HPE/Super Micro) for sim capture and simulation center management software. A shared IDF/TR is possible, but close attention will be required in heat dissipation management /cooling. Typical simulation capture and management servers are approximately 1,000 watts each, and it will require approximately (10) servers for a simulation center of this size. The simulation system's power requirements translate into approximately 10,000 watts with an estimated heat load of 34,000 sbtu or roughly three tons of air conditioning. It is recommended that these servers be in the Sim/AV Room.

2.11.3.2 SP Exam Rooms

SP Exam Rooms are to be utilized as standardized patient exam rooms.

Each SP exam room should have the following audiovisual technology fit-out.

Video System
One (1) ceiling-mounted HD zoom/pan/tilt video IP camera capable of capturing almost unlimited views of the room(s) and one (1) wall-mounted HD IP video camera for capturing the patient and learner encounter. Camera placement will be optimized to capture patients (actors), learners, and instructors.

Audio System
One (1) ceiling-mounted high-quality microphone for audio capture. One (1) ceiling-mounted loudspeaker for control room communication, paging, and audio file playback.

Control System
All system control will be initiated from the SP control room. This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
Session recording will be controlled by the SP control room and recorded to simulation servers. Control can be initiated from a control computer or tablet at the operator stations.

2.11.3.3 SP Monitoring/Control Rooms

SP Monitoring/Control rooms will be utilized for scenario/case AV/simulation setup/control and recording. This space will control simulation AV devices and house some of the computers and SP technology.

SP Monitoring/Control Rooms should have the following audiovisual technology fit-out:

Video System
Two (2) control stations should allow each operator to control and record multiple simulation sessions. When required, it will also be possible to run a multi-room synchronized recording of all clinic exam rooms from either of the two control stations. The cameras, microphones, and speakers (simulation elements) will be available for routing at the control stations. This creates an environment where preset groups of simulation elements may be switched to accommodate a scenario.

Audio System
The audio system should have the ability to route the source audio to any recorders and ceiling speakers. There should be a desk-mounted loudspeaker for paging.

Control System
Control should be initiated from a control computer or tablet at the operator stations. Capture devices/recording servers should be in the Sim/AV Room.

Storage System
The storage system should be in the Sim/AV room, and it is recommended to utilize SSD technology with a minimum of 12 terabytes for primary storage with RAID 6 compliance.

2.11.3.4 SP Telehealth Teaching Lab

The Telehealth Teaching Lab will be utilized for teaching telehealth and telemedicine skills.

The Telehealth Teaching Lab should have the following simulation technology fit-out:

Video System
One (1) ceiling-mounted HD zoom/pan/tilt video IP camera capable of capturing almost unlimited views of the room(s) and one (1) wall-mounted HD IP video camera for capturing the patient and learner encounter. Camera placement will be optimized to capture patients (actors), learners, and instructors. Software-based video-conferencing application. (PHI approved versions of Microsoft Teams, Zoom, Webex)

Audio System
Two (2) ceiling-mounted high-quality microphones for audio capture. Two (2) ceiling-mounted loudspeakers for control room communication, paging, and audio file playback.

Control System
All system control will be initiated from the control room. This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
Session recording will be controlled by the control room and recorded to simulation servers. Capture devices/Recording servers should be located in the Sim/AV Room.

Control should be initiated from a control computer or tablet at the operator stations.

2.11.3.5 Simulation Rooms

The Simulation rooms are flexible, re-configurable spaces that may act as ER, ICU, L&D, OR, Med-Surg, etc.

The simulation room should have the following simulation technology fit-out.

Video System
Two (2) ceiling-mounted HD zoom/pan/tilt video IP cameras capable of capturing almost unlimited views of the room(s) and two (2) wall-mounted HD IP video cameras. Camera placement will be optimized to capture patients (actors),

learners, and instructors. Software-based video-conferencing application. (PHI approved versions of Microsoft Teams, Zoom, Webex)

Physiological Monitoring System
Two (2) wall-mounted 27" monitors for displaying mannequin vitals. This monitor should connect to the simulation capture system for recording and camera views during a scenario/session.

Boom Connectivity (OR/ICU Configuration)
Two (2) boom DVI input plates for connecting mock laparoscopes/endoscopes, headlight cameras, etc.

