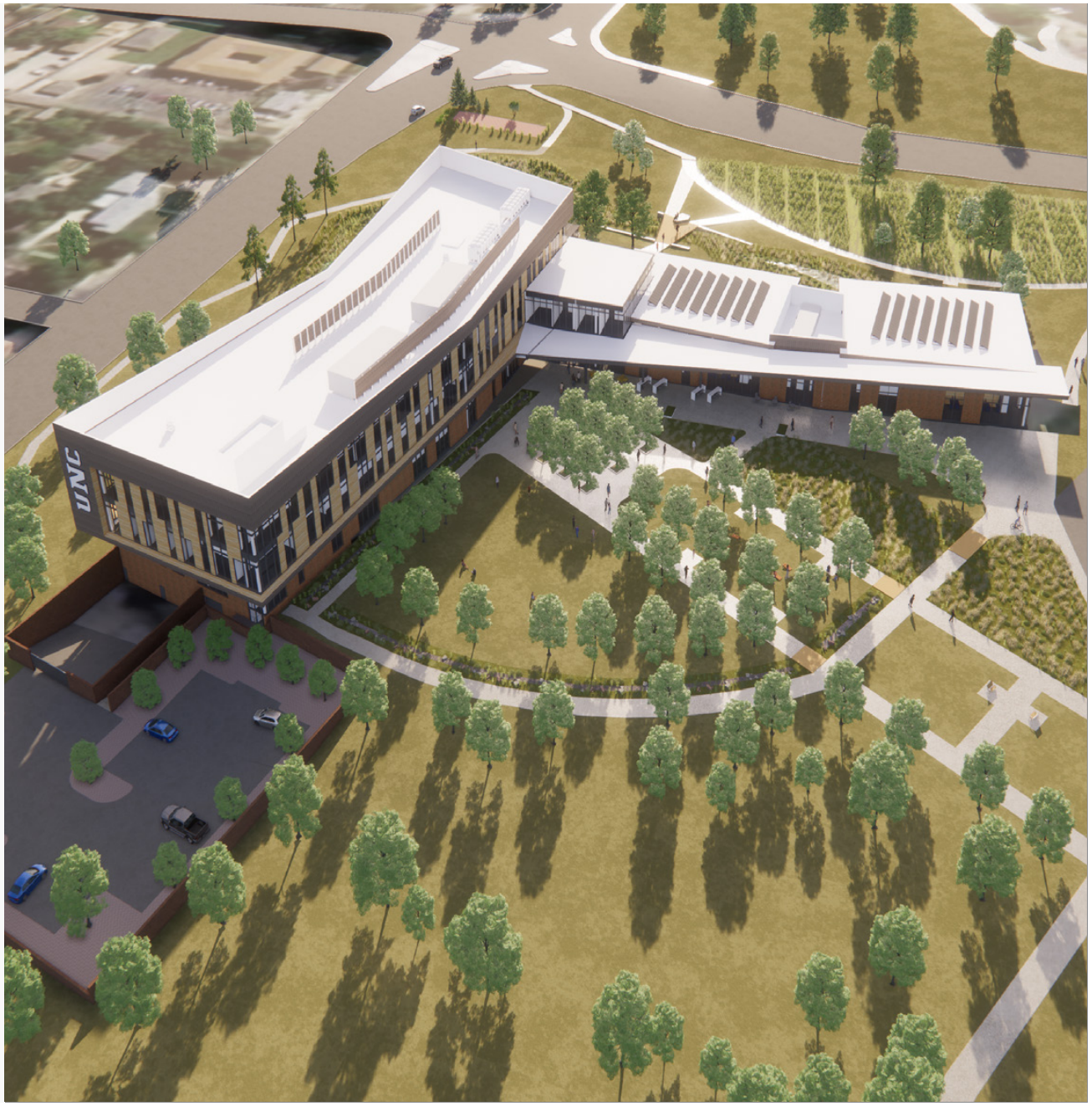
Please note, this is a program plan and not the final architectural plans for a new facility. This is meant to define the space needed and flow of the building and to serve as a basis to estimate the cost of the facility. These plans will evolve as we develop the architectural plans and the final building may not look like the renderings seen in this document. (BA Longenecker, DO)

UNIVERSITY OF NORTHERN COLORADO

COLLEGE OF OSTEOPATHIC MEDICINE

Program Plan



SMITHGROUP DPS

January 2023

UNC

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SECTION 1 – OVERVIEW

1.1 EXECUTIVE SUMMARY

Since its inception in 1889, the University of Northern Colorado has evolved several times in name, character and mission. Now, standing at its next stage, it has a transformative opportunity to:

- Establish a new college of osteopathic medicine
- Create an iconic gateway to campus that reflects program, place and history
- Develop a student-centered west campus quad
- Stitch together disparate campus elements as well as the campus and the Greeley community
- Integrate and activate a previously inherited site into the campus fabric

Redeveloping and re-visioning the 1961 Bishop Lehr K-12 laboratory school site, the design of UNC's proposed College of Osteopathic Medicine (COM) embraces that transformation recognizing each of its opportunities.

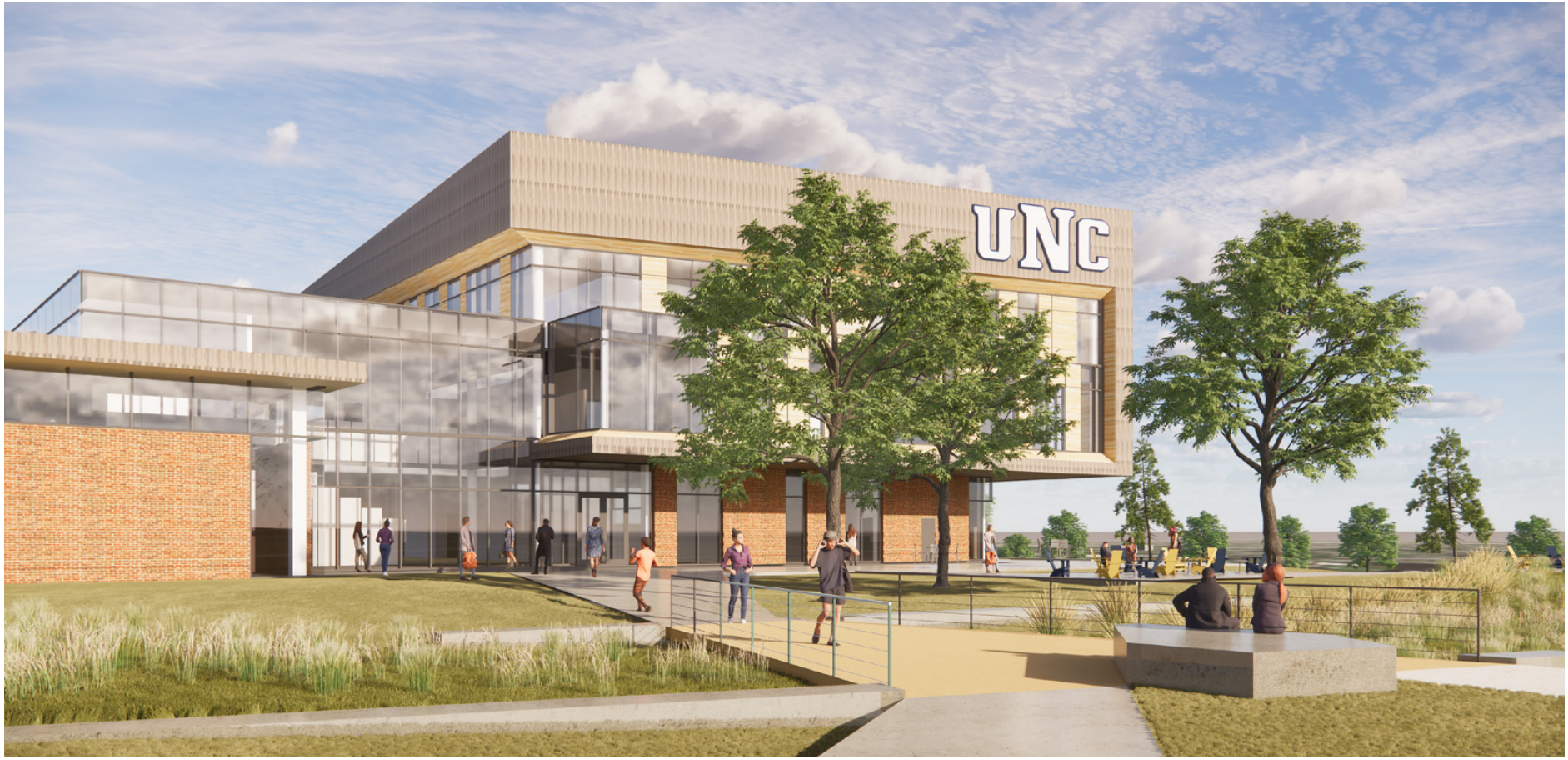
Osteopathic medicine, a "whole person" approach to medicine, treats the entire person rather than symptoms with a focus on preventive healthcare, Doctors of Osteopathic Medicine (DOs) help patients develop attitudes and lifestyles that don't just fight illness, but help prevent it as well, so community and population health play key roles in successful outcomes. With that, inspiration for the design of UNC's COM draws heavily on community and place through Greeley's prominence as a High Plains Front Range Urban Corridor city, its history as a gold rush and stage coach destination, and its resultant regional architecture.

Greeley's historic regional architecture, characterized by its simple geometries with sloped and angled forms clad in natural, tactile materials set against the vast, wonderful and dynamic landscape, evokes a pioneering sense of craft and environment. Adopting these elements, the COM - clad in brick, weathered copper, glass and wood-look panels - sits up from 20th Street atop the sloped edge of the site and gestures out angularly toward incoming visitors to UNC's campus and to students migrating north down to West Campus from Central Campus.

The iconic angled volume floats dynamically with at-grade expanses of glass that promote connection between interior and exterior. The transparency promotes visual connection allowing interior elements to become opportunities for identity and branding, while also inviting students, visitors, faculty and staff into the building's more public spaces at grade level. The highly transparent 'connector' denotes main building entry between the 3-story volume and the one-story volume encouraging intuitive wayfinding and circulation. The building envelope then expresses public to private transitions through transparency moving up the façade.

Integrating building with site, an appropriately collegiate quad to the south, leverages outdoor space as usable program space balancing between hardscape and softscape with a variety of furniture and gathering options, including a hammock farm along the west edge of the quad. Recognizing a sensitivity to water in the region, the site design highlights rainwater capture as an amenity through naturalized stormwater detention ponds and channels around the site edges.

Ultimately, the COM makes a decisive first step toward realizing UNC's recent comprehensive campus plan vision: activating and integrating West Campus, highlighting the campus edge through identity and branding, promoting a premier academic institution with premier programs, notably the new University of Northern Colorado College of Osteopathic Medicine.



PROGRAMMING PARTICIPANTS

UNIVERSITY OF NORTHERN COLORADO

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ARCHITECTURE & INTERIOR DESIGN

SMITHGROUP

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LANDSCAPE ARCHITECTURE

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STRUCTURAL ENGINEERING

DEKKER / PERICH / SABATINI

CIVIL ENGINEERING

MARTIN / MARTIN

AUDIOVISUAL / IT & SECURITY / ACOUSTICS

NV5

COST ESTIMATING

RIDER LEVETT BUCKNALL

1.2 DESCRIPTIONS OF PROGRAMS RELATED TO THE FACILITY

The new College of Osteopathic Medicine (COM) at the University of Northern Colorado (UNC) is a new graduate program training students to become Doctors of Osteopathic Medicine (DOM). Other existing programs at UNC will be impacted by the COM through Inter-Professional Education (IPE), including Nursing, Audiology, Nutrition, Speech Language Pathology, Clinical Mental Health, Health Sciences, Biomedical Science, and Pre-Medical studies.

The COM Leadership developed the Program Objectives, Mission, Vision and Values for the project as required by the accreditation process. These are as follows:

Program Objectives:

- To increase the supply of primary care physicians to serve the state.
- To leverage synergies among existing Health Sciences programs to enhance the osteopathic medicine curriculum.
- To improve the health status of citizens in Northern Colorado and the region.

Mission:

The University of Northern Colorado's College of Osteopathic Medicine (UNCCOM) provides a transformative education in an environment that encourages collaboration, mentorship, and personal growth, inspiring our students to become highly skilled and caring physicians who in turn will positively impact the lives of patients and the communities they serve.

Vision:

- UNCCOM will be nationally recognized for its efforts to advance diversity, equity, and inclusion in medical education.
- UNCCOM will achieve recognition for the positive impact made on the physician workforce in Colorado and the Northern Great Plains region.
- UNCCOM will be recognized for efforts and innovations in interprofessional medical education.
- UNCCOM graduates will seek opportunities for practice in rural and under served communities.
- More than 50% of UNCCOM graduates will practice primary care.
- UNCCOM faculty and staff will create a workplace where mentorship, trust and respect are valued.

Values:

- Osteopathic Philosophy
  - We recognize that people are comprised of mind, body and spirit and seek ways to foster wellness across this spectrum, not just for our patients but for our students, faculty, and staff.
  - We will integrate the tenets of osteopathic medicine within the full spectrum of the curriculum.
- Community
  - UNCCOM is an integral part of the university, partnering to create opportunities for cross-disciplinary teaching, learning and innovation.

- We work with our health care partners in ways that provide value to both our students and to those engaged in clinical teaching.
- We actively engage with leadership in Greeley and Weld County to improve health and health literacy.
- Our students, faculty, and staff advocate for social change that will improve the health and wellbeing of the communities we serve.

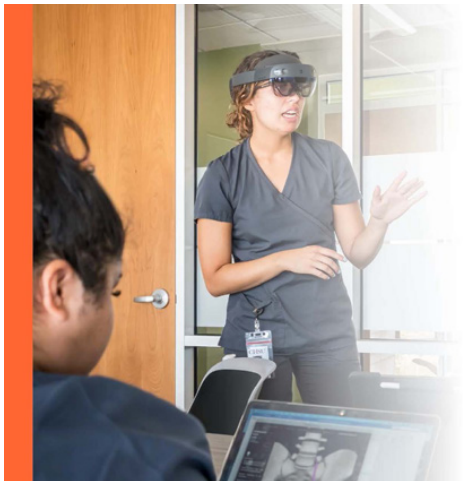
- Life-long Learning
  - Our curriculum prepares our students for a career that requires them to continually learn and apply evolving concepts and new discoveries.
  - Our faculty and staff participate in learning experiences that allow them to further develop their skills and explore their career trajectory.
  - We support graduate medical education programs within our community and assist in the development of new GME programs.
- Service
  - Our students, faculty, and staff serve others through participation on university and community committees, mentorship, and engagement with service projects.
  - Our students, faculty, and staff serve their profession through active membership and leadership roles in professional societies.

Accreditation Standards

The UNCCOM will be accredited by the Commission on Osteopathic College Accreditation (COCA). COCA is recognized by the U.S. Department of Education as the accreditor of colleges of osteopathic medicine. COCA accreditation signifies that a college has met or exceeded the Commission's standards for educational quality.

Guiding Principles

During Workshop One, the team employed a visioning exercise and explored current and future approaches to medical education that could inform the design of the facility. The comments gathered from these exercises were synthesized and Guiding Principles for the project were drafted and presented in Workshop Two. Leadership comments were incorporated into the final, five principles below and to the right.



GUIDING PRINCIPLES 01

Focus on team-based learning (TBL) and interprofessional education (IPE)

Key Concepts

- Group-learning pedagogies
- Multiple scales of engagement
- Interdisciplinary learning
- Robust technology infrastructure and appropriate instructional technology
- Integrated simulation and preclinical skills

Program Responses

- Small group work/study
- Preclinical simulation tailored to primary care
- Standardized Patient suite for both medicine & IPE
- Range of approaches to Human Anatomy
- Collaborative environments

GUIDING PRINCIPLES 02

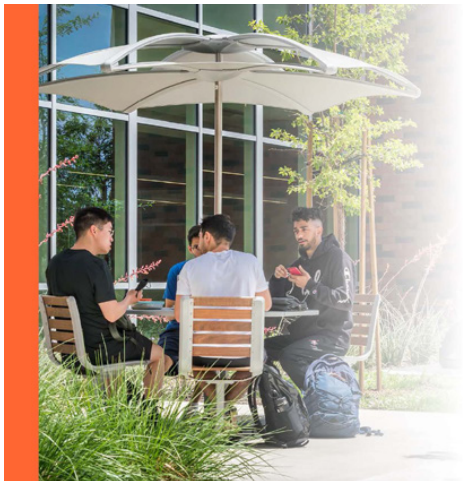
Engage our community and become a regional resource

Key Concepts

- Extend the public realm into the UNC COM
- Multiple potential points of engagement
- Health education and wellness
- An inclusive space welcoming to students and community
- Focus on Mission
- Foster both internal and external communities

Program Responses

- Teaching kitchen
- Pop-up clinics
- Space allocation for community engagement



GUIDING PRINCIPLES 03

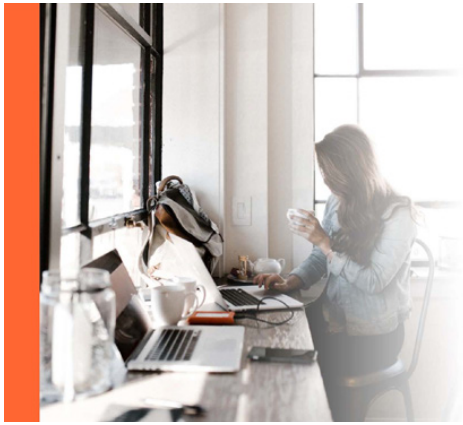
Create a supportive environment for students, faculty, and staff

Key Concepts

- Wholistic services for learners
- Faculty accessibility
- Distinction Tracks / Scholarship
- Accessible, friendly environment
- Meaningful collaboration and social engagement

Program Responses

- Faculty touch-down and engagement zones
- Range of settings for:
  - informal learning & study
  - social engagement
- One-stop shop for services
- Exhibit space for student scholarship
- Wellness / meditation rooms
- Inclusive spaces like gender neutral restrooms and changing rooms



GUIDING PRINCIPLES 04

Respond to change while respecting culture

Key Concepts

- Elevate UNC through the COM
- Friendly, open culture
- Flexibility and adaptability
- Positioned for growth
- HSC with clinical facilities
- Create a new "front door" to the campus

Program Responses

- Create new front door to west campus
- Transparent and honest environment
- Layouts that support flexibility and multiple learning models
- Plan for future growth
- Plan for future tech integration

GUIDING PRINCIPLES 05

Commitment to sustainability and wellbeing

Key Concepts

- Reduce energy use and CO_2 emissions
- Design for human health and comfort
- Comply with mandated requirement for LEED Gold
- Active design, promoting pedestrian movement within and between buildings
- Access to daylight & views / connections to nature / biophilic design
- Inclusive / universal design

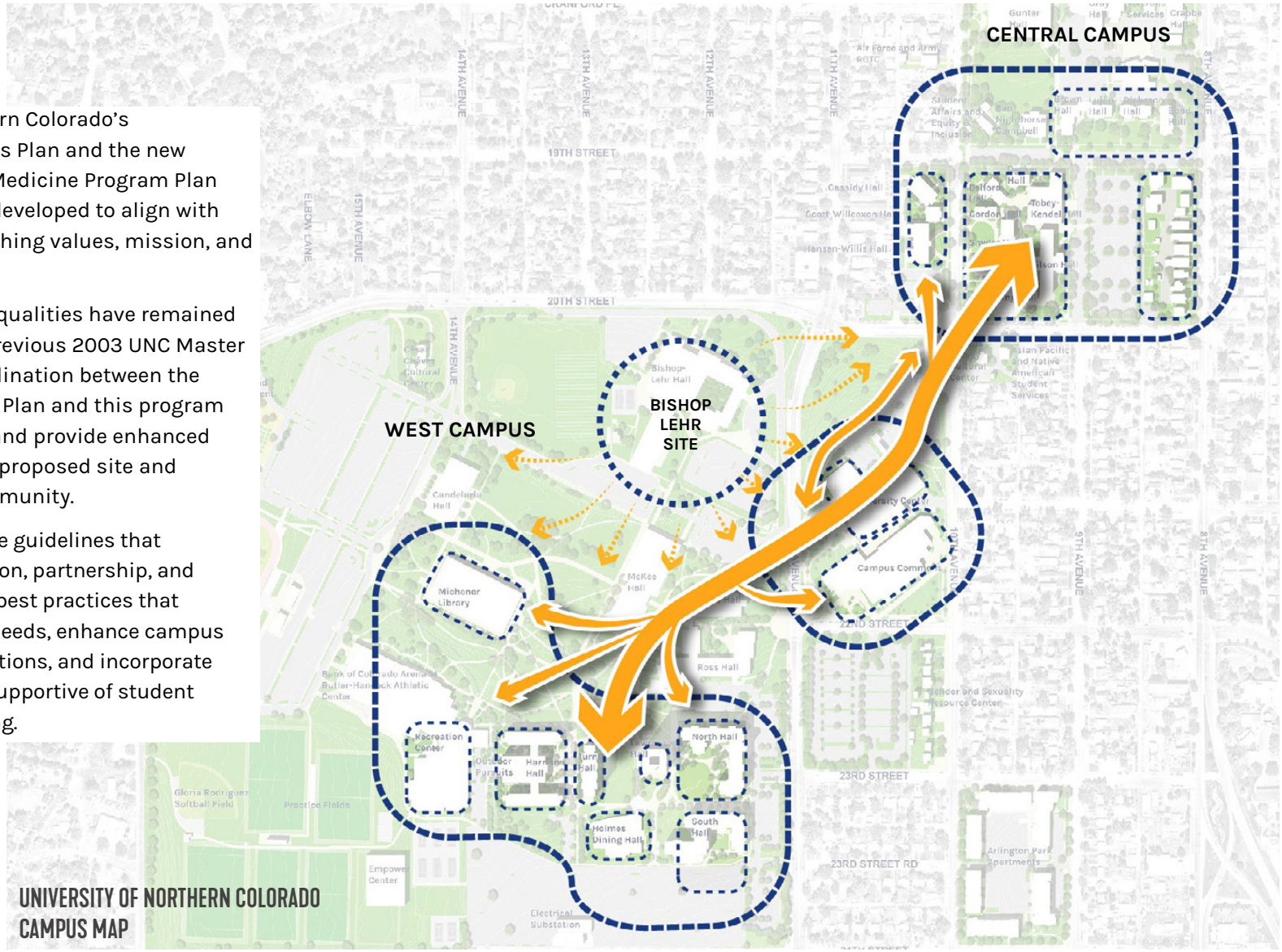
Program Responses

- Energy efficient systems and water conservation strategies
- Building orientation optimized for climatic conditions
- Low-emitting materials
- Controllability of temperature and lighting
- Thoughtful use of regional, recycled, or otherwise sustainable materials

1.3 RELATIONSHIP TO COMPREHENSIVE FACILITIES PLAN

The University of Northern Colorado's Comprehensive Facilities Plan and the new College of Osteopathic Medicine Program Plan are concurrently being developed to align with the institution's overarching values, mission, and strategic goals.

- While many campus qualities have remained the same since the previous 2003 UNC Master Plan document, coordination between the new Facilities Master Plan and this program plan will re-imagine and provide enhanced opportunities for the proposed site and broader campus community.
- Both plans will provide guidelines that encourage collaboration, partnership, and scholarship, through best practices that meet programmatic needs, enhance campus character and connections, and incorporate emerging pedagogy supportive of student success and well-being.



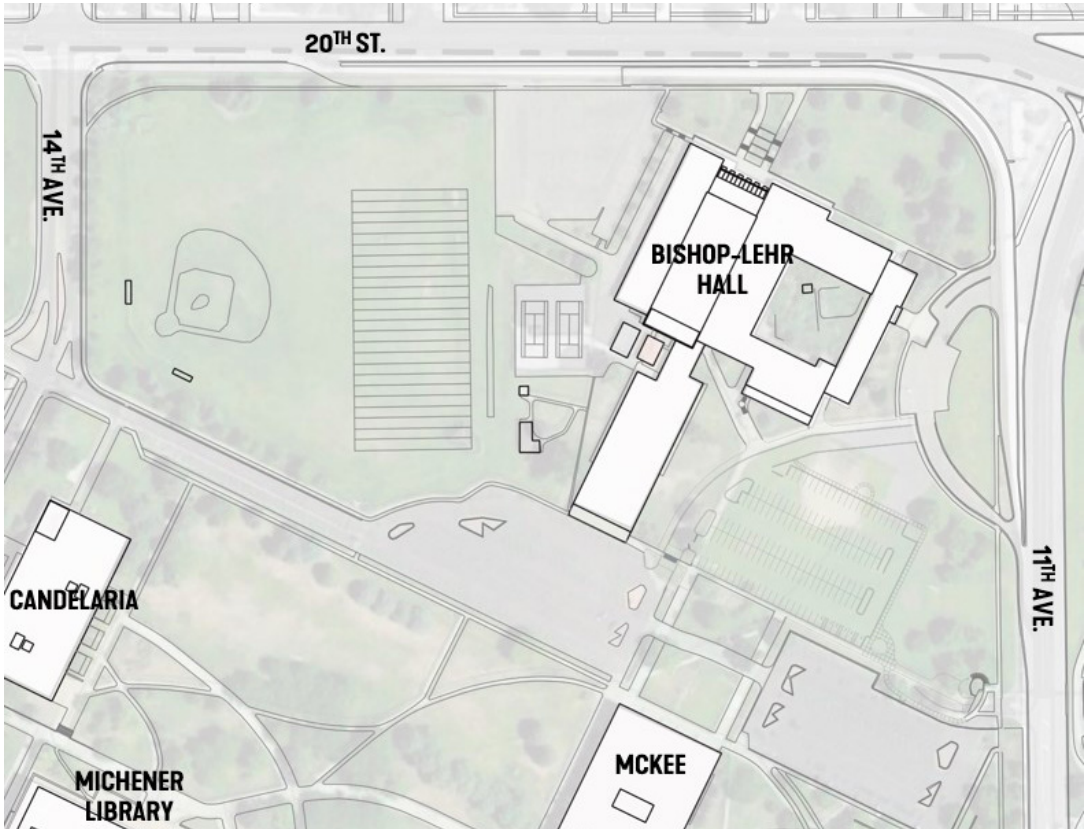
UNIVERSITY OF NORTHERN COLORADO CAMPUS MAP

SECTION 2 – JUSTIFICATION

2.1 EXISTING CONDITIONS

The site chosen for the new College of Osteopathic Medicine is on the corner of 20th Street and 11th Ave, at the former K-12 laboratory school, Bishop Lehr. The building has been vacant for almost two decades and is prime for redevelopment. The structure is unfortunately not suitable for rehabilitation as a teaching or learning environment and will be demolished as part of the project. Along the northern edge of the site, steep grades exist however the footprint of Bishop Lehr yields opportunity to site a new building, and sizable enough to maintain the newly paved parking lot undisturbed. The site also has direct access to the campus utility tunnel that will lend certain efficiencies as compared to the adjacent athletic field to the west.

EXISTING SITE PLAN



View of existing Bishop Lehr Building and new parking lot.

2.2 CHANGES & PROJECTIONS

STUDENT PROJECTIONS

The number of students at the new College of Osteopathic Medicine at UNC is dictated by the Commission on Osteopathic College Accreditation (COCA) and is capped at 150 students per year. The first matriculating class, Year One, cannot exceed half of that maximum, or 75 students. The Year Two class is estimated to be 112 students and at Years Three and Four the class size will not exceed 150. By Year Five all classes will be at full enrollment of a minimum of 150 students, but the facility is capable of supporting 180 students per class.

The school, however, is sized to accommodate Years One and Two at full capacity of 360 students and the staff and faculty to support those students. Students in Years Three and Four are in their clinical rotations and only occasionally on campus.

STAFF PROJECTIONS

The COM leadership has prepared the staffing projections on the next page, as required by COCA, while in Applicant Status. As indicated, all staffing required for the first year will be in place prior to that class starting their education at the UNCCOM. Additional staff will be added to support students as they enter their clinical rotations.