Audio System
Two (2) ceiling-mounted high-quality microphones for audio capture. Two (2) ceiling-mounted loudspeakers should be used for control room communication, paging, and audio file playback.

Control System
All system control will be initiated from the control room. This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
Session recording will be controlled by the SP control room and recorded to simulation servers. Capture devices/Recording servers should be in the Sim/AV Room.

Control should be initiated from a control computer or tablet at the operator stations.

2.11.3.6 Patient/Med-Surg Room

The Med-Surg rooms are flexible, re-configurable spaces that utilize curtains or backdrops to create various room configurations.

Each Patient/Med-Surg room should have the following simulation technology fit-out.

Video System
Two (2) ceiling-mounted HD zoom/pan/tilt video IP cameras capable of capturing almost unlimited views of the room(s) and one (1) wall-mounted HD IP video camera. Camera placement will be optimized to capture patients (actors), learners, and instructors. One (1) Wall mounted 55" monitor (By AV Integrator). Software-based video-conferencing application. (PHI approved versions of Microsoft Teams, Zoom, Webex)

Audio System
One (1) ceiling-mounted high-quality microphone for audio capture. One (1) ceiling-mounted loudspeaker should be used for control room communication, paging, and audio file playback.

Physiological Monitoring System (Vitals)
One (1) wall-mounted 27" monitor for displaying mannequin vitals. This monitor should connect to the simulation capture system for recording and camera views during a scenario/session.

Control System
All system control will be initiated from the control room. This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
Session recording will be controlled by the control room and recorded to simulation servers. Capture devices/Recording servers should be located in the Sim/AV Room.

Control should be initiated from a control computer or tablet at the operator stations.

2.11.3.7 Designated Agency Simulation Room

The Designated Agency Simulation room will be a flexible, re-configurable space that may act as ER, ICU, L&D, OR, Med-Surg, etc.

Video System
Two (2) ceiling-mounted HD zoom/pan/tilt video IP cameras capable of capturing almost unlimited views of the room(s) and one (1) wall-mounted HD IP video camera. Camera placement will be optimized to capture patients (actors), learners, and instructors. One (1) Wall mounted 55" monitor (By AV Integrator). Software-based video-conferencing application. (PHI approved versions of Microsoft Teams, Zoom, Webex)

Physiological Monitoring System (Vitals)
One (1) wall-mounted 27" monitor for displaying mannequin vitals. This monitor should connect to the simulation capture system for recording and camera views during a scenario/session.

Audio System
Two (2) ceiling-mounted high-quality microphones for audio capture. Two (2) ceiling-mounted loudspeakers should be used for control room communication, paging, and audio file playback.

Control System
All system control will be initiated from the control room. This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
Session recording will be controlled by the control room and recorded to simulation servers. Capture devices/Recording servers should be located in the Sim/AV Room.

Control should be initiated from a control computer or tablet at the operator stations.

2.11.3.8 Large Simulation Viewing Room

The Large Simulation Viewing Room can be utilized for teaching/presenting various tasks and simulation scenarios and vendor demonstrations for medical/clinical products. This space may also be used for large group session debriefing.

Large Simulation Viewing Room should have the following simulation technology fit-out:

Video System
Two (2) ceiling-mounted electrical roll-down projection screens and two (2) ceiling-mounted projectors (By AV integrator). There should be two wall-mounted P/T/Z HD cameras, one on the front wall and one on the rear. Software-based video-conferencing application. (PHI-approved versions of Microsoft Teams, Zoom, Webex). Wireless screen casting gateways for both projectors

Physiological Monitoring System (Vitals)
One (1) wall-mounted 27" monitor for displaying mannequin vitals. This monitor should connect to the simulation capture system for recording and camera views during a scenario/session.

Audio System
Two (2) ceiling-mounted beam-forming array microphones (By AV Integrator) for audio capture and web conferencing. Eight (8) ceiling-mounted loudspeakers for program audio, web conferencing, paging, and audio file playback.

Control System
There should be a wall-mounted touch panel for control of the AV devices (By AV Integrator). This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
This room should record the sim capture system via the web conferencing software and connectivity to the AV lecture capture system. AV lecture capture system (By AV Integrator).