STAFFING PROJECTIONS

	Applicant Status Apply Candidate Status (6/23) June 2022 - August 2023	18-24+ months Pre-Matriculation August 2023 - February 2024	12-18 months Pre-matriculation February 2024 - August 2024	6-12 months Pre-matriculation August 2024 - February 2025	6 months Pre-matriculation February 2025	3 months Pre-matriculation May 2025	Year One 75 student cohort	Year Two 112 student cohort	Year Three 150 student cohort	Year Four 150 student cohort
Admin (12)	Founding Dean	Sr Assoc. Dean Med Ed Associate Dean Clin Ed/GME Assoc. Dean Admissions	Asst Dean/Dir Assessment Assoc Dean Preclinical Ed or Asst Dean Curriculum	Asst Dean Admissions	AD/Dir Student Affairs DEI director or liaison			Asst Dean/Dir GME Asst Dean/Dir Faculty Affairs Asst Dean/AD research		Dean Sr Assoc Dean Med Ed AD Clinical Affairs Asst Dean/Dir GME Asst Dean/Dir Assessment AD Preclinical Ed or Asst Dean Curriculum Asst Dean/Dir Faculty Affairs Asst Dean/AD Research AD Admissions Asst Dean Admissions AD/Dir Student Affairs DEI Director or Liaison
Operations (6)			Business Operations Manager (BOM) HR Spec Communications specialist	Accounting Spec		2 Facilities Support				Business Operations Manager (BOM) HR Spec Accounting Spec Communications Specialist 2 Facilities Support
Faculty (34)	1 OMM or CS Lab 0.3 min. if develop. 0.2 if attending	1 FTE Anatomy 2 other BMS FTE at COM 1.2 FTE across part time purchase from other colleges Chair Primary Care (or 1 Family Med Faculty) Chair OMM (or 1 OMM Faculty) Clin Faculty 2 FTE + 2 FTE shared across partners	add 1 Anatomy increase by 2 increase by 0.6 Faculty hiring to reach 6 FTE		2 FTE Pathology 3 FTE Pharm Chair Primary Care Chair OMM Need 5 in OMM(2 FTE) and 5 in CS lab(2 FTE); Need SG (0.0.6FTE lecture/presentations 0.4 FTE) 5FTE	add 1 Anatomy Increase by 1 Increase by .6	add 1 Anatomy Increase by 1 Increase by 1.2 Hire to 10 FTE Clinical - LOOKS LIKE AT 10 ALREADY	add 1 Anatomy Increase by 3 FTE Increase to full Clinical Fac complement	last FTE, if not in place last FTE last FTE last FTE 3 FTE Physiology last 2 FTE	5 FTE Anatomy 3 FTE Biochem 2 FTE Micro/Immuno 2 FTE Pathology (non-clinical) 3 FTE Pharm 3 FTE Physiology 2 other areas Chair Primary Care Chair OMM 12 Clinical Faculty FTE (at least 5 with OMM Skills)
Additional Staff (36)	FSA-Spec Asst to COM Leadership	2 FSA for Curriculum Develop/Faculty Support FSA in Admissions/SA for data/assists central with enrollment/student tracking etc.) SIM Director (may be faculty) 1 IT Support 2 FSA for Dept Support		1 IT	1 FSA	Clin Ed Manager 1 Financial Aid Counselor 2 Learning Svcs Support Spec Student Orgs and Event Planning Anatomy lab manager CTAC coordinator 1 IT 1 Library Support Research Support Coordinator	2 FSA Career Counselor 1 1 FSA Statistical Support	add 3 FSA add 1 FAC add 1 LSS 1 1 IT		FSA-Spec Asst to COM leadership Clin Ed Manager 5 FSA for Rotation Management (Clinic Coordinator) Career Counselor 2 Financial Aid Counselors 3 Learning Svcs Support Spec Dir Alumni Relations / Advancement - WHEN? Student Orgs and Event Planning 4 FSA for Assistance in Pre-Clinic & Support Clinic Ed FSA in Admissions/SA for data/assists central with enrollment/student tracking etc.) Anatomy Lab Manager SIM Director (may be faculty) CTAC coordinator IT support (3) (curriculum, rotation software, sim, online support) - CONFIRM IF 3 or 4 4 FSA for Departmental Support 1 Library Support (may be central) Dir. Body Donor Program FSA to support Body Donor Program and Anatomy Dept. Research Support Coordinator Statistical Support
										88 total

2.3 TOTAL SPACE REQUIREMENTS

The new College of Osteopathic Medicine at the University of Northern Colorado will offer students a state-of-the-art facility for medical education, including dedicated spaces for Anatomy, Osteopathic Manual Manipulation, and Simulation as well as large Team-Based Learning classrooms. These spaces are split between the first and third floors. Programmed spaces offer students additional resources and technology, collaboration spaces, and a variety of study spaces. Faculty, staff, and administration office space is collocated and adjacent to Student Services on the second floor to provide easy access for students.

The following describes the specific space needs of the facility.

PROGRAM SPACE SUMMARY

PUBLIC / USER SPACES

Commons

The commons located in the center of the building is accessed from the west and the east through vestibules to protect occupants and visitors from the elements. This inviting, transparent two-story space links the one-story classroom wing with the three-story portion of the building. The commons includes a monumental stair with adjacent step seating, both of which access an overlook area on the second floor, creating a gathering space for informal presentations. Lounge seating on the first level provides places for students to study or collaborate and the north wall is a prime location for a donor wall. The large open space creates visual access to Student Services located on the second floor. The second level of this space also includes five group study rooms and an additional lounge area.

Multipurpose Space

This column-free space is adjacent to the social and study area on the first floor and will have direct access to the terrace on the northeast side of the building. This multi-functional space with a small demonstration kitchen can be used for a variety of uses including community outreach. Adequate acoustical separation from the adjacent spaces will be key, along with multi-use technology and controllability. An adjacent furniture storage room provides flexibility to reconfigure as needed from lecture seating to banquet tables to general study space.

Student Social and Study Space

While these spaces are distributed throughout the facility along the circulation areas, the largest concentration is located on the first level of

the three-story wing. This space includes half of the fourteen group study rooms that each house ten learners and faculty. These rooms will be used to deliver curriculum and for study when not in use. Small group study rooms for up to four learners are in this area as well. IT support and a help desk are also located here for easy access. The server room for the facility has direct IT staff access. Student organizations have dedicated meeting space and storage and a meditation space is discretely located here. Open lounge space connects these functions to create a student-centric environment with space for refrigeration, microwaves, and vending.

Medical Information Center

The resource center located on the third floor includes a workroom and workstation for student use, an office for staff, storage for bone boxes for student use, reference materials and lounge space. Two additional group study rooms are located is this area as well but are not included in the fourteen dedicated to curricular use.

Quiet Study Area

An expanded quiet study area is located within the Medical Resource Center. This space will be furnished with carrels to accommodate concentration and individual use.

Classrooms

Team-Based Learning (TBL)

Team-based learning is the teaching pedagogy established for the COM. Two large flat floor TBL classrooms are in the south wing of the building. These spaces can accommodate up to 180 learners in high volume, column-free space. Each classroom is dedicated to the Year One and

Year Two students. Teaching is from the center of the room with monitors for each student team wall-mounted on the perimeter. Natural light enters these spaces from high clerestory windows. Support spaces for AV, recording and storage separate the two classrooms. Two group study rooms and informal study space is located outside the classrooms.

Skills Lab

A large flexible space for teaching skills is located on the third floor. This space can be reconfigured as needed to support a variety of activities from suturing to CT scanning. Durable finishes will withstand heavy and potentially wet use, casework with sinks within the room, and storage is adjacent. The skills lab is located near the gross anatomy and the virtual anatomy labs for use in conjunction with those spaces.

Class/Lab

Anatomy

The UNC COM leadership will employ a hybrid approach to teaching anatomy, through cadaveric dissection and virtual anatomy. The class will use the two spaces simultaneously. These spaces will be located on the third floor for ease of ventilation and a gurney-sized elevator is required nearby to facilitate movement of cadavers. The Skills Lab is adjacent for teaching topics related to the anatomy curriculum. Locker rooms and showers for students and faculty are located near these programmatic spaces as well as the OMM Lab. Faculty and meeting space is located with easy access to both modalities.

Physical Anatomy

The cadaver lab is sized for 20 dissection tables with up to five students per table. An additional table is added for upper level student use. Dissection tables will have downdraft ventilation and chases for routing utilities. Each table will be equipped with operating room lighting in addition to general illumination and wall-mounted monitors. Vestibules are provided at each access point and handwash sinks are located in the lab.

Refrigerated storage is located near the entry of Physical Anatomy for delivery of cadavers with a prep area adjacent. A donor program is not anticipated to be in place at time of the first matriculating class. Should a program be initiated, a separate space could be added in a future phase to accommodate embalming and storage. General storage, AV support, and a laundry are directly adjacent to the lab.

Virtual Anatomy

The Virtual Anatomy Studio is a large flexible space with storage and AV space adjacent. Monitors will be located on all walls. While the tools for teaching virtual anatomy are constantly evolving, the leadership is considering the use of HoloLens technology developed by Case Western. This space is flexible and can be used as meeting or teaching space when not used for anatomy.

OMM Lab

Osteopathic Manual Manipulation is a required and foundational element of the curricula. This space supports the teaching of OMM, the therapeutic application of manual pressure or force to diagnose and treat structural and functional issues in the bones, joints, tissues, and muscles of the body. Students learn the relationship between the neuromusculoskeletal system and the rest of the body to restore functionality and/or remove barriers to motion and healing. This large column-free space is organized with tables in rows with two learners per table. The instructional platform is located to the front with an overhead camera for broadcasting to ceiling-mounted monitors throughout the space. Handwash sinks are located near the entry. Private offices and touchdowns for faculty and storage are accessed from the larger teaching environment.

Simulation

The COM will employee mannequin-based and standardized patient simulation. They are located adjacent to each other to share debrief for post-situational learning. A separate entrance is required for the Standardized Patients to access the space without interacting with students. In this case, a separate entrance and parking area are located on the lowest level.

Simulation Center

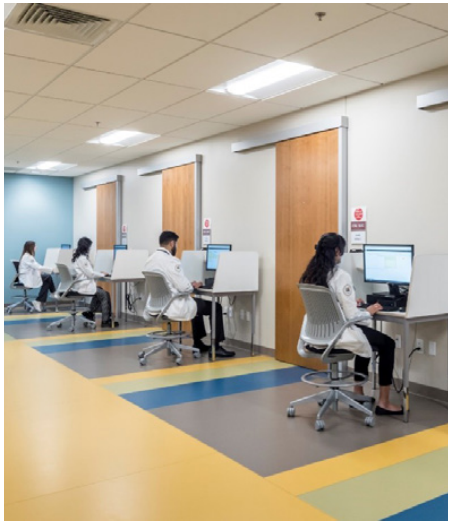
The simulation center provides experiential and immersive simulation education for the students of the COM, other UNC health science programs through interprofessional education (IPE), and potentially outside providers using high-fidelity mannequins in clinical settings. The center is designed for flexibility and adaptability. The environments are not purpose-built to recreate specific settings, rather the situation will be created in one or more of the four, 400 sf simulation spaces. A centralized control room allows the technicians running the simulations to observe all four rooms. An area for simulating the pre-operative scrub environment is

also located in this group of spaces. All events are recorded with cameras and microphones for playback and review with teams and individual students.

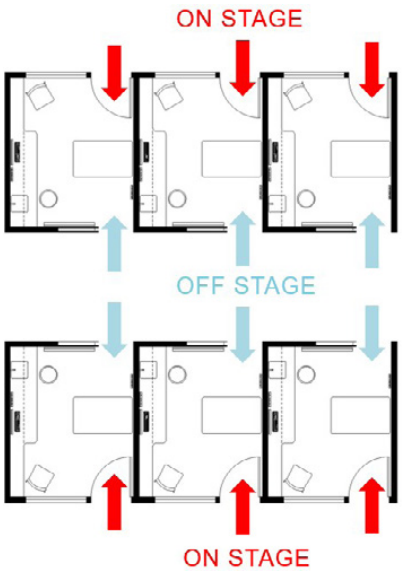
Adequate storage is an important requirement for mannequin storage and repair. The Simulation Director and staff have workspace within the area and a large debrief space is available for both the Simulation Center and the adjacent standardized patient suite.

Standardized Patient (OSCE)

A Standardized Patient is an individual trained to portray the personal history, physical symptoms, emotional characteristics, and everyday concerns of a healthcare patient during an exam, so that students can practice and be tested on their clinical skills. Patients enter the building on the lower level and come to the first floor via stair or elevator, directly into check-in. Patients occupy the waiting and changing space and are trained in the conference room prior to being deployed into the exam rooms. Personal lockers are provided for their personal effects. The layout of the exam rooms is an onstage/offstage approach to the clinical environment. Patients enter the exam rooms from one side and students from the other. The student side has adequate space for post-exam



charting. A large student waiting space has direct access to the offstage entries to the exam rooms.



Twelve standard-size exam rooms are provided for training sessions and Board required testing use. Four additional larger rooms have been added to provide environments for IPE with the other health profession students on campus. These larger rooms also accommodate larger families in the simulations, a real-world situation often occurring in rural locations where students may practice.

A control room monitors the exam rooms and the charting spaces. All events are recorded with cameras and microphones for playback and review with teams and individual students. A shared office space for the coordinator, trainer, and staff as well as storage are included in the area.

Office Space

Most of the workspace is located on the second floor for ease of student access. Administration, faculty, and staff are collocated and co-mingled, creating a level hierarchy and a flexible environment that can adapt and change over time. Student Services is located at the east end of the building with visual connection to the commons for ease of wayfinding. Faculty are nearby to facilitate meetings with students. Workspace for simulation, anatomy and OMM faculty are located within those environments.

Student Services

All services needed by students have been consolidated into a one-stop shop on the second level, visible from the Commons below. The Welcome Center is an open and welcoming space, similar to a Genius Bar, where students can get support on a self-serve basis, can be triaged within the center, or attend scheduled meetings with the various service providers. Potential students come here for information sessions and interviews also. By collocating all of the services together it reduces the stigma of coming to Student Services. The following departments are located here:

- Admissions
- Student Affairs
- Diversity Equity and Inclusion (DEI)
- Career Counseling
- Financial Aid

- Learning Services
- Alumnae Relations
- Student Organization Leadership
- Clinical Education Coordination
- Mental Health Services

Workspace ranges from private offices to workstations. Support spaces include conference and huddle rooms, workrooms, storage, and break space.

Administration

The Dean and Assistant Deans are in the center of the second floor. Support staff are located at the entrance to the area with a large conference room accessible to faculty and staff. Support spaces include storage, a work area, and a touchdown for visitors. Operations staff are located adjacent.

Faculty

The office area houses department chairs and faculty in offices, adjunct faculty in touchdown spaces, and support staff in workstations. Clinical Affairs and Graduate Medical Education are included in this area. Support space includes four conference rooms, work area, storage, and shared break space.

GENERAL BUILDING

Much of the general building program has been described in the areas outlined above, including the commons, multipurpose room, meditation room, and IT support. The remaining support spaces are located on the lower level or in the building core.

The receiving area, facilities staff, equipment, and storage, and building storage are all located on the west side of the building on the lowest level. Other spaces on this floor are building mechanical and electrical and a connection to the service tunnel.

The building core is located along the edge of the east/west circulation and houses stairs and elevators, restrooms, two lactation rooms, technology spaces (IDR), electrical rooms, and shaft spaces.

Research

Research is a key component in the curriculum and will be housed in the Ross Science Building located south of the COM. Eleven labs of approximately 900 sf each will be made available to the COM. As this academic space is not in the COM we have not added this square footage to the facility program.

TOTAL NSF AND GSF

The total net program space requirement is **66,150 NSF.** For the purposes of this Program Plan a 10% program contingency and a 40% grossing factor is added to the net building area for a total of **101,871 GSF** for the new medical education facility.

The following pages summarize the approved program for the UNC College of Osteopathic Medicine.

University of Northern Colorado

COLLEGE OF OSTEOPATHIC MEDICINE

January 2023

Description of Space	Design Program for 160 Students per Year: Qty.	Area Each	Net SF	Students/ Classroom	Student Capacity	Notes
CLASSROOMS						
TBL	2	5650	11,300	180	360	2 individual TBL; 8 students per table
AV	2	150	300			
Recording Room	2	180	360			
Storage	1	750	750			
Skills Lab	1	2200	2,200	90	90	for 90 students; 6 sinks, resilient flooring; adjacent to Anatomy
Handwash Sinks	6	5	30			
Storage	1	300	300			
Total square footage			**15,240**		**360**	
CLASS / LAB						
Physical Anatomy						
Cadaver Lab	1	2950	2,950	100	100	20 tables @ 5 students per table; add 150 sf for upper level dissection station
Handwash Sinks	8	5	40			
Refrigerated Storage	1	500	500			
Prep Area	1	250	250			
Locker Room - Faculty	2	200	400			
Storage	1	100	100			
Laundry	1	100	100			
AV	1	80	80			
Virtual Anatomy						
AR Studio	1	1000	1,000	40	40	could reduce to 900 sf if needed; proximity to Physical Anatomy Lab preferred
AR Storage	1	160	160			
AV	1	80	80			
Private Office - Anatomy Director	1	120	120			
Private Office - FSA Anatomy and Donor Program	1	120	120			
Workstation - Donor Program / Anatomy Support	1	64	64			
Conference	1	250	250			
OMM						
OMM Area	1	4460	4,460	200	200	50 tables; instruction on perimeter
Handwash Sinks	4	5	20			
Faculty Touchdown Office	1	150	150			4-person
Private Offices	2	120	240			3-person
Storage	1	180	180			
Total square footage			**11,264**		**340**	

PROGRAM SPACE LIST (CONT.)

University of Northern Colorado

COLLEGE OF OSTEOPATHIC MEDICINE

January 2023

Description of Space	Design Program for 160 Students per Year: Qty.	Area Each	Net SF	Students/ Classroom	Student Capacity	Notes
SIM AND SPECIALTY						
Simulation Center						
Simulation Room	4	400	1,600			
Control Room, Sim	1	300	300			
Private Office, Sim Center Director	1	120	120			
Workstation, Sim Support	1	64	64			
Conference Room / Debrief	1	400	400			20-person, share with SP
Storage	1	500	500			
Scrub Room	1	100	100			6 students
Standardized Patient (OSCE)						
Private Office @ 150 SF	1	150	150			3-person for SP Coordinator, SP Trainer, and CTAC
Conference Room	1	400	400			at intake
Check-In Area	1	120	120			
SP Waiting Area with RR and Changing	1	600	600			2 non-gendered changing rooms
SP Exam Room, Standard	12	132	1,584			
SP Exam Room, Large	4	200	800			
Student Waiting	1	800	800			
Storage	1	250	250			
Control Room, SP	1	200	200			in 3-person private office
Total square footage			**7,988**		**0**	
OFFICE						
Student Services						
Welcome Center	1	800	800			
Private Office @ 180 SF	4	180	720			AD Admissions Asst Dean Admissions AD/Dir Student Affairs Mental Health (need back door exit)
Private Office @ 120 SF	15	120	1,800			DEI Director Dir Alumnae Relations Dir. Student Orgs Career Counselor Clinical Ed Manager Research Support Statistical Support (2) Financial Aid Counselors (3) Learning Services Support Specialists (3) for future (fin aid, clin coord, learning support)

University of Northern Colorado

COLLEGE OF OSTEOPATHIC MEDICINE

January 2023

Description of Space	Design Program for 160 Students per Year: Qty.	Area Each	Net SF	Students/ Classroom	Student Capacity	Notes
Workstation	9	64	576			(2) FSA - admissions (need privacy screens) (2) FSA - Preclin Asst / Clin Ed Support (need privacy screens) (5) FSA - Clinic Coordinators (need privacy screens)
Copy Room	2	120	240			
Storage	1	120	120			
Storage	1	250	250			
Conference Room	1	240	240			
Waiting Area	1	50	50			
Waiting Area	1	150	150			
Conference Room	1	500	500			adjacent to admissions
Large Huddle	1	160	160			6-person
Small Huddle	2	120	240			4-person
Break Area	1	200	200			
Admin						
Private Office - Dean	1	200	200			
Private Office - Admin @ 180 SF	5	180	900			Asst Dean/Dir Assessment (may move to faculty) AD Preclinical Ed or Asst Dean Curriculum (may move to faculty) Asst Dean/Dir Faculty Affairs (may move to faculty) Asst Dean/AD Research Future
Private Office - FSA	1	120	120			FSA - Special Asst to COM Leadership
Workstation - Support Staff	3	64	192			
Storage Room	2	120	240			
Work / Copy Area	1	120	120			
Conference Room	1	400	400			not visible from waiting area
Waiting Area	1	150	150			
Touchdown for Visitors	1	36	36			

PROGRAM SPACE LIST (CONT.)

University of Northern Colorado

COLLEGE OF OSTEOPATHIC MEDICINE

January 2023

Description of Space	Design Program for 160 Students per Year: Qty.	Area Each	Net SF	Students/ Classroom	Student Capacity	Notes
Cinical and GME						
Faculty						
Private Office @ 180 SF	6	180	1,080			Chair Primary Care Chair OMM Chair Biomedical Sciences Chair of Specialty Med and Surgery AD Clinical Affairs Asst Dean/Dir GME
Private Office @ 120 SF	18	120	2,160			3 FTE anatomy 3 FTE biochem 2 FTE micro/immuno 2 FTE pathology (non-clinical) 3 FTE pharmacy 3 FTE physiology 2 FTE other
Touchdown for Adjunct Faculty	10	64	640			
Workstation - Deptartmental Support	6	64	384			
Storage	1	120	120			
Storage	1	250	250			
Work Area	1	150	150			
Break Room	1	700	700			
Conference Room @ 200 SF	2	200	400			
Conference Room @ 250 SF	1	250	250			
Conference Room @ 400 SF	1	400	400			
Waiting Area	1	50	50			
Operations						
Private Office @ 120 SF	4	120	480			BOM (Bus Ops Manager) HR Specialist Accounting Specialist Communications Specialist
Workstation - Support Staff	3	64	192			
Total square footage			**15,660**		**0**	

University of Northern Colorado

COLLEGE OF OSTEOPATHIC MEDICINE

January 2023

Description of Space	Design Program for 160 Students per Year: Qty.	Area Each	Net SF	Students/ Classroom	Student Capacity	Notes
SOCIAL AND STUDY						
Medical Information Center and Quiet Study						
Reference Area, Stacks	1	150	150			
Group Study Room	2	200	400			8-person
Carrel	24	25	600			arrange for quiet space
Lounge Area	1	400	400			
Private Office - Librarian	1	120	120			
Workstation - Student Use	1	64	64			
Work Area - Student Use	1	150	150			
Storage	1	250	250			
Study / Social						
Student Lounge	1	2400	2,400			Incl vending and break
Locker Room	2	500	1,000			
Changing	2	35	70			
Changing with Shower	2	50	100			
Space for Organizations	1	240	240			
Private Office - SGA	1	120	120			3-person office
Student Orgs Storage	1	120	120			
Group Study Room	14	200	2,800	6	84	10-person
Small Study Room	4	80	320	3	12	2-3 person
Total square footage			**9,304**		**96**	

PROGRAM SPACE LIST (CONT.)

University of Northern Colorado

COLLEGE OF OSTEOPATHIC MEDICINE

January 2023

Description of Space	Design Program for 160 Students per Year: Qty.	Area Each	Net SF	Students/ Classroom	Student Capacity	Notes
GENERAL BUILDING						
Vestibule	2	100	200			
Building Commons	1	2500	2,500			
Multipurpose Room	1	1100	1,100			
Teaching Kitchen	1	180	180			open onto MP Room
MP Storage	1	100	100			adjacent to MP room
Building Storage	1	1000	1,000			
Receiving / ~~Mailroom~~	1	250	250			need at grade dock space
Lactation Room	2	50	100			
Meditation Room	1	120	120			
Server Room	1	300	300			placeholder
IT	1	180	180			3-person
IT Help Desk	1	150	150			located off lobby
Workstation - Facilities Support	1	64	64			
Facilities Break	1	150	150			
Facilities Equipment and Supplies	2	150	300			
Total square footage			**6,694**		**0**	
NET BUILDING AREA (NSF)						
Total Net Square Footage			**66,150**		**796**	
Program Contingency on Net Building Area		10%	6,615			
Grossing Factor on Net Building Area		40%	29,106			
GROSS BUILDING AREA (GSF)						
Total Gross Square Footage			**101,871**			

2.4 ALTERNATIVE ANALYSIS

Interim Space Plan

One of the requirements for accreditation through COCA is to create a Interim Space Plan to accommodate the program in Year One, if the facility is not complete. The first class cannot exceed 75 students, so that number of staff and related faculty reduces the program space needed, should this event occur. The team studied two options for creating a viable solution for housing the programs for the short-term as the facility is being completed. The first option is to temporarily locate the programs on the UNC campus and the second is to locate the programs at the Banner North Colorado Medical Center (NCMC). A possible hybrid approach, and one that could be the best alternative is to house all of the temporary facilities at UNC and locate Simulation, temporarily in the NCMC facility (Standardized Patient and Mannequin-based Simulation).

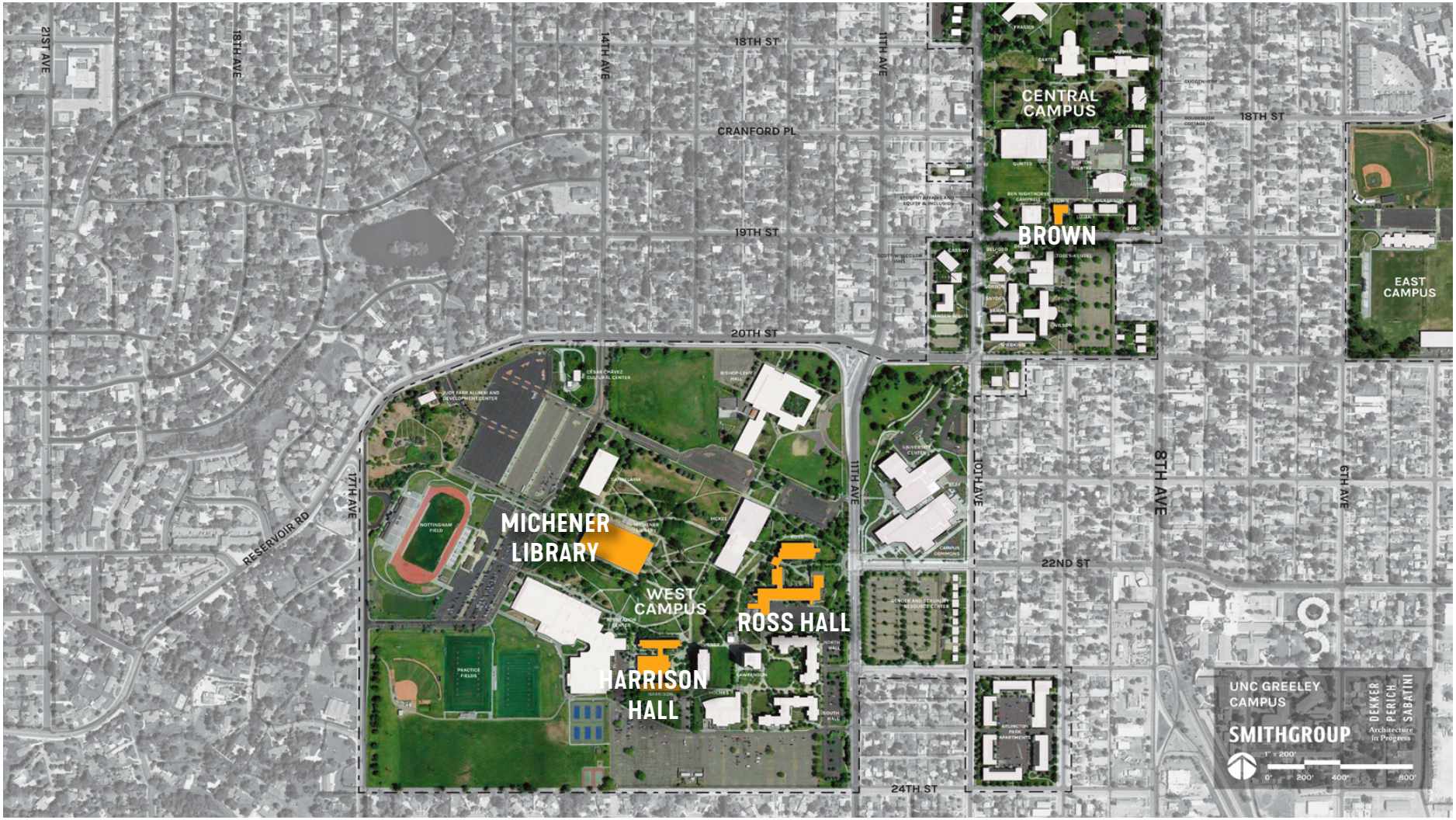
UNC Campus

The Facilities team identified locations on the Central and West Campus that could be made available to house program space to accommodate 75 students. One of the benefits of locating the programs on campus is the continuity it will provide to students and faculty. Other spaces on campus can also be accessed for learning opportunities. Office space for the administration, faculty and staff can be found across campus for temporary occupancy.

The Team-Based Learning (TBL) Classroom for 75 students would be in Brown Hall on the Central Campus. This former dining hall is large and column free, requiring minimal modifications other than the installation of monitors on the walls. The OMM Lab, lounge space and group study rooms would be in Harrison Hall on the West Campus. This large open area is currently vacant and would require some construction to create these spaces. Technology would also need to be incorporated. Michener Library is best location for the temporary Anatomy Lab. A portion of the lowest level is available and is located under an outdoor plaza above. This location would allow for ventilation from the lab through the plaza rather than through several floors above. A small lab with ten dissection tables, refrigerated storage, prep area, and an office for the Director can be accommodated. A Student Lounge and Meditation Room can be located adjacent to the Anatomy Lab.

Another location for a permanent, full-size Anatomy Lab on campus was investigated, converting two sloped floor lecture halls in Ross Hall into the lab and support spaces. While the spaces could be converted, it would be at significant expense, including: the sloped floors would need to be infilled, the ventilation system upgraded, and an elevator would be added at the south entrance to deliver cadavers into the refrigerated store area. The classrooms that would be sacrificed in this retrofit would need to be recreated in the new COM building as well.

ALTERNATIVE LOCATIONS PLAN



SECTION 3 – DESIGN CRITERIA & IMPLEMENTATION

3.1 DESIGN CRITERIA

ARCHITECTURAL NARRATIVE

The building should employ high-quality, durable, low-maintenance materials for the exterior of the facility, maximizing quality for the budget allocated to each exterior envelope system. The proposed design considered the materiality of adjacent buildings on campus and selected a combination of high-performance glazing systems and durable rainscreen claddings for the exterior palette. Selected interior materials will contribute to a harmonious overall aesthetic inside and out. Refer to the UNC Architectural Standards being incorporated.

EXTERIOR ARCHITECTURAL MATERIALS

- Aluminum curtain wall with high-performance glazing featuring vision, spandrel, and fritted glass.
  - The depth of the curtain wall aluminum framing is anticipated to be 7 ½" to 10" based on wind loading and span.
  - At least two vision glazing types are anticipated, a clear glass at ground level where the overhanging second level will provide solar protection and a more efficient glazing on upper levels.
  - Storefront may be considered where spans and wind loads allow.
- Please see the Structural Narrative for exterior framing information.
- 4" face brick veneer matching the campus standard masonry
  - The primary brick is the Lakewood Brick and Tile – Sheffield Grain
  - The accent brick is Lakewood Brick and Tile - Misty Gray Grain
- Single skin concealed fastener metal panel system
  - System should be attached using a thermally broken furring system such as Knight Wall.
  - Finish is assumed to be a custom fluoropolymer coating
  - An alternate for standing seam or shingled copper may be considered
  - Perforated metal panel will be considered for the mechanical screening
  - Matching brake metal for use at roof fascia, transitions, etc.
- Exterior walls of veneer masonry or metal panel will receive glass-mat sheathing, fluid applied air-barrier, and continuous mineral wool insulation.
- Foundation walls will receive fluid applied waterproofing at below grade occupied spaces with associated drainage board and extruded polystyrene.
- Wood-look concealed fastener metal panel soffit system
- Roofing membranes should be a 60 or 90 mil fully adhered EPDM with a high SRI
  - All roof membranes should be pitched to drain using a combination of sloping roof decks and tapered insulation
  - Pathways to roof mounted equipment must be included

- Painted architectural steel sun shading scrim
    - Scrim will be fabricated from steel supports attached to structure as well as steel framing and architectural metal mesh.

Partial demolition of the utility tunnel that parallels the foundation of the existing Bishop Lehr Building will be required. A proposed extension would connect the campus utility loop to the new development. This tunnel will be constructed of cast-in-place concrete with associated reinforcing and fluid applied waterproofing.

INTERIORS MATERIALS

Refer to **Section 3.2 Spatial Relationships and Room Specifications** for interior materials and finishes based on each specific room type.

STRUCTURAL NARRATIVE

CODES AND DESIGN CRITERIA

The building structure on this project will be designed to satisfy all the applicable criteria and parameters contained within the 2021 International Building Code and applicable local provisions. The following design loads and criteria shall apply:

Occupancy Category:	III
Basic Wind Speed:	114 mph
Wind Exposure:	C
Location:	Lat. = 40.4055; Long. = -104.6982
Seismic Design Category:	B
Soil Site Class (assumed):	D (Default until confirmed by geotechnical)
Frost Depth (assumed):	36" (assumed)
Roof Live Load:	20 psf (non-reducible)
Ground Snow Load:	43 psf
Roof Snow Load:	30 psf (plus drift loads where applicable)
Suspended Equipment:	5 psf allowance plus actual weight of major equipment
Allowable Soil Bearing:	End bearing and side friction for drilled piers (values TBD)

DESCRIPTION OF STRUCTURE

The project will consist of a three-story academic building with an attached single-story wing totaling approximately 102,000 square feet. It is configured in a tee shape with the east-west wing consisting of 3-stories of various functional spaces including simulation rooms, study areas, exam rooms, office space, learning lab spaces, etc. The north-south wing consists of a single-story area with two large Team Based Learning (TBL) classrooms and associated support spaces The two wings are tied together with a two-story "hub" that serves as a Building Commons on the ground floor with a welcome center and group study spaces on the second floor. This connector hub will also contain a monument stair. A building expansion joint may be required and would be located between the connector hub and the single-story classroom area. As currently envisioned, the upper floors of the multi-story building structure will cantilever beyond the ground floor wall plane on several sides. There is also a large, cantilevered overhang on the north side of the high roof. A small walk-out basement level in the northeast corner of the building serves as a loading and receiving area, as well as storage and waiting/changing rooms. Floor to floor heights in the multi-story wing will be 16'-0"and approximately 24'-0" in the single-story wing.

The building superstructure is envisioned as a conventional steel frame with a combination of braced frames, moment frames, and cast in place concrete core elements.

ROOF FRAMING

The roof framing for the building will consist of a metal roof deck supported by a combination of steel bar joists and steel wide flange beams supported on steel wide flange girders. Long span steel joists will be utilized at large clear span conditions over the TBL spaces as well as the lab spaces on the third floor. Rooftop units will typically require concrete pads for sound and vibration mitigation. A large mechanical unit will be within a recessed well on the roof of the single-story classroom wing. This area will consist of wide flange steel beams and girders supporting a concrete and metal deck composite slab. At the three-story wing, various exhaust units and air handlers are anticipated to be mounted on the roof. Framing at these areas will be wide flange steel beams.

FLOOR FRAMING

The floor framing will consist of metal deck concrete slabs, supported by composite steel wide flange beams and girders. Overhanging upper floors will be accomplished with cantilevered steel beams and girders at the primary column locations on the second floor. Several of the spaces will require strict floor vibration control and will framed with very stiff floor framing members.

WALLS AND VERTICAL FRAMING

The main vertical structural support will consist of a combination of tubular steel and wide flange columns. The two primary stair and elevator cores are envisioned to be cast in place concrete elements that will support the surrounding steel framing as well as to provide part of the lateral force resisting system. Exterior walls will be a combination of non-load bearing metal studs supporting architectural metal panels, glass and aluminum storefront, and curtain wall systems. At the single-story area, there will be brick veneer supported on a combination of CMU and metal stud framing. Some architectural scrim shading devices will likely be incorporated into the design and will require structural support. Interior walls will be non-load bearing light-gage steel studs.

LATERAL FORCE RESISTING SYSTEM

The primary lateral force resisting system will consist of a combination of tubular steel braced frames and moment frames. As mentioned above, the two primary stair/elevator core elements could be constructed of cast-in place concrete to resist lateral forces in the three-story wing. The metal deck and concrete floor slabs and the metal deck roof diaphragms will distribute lateral forces into these elements. It is anticipated that any exposed structural steel framing will be detailed as architecturally exposed structural steel (AESS).

SUBSURFACE PREPARATION AND FOUNDATION SYSTEMS

The foundation will likely consist of a system of drilled piers, pier caps, and formed perimeter grade beams supporting the primary structural columns and perimeter walls. Piers will vary in diameter and length to achieve required load capacities. A system of concrete tie beams will be utilized to interconnect the various pier caps. The sub-grade geology likely consists of sandstone bedrock at varying depths. It is anticipated that the piers will be "socketed" into the sandstone a minimum of five feet, and a maximum of fifteen feet. The water table on the site may be an issue, particularly at the lowest level, and may require temporary or permanent dewatering and drainage. Interior slabs will likely be reinforced concrete, bearing directly on a layer of engineered fill. There will be cast-in-place concrete retaining walls at the basement area.

PRELIMINARY STEEL TONNAGES

Based on the current design the structural steel weight is estimated to be in the 12-15 psf range. This includes all primary steel framing, connections, and miscellaneous metal items, but excludes the metal roof and floor decking.

MECHANICAL NARRATIVE

MECHANICAL DESIGN OBJECTIVE

Development of the mechanical systems shall focus on providing mechanical systems that are cost effective, energy efficient, environmentally friendly, and easily maintainable. All systems shall have energy metering to assist in optimized energy use strategies to conserve energy and reduce water consumption. Design of the mechanical systems should promote forward thinking in engineering and be flexible to support future changes in program use.

CODES AND STANDARDS

The latest version of the following codes and standards will be used in the mechanical system design:

- 2018 International Building Code with Local Amendments
- 2018 International Mechanical Code with Local Amendments
- 2018 International Energy Conservation Code with Local Amendments
- 2018 International Plumbing Code with Local Amendments
- 2018 International Fire Code with Local Amendments
- Office of the State Architect New Construction HPCP
- 2017 National Electrical Code with Local Amendments
- 2018 National Fire Alarm and Signaling Code with Local Amendments
- Office of the State Architect State Building Programs Policies and Procedures
- Colorado High Performance Certification Program
- Office of the State Architect New Construction High Performance Certification Program
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Std 62.1-2016
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Std 90.1-2016
- Leadership in Energy and Environmental Design (LEED) Version 4.1 – Minimum Gold Rating
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks
- American Society for Testing and Materials (ASTM)
- American National Standards Institute (ANSI)
- Sheet Metal & Air Conditioning Contractors National Association (SMACNA)
- Occupational Safety and Health Administration (OSHA)
- Underwriters' Laboratories (UL)

ENVIRONMENTAL DESIGN CONDITIONS

Site/Elevation:	Greeley, CO / 4,700 Feet above Sea Level
Latitude/Longitude:	40.4 ° N / 104.6° W
ASHRAE Climate Zone	5B

OUTDOOR DESIGN TEMPERATURES

	(ASHRAE 99.6% / 0.4% DATA)
Winter Dry Bulbs	-8 ° F
Summer Dry Bulb/Coincident Wet Bulb (Hot):	97 ° F / 63 ° F
High Dew Point	63 ° F / 73 ° F
Wet Bulb Designed Equipment	68 ° F
Air-Cooled Condensers:	105 ° F

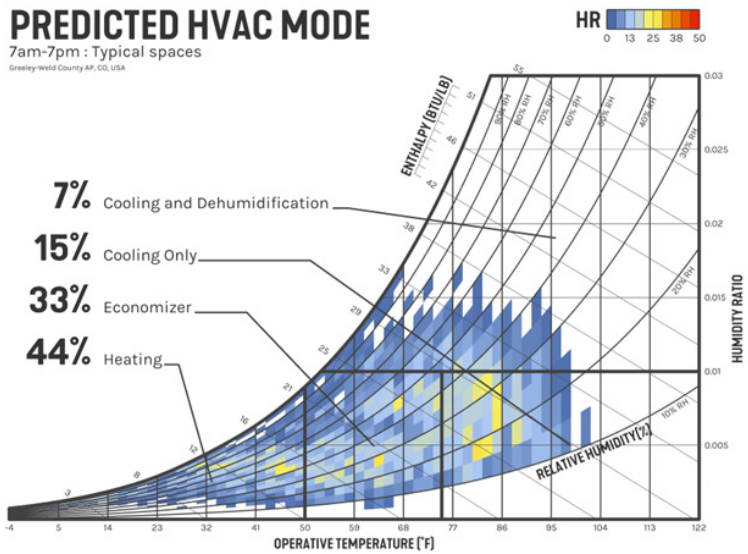
INDOOR SPACE DESIGN CONDITIONS

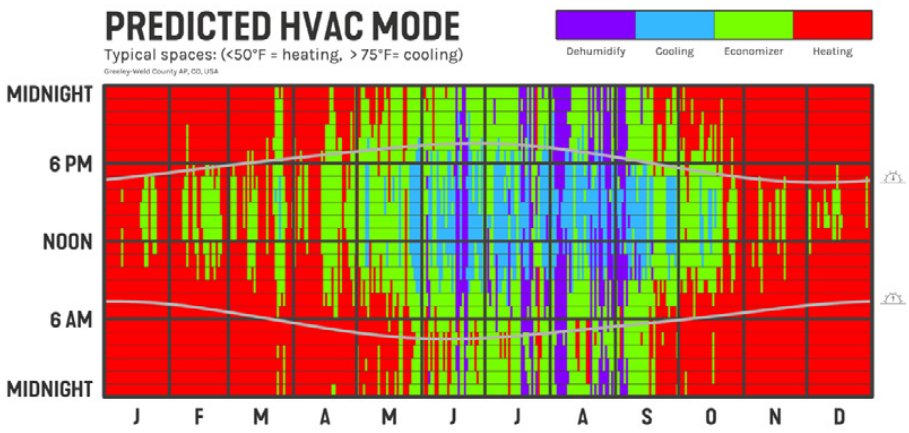
DESIGN TEMPERATURES			
SPACE TYPE	COOLING SETPOINT	HEATING SETPOINT	HUMIDITY RANGE
Office, Classrooms, General Spaces	75	70	20%-50%
Non-Occupied Spaces	80	68	20%-50%
Laboratories	75	70	20%-50%
IDF/MDF/Electrical Rooms	80	64	20%-50%
Elevator Control Room	80	64	20%-50%

TEMPERATURE PROFILES AND SYSTEM OPERATING MODES

The site was analyzed to assist in determining systems that may be appropriate for this building. A representative hourly weather analysis is shown below to estimate system operating modes based on outside air conditions. The operating modes are also shown over the year in the bar chart below.

The Greeley climate is a predominantly a heating environment. Radiant systems will be used where applicable to increase energy efficiency. The climate is consistently dry with limited amounts of elevated humidity in July and August. The dry climate allows for evaporative process to be used in the humidification process to reduce energy consumption.





EXISTING BUILDING

The proposed new building will be located where Bishop-Lehr Hall is currently located. All mechanical systems associated with Bishop-Lehr Hall will be demolished. The northern leg of the utility tunnel shall be demolished and rerouted. Refer to narrative below for additional information.

BUILDING COOLING & HEATING LOADS

A new three-level building will be constructed for classrooms, labs, student collaboration spaces and offices spaces. The building is approximately 100,000 square feet and the estimated cooling load for the building is 250 tons. The building will have a dedicated cooling system. The building will connect to the campus High Temperature Hot Water (HTHW) system to provide the hydronic and domestic hot water systems.

CHILLED WATER SYSTEM

The building will be conditioned by an air-cooled, chilled water system. The chilled water system will be designed as a variable-primary system for energy efficiency. The chilled water systems will be provided with a 45% propylene glycol solution since parts of the piping systems will be exposed to the elements. The chilled water pumps are sized at one per chiller with an additional stand-by pump for system redundancy. The chillers and pumps will be located on grade adjacent the building in a mechanical equipment yard.

The chilled water system will be optimized for energy performance. Optimization sequences will reset the chilled water supply temperatures based on outside air conditions and building demand. Two-way control valves at each chiller to provide isolation when not in use. Two-way control valves at building cooling coils modulate to maintain their respective set points. Three-way valves or bypass control valves at remote building points ensure minimum flow is maintained for the chilled water pumps.

The chilled water system will consist of chillers, pumps, variable-frequency drives (VFDs) for all pumps, chilled water expansion tank, coalescing air separator, chilled water flow-meter, make-up water station with reduced pressure backflow preventer, closed loop chemical treatment.

Preliminary equipment sizes and capacities are as follows:

- Two (2) 200-ton air-cooled, magnetic bearing compressor chillers. Chillers are sized for approximately 67% of the total building load to provide partial redundancy in the event of a chiller failure along with 15% additional capacity per the Campus Guidelines. Each chiller shall be provided with variable speed condenser fans, single point power, and factory mounted controller with BMS interface. The chilled water system will be designed with a supply temperature of 44F and design temperature difference of 14F.
- Three (3) chilled water pumps (one stand-by), 375 GPM each. Vertical inline or end suction pumps with inverter-duty motors and a dedicated VFDs. Grouping allows operation of any pump with any chiller. All pumps utilize suction diffusers with inlet strainers, discharge check valves, isolation valves and pressure gauges.

Chilled water piping will be routed from the chiller location to the rooftop air handling units. Chilled water piping will be Schedule 40 steel iron for sizes 2-1/2" and larger and Type L cooper for sizes 2"and smaller. All chilled water piping will be insulated with preformed mineral fiber pipe insulation. The insulation thickness shall comply with the International Energy Conservation Code. All outdoor piping will be provided with an aluminum jacket.

HEATING WATER SYSTEM

The existing utility tunnel and HTHW system will be extended to the west end of the new building. A mechanical room will be provided at the lowest level of the building for the HTHW to enter in. Two (2) shell-and-tube heat exchangers and three (3) heating hot water pumps will be located in this room. Additional heating hot water system components such as expansion tank, air separator, makeup water station, etc will also be located in this room. Heat exchangers will be provided for full building load and in a N+1 arrangement. The heating water system will be designed as a variable flow system for energy efficiency and increased system reliability. The heating hot water pumps will be sized for 50% of the load with one stand-by pump for system redundancy. Vertical inline or end suction pumps with inverter-duty motors and a dedicated VFDs. All pumps utilize suction diffusers with inlet strainers, discharge check valves, isolation valves and pressure gauges.

The heating hot water piping system will extend to each of the three AHUs and all terminal units. Radiant slab heating systems will be provided on all levels for areas where the exterior fenestration extends to the floor. The piping system will extend from the perimeter wall to ten feet inside the building. Two-way control valves at building AHU and terminal unit coils modulate to maintain their respective set points. Three-way valves or bypass control valves at remote building points ensure minimum flow is maintained for the heating hot water pumps.

Heating hot water piping will be Schedule 40 steel iron for sizes 2-1/2" and larger and Type L cooper for sizes 2" and smaller. All heating hot water piping will be insulated with preformed mineral fiber pipe insulation. The insulation thickness shall comply with the International Energy Conservation Code. All outdoor piping will be provided with an aluminum jacket.

SUPPLY AIR SYSTEMS

Three (3) outdoor air handing units (AHUs) will be used to condition the building. Two (2) of the air handling units will condition the three-story part of the building and be sized for 50,000 cfm each. One (1) air handling unit will serve the single-story part of the building and be sized for 17,000 cfm. AHU sizing accounts for future expansion sizing per the University's Design Guidelines.

Each air handling unit will consist of a return air mixing section, return air fan array, airside economizer, MERV 8 and 13 filters, heating hot water coil, direct evaporation section, chilled water-cooling coil, supply air fan array, and discharge plenum. All fan arrays shall consist of direct drive electrically commutated motors (ECM) with individual VFDs and piezo-ring type airflow measuring stations. Fan arrays will be provided in a N+1 arrangement so that full airflow will be provided with a fan failure. The design coil face velocity will be a maximum of 400 FPM to reduce fan energy. Units will utilize double-wall insulated construction with perforated liner in fan and discharge sections and solid inner liner in all other sections. All air handling units shall be mounted on vibration curbs with 2" spring deflection. Service vestibules shall be located along one length side of each AHU and a be a minimum of eight feet wide.

Supply air from air-handling units will be distributed throughout the building via medium pressure ductwork to single duct variable air volume terminal units with heating hot water coils. The gross anatomy and other similar spaces will utilize pressure-independent venturi-type supply valves with heating hot water coils. Depending on the space usage, the supply valves will be standard or high speed. A fixed airflow offset from exhaust will maintain the relative space pressurization relationships.

Return ductwork will be extended from each air handling unit to each associated space. Supply and return ducts from the two air handling units on the high roof will be extended down from the roof through shafts, with rated combination fire/smoke dampers at each floor. The return duct will extend for approximately 30' from the shaft on each level. Modulating control dampers in return ducts will ensure correct pace pressurization relationships are maintained. An overhead plenum/open ceiling concept will be used to return the air back to the air handling units.

The air distribution system will be constructed of G90 galvanized sheet metal, rectangular, round or oval ductwork per SMACNA standards. Ductwork in exposed areas shall be internally lined with fiberglass liner and ductwork in concealed areas shall be externally insulated with blanket, fiberglass ductwork. All insulation and liner shall meet R-8 installed value. Lined sheet metal z-shaped transfer elbows shall be provided at noise sensitive rooms.

Supply air ductwork construction will be based on SMACNA 4"pressure and 2"pressure classifications for VAV systems. Four-inch pressure ductwork construction will be used from the air handling unit outlet to the VAV boxes and two-inch pressure ductwork construction will be used downstream of the VAV boxes and fan coil units. All return ductwork construction will be based on SMACNA -4" pressure classification. Transfer elbow ductwork construction will be based on SMACNA -1"pressure classification. All exhaust ductwork construction will be based on SMACNA -3" pressure classification.

Each VAV terminal device will constitute a separate thermostatically controlled zone. Separation of interior and exterior zones will be provided for optimum zone control. The perimeter zone will be considered fifteen (15) feet inside the perimeter wall. A single terminal unit will serve a maximum of four private offices. All conference rooms, huddle rooms and similar meeting spaces will be provided with a dedicated terminal unit. Supply diffusers will consist of sidewall diffusers or round plaque round diffusers for exposed areas, linear diffusers in hard lid areas and square plaque diffusers for the acoustical grid ceiling areas. Perforated square return diffusers will be used in all acoustical grid ceiling areas and linear diffusers will be used for return air in hard lid areas.

Outdoor air volume will be controlled by carbon dioxide sensors located throughout the building to minimize the outside air while still maintaining a healthy building. Carbon dioxide sensors will be located in areas where the people density is above 25 people per 1,000 square feet and the space is more than 500 square feet. Ventilation will be provided per the 2018 International Mechanical Code. This will be increased by 30% to help achieve the LEED Gold rating.

OCCUPANCY AND VENTILATION DESIGN CRITERIA			
SPACE TYPE	PEOPLE PER 1000 SF	CFM PER PERSON	CFM PER SQUARE FOOT
Offices and General Spaces	5	5	0.06
Classrooms	35	10	0.12
Laboratories	25	10	0.18
Unoccupied Spaces	0	0	0.06

HUMIDIFICATION STEAM

An atomizing type of humidification section will be provided in each air handling unit. Reverse osmosis water will be provided to a pump skid that will provide high pressure water to the humidification coil in the air handling units. This will also provide direct evaporative cooling. Humidification systems will be MeeFog or equal product.

Humidification coils will be provided in all air handling units. Rapid absorption coils will be provided to limit the length of the humidifier coil section. Stainless steel internal casing shall be provided for humidifier air handling section. Mechanical systems will condition the general building areas of 20% relative humidity and limit upper level building relative humidity to 50% at 75 ° F for all areas. Discussions with users and the University in schematic design will confirm assumptions and requirements.

RESTROOM EXHAUST SYSTEMS

A 6,000 cfm centrifugal, upblast, roof mounted exhaust fan will be used to exhaust the core restrooms on each level. Ductwork risers will be extended up through the building in a shaft to the roof with rated combination fire/smoke dampers at each floor. Restrooms and janitor's closets will be exhausted at a minimum rate of 10 air changes per hour. Transfer air will be utilized for makeup air into the restrooms to prevent over cooling or excessive reheat. Exhaust systems will not be provided for break rooms or similar areas. The remaining relief air for the building will be removed from the building through the AHU economizer sections.

GROSS ANATOMY LAB EXHAUST

The lab is located on Level 3 and will be provided with two (2) dedicated exhaust fans in a N+1 arrangement. The lab and associated spaces will be designed for 12 air changes per hour. Each exhaust fan will be sized for 9,000 cfm and be a utility set, roof mounted arrangement. The system will be provided with a bypass outside air damper to allow for variable exhaust from the space. Ductwork will be extended a minimum of ten feet above the roof to protect maintenance personnel working in that area. The discharge velocity will be sized for 3,000 fpm to ensure the exhaust air is not re-entrained into the building outside air intakes and to protect maintenance personnel working in that area.

Exhaust valves will be pressure-independent venturi or other high-performance laboratory valves with direct airflow measurement type. Dedicated exhaust valves will be provided for snorkel or point exhaust connections. Given their smaller size, operation for these systems may either be constant flow or variable flow based on maintaining a constant duct pressure.

VARIABLE REFRIGERANT FLOW (VRF) SYSTEMS

Air-cooled, heat pump VRF systems will be used to condition rooms that require 24/7 operation and/or emergency backup. These rooms include but are not limited to electrical rooms and IT rooms. The systems will be provided with a -20 deg low ambient kit to ensure cooling is provided during the winter.

A combination of horizontal ducted units and wall mounted units will be used to deliver conditioned air to the spaces. Wall mounted units will be used in electrical and IT rooms of 150 square feet and smaller and horizontal units will be used in all other rooms. Horizontal indoor units will serve the rooms through low pressure ductwork and diffusers. The condensing units will be located on the roof and refrigerant piping will extend between all indoor units and condensing units unless otherwise noted. Refrigerant piping shall be type ACR copper piping and fittings with lead free solder joints. All piping shall be insulated with elastomeric insulation.

A 2-ton air-cooled, heat pump split system will be provided for the elevator hoistway and control room. The indoor unit will be located in the Level 3 ceiling plenum. Supply and return duct will be extended to the hoistway. The condensing unit will be located on the roof. Refrigerant piping will be extended between each indoor unit and the condensing unit.

ENERGY MANAGEMENT AND CONTROL SYSTEM

An electronic direct digital control system to monitor and control building HVAC, plumbing and electrical systems will be provided in accordance with the University's Design Guidelines. It will consist of central processor, branch devices, equipment controllers, and required sensors and shall be integrated into the campus control system. The BMS shall communicate in native BACnet certified to ASHRAE 135. The system shall communicate over IP to allow remote access of the BMS system remotely via the internet.

The direct digital control system will provide precise temperature control and include operational strategies to maximize the energy effectiveness and proper maintenance of the building systems complete with a historian. All systems will be tested, adjusted, balanced, and commissioned for proper flow rates, operation, set points and controls.

Electrical metering will also be provided to ensure optimum building performance. The items to be metered & trended include but are not limited to the following: electrical total energy use, mechanical energy use (through variable frequency drives and controllers), lighting energy use, building water use, and irrigation water use.

ELECTRICAL NARRATIVE

Emphasis in the electrical systems design will be made toward life safety, quality of power service, reliability, efficiency, ease of maintenance, flexibility, and functionality. Overall, the approach is to provide a balanced economical and high-quality electrical systems design. The electrical design is based on a 3-story new facility of approximately 110,000 gross square feet (GSF). The project will be targeting LEED BD+C v4 gold.

CODES AND STANDARDS

Electrical systems for the University of Northern Colorado College of Osteopathic Medicine will be designed in compliance with the following applicable codes, regulations, and standards.

Authority Having Jurisdiction: Greeley, Colorado

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection 2016

NFPA 70 National Electrical Code 2020

NFPA 72 National Fire Alarm and Signaling Code 2016

NFPA 110 Standard for Emergency and Standby Power Systems 2016

ASHRAE STANDARDS

ASHRAE 90.1 2016 – Energy Standard for Buildings Except Low-Rise Residential Buildings

ELECTRICAL LOAD ANALYSIS

A load analysis was completed for the building. It was based on a volt-amperes (VA) per square foot calculation utilizing the gross square footage (GSF) of building areas. A load summary follows with average density values and demand factors.

LOAD TYPE	POWER DENSITY VALUES (VA/GSF)	DEMAND FACTOR
Lighting	1.0	125%
General Power	5.0	60%
HVAC	10.0	100%
Equipment	3.0	100%

AREA SUMMARY

Building	110,000GSF

BUILDING LOAD SUMMARY

Load Type	Connected kVA	Demand kVA
Lighting	110 kVA	140 kVA
General Power	550 kVA	330 kVA
HVAC	1100 kVA	1100 kVA
Equipment	330 kVA	330 kVA

Total connected load kVA	2090 kVA
Average demand load kVA	1900 kVA
Average demand load kVA plus 25% growth	2375 kVA

DEMOLITION

The existing electrical system at Bishop-Lehr Hall will be demolished in its entirety. Demolition will consist of the removal of all electrical devices and distribution equipment including but not limited to MV switch, MV transformer, switchgear, switchboards distribution boards, panelboards, receptacles, light switches, light fixtures, associated conduit and wiring, cable tray, etc. All feeders will be removed back to the source. The MV cable will be removed back to the connection point.

CONTINUITY OF POWER THROUGHOUT CONSTRUCTION

Temporary power will need to be provided to existing to remain site lighting.

Contractor to verify telecommunication and phone connections between campus buildings. If removal of Bishop-Lehr equipment or cabling will impact the continuity of service at other campus buildings, a temporary power and communication plan will need to be developed and reviewed with the university.

At the time of this report, openings in the campus distribution loop are not anticipated during the construction of the new facility. The loop shall remain live with the opening at the new facility during construction.

INCOMING SERVICES

POWER

The primary electrical service will be 12,470 volts, 3 phase, 3 wire, and will be provided by Xcel through the UNC campus distribution system. The incoming service will terminate in a 15 KV medium voltage switch compartment with an adjacent utility metering compartment. The MV switch will be an S&C Vista switch in a loop configuration. The switch will be fed from the McKee Switch and the new UC Vista Switch. Incoming primary cable will be 15 KV, in accordance with Xcel and UNC Campus Standards. The medium voltage feeder will be Okanite, Okoguard Okoseal Type MV-105, 3#4/0 AWG copper, 15 kV, EPR Insulation and 1#2/0 600V XHHW Insulation Ground in 4" conduit routed through the campus utility tunnel.

The incoming duct bank will consist of (4) 4-inch schedule 40 PVC conduits encased in concrete. Conduits will terminate at outdoor pad mounted switch. From the switch feeders will be routed in a concrete encased duct bank to the transformer primary and from transformer secondary feeders will be routed in concrete encased underground ductbank to terminate at the service entrance switchboard inside the building exterior wall and will be sloped away from the building, and made watertight.

The pad-mounted transformer will have a rating of 2,500 KVA, 115 degree C rise, ventilated, non PCB liquid cooled with FM Approved liquid. The transformer secondary voltage will be 480Y/277-volt, 3-phase, 4-wire. Transformer shall have internal switching with an "OFF" position to isolate the secondary.

POWER DISTRIBUTION

SERVICE ENTRANCE SWITCHBOARD DESIGN

Free standing, metal enclosed, service entrance switchboard will be provided. The switchboard will be circuit breaker type and will consist of 4,000A Main.

METERING

Meters will be installed on the secondary main and feeder breakers. The metering system will be a digital, multi-point, scalable system with built-in communications capabilities for real-time monitoring, report generation and revenue billing via the Owner's Ethernet-based telecom system. Minimum display functions include the following: AC amperes for each phase, AC voltage – phase to phase, phase to neutral, watts, power factor, frequency, watt demand, and watt hours. The meter should be Square D Power Logic Series 2000 or equivalent.

INTERIOR POWER DISTRIBUTION

The interior power distribution system will be designed to support lighting loads, mechanical equipment loads, and general power loads.

Electrical closets will be located on each floor to house all electrical panelboards and control equipment. The closets will be located at each end of the east-west bar and centered in the north-south bar to limit branch circuit voltage drop.

Electric heat and other mechanical loads, per floor, will be powered at 480-volt and/or 277-volt from one power panel on each floor. Mechanical loads on the roof which will be served by a power distribution panel located close to the roof.

For 208Y/120-volt service to each floor, a step-down transformer will be provided in each closet for all office power requirements. Fused disconnect switch for the primary side of the transformer. Receptacles panelboards will be 42 circuits, 208Y/120-volt, 3-phase, 4-wire, with 225A main breaker, and 1-pole, 2-pole, and 3-pole branch breakers as required.

Receptacle panelboards for telecommunications equipment will be 42 circuits, 208Y/120-volt, 3 phase, 4 wire, with 100A main breaker, and 1-pole, 2-pole, and 3-pole branch breakers as required.

Lighting panelboards will be 42 circuits, 480Y/277-volt, 3-phase, 4-wire, 125A frame with 100A main breaker, and 1-pole, 2-pole, and 3-pole branch breakers as required.

Laboratory and specialty equipment panelboards will be 42 circuits, 208Y/120-volt and will be located in the electrical closets.