2.11.3.9 Control Rooms

Control Rooms will be utilized for scenario/AV setup/control and recording. The control room will have a minimum of four (4) control computers to control mannequins and associated simulation devices.

Control rooms should have the following simulation technology fit-out:

Video System
All control operations and viewing shall be available on 27" LCD monitors at each control station. There should be an auxiliary video input for providing video images into the simulation scenarios.

Audio System
The audio system shall have the ability to route the source audio to any recorders, ceiling speakers, and mannequin speakers. There shall be a desk-mounted loudspeaker for paging. There shall be two (2) desk-mounted push-to-talk microphones for the pages and voice of the mannequin. There should be an auxiliary audio input for injecting sound effects into the simulation scenarios.

Control System
Control shall be initiated from a control computer or tablet at the operator stations. The two (2) control stations shall control the simulation room cameras, microphones, speakers, and recording. It is possible to create an environment where preset groups of simulation elements may be switched to accommodate a scenario. This may be a multi-room session that involves team-based handoffs. This flexible approach allows for the control and recording of a diverse selection of room/space configurations.

Recording System
Capture devices/Recording servers shall be in the Sim/AV Room

Storage System
The storage system shall be in the Sim/AV room, and it is recommended to utilize SSD technology with a minimum of 12 terabytes for primary storage with RAID 6 compliance.

2.11.3.10 Debriefing Rooms

Debriefing rooms will be utilized for simulation session/scenario debriefing and may also be used for presentations and web conferencing.

Debriefing rooms should have the following simulation technology fit-out:

Video System
One (1) wall-mounted IP-network HD zoom/pan/tilt video camera can capture almost unlimited room views. Camera placement will be optimized to capture learners and instructors. This will include facial expression capture of debriefing participants. There should be one (1) wall-mounted 75" HD LED LCD Display (By AV Integrator). There will be a small form factor PC mounted behind the display, which will allow for debriefing playback, accessing SIUE network-based files, and viewing live streams of ongoing simulation sessions if desired. There will also be a screencasting/mirroring device behind the display, allowing any device to connect and mirror its screen to the large screen display. This will include Android tablets/phones, Apple iPads/iPhones, Windows, and Mac laptops/computers. This creates an ad hoc wireless interaction with the large screen display. This may also be used to show debriefing playback sessions by simply opening a browser to view a live or archived video or displaying anything currently available on your mobile device or laptop/computer. The small form factor-computer will also have a wireless keyboard and mouse. Software-based video-conferencing application. (PHI-approved versions of Microsoft Teams, Zoom, Webex).

Audio System
There should be one (1) ceiling-mounted high-quality microphone for audio capture. The debriefing session audio will be played back via two (2) ceiling-mounted program audio speakers.

Control System
Control can be initiated from a wall-mounted touch panel or a computer/tablet running the required control software. This will include 75" LCD input source select, on-off audio devices, and associated volume levels. Camera controls will be initiated from both the debriefing room and the control room.

Recording System
Session recording will be controlled by the control room and recorded to the simulation server.

2.11.3.11 Home Health Lab

The Home Health Lab is set up to create a home healthcare environment with a bedroom, living room, kitchen, bathroom, etc.

The Home Health Lab should have the following simulation technology fit-out:

Video System
Three (3) ceiling-mounted HD zoom/pan/tilt video IP cameras capable of capturing almost unlimited views of the room(s) and one (1) wall-mounted HD IP video camera. Camera placement will be optimized to capture patients (actors), learners, and instructors. One (1) Wall mounted 55" TV monitor (By AV Integrator). Software-based video-conferencing application. (PHI approved versions of Microsoft Teams, Zoom, Webex)

Audio System
Three (3) ceiling-mounted high-quality microphones for audio capture. Three (3) ceiling-mounted loudspeakers should be used for control room communication, paging, and audio file playback.

Control System
All system control will be initiated from the control room. This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels. (Note: 55" TV will have a handheld remote).

Recording System
Session recording will be controlled by the control room and recorded to simulation servers. Capture devices/Recording servers should be located in the Sim/AV Room.

Control should be initiated from a control computer or tablet at the operator stations.

2.11.3.12 AR/VR/Immersion Lab

The AR/VR/Immersion Lab is set up to create virtual anatomy lab-type systems and utilize next-generation XR technologies.