All panelboards and power panels will 3P, 4W with bolt-on circuit breakers and main breaker or main lugs only as required. Panels will have hinged door-in-door construction and be lockable and keyed alike for the full building. Panels will have 30% spare capacity and a minimum of 4 spare conduits from each panel to an accessible location for future growth.

Surge protective devices (SPD) will be provided at the service entrance, and 208Y/120-volt panelboards serving areas with a high concentration of electronic loads, such as laboratories and office floors with computer workstations.

Conductors will be copper. Aluminum conductors will not be permitted. The minimum conductor size for power and lighting circuits will be #12 AWG. Conductor insulation will be THHN unless special conditions warrant another insulation type. All branch circuits will have a separate neutral conductor.

The minimum power and control conduit size will be ¾-inch. Conduit will be metallic; RMC, IMC or EMT with each application to be determined. Minimum telecommunications conduit size will be ¾-inch. MC cable is limited to light fixture whips and final connections to equipment. Liquid-tight flexible metal conduit will be used for final connections to motors, transformers, and equipment in wet locations. Galvanized rigid steel sleeves will be provided for conduit penetrations through walls, floors, and ceilings.

Power for small motors (½ HP or less) will be 120-volt, single phase. Motors greater than ½ HP will be 480- volt, 3-phase, 3-wire. Motors will be fed from a distribution board with motor starters or variable frequency drives local to the motor. Motors larger than 10 HP will be provided with power factor correction.

Most motors will be provided with variable frequency drives (VFD). Local safety non-fused disconnect switches will be provided if motor starters or variable frequency drives are not within line-of-sight of the motor. Safety switches used with VFD's will be equipped with a pre-break (auxiliary) control contact.

General branch circuiting will be designed with a maximum of 6 general use duplex receptacles on one 20-amp circuit. Branch circuiting for computer workstations will be designed with a maximum of four workstations on one 20-amp circuit. Each office will include a minimum of one duplex receptacle on each wall and a quad receptacle at the location of the workstation. Corridors will have general duplex receptacles located not more than 30'-0" apart.

Copiers, printers, appliances, and special equipment will be served from a dedicated circuit. Ground fault circuit interrupter receptacles will be provided for locations within 6 feet of sinks or other water sources and outdoors. Special purpose, 250-volt NEMA-type receptacles will be provided for specific lab/clinical equipment. Floor boxes and/or poke thru will be provided in selected rooms such as the student lounge, multipurpose room, Team Based Learning classrooms, conference rooms, labs, and studios. Meeting rooms, conference rooms, huddle rooms quantity of wall and floor 120-volt receptacle outlets will be provided per NEC 2017 Article 210.71 requirements.

Labs and clinical support spaces will be provided with two-compartment aluminum surface raceway for power and telecommunications service. The raceway will consist of two-pieces; a wall mounted fixed base and a removable cover. Duplex 120-volt receptacles will be provided every 24 inches on center for the power section of the raceway. Raceway branch circuits will have a maximum of (5) outlets per circuit.

EMERGENCY ELECTRICAL POWER SERVICE

The non-emergency standby power will be fed from the campus distribution. The campus system will consist of (8) 625 kW, 480Y/277-volt, 3-phase, 4-wire diesel generators in (2) separate 2500 kW, Tier 4, Level 2 generator enclosures, 'GE1' and 'GE2'. The campus generators tie into the main campus switchgear.

The emergency, legally required, and optional standby power critical to the functions of the facility will be fed from a dedicated diesel generator and 24-hour fuel storage located within the building's service yard. The generator will be locally grounded to operate as a separately derived system. The generator will feed an emergency switchboard that feeds (3) ATS's serving Article 700,701, and 702 loads respectively.

- Article 700: Life/safety/Emergency loads will be on within 10 seconds.
- Article 701: Legally required breaker will close within 60 seconds.
- Article 702: Optional standby loads will be fed from generator once the generators are stable and the metering indicates there is available capacity.

The emergency loads will consist of means of egress lighting, exit signage, fire detection and alarm systems, emergency communications systems, emergency responder radio coverage, elevator cab lighting, and generator auxiliary loads. A fire pump is not anticipated for the project.

Surge protective devices (SPD) will be provided at all NEC Article 700 panelboards.

The legally required standby loads will consist of one elevator per bank (selectable via the elevator controller, elevator equipment power and ventilation, smoke/fire dampers, automatic fire doors and smoke curtains, fire command center receptacles, hazardous materials exhaust, and other loads to assist first responders in rescue operations.

The optional standby loads will consist of building management systems, sump pumps and sewage ejectors, security systems, telecommunication systems, telecommunications room cooling units, cadaver storage and refrigerators, select mechanical equipment, and other Owner-requested equipment.

SPECIAL POWER SYSTEMS

An on-line, double conversion uninterruptible power supply (UPS) system will be provided for the critical cadaver storage and refrigerator loads and will be connected to the generator. The UPS will provide interim power to the critical loads until the optional standby loads are fed from the generator, or a maximum of 5-minute battery. The generator will then power the UPS until normal power returns.

Rack-mounted UPS will be provided for telecommunication equipment.

Point-of-use UPS will be provided for building control/security systems, select lab and specialty equipment, and additional owner-specified loads.

INTERIOR LIGHTING

All new lighting fixtures will utilize light emitting diode (LED) sources. All sources will provide 4000 degree kelvin (K) correlated color temperature (CCT) and 80 color rendering index (CRI) minimum. Lighting fixtures will be serviceable with replaceable parts.

LIGHTING CRITERIA

Interior lighting levels are based on Illuminating Engineering Society (IES) recommendations. These illuminance values listed below will be average maintained horizontal foot-candles measured at the work plane unless otherwise not.

AREA	ILLUMINANCE LEVELS
Cadaver Lab	100 FC ambient, 300 FC at table
Cadaver Storage	30 FC
Classrooms	25 to 35 FC
Conference Room	15 FC low level and 30 FC high level
Copy/Print Room	10 FC
Corridors	10 to 15 FC at finished floor
Dining	30 FC
Elec/Mech Rooms	20 to 30 FC
Enclosed Office	30 FC w/50 FC on work surfaces w/task lighting
Exam Room	50 C
Kitchens	50 to 70 FC
Laboratories	50 to 70 FC
Lobbies	10 TO 20 FC at finshed floor
Locker Room	15 FC
Open Office	30 FC w/50 Fc on work surfaces w/task lighting
Service Areas	25 to 35 FC
Stairs	20 FC
Storage Active/Inactive	30 FC/15 FC
Telecommunications Rooms	30 to 40 FC
Toilet Rooms	10 to 15 FC
Training Rooms	15 FC low level and 50 FC high level

LIGHTING CONTROL SYSTEM

All spaces will have some form of automatic control via vacancy sensor, time clock and/or daylight sensors where possible except for spaces exempt from automatic control per Code.

Daylight harvesting in conjunction with continuous dimming will be utilized. The dimming of the LED fixtures will augment the daylight inconspicuously and can also accommodate for light level depreciation as the LED's age. An occupancy sensing system will also be incorporated with the daylight harvesting to optimize energy savings and controllability.

In interior spaces where daylight is not available, vacancy sensing, and if appropriate for the type of space, dimming will be used. Conference and meeting rooms will have multi-scene dimming control systems to accommodate different room uses.

A centralized lighting control system will be used and will tie into the BAS and have the capability of tying into a campus system in the future.

EMERGENCY LIGHTING

The emergency lighting will consist of selected fixtures along the path of egress, exterior exit doors, elevator control/machine rooms, elevator pits and elevator landings connected to the emergency generator. Emergency lighting will also be installed in the main electrical room, electrical closets, fire command center, telecommunications rooms, and mechanical rooms. Switched emergency lighting fixtures will utilize emergency load transfer devices to enable emergency lighting during loss of normal power regardless of previous lighting level. The emergency illuminance values listed below are horizontal foot-candles measured at the finished floor, unless otherwise noted:

AREA	ILLUMINANCE LEVELS
Elevator control room	19 FC minimim
Elevatio	10 FC minimum
Elevator landing sill	10 FC minimum (with elevator doors closed)
Means of egress	1.0 FC average, 0.1 FC minimum, 40:1 uniformity ratio

Illuminated exit signs will also be used along the path of egress, allowing two signs to be seen at any one time. Exit signs will be LED and UL listed with an operating voltage of 277-volts.

EXTERIOR LIGHTING

Exterior lighting will be designed to balance the sustainable goals for the project with the desired nighttime character of the building. Light pollution reduction will be addressed via controls and a curfew based on programmatic requirements. Light levels will be in accordance with city safety requirements and egress lighting per NFPA 101 Life Safety Code.

LED wall packs above exterior exit doors will be connected to emergency power circuit.

LED pole mounted campus standard fixtures will be utilized for walkway lighting; Lumec LED-DMS50-SG3-277-CNI-IA-FB-SC-SM6-14-SC-UNC Norton Blue.

LED pole mounted campus standard fixtures will be utilized for roadway and parking lot lighting; 15 ft cast iron pole, powder coat finish and stainless steel tamper resistant hardware. Lithonia Lighting Holophane NY15/17-CIS/CM – LED, Pole: L##/5RSL9P-CM-S150/277.

Outdoor pole bases will be 6” above grade in landscaped areas and 2’ above grade where vehicular contact is possible.

EXTERIOR LIGHTING DESIGN CRITERIA

The Lighting systems will conform to engineering practice using IESNA Lighting Handbook, 10TH Edition, as follows:

AREA	ILLUMINANCE LEVELS
Roadways	1.0 to 2.0 FC
Walkways/Sidewalks	1.5 to 2.0 FC
Parking Lots	2.5 to 3.0 FC
Entry Ways	1.0 to 5.0 FC

GROUNDING SYSTEM

Interconnection of the service ground, system neutral and equipment ground conductors will be made within the service equipment. The power system ground will serve as a reference point for equipment grounding for all building systems.

Building structural steel columns will be grounded at every other perimeter column via copper cabling and ground rods to form a grounding ring. The ground rods will be copper clad and will be inter-connected with copper grounding cables to form a ground ring around the building.

A 36-inch long x 4-inches wide x ¼-inch thick ground bus will be installed on one or more walls of the main electrical room. A 12-inch long x 4-inches wide x ¼-inch thick ground bus will be installed on one wall in all electrical rooms.

An insulated ground conductor will be provided with all power feeders and branch circuits for equipment grounding purposes.

An insulated, non-looping, single-point ground system will be provided and made available in all communication closets for signal ground referencing purposes. A 24-inch long x 4-inches wide x ¼-inch thick telecommunications main grounding bus bar (TMGB) will be provided in the main communications room and will be connected to the main building grounding system with not less than a #6 AWG copper ground wire. A 12-inch long x 4-inches wide x ¼-inch thick telecommunications grounding bus bar (TGB) will be provided in each building communication rooms and will be connected to the main building grounding system will not less than a #6 AWG copper ground wire.

LIGHTNING PROTECTION SYSTEM

A passive lightning protection system will be provided for the building consisting of roof-mounted air terminals, copper down conductors and a counterpoise ground ring. It will be designed for Class I service (for buildings less than 75 feet in height) in accordance with NFPA 780 and UL 96A and will be LPI certified.

The building's structural steel will be used as down conductors where electrical continuity between the structural steel members exists.

FIRE ALARM SYSTEM

The fire alarm system will be a UL approved, multiplexed, addressable, supervised, fire detection and alarm system in compliance with local and national codes, and the authorities having jurisdiction. The system will consist of fire alarm control units, alarm initiating devices, alarm notification appliances, control devices, supervisory devices, door holders (if needed), battery power supply, wiring and necessary accessories for interface and control functions with the building sprinkler system and HVAC systems.

The system will be capable of transmitting and receiving addresses and data between the fire alarm control panels and the addressable devices. The audible/alarm communication speaker system will provide automatic pre-recorded sound and voice/evacuation.

The fire alarm system will be connected to the emergency power system by the emergency generator. The fire alarm system will also be provided with secondary power by means of a battery backup, which will have sufficient capacity to provide a minimum of 24-hour standby service under normal conditions followed by not less than 15 minutes in alarm.

Addressable manual pull stations will be provided at all exits and as required by code and the authority having jurisdiction. Audible and visual notification appliances will comply with the applicable codes. Strobes will be in corridors at 100 feet on center and a maximum of 15 feet from ends of corridors. They will also be located in public areas and restrooms as required by the NFPA. All strobes on a floor will be synchronized; their intensities will be as required for dimensions of the space.

Addressable duct smoke detectors will be provided for all air handling units over 2,000 cfm and installed in return ducts to initiate fan shutdown. Relays will be provided to shut down each air handling unit in response to supervisory signal generated by its associated detector. Smoke dampers will be wired to dedicated 120-volt circuits from emergency panels. Circuits will be controlled by fire alarm control modules activated by the fire alarm control panel so dampers close upon smoke detection at the serving air handling unit or in the space served.

Fire alarm monitor modules (FAM) will be used to provide an addressable circuit for alarm and supervisory devices that do not have integral addressable electronics, such as waterflow switches and supervisory switches.

Fire alarm control modules (FAC) will be used to provide addressable relay control for magnetic door holder release, electric strike release for exit doors and smoke/fire shutter release, as needed.

The system will be designed to operate in a stand-alone mode. The system will transmit alarm, trouble and waterflow to an off-site response center.

A fire fighters command center will be provided on the first floor from which all communications and operations of HVAC systems, elevators and firefighting systems can be monitored and controlled. A fire fighters communication system consisting of recessed phone jacks will be provided on each floor landing inside the stairwells.

All fire alarm wiring will be installed in EMT conduit above ceiling.

EMERGENCY RESPONDER RADIO COVERAGE SYSTEM (ERRCS)

A public safety emergency responder radio coverage system (ERRCS) will be provided for wireless service for emergency responder radio coverage in accordance with all applicable codes. The ERRCS will provide radio coverage in all building areas within the 700/800 MHz frequency range. All component enclosures will be rated NEMA 4 or 4X. A secondary power supply will be provided with a 24-hour battery back-up system supplied from the emergency power system. The system will include automatic supervisory and trouble signals that are annunciated by the fire alarm system. The system will be FCC-compliant and capable of upgrades and frequency changes in the future. System testing, proof of compliance and AHJ approval will be required of the supplier/installer.

TWO-WAY EMERGENCY COMMUNICATION SYSTEM (ECS)

A two-way communication system will be provided in accordance with IBC 1009.8. All associated signage will be provided in accordance with NFPA requirements. The two-way communication system will provide both an audible and visual alert at a dedicated location. The communication line will contact an off-site emergency responder as approved by the authority having jurisdiction. Interconnecting cabling will be rated for two hours. The two-way communication system will be equipped with a 24-hour battery backup system and will be monitored by the fire alarm system.

SHORT CIRCUIT, DEVICE COORDINATION, AND ARC-FLASH STUDIES

The Contractor will provide a complete report for short circuit, coordination, and arc-flash studies, for all new equipment installed per the requirements of NFPA 70E, IEEE 1584. The Contractor to provide and install arc-flash labels per the results of the study. The campus normal and emergency systems shall be taken into account for the short circuit calculations. The utility service and campus generators are paralleled for up to 2 minutes during start-up and shut down.

ELECTRICAL TESTING AND COMMISSIONING

The Contractor will provide electrical testing and commissioning for all major equipment including but not limited to the following (where applicable):

Substation primary switches, transformers, secondary switchgear. Primary and secondary feeders. Emergency generator. Central battery inverters. UPS system. Distribution and lighting and receptacle panelboards. Low voltage transformers. Grounding system. Lighting control system. Fire alarm system. Two-way emergency communications system. Emergency responder radio coverage system. Access control security system and fiber optic cables.

SUSTAINABILITY

A goal of LEED Gold NC v4.1 certification has been identified for the UNC College of Osteopathic Medicine Building. Strategies and technologies will be implemented to promote electrical sustainability, reduce energy consumption, and provide on-site energy production.

Individual lighting controls and/or bi-level switching will be provided for all occupants and spaces in accordance with LEED IEC credit 6.1 Controllability of Systems – Lighting. The exterior lighting will be designed in accordance with LEED SS credit 8 Light Pollution Reduction. Installed lighting power density will be designed to be 30 percent below the LEED baseline building.

Electric vehicle charging stations will be provided in parking areas for at least 5 percent of the site parking capacity. The charging stations will be designed in accordance with LEED SS credit Electric Vehicles.

High efficiency transformers, premium efficiency motors and VFD will be deployed throughout the building to improve energy efficiency.

Roof mounted photovoltaic (PV) system will be provided. The array will be comprised of highly efficient monocrystalline silicon cell technology. The nominal power rating for the lower roof array will be 60-72 kW and estimated annual energy production is 90,000-108,000 kWh. The nominal power rating for the upper roof array will be 130-156 kW and estimated annual producation is 195,000-234,000 kWh. The roof array will utilize a ballast type dual tilt mounting system. String inverters will be located inside the penthouse for each array. All inverter output circuits will back feed the main service panelboard. All PV wiring located on the roof will be in conduit or cable tray. The PV system will include energy monitoring and integration with the building management system. The PV installation will include ground-fault protection, arc-fault protection, rapid shutdown, and code compliant signage. The PV design will be in accordance with LEED EA credit Renewable Energy.

An energy dashboard will be provided to allow visitors to view energy consumption. Appropriate sub metering will be provided to accommodate the energy dashboard. Sub-metering will meet the requirements of LEED EA Advanced Energy Metering.

PLUMBING NARRATIVE

PLUMBING DESIGN OBJECTIVE

The following narrative describes the plumbing work and materials to be provided for the new University of Northern Colorado College of Osteopathic Medicine building. The project will be provided with plumbing systems that are cost-effective, energy-efficient, environmentally friendly, and easily maintainable. Strategies will be employed to conserve energy in conjunction with various sustainability and wellness strategies. Design of the plumbing system shall promote forward thinking in engineering and be flexible in design incorporating minimum requirements needed to ensure a safe and healthy building while applying guidelines to minimize environmental impact.

All plumbing systems shall be designed to promote reliability, serviceability, flexibility, and capacity for future renovation. Plumbing systems and equipment shall be sized to accommodate worst-case operational conditions. The design of the systems and materials shall not compromise the systems' required cleanliness or purity levels.

CODES AND STANDARDS

The latest version, or current adopted version, of the following codes and standards will be used as references in the electrical design of the building:

- 2018 International Building Code with Local Amendments
- 2018 International Fire Code with Local Amendments
- 2018 International Mechanical Code with Local Amendments
- 2018 International Plumbing Code with Local Amendments
- 2017 National Electrical Code with Local Amendments
- 2018 National Fire Alarm and Signaling Code with Local Amendments
- 2018 International Energy Conservation Code
- National Fire Protection Association (NFPA)
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks
  - ASHRAE 90.1 – 2016
- LEED v4.1 – Silver with a goal of Platinum
- American Society for Testing and Materials (ASTM)
- American National Standards Institute (ANSI)
- Occupational Safety and Health Administration (OSHA)
- Underwriters' Laboratories (UL)

EXISTING BUILDING

The proposed new building will be located where Bishop-Lehr Hall is currently located. All plumbing systems associated with Bishop-Lehr Hall will be demolished. The northern leg of the utility tunnel shall be demolished and rerouted. There is an existing gas service for the existing building that needs to be demoed. The new building will not require gas service.

SYSTEMS METERING

Sub-metering of the plumbing systems shall be provided to the building to provide operations and maintenance transparency needed to enable efficient energy and water resource management.

SANITARY WASTE AND VENT

Approximately a 6" sanitary sewer drains will exit Southeast of the building footprint underground and will be continued by civil as shown on site utility drawings. The sanitary waste and vent system will be provided for all plumbing fixtures, floor drains, and equipment drain in the building. Plumbing fixtures will be drained by gravity through soil, waste, and vent stacks and to 5 feet outside the building wall, where they will be picked up by civil. The building plumbing fixtures will be provided per the applicable code and will connect to a code-compliant sanitary waste & vent system. Two-way directional cleanouts will be provided at the building exterior.

All vents from plumbing fixtures shall extend to the roof and be located with a 25-foot clearance away from air intakes. There will be multiple waste and vent risers that serve the upper floors. Riser locations shall be at construction elements that are permanently unaffected by interior fit-out arrangements, providing maximum flexibility for future modifications and connections.

SANITARY WASTE & VENT PIPING DESIGN CRITERIA	
Sizing	International Plumbing Code
Piping Slope	Minimum 1/4" per foot
Pipe Material (Below Grade)	PE Encased hubless cast-iron pipe with CISPI 301 stamp, IAPMO UPC-approved service weight cast-iron, heavyweight no-hub couplings with 4-band stainless steel clamps.
Pipe Material (Above Grade)	Hubless cast-iron pipe with CISPI 301 stamp, IAPMO UPC-approved service weight cast-iron, heavy weight no-hub couplings with 4-band stainless steel clamps
Pipe Material (Pumped Water)	ASTM B88 and ANS/NSF 61 type 'L' hard drawn copper pipe and soldered/brazed joints.

PERIMETER/FOOTER AND SUBSOIL DRAINAGE SYSTEM

A geotechnical report is required to determine if sub-soil drainage is needed for this project. It is anticipated at this time that a subsoil and footing drainage system will not be required.

ELEVATOR SUMP PUMP

The elevator sump pumps shall be rated at 50 gpm flow per elevator cab. Duplex pumps will be provided at each pit with an "Oil Smart Switch" and will discharge indirectly via receptor to the sanitary sewer. The control panel for pumps and oil smart switches will be tied into the BMS system to activate the alarm in the case of hydraulic fluid in the pit.

STORM DRAIN

A complete storm drainage system will be provided to convey rainwater from the roof of the building to some point of discharge exterior to the building. Overflow drains will be provided to convey emergency stormwater by gravity through a separate piping system discharging 2'-0" above grade utilizing downspout nozzles with bird screens.

STORM DRAIN PIPING DESIGN CRITERIA	
Sizing	International Plumbing Code
Piping Slope	Minimum 1/8" per foot
Pipe Material (Below Grade)	PE Encased hubless cast-iron pipe with CISPI 301 stamp, IAPMO UPC-approved service weight cast-iron, heavyweight no-hub couplings with 4-band stainless steel clamps.
Pipe Material (Above Grade)	Hubless cast-iron pipe with CISPI 301 stamp, and IAPMO UPC-approved service weight cast-iron, heavyweight no-hub couplings with 4-band stainless steel clamps. ASTM C1540, FM 1680 CLASS 1

DOMESTIC WATER

A 4" domestic water service connection is anticipated for the proposed building connecting to the existing water main on site located on the south side of the building. A minimum of 35 psi shall be delivered at the most hydraulically remote fixture.

Shut-off valves shall be provided on all branch connections and equipment connections. Water-hammer arrestors with accessible isolation valves will be provided at quick closing valves and other potential shock sources. The Hammer arresters will be sized and located per PDI standards.

Provide hose bibbs on all exterior walls, mechanical equipment rooms, loading dock & accessible rooftops. Hose bibbs in public areas shall utilize common loose key enclosure boxes or loose key operators.

Riser locations shall be at construction elements that are permanently unaffected by interior fit-out arrangements, providing maximum flexibility for future modifications and connections. Provide isolation valves to facilitate independent shutdown at each floor, restrooms, and other locations as required such service and modifications may be performed without affecting other areas. Each equipment and plumbing fixture shall be provided with individual isolation valves, or fixture supply stops.

Hydrant test is not available during the time of the report. If the available site pressure is less than 50psi, provide a packaged booster pump, each pump with variable speed controls, 304 stainless steel headers, NSF 61 rated 304 stainless steel end suction pumps, and factory tested and pre-set to site conditions. The booster pumps shall be sized for handling the approximate full building demand plus 20% capacity. If the site main pressure is more than 80 psi, pressure regulator will be installed at the main domestic water line as it enters the building.

DOMESTIC WATER PIPING DESIGN CRITERIA	
Velocity (Cold Water)	Maximum 6 feet per second.
Pipe Material (Below Grade)	Seamless copper tube, ASTM B88, Type K.
Pipe Material (Above Grade)	ASTM B88 and ANSI/NSF 61 type 'L' hard drawn copper pipe and soldered/brazed joints.

NON-POTABLE WATER

A dedicated industrial cold water protected by a reduced pressure backflow assembly will be provided to serve equipment. The non-potable water systems will be separated from the domestic water systems through two ASSE 1013 Lead-free reduced pressure backflow preventers piped in parallel.

Shut-off valves shall be provided on all branch connections and equipment connections. Water-hammer arrestors will be provided at all quick closing valves and other potential shock sources.

Riser locations shall be at construction elements that are permanently unaffected by interior fit-out arrangements, providing maximum flexibility for future modifications and connections. Provide isolation valves to facilitate independent shutdown at each floor, laboratory room, and other locations as required such service and modifications may be performed without affecting other areas. Each equipment and plumbing fixture shall be provided with individual isolation valves, or fixture supply stops.

DOMESTIC HOT WATER

The piping layout design shall be based on a loop system with valved branches to all rooms and sectional valves. Domestic hot water piping will be extended to all domestic plumbing fixtures.

Riser locations shall be at construction elements that are permanently unaffected by interior fit-out arrangements, providing maximum flexibility for future modifications and connections. Provide isolation valves to facilitate independent shutdown at each floor, laboratory room, restrooms, and other locations as required such service and modifications may be performed without affecting other areas. Each equipment and plumbing fixture shall be provided with individual isolation valves, or fixture supply stops.

The domestic hot water system will include circulation pumps and an expansion tank. A central thermostatic mixing station will be provided for hot water distribution. The Building Management System (BMS) will control the domestic hot water system components.

The new building will connect to the campus High Temperature Hot Water (HTWT) system to provide domestic hot water. Provide water to water heat exchanger, factory packaged skid mounted instantaneous water heater.

DOMESTIC WATER PIPING DESIGN CRITERIA	
Velocity (Hot Water)	Maximum 5 feet per second.
Pipe Material (Below Grade)	Seamless copper tube, ASTM B88, Type K.
Pipe Material (Above Grade)	ASTM B88 and ANSI/NSF 61 type 'L' hard drawn copper pipe and soldered/brazed joints.
Insulation	Hot water piping to be insulated.

EMERGENCY FIXTURES

Provide emergency fixtures to rooms where corrosive or hazardous materials are handled. Emergency shower and eyewash fixture shall be connected to domestic potable hot and cold water per ANSI Z358.1 and ASSE 1071 water tempering device. Isolation valves shall be labeled and locked open. Shower drains, and eyewash basins shall be connected to the sanitary drains.

CONDENSATE DRAIN

The air conditioning condensate waste pipe shall connect indirectly to the storm drainage system. The pipe within the building shall be insulated. Condensate piping will be sloped at 1/4 inch per foot.

CONDENSATE PIPING DESIGN CRITERIA	
Sizing	International Plumbing Code
Pipe Slope	Minimum 1/4" per foot
Pipe Material (Above Grade)	ASTM B88 and ANSI/NSF 61 type 'M' hard drawn copper pipe (Insulate within the building).

LEGIONELLA PREVENTION VS. TREATMENT ENCOURAGE

No deadlegs for future (as short as possible, valve and cap only). Provide hose valve connections at strategic locations near drains for flushing capabilities. Circulation of domestic hot water (at approx. 115 – 125 deg. F) for 24 hrs./day.

PLUMBING FIXTURES

All applicable fixtures will meet the American Disabilities Act (A.D.A.) for accessibility. The design team will use advanced innovative, water-efficient plumbing fixtures to help attain water conservation goals. Plumbing Fixtures shall be highly efficient, decreasing total water demands without negatively impacting the quality of life.

The proposed plumbing bathroom fixtures will be touchless. Touch-free sensors conserve water, prevent runs-on, reduce indoor water use, and provide an enhanced bathroom experience.

Automated fixture energy source options:

- Hard-wired
- Solar cells
- Miniaturized turbines
- Battery

PLUMBIG FIXTURES		
FIXTURES	**TYPE**	**FAUCET/FLUSH VALVES**
Water Closet	Vitreous China	■ 1.28 gpf ■ Automatic, Infra-Red Sensor
Urinal	Vitreous China	■ 0.125 gpf ■ Automatic, Infra-Red Sensor
Lavatory	Wall and Counter-mounted, Vitreous China	■ 0.35 gpm ■ Automatic, Infra-Red Sensor
Break/Kitchen	Stainless Steel	■ 0.125 gpf ■ Pull Down Spray Faucet
Shower		■ 1.5 gpm
Mop Sink	Floor Mounted, Acid Resisting Enameled Cast Iron	■ 1.5 gpm

FIRE PROTECTION

An 8" water connection is anticipated for the proposed building connecting to the existing public main.

Hydrant flow test data will be provided once it becomes available. The anticipated maximum hydraulic demand of the building will be calculated in accordance with NFPA 13. A fire department connection will be provided and attached downstream of the backflow preventer outside side of the building. The exact location of the fire department connection will be determined further along during the design process though the intent is to request permission to locate the connection on the side of the building.

The fire sprinkler service lateral to the building shall be sized by a properly licensed fire protection engineer or contractor. The fire sprinkler service lateral shall include a check valve in a vault, a post indicator valve, and a fire department connection. The number of hose connections on the fire department connection shall be as required by the local fire marshal for the calculated fire sprinkler flow rate.

The sprinkler system will be wet pipe in all areas not subject to freezing, unless otherwise indicated for rooms or areas requiring special protection systems.

The sprinkler system shall be hydraulically designed and calculated in accordance with NFPA 13 and a safety factor of 10 psi.

Sprinkler system zone control assemblies will have check valves, isolation valves with tamper switches, vane type water flow indicating devices, test and drain assemblies. Double interlock pre-action suppression systems will be provided to protect MDF and IDF rooms that are considered sensitive to building functions.

Overhangs shall require sprinkler protection unless specifically exempted per NFPA 13.

Sprinkler style and finish will be selected to blend in with architectural finishes. Sprinkler piping will be routed concealed where possible and painted to match finish. In less architecturally sensitive areas, like mechanical rooms, electrical rooms, and janitor closets, upright sprinklers will be provided on unpainted pipe. In areas with ceilings, sprinklers will be concealed pendent, with cover plates to match the ceiling color. All light and/or ordinary hazard areas will be provided with quick response sprinklers.

Dry type sprinklers connected to wet sprinkler piping or wet sprinkler piping 2 inches or larger with standard wet type sprinklers may protect areas that are exposed to potentially freezing conditions, such as exterior balconies, loading docks, and the like.

Wet sprinkler pipe with a diameter of less than 2.5" shall be schedule 40 black steel. Wet sprinkler pipe with a diameter of 2.5" and larger may be schedule 10 or schedule 40 pipe. Roll grooves are permitted for all pipe both Schedule 10 and 40. Threaded pipe is only permitted for Schedule 40 pipe. No grooving that removes material from the pipe shall be allowed.

No plastic pipe of any type may be used on any fire protection systems.

No mechanical joints will be allowed in electrical or communications equipment rooms, If piping must pass through, then all joints shall be welded.

Hook collar assemblies shall not be used for connecting sprinklers or drop nipples to sprinkler pipe.

Listed corrosion-resistant fittings, piping, and hangers will be provided in areas where chemicals, moisture or other corrosive vapors exist.

TECHNOLOGY NARRATIVE

ABOUT THE BUILDING

The University of Northern Colorado (UNC) is currently planning to build a new College of Osteopathic Medicine. The new building will house many technology-rich spaces, including:

- Active Learning Classrooms
- Meeting and small group collaboration spaces
- Exam Rooms

ABOUT THIS PROGRAM

This Technology Program is organized into several main sections which are described below:

- **Considerations** – This section details trends and general topics for your consideration. We suggest reviewing this section and then letting the Design Team know if you would like to discuss any topic further.
- **User Stories** – Much of this document is technical; however, it is important to ensure the end user experience is not overlooked. Each user story is told from the perspective a different cohort, designed to foster creative thinking and ensure we are not building "a hammer" when we need a "saw".
- **Audiovisual** – This section details each audiovisual system type and largely consists of System Datasheets, which detail system features, equipment space layouts, precedent images, a preliminary equipment list, and section for general considerations.
- **Information Technology** – The section covers descriptions of the building's telecommunications requirements and is primarily based on Owner standards and industry best practices. Considerations specific to this project are addressed in this section.
- **Building Security** – The section covers descriptions of the building's physical and electronics security requirements and is primarily based on Owner standards and industry best practices. Considerations specific to this project are addressed in this section.
- **Opinion of Probable Cost** – A preliminary cost opinion for this project is attached as an appendix to this document.

OWNER FEEDBACK AND COMMENTARY

This document is a first draft expressing our interpretation of what we gathered from meetings and interviews to date, in addition to our experience design similar spaces. Where there are no specific directions provided, we will be guided by our experience, focusing on innovative applications which will enrich and strengthen the on-grounds student experience.

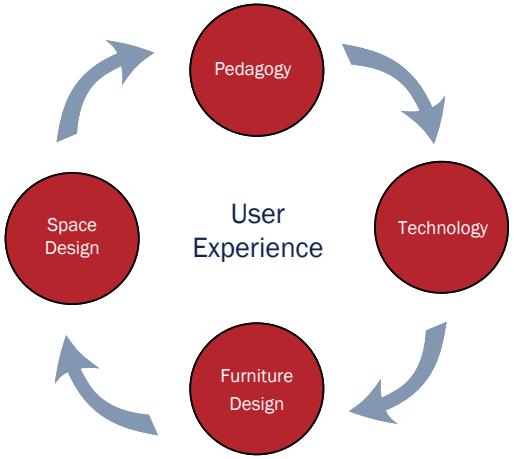
We will rely on feedback and commentary from the design team and user groups to confirm this document and allow us to move on to the next design phase of the project.

USER EXPERIENCE

The technology systems for this project are envisioned to provide students and faculty with an experience that is progressive, flexible, collaborative, mobile, and unique to the College of Osteopathic Medicine. This vision requires starting with the end in mind; the journey people will take while using these spaces. Throughout this process it will be important to consistently reflect on, and refine, the target user.

Pedagogy, Technology, Furniture Design, and Space Design are four cornerstones for building successful learning spaces. These four elements are completely interdependent on each other. When viewing these elements from the perspective of the student and faculty, no one element is more important than the other. For example, an active learning space with state-of-the-art technology being used for passive didactic style pedagogy will likely miss the target user experience.

The User Stories section of this document highlight various features of the building's technology systems by narrating the journey of different cohorts. Each story is not intended to be a complete list of equipment and features, rather, it highlights elements of the building's technology systems that have the greatest impact on the user experience. It is very important to review each story to ensure major elements of the user's journey are not missed in the technology/space designs.



EQUIPMENT PLANS

The equipment plans located in the Audiovisual section of this document communicate design intent only to assist in establishing an understanding of the equipment locations each space. Where architectural plans are not available for a space, equipment plans are based on a representation of that room type. Not all spaces or systems have equipment plans associated with them. The equipment locations will change over time as the design progresses.

Refer to the following Equipment Legend below when reviewing the equipment.

- Audio Conference Device
- Bluetooth
- Cable Cubby
- Camera on Articulating Arm
- Camera
- Ceiling Camera
- Ceiling Mic
- Ceiling Speaker
- Computer
- Control Panel
- Credenza
- Display Cart w/55" Display
- Equipment Rack
- Equipment Rack
- Flat Panel Display
- Floor Box
- I/O Plate
- Intercom Station
- IR Emitter
- Keyboard and Mouse
- Lectern
- Low Profile Credena
- Projection System
- Room Scheduler
- Screen Control
- Soundbar
- Surface-Mount Mic
- Surface-Mount Speaker
- Telecom Rack
- Wireless Screen Sharing
- WIFI

INFRASTRUCTURE FOR LOW VOLTAGE OR AUDIOVISUAL TECHNOLOGIES

The design of the technology systems within the facility will be divided between the categories of "Base Building" and "FF&E". Base Building design is typically associated with those items that are provided by the General Contractor or its subcontractors. This includes the infrastructure or junction boxes and pathways required for the low-voltage/audiovisual systems as well as the Structured Cabling and Security Systems.

The FF&E design is associated with the audiovisual systems. We group this with "Fixtures, Furniture, and Equipment" because this equipment is not part of the building itself. All audiovisual system equipment will be provided by a specialty AV Contractor who may be a sub-contractor to the General Contractor or as Contractor direct to UNC.

BASE BUILDING ELEMENTS

- Junction boxes, wall boxes, specialty flat panel display boxes, specialty projector plenum boxes and specialty floor boxes.
- Pathways to include cable trays, ladder trays, and conduit. Pathways will be needed between:
  - Conduit size shall vary depending on the application and cable quantity
  - Conduit material shall be rigid or EMT steel (not flexible) PVC, or aluminum.
  - Free-air cables in accessible ceiling shall be placed in J-hooks secured to the hard deck ceiling, and never resting on the ceiling tiles.
  - Free-air cables are not permitted in open-ceiling conditions and shall be placed in point-point conduit.
  - Surface mounted raceway that contains High-Voltage cabling must be separated from low-voltage cabling with an integral metal divider.
- In-wall blocking for equipment mounting.
- Structural supports for projection screens, projectors, flat panel displays, cameras, speakers, etc.
- Projection screens, both cases and screens.
- Electrical Circuits and Outlets for Technology
  - All circuits powering low voltage equipment shall be dedicated strictly to technology devices.
  - Circuits powering low voltage equipment shall not share circuits powering motorized equipment, lighting system dimmers, or any other inductive electrical loads.
  - Information Technology and Security Systems should be on emergency power and a building-wide UPS is recommended for these systems.
  - Room specific audiovisual devices will not be on the building UPS or emergency power; however, centralized audiovisual equipment should be.
- All structured cabling ports necessary for the audiovisual systems and security systems will be included within the structured cabling documents.
  - Specialty AV cabling (speaker cable, video cable, etc) will be provided by the AV Contractor during equipment installation.
- See the Information Technology section of this program document for more information regarding Telecommunications room size, finish, electrical and colling requirements.

FF&E – AUDIOVISUAL SYSTEMS

- Projectors, Displays
- Source devices
- Video camera
- Loudspeakers and microphones
- Control Processors
- Specialty furniture
- Audiovisual specific cabling
- Specialty mounting hardware for audiovisual equipment

CONSIDERATIONS

AUDIOVISUAL SIGNAL TRANSPORT

Conventional audiovisual distribution/switching systems rely on a frame-based architecture and transport system called HDBaseT. Where all inputs/outputs connect to transmitters/receivers, which are connected to a router. The major challenge with HDBaseT systems is that they are not very scalable. For example, if you have four sources and four displays, a 4 in x 4 out frame will suffice. However, if you need to add a fifth source, you will then need to remove the 4 x 4 frame and use an 8 x 8.

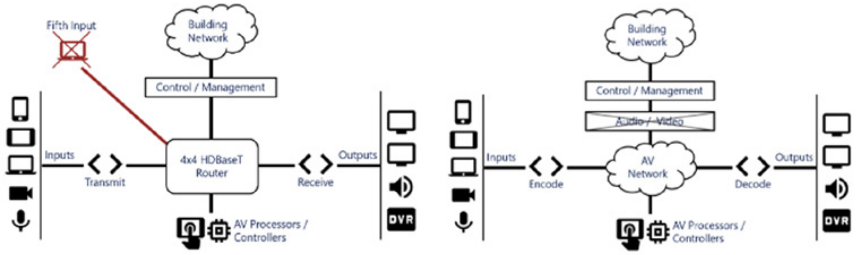
A modern approach to the scalability issues or traditional audiovisual routing is often referred to as IP-Based transport. This method replaces the transmitters/receivers with network encoders/decoders and the router with a standard network switch. A central controller switches the sources audio/video signals to displays by routing the desired encoder's IP address to the display's decoder IP address.

A major benefit to IP-based transport is its scalability and flexibility. We have coined the term "Software Defined AV" to describe these systems, as you are able to redefine the systems operation via software as opposed to hardware. If an extra source is needed, you simply add another encoder. If you need to route a single in a way the was not originally intended, you simply reconfigure your system.

There are many different ways in which the network system can be designed to support a Software Defined Audiovisual system:

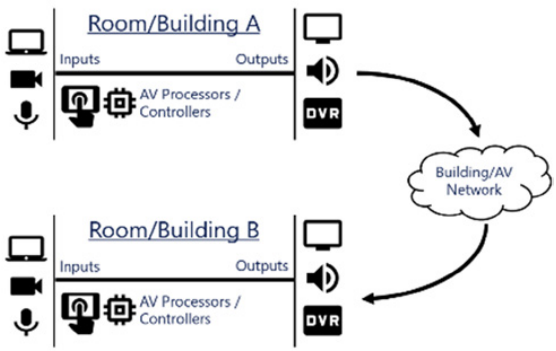
- **Type 1: Single Centralized Building Network Core**
  - All multicast and control/management traffic converges on one network
- **Type 2: Centralized Parallel Audiovisual Core**
  - All multicast traffic is connected to a centralized Audiovisual Core, with all management/control traffic connected to the building's Central Core
  - The audiovisual processors bridge the two networks
- **Type 3: Distributed Edge System**
  - All multicast and control/management devices connect to a local network switch local in or near spaces with audiovisual equipment
  - Each edge network switch connects to a centralized core (either an Audiovisual or Building Core)
  - The edge switches can be equipped with large uplinks to allow audio/video overflow between spaces, or each edge network switch can have multicast blocking turned on where only control/management traffic travers the uplinks

Further discussion is required with the project's IT support team to determine the best method of design, procurement, installation, and configuration of the network



Another significant benefit to an IP-Based system is it natively allows routing of any source to any display on the entire network

- Not just routing of the sources and displays to which the individual switch is connected. This is a key component for the audiovisual systems described in the program within the active learning classrooms.



COLLABORATION TECHNOLOGIES

Real-time collaboration is a foundation requirement for this project which is typically addressed with Collaboration systems that allow users to easily share their laptop/tablet/phone screen with the audiovisual systems. Selection of the best collaboration hardware/software solution will be critical to the success of this project. Ideally, a single solution will be selected and implemented in numerous locations throughout the building. One or two special spaces may have unique "one-off" solutions, but this capability should be consistent and standardized for the bulk of the spaces.

The impact of the decision may be limited to just this project but could extend beyond the reach of this building. We recommend that the campus establish a group or committee comprised of technology staff, faculty/users and possibly students to evaluate various options for collaborative technologies.

Options range from free offerings such as Google Docs to hardware and software solutions such as those from, Kramer, Crestron, Mersive, Barco, T1V and others, some of which require a significant investment and ongoing licensing fees.

Our experience shows that early decisions related to this technology are beneficial so the solutions can be beta-tested and rolled out prior to the final design.

MEDICAL SIMULATION CAPTURE HARDWARE AND SOFTWARE

The Medical Simulation system addresses the acquisition, storage, playback and management of audio and video from multiple microphones and cameras as well as data from clinical instruments such as full-body manikins and task trainers.

The systems are compatible with several devices from various manufacturers and extend to assessment, grading, research, remote access for faculty and students (with proper credentials), scheduling and other administrative tasks associated with managing a medical simulation environment.

A small portion of these tasks can be handled by inexpensive packages that are available through some manufacturers of manikins. Options that are more powerful are available through third-party hardware/software developers, albeit at significantly higher costs.

Higher cost options have more advanced capabilities to capture more high-resolution inputs, are generally easier to navigate, offer built-in or readily available scenarios, and contain more sophisticated options for administrative functions such as scheduling, self-evaluation, informal evaluation and formal assessment.

Other variables to consider include web-based vs. hosted, the extent of the information captured, ability to output to industry standard programs such as Microsoft Excel, calendaring, scalability, customization, capture in real-time vs. near real-time, and location of technical support resources. Of course, there are a huge number of more subtle differences such as batch-loading vs. loading an individual file that may be critical to your intended workflow.

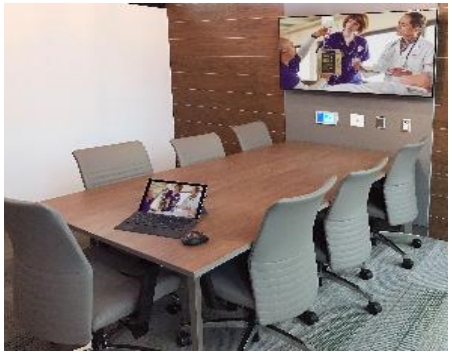
The selection of such a medical simulation capture provider is a critical decision and should not be overlooked. The University of Minnesota currently utilizes medical simulation capture systems from B-Line. NV5 can help facilitate on-campus demonstrations from other simulation capture hardware and software systems if desired.

Simulation Center

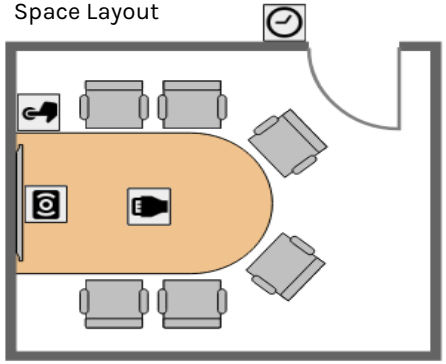
AUDIOVISUAL SYSTEM DATASHEETS : GROUP STUDY/SMALL HUDDLE

SYSTEM FEATURES

- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and a web-camera with built-in microphone.
- The system supports wireless screen sharing between user devices and the display system.
- The user controls the system from a button panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.



Space Layout



QUESTIONS

- Will Small Group Room require a dedicated all-in-one computer, or will students bring in theri own devices?
- Will all Small Group Rooms include technology, or will some be tech free?
- Is web-conferencing capability a requirement in the Small Group Room?

PRELIMINARY EQUIPMENT LIST

GROUP STUDY / SMALL HUDDLE

ITEM/DESCRIPTION	QTY
Display Systems:	
55" Flat Panel Display	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
Passive HDMI Wall Plate	1
Capture, Streaming and Conferencing:	
4k USB Auto-framing Web Camera with Built In Microphone	1
Audiovisual Control and Processing:	
Button Panel Control System	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

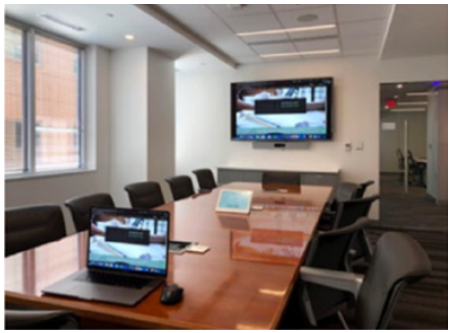
CONSIDERATIONS

- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown above.
- System could be equipped as a "Zoom Room", "Teams Room", etc. Further discussion is required.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.

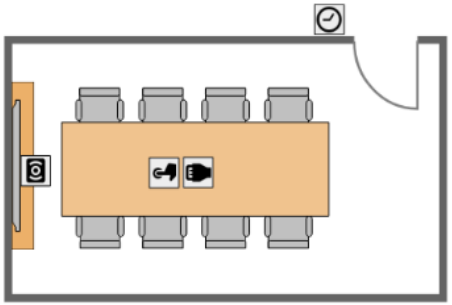
AUDIOVISUAL SYSTEM DATASHEETS : GENERAL CONFERENCE ROOM

SYSTEM FEATURES

- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and a web-camera with built-in microphone.
- The system supports wireless screen sharing between user devices and the display system.
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.



Precedent Image



Space Layout

PRELIMINARY EQUIPMENT LIST

CONFERENCE ROOM

ITEM/DESCRIPTION	QTY
Display Systems:	
75" Flat Panel Display	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Table Pocket	1
Capture, Streaming and Conferencing:	
4k USB Auto-framing Web Camera with Built In Microphone	1
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Audiovisual Control and Processing:	
Small Traditional AV Processing/Control Equipment	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

CONSIDERATIONS

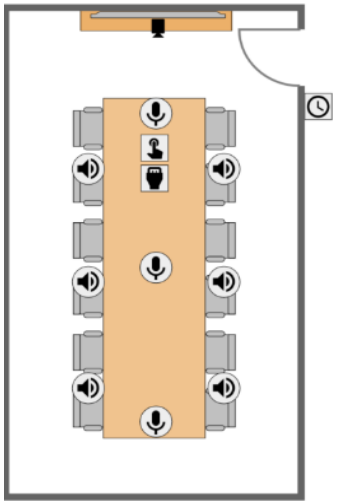
- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown above.
- System could be equipped as a "Zoom Room", "Teams Room", etc. Further discussion is required.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.

AUDIOVISUAL SYSTEM DATA-SHEETS : LARGE CONFERENCE ROOM

SYSTEM FEATURES

- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and camera/ ceiling microphone.
- The system supports wired and wireless screen sharing between user devices and the display system.
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.

Precedent Image



Space Layout

PRELIMINARY EQUIPMENT LIST

LARGE CONFERENCE ROOM

ITEM/DESCRIPTION	QTY
Display Systems:	
98" Flat Panel Display	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Table Pocket	1
Sound Reinforcement System:	
Ceiling Loudspeaker w/Audio Amplifier Allowance	6
Capture, Streaming and Conferencing:	
HD USB Pan-Tilted-Zoom Camera	1
Beamtracking Ceiling Microphone	3
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Audiovisual Control and Processing:	
IP-Based AV Procesing/Control Equipment: Audio DSP, Network Switch, Controller	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

CONSIDERATIONS

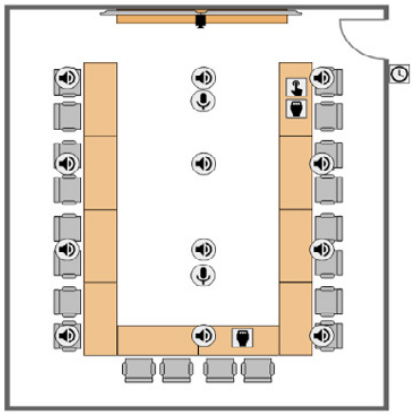
- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown above.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.
- Control of environmental factors such as lights, shadesm and thermostat is possible; however, this requires coordination with design team to confirm compatibility between systems and Owner requirements.

AUDIOVISUAL SYSTEM DATASHEETS : LARGE HUDDLE ROOM

SYSTEM FEATURES

- The multi-display system supports showing the same content (source) an all displays or unique content (source) on each.
- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and camera/ceiling microphone.
- The system supports wired and wireless screen sharing between user devices and the display system.
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.

Precedent Image



Space Layout

PRELIMINARY EQUIPMENT LIST

LARGE HUDDLE ROOM

ITEM/DESCRIPTION	QTY
Display Systems:	
98" Flat Panel Display	2
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Table Pocket	2
Sound Reinforcement System:	
Ceiling Loudspeaker w/Audio Amplifier Allowance	12
Capture, Streaming and Conferencing:	
HD Pan-Tilted-Zoom Camera (12x)	1
USB Web Conferencing/Capture Computer Interface	1
Beamtracking Ceiling Microphone	2
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Audiovisual Control and Processing:	
IP-Based AV Procesing/Control Equipment: Audio DSP, Network Switch, Controller	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

CONSIDERATIONS

- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown above.
- System could be equipped as a "Zoom Room", Teams Room ", etc. Further discussion is required.
- System could support camera auto tracking; however, this is currently not planned for in the equipment list shown.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.
- Control of environmental factors such as lights, shades, and thermostat is possible; however, this requires coordination with design team to confirm compatibility between systems and Owner requirements.

AUDIOVISUAL SYSTEM DATASHEETS : VIRTUAL ANATAOMY STUDIO

SYSTEM FEATURES

- The system supports two modes: AR/VR Studio and Flexible Classroom.
    - *AR/VR Mode:* Flexible Open Space for easy movement and deployment of AR and VR Tchnology
    - *Classroom Mode:* Instructor content is presented on the main display system, while student content is wirelessly shared between each cohort and their respective collaboration system.
- The instructor presents from a connection point within the room with a mobile station. They may draw (digitally) overtop computer content via the annotation monitor.
- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and camera/ceiling microphone.
- The system supports wired wireless screen sharing between instructor's devices and the display system.
- The system supports the reconfiguration of tables and chairs
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.

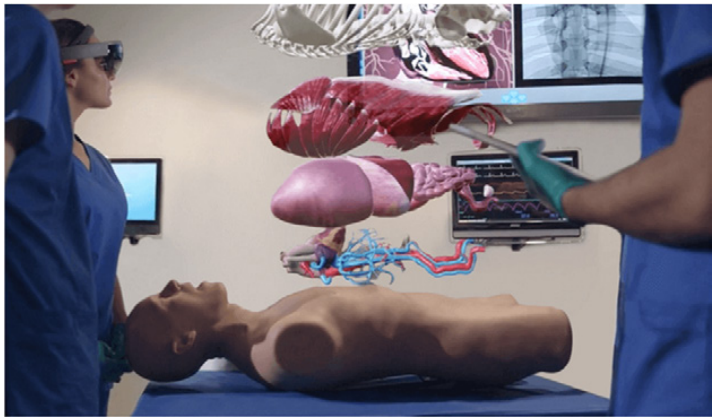
CONSIDERATIONS

- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown on the next page.
- System could be equipped as a "Zoom Room", "Teams Room ", etc. Further discussion is required.
- System could support camera auto tracking; however, this is currently not planned for in the equipment list shown.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.
- Considerations to location of any centralized AV headend equipment to be discussed, i.e., in-room or remote in a nearby IT closet.
- Control of environmental factors such as lights, shades, and thermostat is possible; however, this requires coordination with design team to confirm compatibility between systems and Owner requirements.

Precedent Image

VIRTUAL ANATAOMY STUDIO [CONT.]

Precedent Images



PRELIMINARY EQUIPMENT LIST

VIRTUAL ANATOMY STUDIO

ITEM/DESCRIPTION	QTY
Display Systems:	
7k Lumens Projection System w/Motorized Screen	1
Annotation Monitor at Presenter Station/Lectern	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Lectern/Presenter Station	1
Sound Reinforcement System:	
Ceiling Loudspeaker w/Audio Amplifier Allowance	6
Collaboration Systems:	
Wall-Mounted Collaboration Station (Presenter/Local content)	4
Mobile Collaboration Station (Presenter/Local Content)	2
Capture, Streaming and Conferencing:	
HD Pan-Tilted-Zoom Camera (12x)	2
USB Web Conferencing/Capture Computer Interface	1
Beamtracking Ceiling Microphone	1
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Mobile (tethered) Height-Adjustable Lectern/Presenter Station	1
Audiovisual Control and Processing:	
IP-Based AV Procesing/Control Equipment: Audio DSP, Network Switch, Controller	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

AUDIOVISUAL SYSTEM DATASHEETS : TEAM BASED LEARNING CLASSROOM

SYSTEM FEATURES

- The system supports two modes: Presentation Mode and Breakout Mode.
    - *Presentation Mode:* Content presented on all the displays throughout the room.
    - *Breakout Mode:* Students can wireless share to individual displays throughout the room for collaboration.
- The instructor presents from a mobile station located that can be connected in several locations with the room. They may draw (digitally) overtop computer content via the annotation monitor.
- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and camera/ceiling microphone.
- The system supports the reconfiguration of tables and chairs
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.

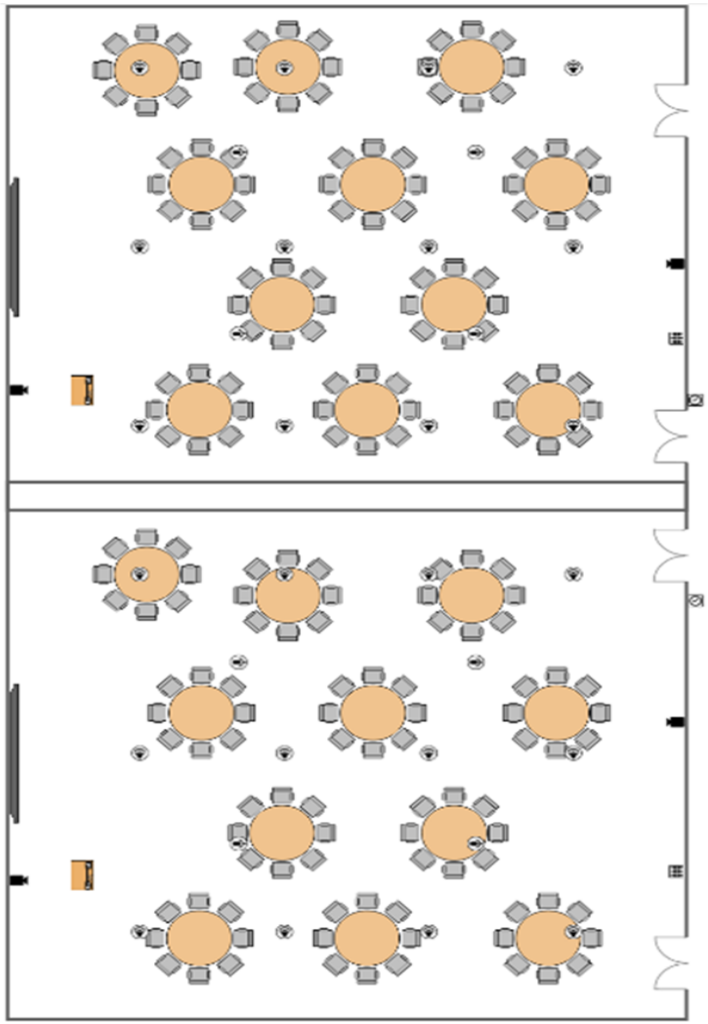
CONSIDERATIONS

- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown on the next page.
- System could be equipped as a "Zoom Room", "Teams Room ", etc. Further discussion is required.
- System could support camera auto tracking; however, this is currently not planned for in the equipment list shown.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.
- Considerations to location of any centralized AV headend equipment to be discussed, i.e., in-room or remote in a nearby IT closet.
- Control of environmental factors such as lights, shades, and thermostat is possible; however, this requires coordination with design team to confirm compatibility between systems and Owner requirements.

Precedent Images

TEAM BASED LEARNING CLASSROOM [CONT.]

Space Layouts



PRELIMINARY EQUIPMENT LIST

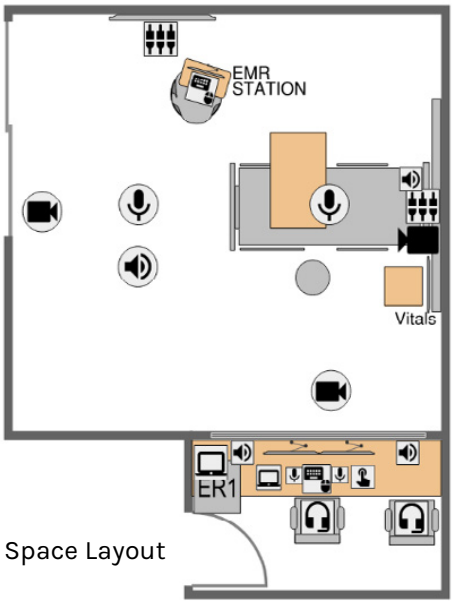
TEAM BASED LEARNING CLASSROOM

ITEM/DESCRIPTION	QTY
Display Systems:	
7k Lumens Projection System w/Motorized Screen	6-8
Annotation Monitor at Presenter Station/Lectern	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Lectern/Presenter Station	1
Sound Reinforcement System:	
Ceiling Loudspeaker w/Audio Amplifier Allowance	16
Wireless Microphone System	1
Assistive Learning Syste	1
Capture, Streaming and Conferencing:	
HD Pan-Tilted-Zoom Camera (12x)	2
USB Web Conferencing/Capture Computer Interface	1
Beamtracking Ceiling Microphone	1
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Mobile (tethered) Height-Adjustable Lectern/Presenter Station	1
Audiovisual Control and Processing:	
IP-Based AV Procesing/Control Equipment: Audio DSP, Network Switch, Controller	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

AUDIOVISUAL SYSTEM DATASHEETS : HI-FIDELITY SIMULATION AND CONTROL ROOM

SYSTEM FEATURES

- Control of the medical capture software/hardware and the manikin(s) is via computers, a joystick controller, and a control touch panel located in the adjacent control room.
- Operators can speak through the manikin, overhead speakers, and in-ear monitors worn by the students.
- The system supports capturing audio/video of the lab, patient vitals, electronic medical records (EMR), aux inputs (such as simulated X-rays), and the lab phone system.
- The EMR station supports simulated telehealth via the local computer and web camera.
- The system supports simulated nurse call.
- A large monitor in the lab may be used to display content such as simulated X-rays or other instructional content relevant to the simulation.