The AR/VR/Immersion Lab should have the following simulation technology fit-out:

Video System
Owner furnished Anatomage VR Table and software
Connectivity for computers and VR headsets.

2.11.3.13 Sim AV Room

The AV Sim Room will be the central simulation systems equipment room for servers, audio, video, and storage systems.

Video System
Video encoders/decoders

Audio System
Audio amplifiers and DSP

Recording System
Capture servers

Storage System
Storage servers (Hyperconverged with NVMe SSD)

Simulation Operations System
Database and web servers (Hyperconverged with NVMe SSD)

2.11.3.14 Task Training Lab

The Task Training Lab should be utilized for task training, teaching/presenting, and vendor demonstrations for medical/clinical products. This space may also be used for large group session debriefing.

The Task Training Lab should have the following simulation technology fit-out:

Video System
Two (2) ceiling-mounted electrical roll-down projection screens and two (2) ceiling-mounted projectors (By AV integrator). There should be two wall-mounted P/T/Z HD cameras, one on the front wall and one on the rear. Software-based video-conferencing application. (PHI-approved versions of Microsoft Teams, Zoom, Webex). Wireless screen casting gateways for both projectors.

Four (4) 50" LCD monitors to be mounted at bed/headwall area. This monitor should be used for displaying mannequin vitals or for presenting. This monitor should connect to the simulation capture system for recording and camera views during a scenario/session. (By AV Integrator)

Audio System
Two (2) ceiling-mounted beam-forming array microphones (By AV Integrator) for audio capture and web conferencing. Eight (8) ceiling-mounted loudspeakers for program audio, web conferencing, paging, and audio file playback.

Control System
There should be a wall-mounted touch panel for control of the AV devices (By AV Integrator). This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
This room should record the sim capture system via the web conferencing software and connectivity to the AV lecture capture system. AV lecture capture system (By AV Integrator).

2.11.3.15 Acute Care Lab/Advanced Practice Skills Lab

The Acute Care Lab/Advanced Practice Skills Lab will be a flexible, re-configurable space that may act as ER, ICU, PACU, etc.

Video System
Four (4) ceiling-mounted HD zoom/pan/tilt video IP cameras capable of capturing almost unlimited views of the room(s) and four (4) wall-mounted HD IP video cameras. Camera placement will be optimized to capture patients (actors), learners, and instructors. (PHI approved versions of Microsoft Teams, Zoom, Webex)

Physiological Monitoring System (Vitals)
Four (4) wall-mounted 27" monitor for displaying mannequin vitals. This monitor should connect to the simulation capture system for recording and camera views during a scenario/session.

Audio System
Four (4) ceiling-mounted high-quality microphones for audio capture. Two (2) ceiling-mounted loudspeakers should be used for control room communication, paging, and audio file playback.

Control System
All system control will be initiated from the control room. This will include the selection of cameras, camera pan/zoom/tilt, audio devices, and their associated volume levels.

Recording System
Session recording will be controlled by the control room and recorded to simulation servers. Capture devices/Recording servers should be located in the Sim/AV Room.

Control should be initiated from a control computer or tablet at the operator stations.

2.11.3.16 Ancillary Systems for Simulation

The following systems should be integrated into the nursing simulation program if possible.

1. Mock Nurse Call
2. Mock EHR/EMR
3. Mock PACS

2.11.4 Security

2.11.4.1 Overview

This report describes the components and systems that make up the proposed security systems to serve the Southern Illinois University Health Sciences Building.

The purpose of this report is to provide clear communications, coordination and understanding between all parties. It is designed to provide valuable information to the architects, engineers, technical and non-technical readers for coordination efforts required for a successful project.

2.11.4.2 Electronic Security Elements

The following sections describe the general elements of the electronic portion of a security program. The following existing Electronic Security Systems, which are located elsewhere will be expanded to accommodate the new spaces within this project via the owners network:

Access Control System, Video Surveillance System, Intrusion Detection System

2.11.4.2.1 Electronic Access Control Elements:

Access Control – The monitoring or control of traffic through portals of a protected area by identifying the requestor and approving entrance or exit. A card access system is anticipated as it expedites the control function. The system electronically checks a cardholder's authorization to enter a restricted area, grants or denies access, records the event, and maintains a computer history of everyone that entered. Electronic access control systems help minimize the number of security personnel needed for the access control task. A card access system is normally used to control access of visitor/guests, contractors and employees from unsecured (public) areas to secure (non-public) areas. This transition between the two areas establishes the secure perimeter.