Space Layout

Precedent Images

PRELIMINARY EQUIPMENT LIST

HI-FIDELITY SIMULATION AND CONTROL ROOM

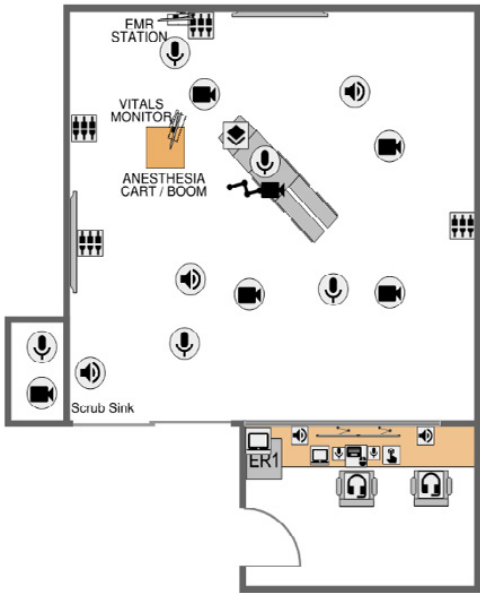
ITEM/DESCRIPTION	QTY
In-Lab Capture/Source Devices	
Pan-Tilt-Zoom IP-Camera	2
Digital Pan/Zoom IP-Camera	1
Ceiling Microphone(s) for In-Lab Audio Capture	1
HDMI Wall Plate Transmitter	1
In-Lab Display/Audio Devices	
In-Lab Vitals Monitor	1
EMR Station with Telehealth Support	1
In-Lab Ceiling and Manikin Speaker System	1
In-Lab Display/Collaboration System	1
Nurse Call System	1
Set of Two Telephones with Audio Tap for Recording	1
Control Station Audio/Video Devices	
Simulation Control PC	1
Manikin Control Laptop and Vitals PC (Control Room)	1
Control Room Audio Monitoring (speakers/headphones)	1
Control Room Audio Talkback System with Voice Processor (Manikin + Lab)	1
4 Channel Wireless Microphone System with In-Ear Audio Talkback	1
HDMI Wall Plate Transmitter	1
Simulation Capture Control and Processing	
Control System Touch Panel	1
Joystick Camera Controller	1
Simulation Control Station Processing /Control Equipment	1
Networked Video Recorder Allowance (per audio/video stream, Based on CAE)	5
Audiovisual Furniture:	
Control Room Power Distribution and Racking	1

AUDIOVISUAL SYSTEM DATASHEETS : OR SIMULATION AND CONTROL ROOM

SYSTEM FEATURES

- Control of the medical capture software/hardware and the manikin(s) is via computers, a joystick controller, and a control touch panel located in the adjacent control room.
- Operators can speak through the manikin, overhead speakers, and in-ear monitors worn by the students.
- The system supports capturing audio/video of the lab, patient vitals, electronic medical records (EMR), anesthesia cart, scrub sink, aux inputs (such as simulated X-rays), surgical boom camera, and the lab phone system.
- The EMR station supports simulated telehealth via the local computer and web camera.
- Large monitor(s) in the lab may be used to display content such as simulated X-rays, medical equipment or other instructional content relevant to the simulation.

Space Layout



Precedent Images

PRELIMINARY EQUIPMENT LIST

OR SIMULATION AND CONTROL ROOM

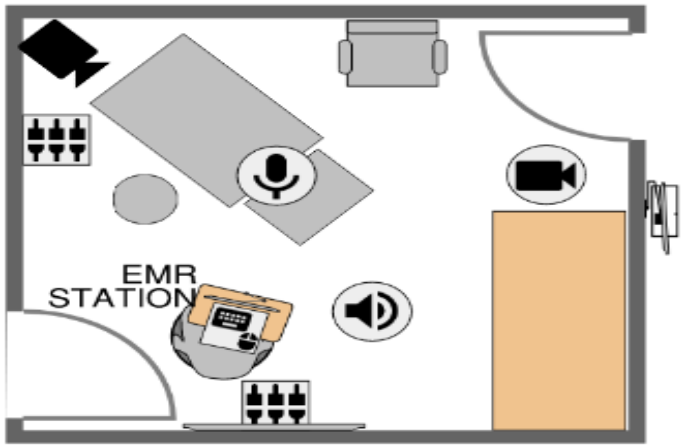
ITEM/DESCRIPTION	QTY
In-Lab Capture/Source Devices	
Pan-Tilt-Zoom IP-Camera	5
Ceiling Microphone(s) for In-Lab Audio Capture	2
Portable Encoder/Decoder Transport	4
Med Sim Capture Station (PTZ Camera(s)/Audio)	1
In-Lab Display/Audio Devices	
In-Lab Vitals Monitor	1
EMR Station with Telehealth Support	1
Anesthesia Display Cart	1
In-Lab Ceiling and Manikin Speaker System	1
In-Lab Display/Collaboration System	1
65" Flat Panel Display	1
Set of Two Telephones with Audio Tap for Recording	1
Control Station Audio/Video Devices	
Simulation Control PC	1
Manikin Control Laptop and Vitals PC (Control Room)	1
Control Room Audio Monitoring (speakers/headphones)	1
Control Room Audio Talkback System with Voice Processor (Manikin + Lab)	1
4 Channel Wireless Microphone System with In-Ear Audio Talkback	1
HDMI Wall Plate Transmitter	1
Simulation Capture Control and Processing	
Control System Touch Panel	1
Joystick Camera Controller	1
Simulation Control Station Processing /Control Equipment	1
Networked Video Recorder Allowance (per audio/video stream, Based on CAE)	9
Audiovisual Furniture:	
Control Room Power Distribution and Racking	1

AUDIOVISUAL SYSTEM DATASHEETS : EXAM ROOM

SYSTEM FEATURES

- Control of the medical capture software/hardware and the manikin(s) is via computers, a joystick controller, and a control touch panel located in the central control room.
- Operators in the central control can speak through overhead speakers.
- The system supports capturing audio/video of the lab and electronic medical records (EMR).
- The EMR station supports simulated telehealth via the local computer and web camera.
- A large monitor in the lab may be used to display content such as simulated X-rays, in -room collaboration content, other instructional content relevant to the simulation.

Space Layout

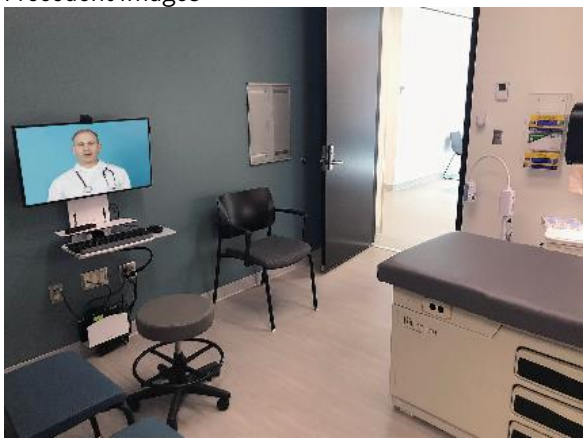


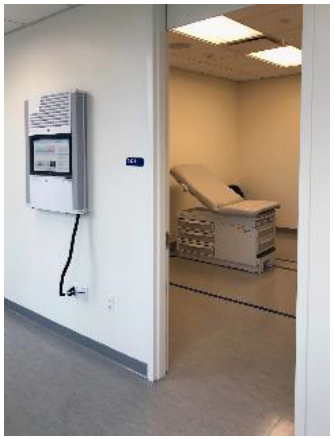
PRELIMINARY EQUIPMENT LIST

STANDARDIZED PATIENT EXAM ROOM

ITEM/DESCRIPTION	QTY
In-Lab Capture/Source Devices	
Pan-Tilt-Zoom IP-Camera	1
Digital Pan/Zoom IP-Camera	1
Ceiling Microphone(s) for In-Lab Audio Capture	1
Portable Encoder/Decoder Transport	1
Exam Room Display/Audio Devices	
Hallway Computer with SIt/Stand Mount	1
EMR/SP Computer with Integrated Camera; Sit/Stand Mount	1
Ceiling Loudspeaker with Audio Amplifier Allowance	1
In-Lab Display/Collaboration System	1
Simulation Capture Control and Processing	
Control System Touch Panel	1
Joystick Camera Controller	1
Simulation Control Station Processing /Control Equipment	1
Networked Video Recorder Allowance (per audio/video stream, Based on CAE)	4

Precedent Images

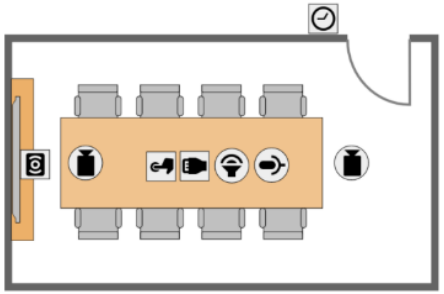




AUDIOVISUAL SYSTEM DATASHEETS : DEBRIEF ROOM

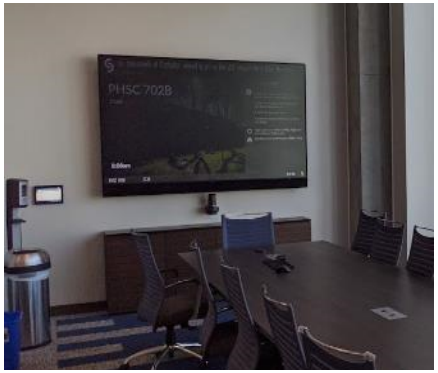
SYSTEM FEATURES

- The system is primary used to view live or recorded simulations for Debriefing with students.
- The system supports local and remote collaboration via web conferencing software loaded on the local computer, such as, Zoom, Teams, etc.
- The system supports wireless screen sharing between user devices and the display system.
- The Debriefing syssions are captured via a ceiling microphone, camera, and speaker connected to the medical simulation system.
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.



Space Layout

Precedent Images



PRELIMINARY EQUIPMENT LIST

DEBRIEF ROOM

ITEM/DESCRIPTION	QTY
Display Systems:	
65" Flat Panel Display	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Table Pocket	1
Sound Reinforcement System:	
Ceiling Loudspeaker w/Audio Amplifier Allowance	4
Capture, Streaming and Conferencing:	
Powered USB Soundbar with Auto-framing Camera and Microphone	1
Medical Simulation Capture	
Pan-Tilt-Zoom IP-Camera	2
Ceiling Microphone(s) for In-Lab Audio Capture	1
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Mobile (tethered) Height-Adjustable Lectern/Presenter Station	1
Audiovisual Control and Processing:	
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

AUDIOVISUAL SYSTEM DATASHEETS : STANDARDIZED PATIENT [SP] CONTROL ROOM

SYSTEM FEATURES

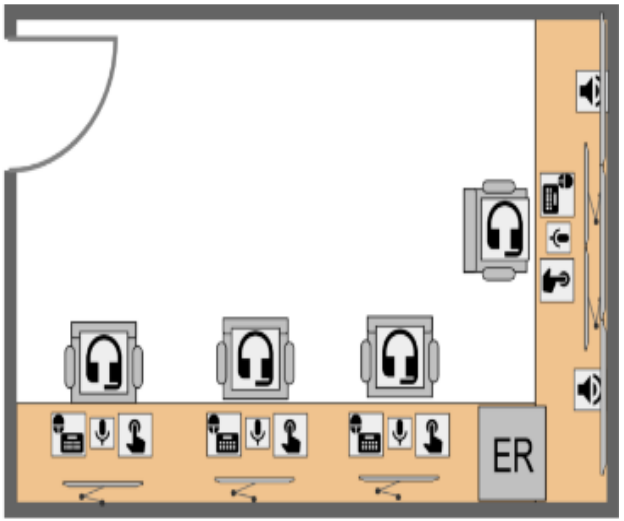
- The system supports proctoring all Exam rooms from one location. Operators are able to view and control any Exam room from this space, as well as audio page into any room or corridor.

PRELIMINARY EQUIPMENT LIST

STANDARDIZED PATIENT CONTROL / PROCTOR

ITEM/DESCRIPTION	QTY
Monitoring System	
Central Monitoring Display System	1
Observation Station with Headset and Computer	4
Control Room Audio Talkback System	1
Control Room Audio Monitoring (speakers/headphones)	1
Pair of Powered Desktop Loudspeakers	2
Control System Touch Panel	4
Audiovisual Furniture	
Control Room Power Distribution anmd Racking	1

Space Layout

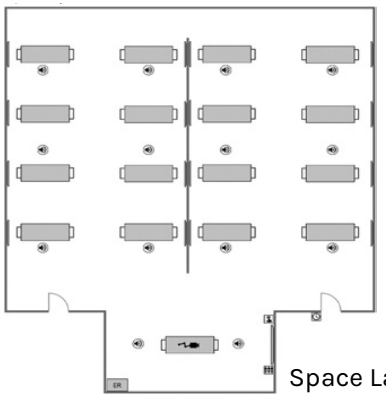


Precedent Images

AUDIOVISUAL SYSTEM DATASHEETS : ANATOMY LAB

SYSTEM FEATURES

- The system supports two modes: Presentation Mode and Breakout Mode.
  - *Presentation Mode:* Content presented on the main display system (instructor demonstration area) is mirrored on all collaboration displays.
  - *Breakout Mode:* Instructor content is presented on the main display system, while student content is wirelessly shared between each cohort and their respective collaboration system. The student content (digital textbooks, etc.) is generated from tablets in waterproof cases.
- The instructor presents from a demonstration area.
- The system supports local and remote collaboration/presentations via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and camera/ceiling microphone.
- The system supports wireless screen sharing between instructor's devices and the display system.
- The system supports the reconfiguration of tables and chairs
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.



Space Layout

PRELIMINARY EQUIPMENT LIST

DEBRIEF ROOM - QUANTITY 2

ITEM/DESCRIPTION	QTY
Display Systems:	
65" Flat Panel Display	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Table Pocket	1
Sound Reinforcement System:	
Ceiling Loudspeaker w/Audio Amplifier Allowance	4
Capture, Streaming and Conferencing:	
Powered USB Soundbar with Auto-framing Camera and Microphone	1
Medical Simulation Capture	
Pan-Tilt-Zoom IP-Camera	2
Ceiling Microphone(s) for In-Lab Audio Capture	1
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Mobile (tethered) Height-Adjustable Lectern/Presenter Station	1
Audiovisual Control and Processing:	
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

AUDIOVISUAL SYSTEM DATASHEETS : SKILLS LAB

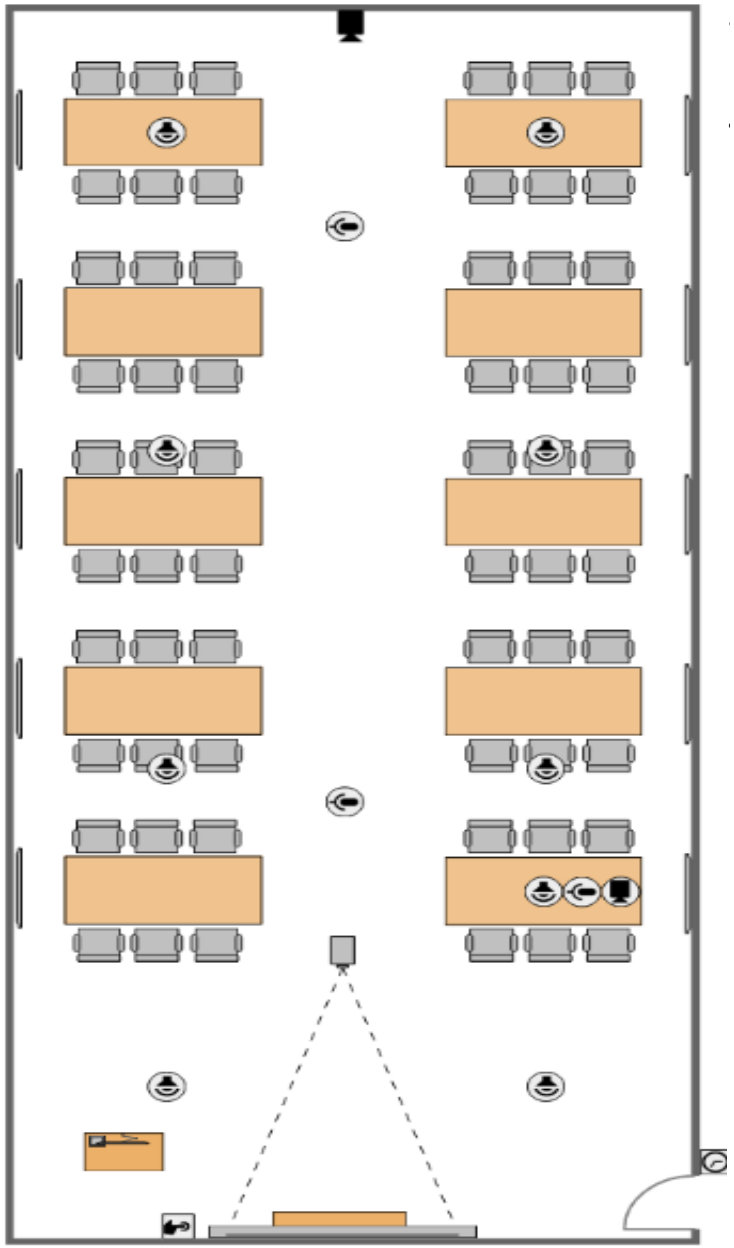
SYSTEM FEATURES

- The system supports two modes: Presentation Mode and Breakout Mode.
    - *Presentation Mode:* Content presented on the main display system (instructor demonstration area) is mirrored on all collaboration displays.
    - *Breakout Mode:* Instructor content is presented on the main display system, while student content is wirelessly shared between each cohort and their respective collaboration system.
- The instructor presents from a demonstration area.
- One of the collaboration stations can capture students performing tasks via a ceiling microphone, camera, and speaker connected to the medical simulation system.
- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and connected to room displays, cameras, speakers, and microphones.
- The system supports wireless screen sharing between instructor's devices and the display system.
- The system supports the reconfiguration of tables and chairs
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.

CONSIDERATIONS

- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown on the next page.
- System could be equipped as a "Zoom Room", "Teams Room ", etc. Further discussion is required.
- System could support camera auto tracking; however, this is currently not planned for in the equipment list shown.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.
- Considerations to location of any centralized AV headend equipment to be discussed, i.e., in-room or remote in a nearby IT closet.
- Control of environmental factors such as lights, shades, and thermostat is possible; however, this requires coordination with design team to confirm compatibility between systems and Owner requirements.

SKILLS LAB [CONT.]



Space Layout

PRELIMINARY EQUIPMENT LIST

SKILLS LAB

ITEM/DESCRIPTION	QTY
Display Systems:	
7k Lumens Projection System w/Motorized Screen	1
Annotation Monitor at Presenter Station/Lectern	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Lectern/Presenter Station	1
Sound Reinforcement System:	
Ceiling Loudspeaker with Audio Amplifier Allowance	8
Collaboration Systems:	
Wall-Mounted Collaboration Station (Presenter/Local Content)	10
Simulation Capture	
Med Sim Capture Station (PTZ Camera(s)/Audio)	1
Capture, Streaming and Conferencing:	
HD Pan-Tilted-Zoom Camera (12x)	1
USB Web Conferencing/Capture Computer Interface	1
Beamtracking Ceiling Microphone	2
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Mobile (tethered) Height-Adjustable Lectern/Presenter Station	1
Audiovisual Control and Processing:	
IP-Based AV Procesing/Control Equipment: Audio DSP, Network Switch, Controller	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

AUDIOVISUAL SYSTEM DATASHEETS : OMM LAB

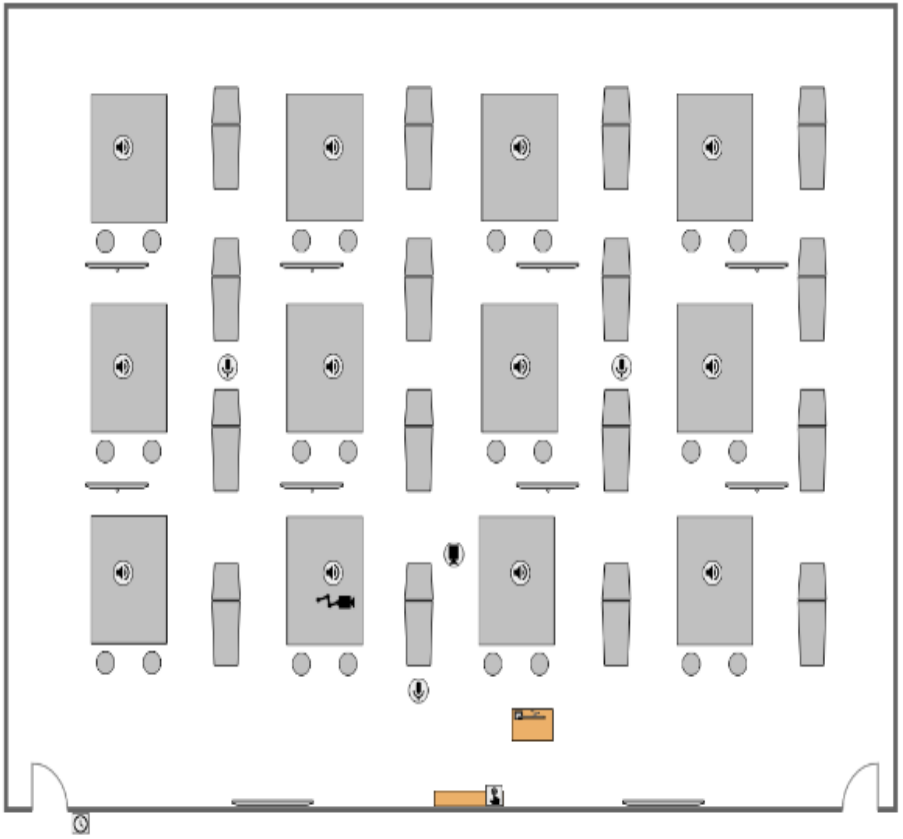
SYSTEM FEATURES

- The multi-display system supports showing the same content (source) on all displays for optimal viewing, alternatively, the system may also show unique content (sources) on each display (ceiling displays grouped together).
- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and connected to room displays, cameras, speakers, and microphones.
- One of the mat stations is equipped with a camera fastened to a ceiling-mounted articulating arm to capture and instructor or student exercise.
- The system supports wireless screen sharing between instructor's devices and the display system.
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.

CONSIDERATIONS

- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown on the next page.
- System could be equipped as a "Zoom Room", "Teams Room ", etc. Further discussion is required.
- System could support camera auto tracking; however, this is currently not planned for in the equipment list shown.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.
- Considerations to location of any centralized AV headend equipment to be discussed, i.e., in-room or remote in a nearby IT closet.
- Control of environmental factors such as lights, shades, and thermostat is possible; however, this requires coordination with design team to confirm compatibility between systems and Owner requirements.

OMM LAB [CONT.]



Space Layout

PRELIMINARY EQUIPMENT LIST

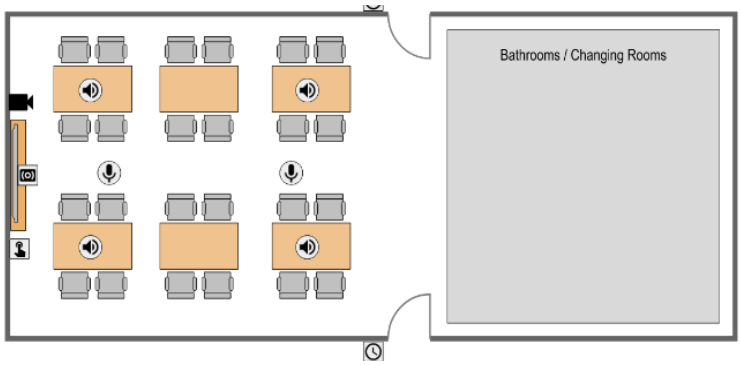
OMM LAB

ITEM/DESCRIPTION	QTY
Display Systems:	
85" Flat Panel Display	2
65" Flat Panel Display	8
Annotation Monitor at Presenter Station/Lectern	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Lectern/Presenter Station	1
Sound Reinforcement System:	
Ceiling Loudspeaker with Audio Amplifier Allowance	12
Wireless Microphone System	1
Capture, Streaming and Conferencing:	
HD Pan-Tilted-Zoom Camera	1
Camera Attached to Ceiling-Mounted Articulating Arm	1
Beamforming Ceiling Microphone	3
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Mobile (tethered) Height-Adjustable Lectern/Presenter Station	1
Audiovisual Control and Processing:	
IP-Based AV Procesing/Control Equipment: Audio DSP, Network Switch, Controller	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	1

AUDIOVISUAL SYSTEM DATASHEETS : STANDARDIZED PATIENT (SP) LOUNGE

SYSTEM FEATURES

- The system supports capturing the instruction or simulated events in the lounge via a ceiling microphones, camera, and speakers connected to the medical simulation system.
- The system supports local and remote collaboration via web conferencing software loaded on the local computer (e.g. Zoom, Teams, etc) and connected to room displays, cameras, speakers, and microphones.
- The system supports wireless screen sharing between instructor's devices and the display system.
- The user controls the system from a touch panel controller.
- The room schedule/availability is accessible to users via an interactive touch panel mounted outside of the room.



Space Layout

PRELIMINARY EQUIPMENT LIST

SP LOUNGE

ITEM/DESCRIPTION	QTY
Display Systems:	
85" Flat Panel Display	1
Audiovisual Services:	
Wireless Screen Sharing Device	1
Local Computer with Wireless Keyboard/Mouse	1
HDMI Laptop Input in Lectern/Presenter Station	1
Simulation Capture	
Med SIm Capture Station (PTZ Camera(s)/Audio)	1
Networked Video Recorder Allowance (per audio/video stream, based on CAE)	2
Capture, Streaming and Conferencing:	
Powered USB Soundbar w/Auto-framing Camera and Microphone	1
Audiovisual Furniture:	
Slim Credenza for Audiovisual Equipment	1
Audiovisual Control and Processing:	
Small Traditional AV Processing/Control Equipment	1
Control System Touch Panel	1
Building Wide Systems	
Interactive Room Scheduling Touch Panel	2

CONSIDERATIONS

- System could support Bring Your Own Meeting via the laptop input; however, this is currently not planned for in the equipment list shown on the next page.
- System could be equipped as a "Zoom Room", "Teams Room ", etc. Further discussion is required.
- System could support camera auto tracking; however, this is currently not planned for in the equipment list shown.
- Room scheduling panel requires connection to Owner's preferred calendaring platform (software). This software is not included in the scope of this program.
- Considerations to location of any centralized AV headend equipment to be discussed, i.e., in-room or remote in a nearby IT closet.
- Control of environmental factors such as lights, shades, and thermostat is possible; however, this requires coordination with design team to confirm compatibility between systems and Owner requirements.

AUDIOVISUAL SYSTEM DATASHEETS : MEDICAL SIMULATION CORE

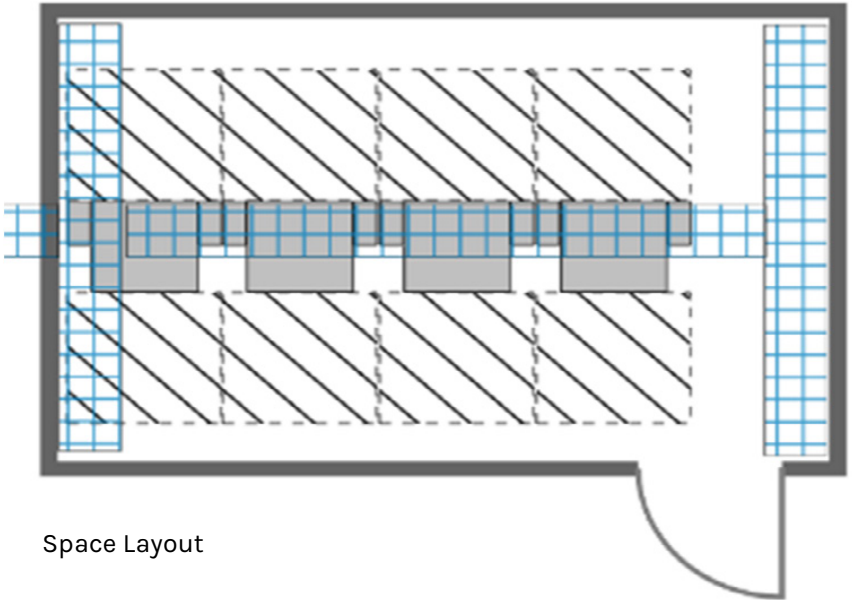
SYSTEM FEATURES

- This space houses all the processing equipment for the medical simulation rooms. Please note, the equipment (and associated costs) that is housed in this room is noted/carried in each room type. For example, several pieces of equipment for the Simulation Lab will be racked in this room, however, to make it easier to understand the scope and cost for each Simulation Lab all costs and equipment needed is detailed on the Simulation Lab datasheet. The only equipment detailed for this space is teh racking hardware and centralized equipment shared by all spaces.

PRELIMINARY EQUIPMENT LIST

MED SIM CORE

ITEM/DESCRIPTION	QTY
Audiovisual Furniture:	
Full-Height free standing Equipment Rack	4
Audiovisual Control and Processing:	
IP-Based AV Processing/Control Equipment: Audio DSP, Network Switch, Controller	1



Space Layout

CONSIDERATIONS

- System requires special considerations around space requirements, power, cooling for equipment cabinets and access/security to room by authorized personnel.

INFORMATION TECHNOLOGY NARRATIVE

OUTSIDE PLANT/TELECOMMUNICATION ROOM

Information Technology systems and infrastructure are the backbone for all digital communication in the building, consisting of the following (which are defined throughout this section):

- Outside Plant
- Telecommunication Rooms
- Structure Cabling
- Wireless Networks
- Network Electronics
- Distributed Antenna Systems

OUTSIDE PLANT (OSP)

The Telecommunication technologies in the building connect to outside services (such as the campus network, internet service providers, etc.) via the OSP. The OSP consists of duct banks, pathways, and cables connecting external services to a demarcation point within the facility, which is should be located on the lower level.

TELECOMMUNICATION ROOMS

Dedicated Equipment Rooms (ER) and Telecommunication Rooms (TR) are required per floor (minimum) to house equipment racks, network switches, optical fiber terminations, copper cabling patch panels, and so on. TRs provide for the organized and logical distribution of low voltage communications signals within a building and are specifically designed to be flexible and scalable. All TRs follow Owner recommendations and standards; where standards are unavailable, our recommendation are based on ANSI/TIA/EIA and BICSI standards.

The following requirements apply to each TR:

Image: Telecommunications Closet

EQUIPMENT/PATHWAYS

- Space for floor mounted equipment racks equipped with both vertical and horizontal wire management with adequate floor space and growth potential of XX rack(s)
- Overhead tray system for management of flexible connection cabling in TRs.
- Pathways entering/existing the TR for horizontal cabling
- Vertical pathways (floor sleeves) for Backbone/Vertical cabling.
- Pathway length should be kept to a maximum of 250 feet to accommodate proper cable length including vertical changes and cable slack.
- The TR shall not be shared for other purposes including, but not limited to, custodial, access pathways, electrical, mechanical, storage, etc.
- HVAC Duct other than that serving the room, electrical conduits for other areas, sprinkler system piping, drainpipes, clean outs, steam pipes, chilled water pipes, or any other systems should not be routed through the interior of the TR.
- Due to RFI and EMI the TR shall not house any electrical equipment (i.e. - step down or step-up transformers, breaker panels, etc.). The equipment room shall be in a location where electromagnetic interference is minimal.
- The TR shall not be adjacent to any electrical room or room containing a transformer or motors.
- The TR shall not be located beneath or adjacent to wet locations or spaces with water piping such as roof drains, pump rooms, restrooms, janitorial sinks, etc.
- The TR will have a ground bar tied into grounding system and telco ladder tray for routing cables within room.

ENTRY

- Personnel entry to the TR should be through a locked door at least 36 inches wide by 80 inches high.
- The door should open outward unless building codes prohibit, and the threshold should include a sealed door bottom sweep.
- The door shall be secured either by electronic card key system or standard lock

LIGHTING

- Locate light fixtures a minimum of 8 ft. 6 in. above the finished floor.
- A light intensity level of 70-foot candles minimum should be provided measured at 3.3 feet from the finished floor.
- It is recommended that the lights are not located above the equipment racks but instead are located over the areas where a service technician would be working on the rack (both front and rear of racks). This will provide ample light on both sides of the rack without causing shadows or interfering with overhead cable pathways.

HVAC

- Provide heating, ventilation and air conditioning that will maintain continuous and dedicated environmental control 24 hours per day, 365 days per year. Since the TR houses sensitive equipment, the normal temperature range should be 65 to 75 degrees with 30% to 55% relative humidity. The TR should maintain a positive air pressure to assist in reducing dust into the room.

FINISHES / CONSTRUCTION / LOCATIONS

- TRs should be stacked vertically with one TR per floor (minimum)
- All walls should be finished, i.e., sheetrock/painted, and lined with 3/4 inch thick, A/C Grade Plywood backboard, 8 feet high by 4 feet wide (plywood locations will be shown on the Technology Drawings).
- The floor should be finished with VCT or sealed concrete.
- To permit maximum flexibility and accessibility, false ceilings (drop ceilings) are not required in the TR.
- Over-head clearances should be at least 8 feet 6 inches (i.e., HVAC duct work, sprinkler heads, etc.).
- The rated distributed floor loading shall be greater than 250 lb.-ft/ft2
- The rated concentrated floor loading shall be greater than 1,000 lb.-ft/ft2
- The TR shall not be shared for other purposes including, but not limited to, custodial, access pathways, electrical, mechanical, storage, etc.
- HVAC Duct other than that serving the room, electrical conduits for other areas, sprinkler system piping, drainpipes, clean outs, steam pipes, chilled water pipes, or any other systems should not be routed through the interior of the TR.
- Due to RFI and EMI the TR shall not house any electrical equipment (i.e. - step down or step-up transformers, breaker panels, etc.). The equipment room shall be in a location where electromagnetic interference is minimal.
- The TR shall not be adjacent to any electrical room or room containing a transformer or motors.
- The TR shall not be located beneath or adjacent to wet locations or spaces with water piping such as roof drains, pump rooms, restrooms, janitorial sinks, etc.

ELECTRICAL

- Provide at two dedicated 208 VAC 30-amp (L6-30) receptacle at each rack; one receptacle should be on normal and one on building emergency power. Provide at least one dedicated 120 VAC 20-amp (non-switchable) quad receptacle on each wall. All power receptacles located in the TR should be fed from dedicated telecommunications panels located in the TR.
- If a building wide UPS is not planned, UPS should be installed within the equipment rack and sized to provide adequate runtime for emergency power to engage
- Independent telecommunications grounding system
- The TR will have a ground bar tied into grounding system and telco ladder tray for routing cables within room.

INFORMATION TECHNOLOGY : STRUCTURED CABLING

STRUCTURED CABLING

The structured cabling system connects all network-enabled devices to the building's networking infrastructure, which is made up of four primary components Vertical Cabling, Horizontal Cabling. Outlets, and Patch Panels.

VERTICAL CABLE/PATHWAYS

The building has multiple TRs that all connect back to a single Main Telecommunication Room (MTR) via fiber and copper cabling . All fiber cabling terminates in rack mounted housings to provide complete flexibility for cross- connecting of various networks, and to provide redundancy. All copper cabling terminates at the racks via patch panels. If required, copper tie-lines from rack patch panels to wall-mounted 110 blocks may also be incorporated into the backbone.

The following are the specific Vertical Cabling requirements for this project:

- 24-strands of 50µ multimode (MM) fiber (OM3 or OM4)
- 24-strands of single mode (SM) fiber capable of supporting 40 Gbps or 100 Gbps
- 100-pair copper cable

HORIZONTAL CABLE/PATHWAYS

Category cable will be utilized for all horizontal cabling. All areas of the building follow similar design standards regarding the number of cables per workspace as established by the Owner's IT Department standards and industry codes, standards, best practices, etc.. Outlet configurations will vary depending on the locations. As the design progress the overall horizontal cabling plan will be documented for installation.

The following are the specific Horizontal Cabling requirements for this project:

- Utilize CAT 6A cabling at a minimum including all cabling, patch panels, patch cables, termination modules, and wiring blocks.
- Utilize CAT6A cabling for all wireless access points following UNC standards.
- Terminate on rack-mounted patch panels regardless of the application using the cable – email, phone call, fax, video, etc.
- Utilize the same cable regardless of the device using the cable – computer, telephone, surveillance camera, etc.

OUTLET CONFIGURATIONS

Preliminary definitions for the recommended work area outlet configurations are as follows:

- The "Data-Only" or "Voice-Only" Outlet consists of one (1) Category 6 cable. This outlet type will be used less frequently than a "Dual" Outlet and will support such specialty applications as stand-alone wall-mounted telephones, video projectors, flat panel displays, and surveillance cameras. These outlet types are typically characterized by specialty mounting heights and locations. Examples of required "Voice-Only" outlets will include:
    - Emergency Blue-light or Code Blue phones provided outside each building exit/entrance
    - Wall telephones in the elevator lobby area on each floor

- Hall telephones (on campus dialing only) in sections of the building
- The "Dual" Outlet consists of two (2) Category 6 cables on a single-gang faceplate.
- The "Triple" Outlet consists of three (3) Category 6 cables on a single-gang faceplate.
- The "Quad" Outlet consists of four (4) Category 6 cables on a single-gang faceplate.
- The "High Density" Outlet consists of six (6) or more Category 6 cables on a single-gang or dual-gang faceplate.
- A "Furniture Feed" consists of one (1) 4" square wall box to provide a pathway from the wall to the furniture system's raceway.
- "Specialty" Outlet variants will be adapted as needed for unique uses and locations not covered by the above-listed configurations.
- Wireless Access Points (WAP) cabling will be provided with a "Dual" outlet; one ca etwork uplink.

Image: Telecommunications Cabling installed in conduit sleeves and cable tray

PATCH CABLE ASSEMBLIES

Effective patch "flow" is an integral part of the Structured Cabling System design to be planned according to the specific rack and wire management layouts.

- Patch cable assemblies will be provided and warranted as a part of the Structured Cabling System based upon a quantity twice that of the installed and available horizontal cabling channels plus an additional 5% to provide for varying needs at both cable ends.

- Patch cables will be color-coded according to UNC standards.
- Patch cables will be provided as part of the base building build-out.

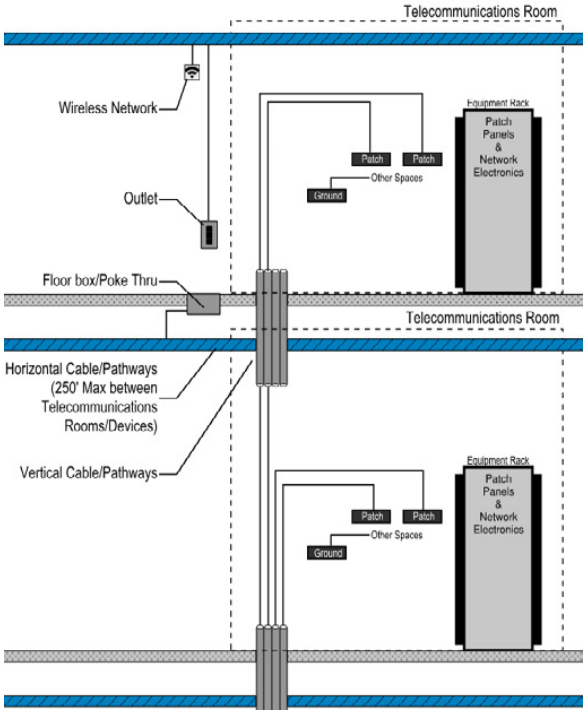


Image: Telecommunications Riser

INFORMATION TECHNOLOGY : WIRELESS NETWORK & DISTRIBUTED ANTENNA SYSTEM (DAS)

WIRELESS NETWORK

The building-wide wireless network will be designed to augment the traditional wired network. Access points will be located throughout the building and will be activated as needed to provide full building-wide wireless coverage. The wireless infrastructure design will be based on the latest IEEE-802.11 standard (802.11ac) and can adapt to and supporting recent standards such as 802.11ax Wi-Fi 6 and future standards such as 802.11be Extremely High Throughput (EHT).

Power over Ethernet (PoE) technology will be used to simplify installation and increase system flexibility by centrally locating all power requirements for wireless access points. This design methodology greatly increases the availability of network bandwidth by adding the capability of connecting to the network via multiple frequencies and channels. The goal of the wireless system design is to allow for wireless coverage for the entire facility, including adjacent exterior areas, utilizing high density and dynamic load balancing wireless network standards.

Image: Wireless Access Point mounted to Ceiling

DISTRIBUTED ANTENNA SYSTEM (DAS)

The technical definition of a Distributed Antenna System, or DAS, is a network of spatially separated antenna nodes connected to a common source via a transport medium that provides wireless service within a geographic area or structure. In more general terms, a DAS is a system used to distribute various RF signals throughout an area or building.

Though often overlooked, adequate cellular phone service is now vital for many buildings. Delivery of course content and other information to cell phones is a logical extension to podcasting and webcasting and is sure to be utilized by students. DAS systems are commonly deployed to support cellular services within a building that may otherwise not have sufficient coverage. These Cellular DAS systems do not require a user to connect their cellular device to the system similar to a tower that is part of a cellular network.

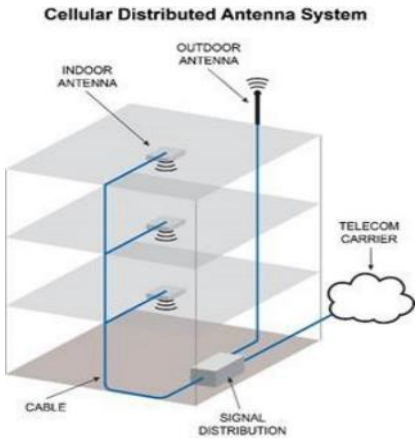
In addition to cellular networks, a DAS can support diverse radio systems such as 400 MHz, 700 MHz, 800 MHz, UHF, and VHF radios, etc. all at the same time.

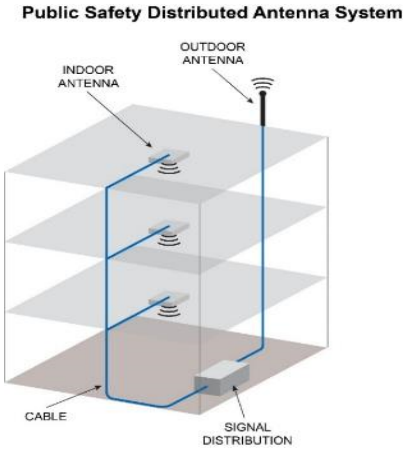
It should be noted that NFPA 72: National Fire Alarm and Signaling Code requires the use of a Public Safety DAS where first responder radio coverage is not sufficient to enable first responders within the building to communicate during an emergency. Critical areas as defined by the NFPA and the Authority Having Jurisdiction require 99% floor area coverage. General areas of the building must be provided with 90% floor area coverage. Depending on building construction and final site conditions, these levels may not be achievable without the installation of a Public Safety DAS.

DAS System Primary Components

- Tuned antennas on the roof of the building
- Cabling from the uplink antennae to the DAS system Head-End
- Head-End equipment – usually housed in the Main TR
- Cabling from the Head-End equipment to antennas distributed throughout the building

It is recommended that further investigation of the cellular and public safety coverage within the building be explored. This should include an active RF site survey to determine the strength of the cellular network for all carriers within the facility as well as the various first responder frequencies required by the local authority having jurisdiction. The outcome of these surveys will assist in determining the requirements for a Cellular DAS and Public Safety DAS within the building.





Building Security : Electronic

ACCESS CONTROL SYSTEM

An Access Control system will provide card access at certain non-public entry and exit points of the building or departmental perimeters or at any other area or space deemed a priority by the University team. It is likely that the only traditional keys given to faculty would be for their individual offices and any storage rooms that are under their control.

Architecturally-specified door hardware configurations detailed in the Architect's Door Hardware Schedule require close integration with the access control system to ensure proper operation for normal and alarmed conditions. The door hardware schedule should include not only standard door hardware devices such as locksets and closers, but that it also detail electronic security devices and components to create a more comprehensive schedule.

The typical security door configuration will include a reader, interface to the electric locks, door position switches, and request to exit components. Emergency exit doors will employ door position switches and sounders (door open alarms).

Delayed egress exit devices will be used on some of these doors. The typical door configuration will consist of a common pull box located above the door on the secure side for the interconnection of the various door control and signaling components.

Operation of the system will be such that time-of-day features may be utilized. Some doors may be unlocked by the system during regular business hours or for special events while others remain as pass card access only. Doors may go into an alarm state when opened immediately, such as in an emergency exit, or when a perimeter door is held open for an extended period of time.

In general, the access control system will seal off the building perimeter and restrict access to certain spaces at certain times. There may be a need to control access to elevators and stairwells based on occupants' requirements and work schedules. Additional features of the system include holiday schedules, visitor credentialing, access groups, and database segmentation to name a few.

The access control system and the video surveillance system can be integrated, allowing for timestamp management of video records tied to entry and exit events by the user. In addition, emergency call stations around the perimeter and at building entry locations will integrate with these systems to allow alarm and visual event recording. The access control system may incorporate an intrusion detection sub-system with glass break sensors, motion detectors, and door contacts to detect and report unauthorized after-hours entry in certain parts of the building. Since some areas in the facility may operate 24 hours a day or late into the night, the scope of intrusion detection systems including staff that will monitor alarms is yet to be determined.

The card access system used for this building will conform to the current standards on campus and will be connected to the building LAN and the main campus LAN.

VIDEO SURVEILLANCE SYSTEM

A system of fully integrated security cameras will monitor the public-use areas of the building. The camera type is standardized on IP-based units. Pan/tilt/zoom (PTZ) cameras may be manually controlled as well as have the capability of preprogrammed patrols to view large areas. Additional fixed cameras may also be used for entrances/exits, cash handling, and other locations.

These cameras will use motion sensing software to activate recording only when certain conditions are met such as human movement. Analytic software is also available to trigger alarms and people counting. Camera housings will be primarily domes with other housings provided based on environment, architectural goals, or space limitations.

NEAR FIELD COMMUNICATION (NFC)

Near Field Communication (NFC) is the newest standard for providing active electronic identification via devices such as smart phones. By bringing these devices into close range with a proximity-type access control card reader, the user is able to access those locations that normally would have required a separate access card/ID. This enables a student to carry only one type of ID, all contained within their personal cell phone, to access security, payment programs, class schedules, etc.

In cases of higher security, where the concern of a lost phone is greater, the addition of a "personal pin number" or "biometric reader" gives the process a higher degree of reliability and security. This form of identification is enjoying an increase in popularity, and it is anticipated that NFC will become more prevalent on campuses in the future.

Image: Card Reader with RFID Badge

EMERGENCY PHONES

The use of "Blue Light" or "Code Blue" Emergency telephones is planned inside and outside the facility. The configuration is such that the instrument is wall mounted at indoor locations and pedestal mounted at outdoor locations, the latter possibly containing an integrated camera. The units do not have a keypad but at the push of one red button, an automatic call is placed to Police Services, or the local Public Service Answering Point (PSAP) based on campus procedures. Elevator telephones can be programmed to automatically call these same locations for help.

Image: Code Blue Phone

It is our recommendation that any mechanical, electrical, pump and valve rooms all contain a wall phone in the event of an industrial accident. Workers in these areas are often alone and cell service may be limited within the building.

INTRUSION DETECTION

Devices such as glass break detectors, panic buttons, tamper switches, and motion sensors may be employed in certain situations. These devices notify the security detail of an intrusion into a space, based on criteria established by the overall system logic. This system may be stand alone and integrated into the Access Control System.

ASSET PROTECTION

Effective means to secure assets such as computers, projectors, and flat panel displays should be considered. For installed audiovisual equipment, special mounting hardware will be capable of audible alarm in the event of tampering. Also, these mounts will be configured to report to AV control systems which can send email alerts or other notifications in real-time to support staff in the event of unplugged cables or alarm triggering.

Radio Frequency Identification Devices (RFID) may be employed to track assets such as laptop and desktop computers. These devices communicate wirelessly with readers that are typically placed at exit points. When the RFID tag passes through such a reader, an alarm will be triggered. In addition, SNMP enabled network switches can monitor computers in offices and classrooms that are hard-wired to the LAN and trigger an alarm state in the event of an unplugged network cable.

CIVIL NARRATIVE

SITE DESCRIPTION

SITE CLEARING AND DEMOLITION

- The following site components are anticipated to be demolished within the limits of construction:
  - Bishop-Lehr building
  - Campus frontage road that begins on 20th St, circulates around the northern and eastern perimeter of the building and connects to 11th Ave.
    - Associated parking lots with access from frontage road including parking lot northwest of the building, parking lot to the east of the building, and street parking
- Utility tunnel section that serves existing building as it is understood that the portion of the tunnel that runs adjacent to the existing building is integrated with the building foundation and likely to be demolished to the same extent as the building foundation is demolished.
- Trees
  - Protection, removal, and replacement of campus trees shall be coordinated with the University and be in compliance with the UNC Arboretum & Gardens Master Plan Booklet by BHA Design, Inc. dated Winter of 2013.
  - There are many mature trees on campus that may need to be preserved.

SOILS AND GROUNDWATER

- A project geotechnical investigation will need to be prepared to produce design recommendations for the project, however some general assumptions are provided below based on the Geotechnical Subsurface Exploration Program for the Campus Commons Building on the east side of 11th Ave. prepared by Ground Engineering, dated February 24, 2015.
  - Soils are anticipated to be Type A and Type B soils, which generally have moderate infiltration rates, and a relatively low risk for significant post-construction movements due to swelling.
  - Soils are not anticipated to be susceptible to sulfate attack.
  - Soil resistivity are anticipated to be "highly corrosive".
- Groundwater was encountered in the adjacent project geotechnical report at levels that recommended a perimeter underdrain system to be included in the drainage design. If the perimeter drain cannot daylight to grade via gravity outfall, then a sump and pump system will be required to lift water from the perimeter drain to the surface grade.
  - Based on Martin/Martin's experience on similar projects, it is anticipated that a foundation perimeter drain system will be required with the basement level that is expected to be included with the building construction.

EARTHWORK AND SITE GRADING

- Site currently slopes south to north with overland sheet flow, culverts in landscape areas and inlets conveying stormwater north towards the frontage road and 20th St. Public stormwater inlets capture drainage and convey to public stormwater infrastructure north of the site.
- Proposed condition will maintain existing drainage patterns.
- Slopes are generally gradual on the south portion of the site and increase to steep grades on the north side of the building where stairs are needed to connect access from the building to the parking lot and frontage road north of the building.
- Grade difference between the south end of the building and north side is at least 10' in elevation and will need to be considered for providing fire access drives.
- A grading "roadmap" is provided to illustrate program planning level grading concepts around the building.
- Retaining Walls:
    - Due to the grade difference on site, retaining walls are expected to be required to account for the grade difference between the service dock/ loading area and the first floor level. A maximum retaining wall height of 12 feet is anticipated in this area.

STORMWATER AND DRAINAGE

- Water Quality and Detention is required. Underground water quality and detention may be considered; however the University has expressed there are maintenance concerns with this approach and would like to avoid it if possible.
    - Underground options are typically multiples more expensive than surface level stormwater ponds.
- If the pond is at-grade, the pond should be carefully designed aesthetically as it will be located along major access routes when arriving to west campus.
- The pond bottom cannot be lower than stormwater infrastructure that the pond will drain into.
- Existing stormwater infrastructure on the site includes primarily surface drainage with overland flow and culverts conveying water to the north portion of the site. Any inlets and storm pipes located within the project demolition limits will need to be recaptured or routed to the proposed detention pond.
- See LEED STORMWATER CREDIT for additional considerations.

LEED STORMWATER CREDIT – RAINWATER MANAGEMENT

- 3 points can be achieved based on infiltrating stormwater into the surrounding landscaping of the building.
- Soils report that includes percolation testing and provides infiltration rates will be required to determine rate of infiltration and area of landscaping needed to retain the 90th percentile of rainfall events using Low Impact Development (LID) techniques and/or green infrastructure practices such as infiltrating the 5-year storm event into pervious landscaped areas.
- An approximation of 1 acre of impervious area will require drainage to be spread over 1.05 acres of landscaped areas or a full site composite of 49% imperviousness maximum.
- Distributing drainage to all landscaped areas will require many downspouts that discharge to grade, overland sheet flow, minimization of concentrated flow collection points, etc.
- Drainage shall ultimately be routed to a detention pond that shall be located north of the building due to existing drainage patterns and shall be constructed to also infiltrate stormwater.
- Impervious hardscaped areas such as parking lots, drives, and other paving shall direct drainage towards pervious areas.

EXISTING UTILITY TUNNEL

- Attaches to existing building foundation on south end of building.
- Includes heated water, high voltage lines, electrical, comms, and IT lines.
- Does not include domestic water.
- Lid is also the existing sidewalk.
- Proposed condition will likely cover top of tunnel with ground cover.

WATER: DOMESTIC SERVICE AND FIRE PROTECTION

- Domestic
  - A 20" City main is located north of the site within 20th St.
    - Domestic water cannot be pulled from the City main.
    - Fire hydrants can be pulled from the City main.
  - Water pressure is very good in this area, approximately 100 psi; it is assumed the proposed building will not need a fire pump.
  - A 10" UNC owned water main runs east-west south of the building and a 4" service line connected to that main currently serves the Bishop-Lehr building.
- Water Main Extension
  - It is likely that an 8" or 10" water main will be required to be connected to the existing 10" domestic main, loop around the building, and re-connect to the 10" main at a separate location. This will allow fire hydrants, fire service line, and domestic water line to be tapped off the 8" main to serve the building in the proposed site.
  - Proposed domestic service will need to tap into the 10" main to the south or the water main extension and be routed to the building. It is anticipated that the water room will be located on the south end of the building to reduce the service line length or be located near the service dock/loading area along with the FDC and FCC with primary FD access coming from 20th St.
  - Domestic meter shall be installed for proposed building.
  - Provide backflow prevention for fire and domestic lines.
  - Irrigation is anticipated to connect to the non-potable irrigation utility in Doubenmier Field.
- Fire
  - Fire sprinkler lines larger than 2" shall be restrained DIP with thrust blocks.

FIRE ACCESS

- Building is anticipated to be approximately 102,000 GSF, with Type II Construction and will be fully sprinklered.
- Fire access easements and access drives/routes are likely to be required by Fire Department.
- A multi-purpose pedestrian walk/emergency access only fire access drive/utility corridor may need to be provided.
  - A similar strategy was used on the UNC Campus Commons project east of the site to provide access as required by FD
  - Pavers may be considered but will require approval by FD
  - If pavers are considered the project geotechnical report shall include design recommendations.
    - A minimum of two means of fire apparatus aerial access is required for buildings exceeding 30 feet in height.
  - Aerial apparatus access roads shall have a minimum unobstructed width of 26 feet and shall be located between 15-30 feet away from the side of the building that is being provided aerial access.
  - The aerial access road shall be provided alongside one full side of the proposed building.

SANITARY

- Existing sanitary for the campus is generally very deep, on the order of 30ft depths.
- An existing 15" sanitary main is located to the southeast of the site near the west entrance to the pedestrian tunnel that runs under 11th Ave. This is anticipated to be partially demolished depending on the condition of the sewer lines.
- Capacity for the existing 15" main is adequate for the proposed use based on the previous building use that was used for design purposes. However, downstream sanitary main capacity becomes deficient south of the site and may require sanitary sewer main improvements in the future.
- Proposed sanitary should connect to the south side of the building and maintain as much of the current sewer line as possible.
- The existing sanitary shall be scoped to determine the condition, line the pipe if the condition is adequate, or remove and replace the pipe if it is not salvageable due to condition or the site improvements require the line to be relocated.

DRY UTILITIES

- Reference MEP narrative for additional information regarding dry utilities.
- Gas
  - Gas is currently provided to the building which is not typical for every building on campus.
  - Gas is historically used for labs, not heating.
  - Gas may be needed for future phases but is not anticipated in the programming phase.
  - Proposed gas would be a newly installed line.
  - There is a large gas enclosure area at the corner of 20th St. and 11th Ave. that must be protected in place.
- Electric
  - Medium voltage currently exists in the utility tunnel that serves the building.
  - Routing to transformer to be picked up near tail end of tunnel.
  - All new lighting to be fed from the new building.
  - Direct bury lines should be demolished.

- Telephone
  - New phones will come from the UNC data network
  - Existing switch room that belongs to Century Link may or may not be active at this time.
  - Running new fiber lines from McKee and Ross to the new building shall be priced for this program plan

SITE ACCESS

- The frontage road that currently exists is expected to be demolished.
- Site access to the proposed parking areas shall be reworked to accommodate the proposed site layout.This may include multiple right-in-right-out configurations coming from 20th St. and 11th Ave.
  - The current 11th Ave. access is unlikely to be salvaged and a new drive cut or access movement should be anticipated.
- Fire lane(s) will be required to provide fire access around the sides of the building.

Existing Bishop LehrSite

SITE LANDSCAPE NARRATIVE

SITE DESIGN

The central focus of the overall site design is to choreograph the new UNC College of Osteopathic Medicine (COM) with the existing and future surrounding landscape fabric to develop a cohesive and resilient campus environment.

Site topography and circulation routes will be coordinated with civil engineer consultant to provide an integrated, accessible design to all site areas that balances elevated FFE with ADA guided design of ramps, sloped walks, and stairs. Where required, retaining walls will also provide opportunities for various types of seating. Site drainage will be looked at through a biophilic lens and will be coordinated with the civil engineer consultant to develop a performative landscape that will convey water around the building to micro basins. Water will feed low water-use native plantings adjacent to pedestrian paths and gathering areas before being directed toward the site's stormwater retention features located towards the northeast corner of the site. The existing parking lot 'G' will be repurposed as the COM building's main parking lot with a loading/service dock area to access the ground floor.

The landscape and architecture will work together to minimize the thermal and auditory conditions of the site and as a result, various scales of outdoor spaces will be developed to provide flexible program spaces for intimate to large group gatherings. The use of various seating styles, creative hardscape and landscape applications, outdoor plug-in stations, and outdoor Wi-Fi will encourage a lively exterior environment that will help underscore the innovative character of the new COM.

The west portion of parking lot 'D' will be reworked to make way for the introduction of a new pedestrian greenway to create a safe passage for users from West campus to the new COM building. With the removal of the existing 'Ring Road' along the northern and western portion of the site, the western drive exit will be reworked to allow for 2-way drive access. A new pedestrian and bike path will run along 11th Avenue to connect the southwestern underpass to the new COM building.

HARDSCAPE MATERIALS

Areas around entries and other targeted exterior pedestrian gathering spaces will be accentuated with premium paving materials to further layer and define site wayfinding and balance correlation to architectural design language and campus standards/design guidelines. General purpose pedestrian sidewalks will be standard grey concrete with broom finish. New seat walls and retaining walls will be either cast concrete or constructed of CMU core with a veneer material and solid stone cap to match the architecture. All bike racks, standard seating, and trash/recycling receptacles will adhere to the standards set forth in the campus standards/design guidelines.

LANDSCAPE PALETTE

Landscape planting design will consist primarily of trees, shrubs, accents, and ground cover plants with restored turf areas. Plant densities will be highest within impact areas to encourage recognition of arrival points. Similar densities will occur along pedestrian walks and common areas for aesthetics and staff and visitor comfort. Tree and plant size will adhere to minimum size requirements throughout project site area with select high visibility areas receiving increased masses and specimen materials. Plant materials will be selected based on characteristics of low water use and low maintenance requirements and will reflect the recommended species from the campus standards/design guidelines. Plant selection will focus on providing a variety of seasonal colors, and variety in scale and texture of materials.