The existing CBORD CS-Gold access control system will be expanded to accommodate the project spaces. Communication between access control panels and server is to be over the Owners network (provided by others). The CBORD hardware shall be Mercury brand solution that is fully compatible with the CS-GOLD system products with no exceptions. All access control system electronic field equipment will be located in the IT room on a security wall field application. SIU utilizes multi-class, contact-less reader credentials for access into and within the building and will be fully compatible with the CS-Gold system. New access control field devices such

as electrified locksets, power transfer hinges and door closers will be provided by the Division 08 door hardware supplier and will need to be coordinated and remaining all devices are required to be compatible with the existing system.

Current areas that will have Card Access

- Main Lobby
- Entry/Exits
- IT rooms
- All Labs
- Classrooms
- Meeting rooms
- Additional rooms per Room Data Sheets

2.11.4.2.2 Electronic Video Surveillance Elements:

Video Surveillance – The visual monitoring of events, either live or pre-recorded to assist in evaluation of security events and necessary response. A Video Surveillance Systems (VSS) is an effective solution for security to deter, detect, and apprehend.

The existing ExacqVision VSS solution will be expanded for the project following the same manufacturer and methodologies to be applied to the new space. The existing video surveillance system will be expanded to accommodate the project spaces. ExacqVision camera licenses will be required for each camera in this project, provided and installed by SIUE. Communication between video surveillance cameras and server is to be over the Owners network (provided by others). SIU utilizes IP cameras for surveillance into, at the perimeter, and within the building.

The IP cameras are to be based on owner preferred brand, AXIS brand performance, functionality and operation. 2MP (Megapixel) fixed domes, 8MP fixed domes, 2MP 180-degree fixed domes and 2MP 360-degree multi-sensors. Outdoor and stairwell cameras will be environmentally rated in vandal resistant enclosures. Cameras will be Power over Ethernet (POE) terminated to a POE Network Switch in the IDF/IT Data rooms which will be Owner provided and installed. No video server or Network Video Recorder (NVR) is required.

Current areas that will have camera coverage:

- Main Lobby
- Entry/Exit doors
- Corridors
- Elevators
- Perimeter of building

2.11.4.2.3 Electronic Intrusion Detection Elements:

Intrusion Detection - The ability to detect the entry or attempted entry of a person or vehicle into a protected area.

There will be no new intrusion detections systems or devices will be part of the project, except for door position switches which are anticipated in the following locations: Electronic Access Control Doors, Exterior Doors without Access Control, Stairwells without Access Control. No separate or stand alone monitoring Alarm Panels or Intrusion Detection System will be utilized. The CBORD CS-Gold ACS will receive the door position switches on the Mercury input boards to be included in the Access Control Panels.

2.11.4.2.4 Security System Infrastructure:

The security systems shall utilize distributed equipment architecture to transmit and receive signals, as well as carry power to field devices. Security communications cabling may share space in vertical telecom riser pathways. Security cabling may share horizontal pathways with other low-voltage building systems where appropriate and may be run in cable tray or in J-hooks where installed in accessible ceiling spaces.

2.11.4.2.5 Security Space Requirements:

The existing electronic security head-end equipment including the existing access control server and network video recorders will be utilized to accommodate the new devices. A secured space to contain electronic security control panels, power supplies, CPUs, network switches and other required equipment to support new security devices will need to be determined. All security equipment in the room shall be located away from potential sources of electro-mechanical interference (EMI) and water infiltration. Generally, a minimum of two (2) dedicated 120VAC, 20A emergency (EM) power circuits shall be provided at each security wall-field. One circuit shall be dedicated to powering the Andover panels. In the event of loss of building power, all security equipment shall remain operational via on-board battery backup or UPS.

2.12 MEDICAL EDUCATION EQUIPMENT

2.12.1 Medical Education and Laboratory Equipment Matrix

See appendix 3.03 for Medical Education and Laboratory Equipment Matrix.

2.12.2 Medical Education and Laboratory Equipment Datasheets

See appendix 3.04 for Medical Education and Laboratory Equipment datasheets.