Turf areas will be separated from container planted/mulch areas with a 12" wide concrete header or paved pedestrian routes. A cobble apron/maintenance edge will wrap all the non-paved areas around the building perimeter, separated from planting areas by steel edging. Hardwood bark mulch will be used for landscape top-dress in planting areas, and stone/cobble top-dress will be used for anti-scour installation in potential bioswale/rain garden areas, within maintenance edge areas, and as directed by civil plans. Bioswale/rain garden planting areas to receive a sand based engineered soil mix. General landscape planting areas to receive imported topsoil.

The northeast corner of the site will utilize bioswales, natural paths, and native plantings to create a natural ecosystem community that is cohesive with what is planned on the eastern portion of 11th Avenue with the City Greeley Parks Department and their sustainability goals. The overall goal of this area is to create an immersive experience with the beauty of the natural native nature that the students can year-round.

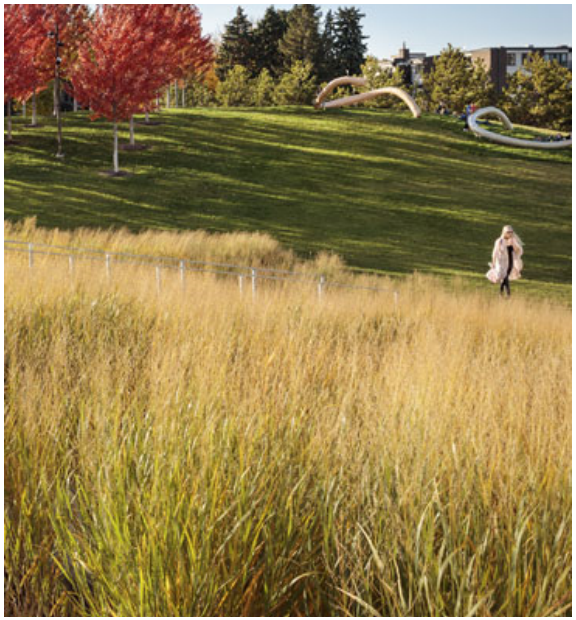
The overall goal of this area is to create an educational experience that allows students to engage with their native ecosystem as a part of their daily campus experience.

IRRIGATION SYSTEM

The landscape planting areas will be fed by an automatic low water-use commercial grade underground irrigation system. The irrigation system and all system components will adhere to specific direction from the campus standards/design guidelines. Irrigation system will be compliant to achieve LEED credits for water efficiency.

SUSTAINABILITY

An environmentally sensitive, sustainable approach will be implemented throughout the site design, as our semi-arid climate faces a number of environmental challenges. Numerous techniques will be studied to reduce the site's water usage. We will aim to maximize passive rainwater harvesting through bioswales and directing runoff to the rooting zones of plants. Proven and locally-available top-dressings will be used to achieve reduced evapotranspiration and maximum plant health.



SUSTAINABLE DESIGN NARRATIVE

STATE REGULATORY REQUIREMENTS

The project must meet the requirements of the Colorado High Performance Certification Program, which mandates the CEDC achieves LEED Gold Certification. LEED is a list of non-prescriptive environmental goals organized into seven categories: Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation. These categories were created in response to the broad environmental issues affecting global health and reflect how green buildings might minimize adverse global impact. There are several goals within each category. Based on the number of goals that a project can successfully implement; the building is awarded a rating. While the CEDC project has a minimum goal of reaching a LEED Gold rating, higher LEED levels are desirable provided the goals pursued are justified economically and environmentally. Given the project scope, certification will be under LEED-NC v4.1 (LEED for New Construction, version 4.1). LEED Gold will require 60 points (minimum), and we'd recommend pursuing 66 points to earn LEED Gold, allowing a 10% contingency given that points can fall away during design and construction.

In addition, the Colorado High Performance Certification Program requires specific LEED credits/strategies are implemented in the project. These include:

- Integrative Process
- Light Pollution
- Reduce Irrigation demand by 50%
- Reduce indoor water use by 25% minimum
- Meter water usage
- Use enhanced Commissioning
- Achieve a 15% reduction in energy costs and GHG emissions
- Procure 15% of materials from sustainable sources
- Divert 50% of construction waste from landfills
- Implement at least 3 IAQ strategies
- Use low-emitting materials
- Require a Construction IAQ Management Plan
- Flush out interior before occupancy (or do IAQ testing)
- Meeting at least one lighting quality and control strategy

UNIVERSITY GOALS

Sustainability goals and aspirations were discussed during visioning exercises and workshops. Specific technologies were identified to be explored throughout the design process. These included:

- Reduce energy use and C02 emissions.
- Focus on access to daylight and views, with connections to nature.
- Reduce car dependency on campus by encouraging biking via access to free cruiser and commuter bikes on campus.
- Incorporate native plant materials to reduce overall water consumption,
- Capture and re-use storm and irrigation water whenever feasible.

PROJECT OPPORTUNITIES

Listed below, are opportunities and strategies for the design team to consider achieving for the requirements and goals noted above.

LOCATION, TRANSPORTATION AND SITE DESIGN

- Provide a minimum of two (unisex) shower-changing rooms.
- Provide bicycle racks for long term and short-term bicycles. (quantity TBD, but estimate 6 bike racks for long term occupants and 18 bike racks for short term occupants).
- Provide electric vehicle charging stations (quantity TBD, but no less than 2 dual charging stations).

SUSTAINABLE SITE DESIGN

- 25-30% of the total site area that has been disturbed should be restored (greenfield areas in site no less than 40% should be protected).
- Disturbed soils will need to be restored either insitu or imported. Imported may not be taken from greenfield sites, prime farmland, or contain sphagnum peat moss.
- Use native, near-native, and other climate-adapted plant varieties, to reduce irrigation demand. Include plants that support birds and pollinators in habitat structure, bloom, and fruit/seed.
- Use locally sourced materials for top-dressing planting beds.
- Detain and release stormwater runoff to return site's hydrograph to pre-disturbance levels. Retaining the percentile event volume needs to be done via low-impact development or green infrastructure practices, such as raingardens / bio retention features to treat surface runoff.
- Landscape watering to be primarily structured around non-potable irrigation. Infiltration directed to roots of trees and shrubs, secondarily around supplemental drip and deep-root irrigation, and thirdly with limited use of matched-precipitation sprinklers.
- Limit extents of turfgrass to high use gathering areas.
- Exterior lighting to meet light pollution standards. Façade lighting to be on a timeclock.
- Allocate portions of the roof for PV array.
- Use light colored paving and roofing to minimize the heat island effect.
- Roofing material to have a high SRI value.

WATER EFFICIENCY

- Use pint-flush urinals (even for some stalls in non-gendered toilet rooms), high-efficiency (1.1 GPF) toilets, 0.35 GPM aerators on faucets, and WaterSense rated shower heads to reduce potable water demand by 40%.
- Install permanent water meters for two or more water subsystems, such as irrigation, indoor plumbing fixtures and fittings, domestic hot water.

ENERGY EFFICIENCY

Maximize passive design strategies:

- Provide horizontal sun shading on the south and southwest portions of the façade, to reduce undesirable solar heat gain and to drive daylight deeper into the interior.
- Parametric modeling should be used to optimize the exterior envelope's thermal performance; we anticipate that triple-glazed windows will provide the best performance and should have a reasonable payback if they can eliminate the need for perimeter heating. If triple-glazed windows are not practical or cost-effective, use low-e3, argon-filled, double-pane glazing.
- Do not overglaze façades. Provide some opaque wall, especially below sill height, to save money, reduce energy use, reduce embodied carbon, and enhances thermal comfort.

Use high-performance, active systems:

- Use CO2 sensors to both ensure adequate ventilation is being provided, but also to set back ventilation when spaces are not occupied.
- For any fume hoods, use high-performance fume hoods with proximity sensors.
- Provide lighting controls including daylight sensors.
- Provide receptacle controls.
- Use indirect lighting where feasible, with stepped or continuous dimming to integrate with daylighting controls.

Provide on-site renewable energy:

- Provide photovoltaic over a portion of the new roof.
- If the photovoltaic array cannot be afforded on day 1, then provide adequate room in electrical rooms to allow for future solar inverters. Size roof structure to accommodate future photovoltaic panels.
- Explore incorporating batteries for storage and setting up a micro-grid approach to a grid-tied renewable energy system. (*This strategy needs to be vetted with all disciplines to understand if this is possible*).

Ensure performance with commissioning and monitoring:

- Involve a commissioning agent during design and construction to ensure all systems are performing as intended. This includes commissioning of the building enclosure.
- Provide sub-metering on all energy uses greater than 10% of the total energy use.
- Provide an interactive dashboard allowing occupants to understand energy flows and how occupant behavior influences energy use.

MATERIAL AND WASTE

- When selecting building materials, give preference to materials that: are salvaged (discuss possible opportunities salvage existing building being demolished), have a high recycled content, are locally extracted, and manufactured, are bio-based and/or rapidly renewable, can be recycled at the end of life, are durable. Give preference to natural materials with minimal processing.
- Favor materials with lower embodied carbon. Explore opportunities to use timber structural systems. Currently, the building is designed for steel truss and deck system, consider specifying steel with the highest recycled content (average of 93% recycled content) possible coming from electric arc furnaces over basic oxygen furnaces with steel recycled content averaging about 25%.
- Maximize pozzolans/cement-replacement materials in all concrete mix designs.
- Gather Environmental Product Declarations (EPDs) to inform material options and provide Global Warming Potential (GWP) allowances for materials in specifications.
- Use FSC-certified wood for all wood products.
- Provide infrastructure for composting throughout the building, in addition to recycling (co-mingled).
- Provide recycling for electronic waste and batteries.
- Establish aggressive construction waste management goals with the contractor. 75% waste diversion rate or greater.

COMFORT, HEALTH, AND WELLBEING

- Maximize daylighting throughout the interior by equitably sharing access to perimeter windows, select glazing with optimized visible light transmittance, and using light-color ceiling and wall systems.
- Use natural materials and finishes to promote a connection to nature.
- Provide outdoor spaces and views to nature.
- Exceed code minimum ventilation air requirements.
- Provide a minimum MERV 13 filter in all air handling equipment.
- Provide accessible staircases that encourage users to take the stair in lieu of elevators.
- Allow full-time occupants to control their thermal comfort, by providing desk-fans when individual thermostats are not feasible.
- Use a task/ambient lighting strategy at all workstations, to reduce energy use and provide occupant control over lighting levels.
- Ensure all paints, coatings, sealants, adhesives, flooring systems, ceiling systems, interior insulation products, and composite wood products are low emitting and are tested according to California Department of Public Health (CDPH) Standard Method v1.2–2017.
- Anticipate a baseline IAQ testing for particulate matter, inorganic gases, and VOC levels.
- Anticipate acoustic compliance via calculations or measurements. Both for HVAC background noise and meeting composite sound transmission class ratings. Strategies to achieve STC metrics include sound vibration isolators, HVAC duct liners, 2 layers gyp. board, resilient channels and or stud and anchor isolators, acoustic sound batt insulation, acoustic backer pads at receptacles, switches, etc.

LEED v4.1 BD+C
Project Checklist

Project Name: UNC
Date: 12/12/2022

Y	"Y-P"	LN	N			
1				Credit	Integrative Process	1

5	1	0	10	Location and Transportation		16
				Credit	LEED for Neighborhood Development Location	16
1				Credit	Sensitive Land Protection	1
			2	Credit	High Priority Site and Equitable Development	2
2			3	Credit	Surrounding Density and Diverse Uses	5
			5	Credit	Access to Quality Transit (11th Ave & 20th?) Weekend trips do no	5
1				Credit	Bicycle Facilities	1
	1			Credit	Reduced Parking Footprint	1
1				Credit	Electric Vehicles (feasible - cost item)	1

5	4	1	0	Sustainable Sites		10
Y				Prereq	Construction Activity Pollution Prevention	Required
1				Credit	Site Assessment	1
2				Credit	Protect or Restore Habitat	2
1				Credit	Open Space	1
	3			Credit	Rainwater Management	3
	1	1		Credit	Heat Island Reduction	2
1				Credit	Light Pollution Reduction	1

5	2	2	2	Water Efficiency		11
Y				Prereq	Outdoor Water Use Reduction	Required
Y				Prereq	Indoor Water Use Reduction	Required
Y				Prereq	Building-Level Water Metering	Required
1	1			Credit	Outdoor Water Use Reduction (50% = 1/ 100% = 2)	2
3	1		2	Credit	Indoor Water Use Reduction (35% for 3pts, 40% for 4 pts)	6
		2		Credit	Optimize Process Water Use	2
1				Credit	Water Metering	1

12	4	6	11	Energy and Atmosphere		33
Y				Prereq	Fundamental Commissioning and Verification	Required
Y				Prereq	Minimum Energy Performance	Required
Y				Prereq	Building-Level Energy Metering	Required
Y				Prereq	Fundamental Refrigerant Management	Required
5	1			Credit	Enhanced Commissioning (feasible - cost item)	6
6	1	3	8	Credit	Optimize Energy Performance	18
	1			Credit	Advanced Energy Metering (feasible - cost item)	1
		2		Credit	Grid Harmonization	2
	1	1	3	Credit	Renewable Energy (feasible - cost item)	5
1				Credit	Enhanced Refrigerant Management	1

6	3	1	3	Materials and Resources		13
Y				Prereq	Storage and Collection of Recyclables	Required
1	1		3	Credit	Building Life-Cycle Impact Reduction (LCA = 1 pt, LCA w/ 5% <baseline= 2 pts)	5
1	1			Credit	Environmental Product Declarations (EPD = 1 pt, Embd Carbon report = 1 pt)	2
1		1		Credit	Sourcing of Raw Materials (3 - 15% by cost = 1 pt, 5 - 30% by cost = 2 pts)	2
2				Credit	Material Ingredients (HPD = 1 pt, ingredient optimization report = 1 pt)	2
1	1			Credit	Construction and Demolition Waste Management	2

6	7	2	1	Indoor Environmental Quality		16
Y				Prereq	Minimum Indoor Air Quality Performance	Required
Y				Prereq	Environmental Tobacco Smoke Control	Required
1	1			Credit	Enhanced Indoor Air Quality Strategies (3 strategies = 1 pt. 6 strategies = 2pts)	2
2	1			Credit	Low-Emitting Materials	3
1				Credit	Construction Indoor Air Quality Management Plan	1
1	1			Credit	Indoor Air Quality Assessment (flush out = 1 pt, testing = 2 pts)	2
		1		Credit	Thermal Comfort	1
1		1		Credit	Interior Lighting (90% indov. Controls=1 pt)	2
	2		1	Credit	Daylight (sDA 300/50% reg.occ : 40% = 1pt, 55% = 2 pts)	3
	1			Credit	Quality Views	1
	1			Credit	Acoustic Performance	1

6	0	0	0	Innovation		6
1				Credit	Innovation: Green Education	5
1				Credit	Innovation: WELL Certification	
1				Credit	Exemplary Performance in MR Credit BPDO - EPD's/HPD's	
1				Credit	Pilot: Safety First: Cleaning and Disinfecting your space	
1				Credit	Pilot: Biophilic Design	
1				Credit	LEED Accredited Professional	1

0	1	2	1	Regional Priority*		4
		1		Credit	Regional Priority: Optimize Energy Performance (Threshold 10)	1
			1	Credit	Regional Priority: Surrounding Density and Diverse Uses (Threshold 3)	1
	1			Credit	Regional Priority: Rainwater Management (Threshold 2)	1
		1		Credit	Regional Priority: Outdoor Water Use Reduction (Threshold 2)	1
	1			Credit	Regional Priority: Indoor Water Use Reduction (Threshold 4)	1
			1	Credit	Regional Priority: Renewable Energy (Threshold 3)	1

46	22	14	28	TOTALS	Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

CODE ANALYSIS NARRATIVE

Zoning Classification: University of Northern Colorado

General: Three-story above grade fully sprinkled building with a one story fully sprinkled classroom wing and a partial basement

OCCUPANCY TYPE

A-3 – IBC 303.4

B – IBC 304.1

- INCIDENTAL USE AREAS:
  - Mechanical Rooms: IBC Table 509. Separation not required: No equipment exceeding minimum criteria
  - Storage: IBC Table 509. Separation not required: Automatic Fire-extinguishing system

CODES AND REGULATIONS

- 2021 Edition of the International Building Code (IBC)
- 2021 Edition of the International Existing Building Code (IEBC)
- 2021 Edition of the International Mechanical Code (IMC)
- 2021 Edition of the International Energy Conservation Code (IECC)
- 2020 Edition of the National Electrical Code (NEC) (NFPA 70®)
- 2018 Edition of the International Plumbing Code (IPC), first printing (August 2017)
- 2018 Edition of the International Fuel Gas Code (IFGC) first printing (August 2017)
- National Fire Protection Association Standards (NFPA)
- 2021 Edition of the International Fire Code (IFC)

2015 EDITION OF THE ASME BOILER AND PRESSURE VESSEL CODE

- 2017 Edition of the National Boiler Inspection Code (NBIC)
- 2015 Edition of the Controls and Safety Devices for Automatically Fired Boilers CSD-1
- 2015 Edition of the Boiler and Combustion Systems Hazards Code, NFPA 85
- 2019 Edition of ASME A17.1 Safety Code for Elevators and Escalators
- Current Edition of ICC/ANSI A117.1, Accessible and Usable Buildings and Facilities

REGULATORY AND NON-REGULATORY AGENCIES

- STATE ELECTRICAL BOARD - Dept. of Regulatory Agencies
- STATE PLUMBING BOARD - Dept. of Regulatory Agencies
- LOCAL HEALTH DEPARTMENT
- STATE BOILER INSPECTION
- STATE FIRE INSPECTION

IECC COMPLIANCE METHODS

The requirements of ANSI/ASHRAE/IESNA 90.1 (Option One per IECC C401.2)

GENERAL BUILDING HEIGHTS AND AREAS

- Allowable height, sprinklered building: 65 ft + 20 ft = 85 ft IBC TABLE 504.3
- Allowable stories above grade, A-3 sprinklered: 4 stories, IBC TABLE 504.4
- Allowable area per floor (based on A-3 occupancy, with 2 or more stories above grade): 46,500 sf IBC TABLE 506.2.3

- Area increases available: 46,500 sf + (15,500 sf x 75%) = 11,625 sf IBC TABLE 506.3.3
- Maximum building area per floor: 46,500 sf + 11,625 sf = 58,125 sf
- Maximum building area: 58,125 sf x 3 = 174,375 sf

* General building heights and areas are based on the most restrictive occupancy

CONSTRUCTION TYPE

II-A, IBC Table 601

FIRE-RESISTIVE, RATED CONSTRUCTION

- Shafts: 2HR, IBC 707.3.1
- Passenger Elevator Hoist way: 1HR, IBC 708.14
- Elevator Lobby: Not required for passenger elevators, IBC 3006.2, not greater than 3 stories. Required for freight elevator, IBC 3006.2, greater than 3 stories
- Hoist way Venting: Not required for passenger elevators, IBC 3006.2, not greater than 3 stories. Required for freight elevator, IBC 3006.2, greater than 3 stories
- Stairway Enclosures: 2HR for West egress stair (connecting 4 or more stories), 1 HR for East egress stair, IBC 1023.2
- Stairway Roof Access: Required, IBC 1011.12.1
- Floor Assemblies: 1 HR, IBC TABLE 601
- Roof Assemblies: 1 HR, IBC TABLE 601
- Structural Frame: 1 HR, IBC TABLE 601
- Exterior Load Bearing Walls: 1 HR, IBC TABLE 601
- Interior Load Bearing Walls: 1 HR, IBC TABLE 601
- Exterior Non-bearing Walls/Partitions: 0 HR, IBC TABLE 601
- Interior Partitions: 0 HR, IBC TABLE 601
- Corridors: 0 Hr, IBC TABLE 1020.1 with sprinkler
- Exterior Walls: 0 HR, IBC TABLE 601, greater than 30 ft separation
- Exterior Wall Openings: Unlimited Unprotected Openings, IBC TABLE 705.8, greater than 30 ft separation

FIRE PROTECTION SYSTEMS

- Sprinkler System: Throughout per NFPA 13
- Automatic Sprinkler System Increase: Yes, IBC 903.2.1.3
- Generator: Provided
- Fire Alarm System: Provided, IBC 907.2.1
- Shunt Trip: IBC CH 30
- Standpipes: Class 1, IBC 905.3.1 Exception 1
- Portable Fire Extinguishers: IBC 906.1, IFC
- Fire Alarm: IBC 907
- Smoke Control: Not required, IBC 909
- Smoke and Heat Vents: Not required, IBC 910.2

Emergency voice/alarm communication system: Required for stair width reduction IBC 1005.3.2 exception 1

MEANS OF EGRESS

- Occupant load factor: IBC TABLE 1004.1.2
  - Concentrated chairs: 1:7 net
  - Unconcentrated tables & chairs: 1:15 net
  - Classrooms: 1:20 net
  - Office: 1:150 gross
  - Storage, Mechanical: 1:300 gross

REQUIRED MINIMUM CORRIDOR WIDTH:

- OCC PER CORR X 0.2 IN IBC 1005.1

REQUIRED MINIMUM STAIR WIDTH:

- (Floor with largest OCC / 2) X 0.2 IN IBC 1005.3.1 exception 1
- Areas of Refuge: Not required, IBC 1009.3.3, Exception 1
- Exit Signs: Provided in compliance with IBC 1013
- Exit Sign Illumination: Provided in compliance with IBC 1013
- Exit Access: IBC 1016
- Exit through Intervening Spaces: IBC 1016.2
- Number of Exits from Room: 1 required if occ load <50, 2 required if occ load >50, IBC TABLE 1006.1
- Maximum Travel Distance to Exit: 250 ft with sprinkler system, IBC TABLE 1017.2
- Dead End Corridor: 50 ft for groups B and E, IBC 1020.3
- Exits Required per floor 1-500 OCC = 2 501-1,000 OCC = 3, IBC TABLE 1006.3.4(1)

INTERIOR FINISHES

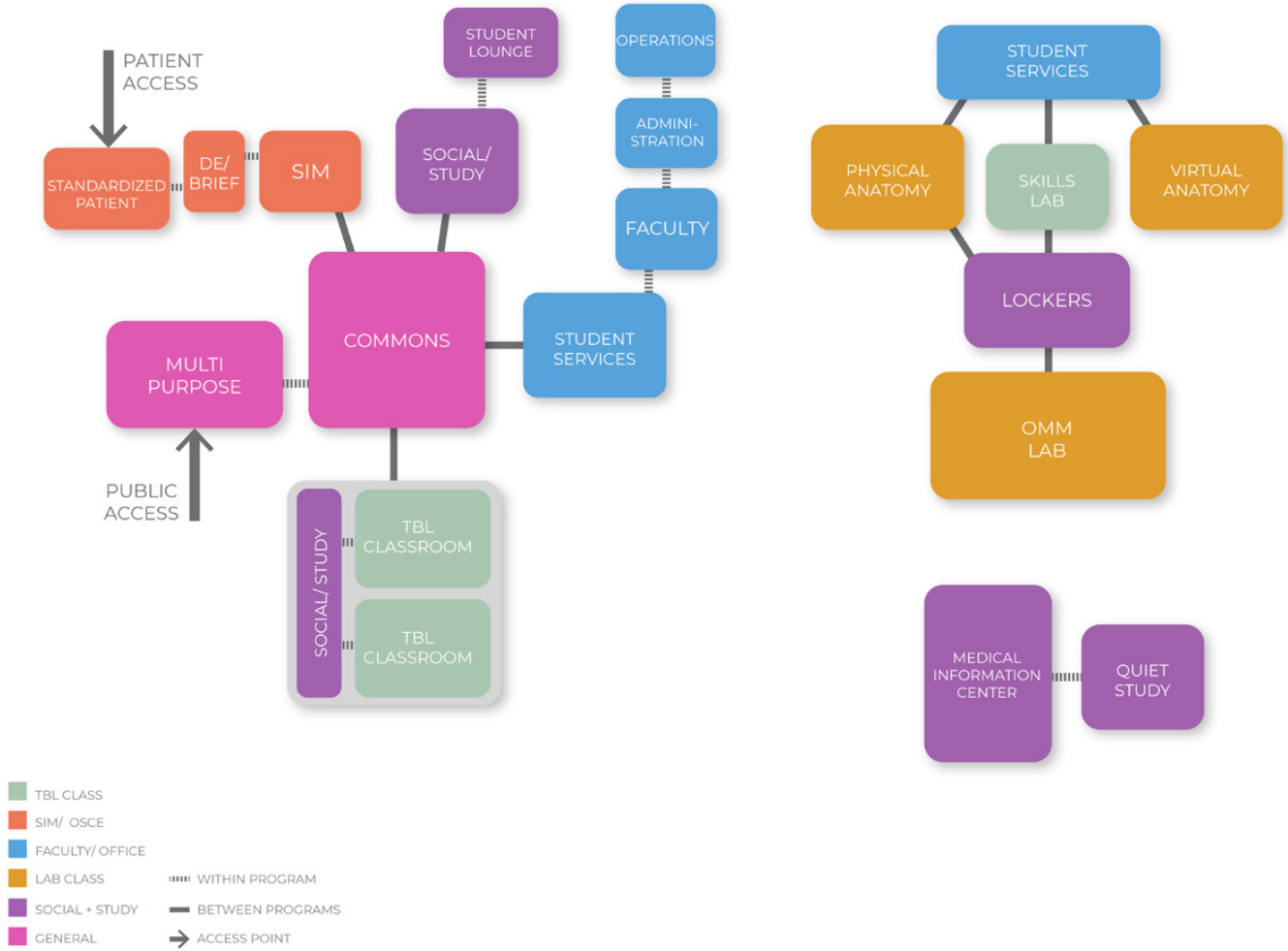
Interior Wall and Ceiling Finish Requirements:

- Exit Enclosures, Corridors, and Passageways: B, IBC TABLE 803.13
- Corridors: B, IBC TABLE 803.9
- Rooms and Enclosed Spaces: C, TABLE 803.13

3.2 SPATIAL RELATIONSHIPS & ROOM SPECIFICATIONS

The diagrams shown to the right illustrate the connection and adjacency relationships between and among the different programmatic elements.

On the following pages, the room specifications were developed through consultations with COM leadership and based on previous projects of similar size, scope, and program.



ROOM SPECIFICATIONS

GENERAL

- Typical higher education level of finish

COMMONS / LOBBY

- Ceiling: height – 26'
  - Gyp board soffits with wood linear ceiling
  - Pendant lights, accent lighting for art installation
- Walls: To deck for acoustic separation, std construction, painted gyp board, wood panels assume 50%
- Floor: Large format porcelain tile with carpet insets
- Millwork: 12' long welcome desk, solid surface and veneer (may be in student services)

STUDENT STUDY / SOCIAL

- Ceiling: height – 12'
  - Large format ceiling tiles with acoustic baffles (felt with lighting)
  - Pendant lights
- Walls: To deck for acoustic separation, std construction, painted gyp board, specialty wall coverings assume 25%
- Floor: Carpet tile with rubber base 4", insets of resilient floor

CIRCULATION SPACES ALONG GLAZING:

- Ceiling: height – 12'
  - 2x2 wood ceiling tile
  - Down lights
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Carpet tile with rubber base 4"

CIRCULATION SPACES WITHIN FUNCTIONAL AREAS

- Ceiling: height – 9'
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Carpet tile with rubber base 4"

CORE FACILITIES

RESTROOMS

- Ceiling: height – 8’, gyp board
- Lighted mirrors at vanity, downlights
- Walls: Ceramic Tile large format, full height on wet walls, Painted gyp board on all others
- Floors: Large format tile, recessed setting bed, with floor drains
- Solid surface countertop with undermount sinks, touchless faucets and soap dispensers
- Additional solid surface counter 4’ long
- In wall towel/trash
- Ceiling hung st stl partitions with wall hung toilets, automatic flush valves

UTILITY SPACES:

- No ceiling, pendent mounted utility light fixture
- Walls: Painted gyp board
- Floors: Sealed Concrete

VERTICAL CIRCULATION

STAIRS:

- Ceiling: Painted gyp board
- Walls: Std construction, painted gyp board
- Floor: Rubber Treads and landings
- Railings: pipe rail
- Lighting: sconces

ELEVATORS

- Passenger: Upgraded cab, veneer wall panels, floor to match commons - Large format porcelain tile
- Freight: Gurney sized, St Stl, removable ceiling

OFFICES

- Ceiling: height – 8’
    - 2x2 ACT
    - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Carpet tile with rubber base 4”
- Power and Data on 2 walls, power only on third wall
- Entry wall 10’ wide typical: 9’ wood veneer door with full glass front

OMM LAB

- Special requirements
  - Monitors on front wall (3) and hanging , two rows of 3 (6)
  - Handwash sinks (4) in millwork base cab near entrance
  - Storage – same finishes as Lab
- Walls to Deck for acoustic separation, std construction
- Ceiling: height – 12’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Carpet tile with rubber base 4”, resilient at sink area

SKILLS LAB

- Special requirements
  - Monitors on front wall (3)
  - Sinks (6) in millwork base cab
  - Power in floor (12) boxes for flexibility of layout
- Ceiling: height – 12’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Resilient with rubber base 4”

CLASSROOMS

TEAM BASED LEARNING CLASSROOM

- Special requirements:
  - Monitors on all walls (14) 1/table and 4 moveable monitors
  - Power in floor (22) 1/table - boxes for flexibility of layout
  - Voice amplification system with unidirectional microphones
  - Power and data at central teaching podium
- Ceiling: height – 20’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
  - Acoustic wall panels on 1/3 of wall, all walls
- Floor: Carpet tile with rubber base 4”

VIRTUAL ANATOMY / MULTIPURPOSE

- Special requirements:
  - Monitors on all four walls
- Ceiling: height – 12’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Carpet tile with rubber base 4”

STANDARDIZED PATIENT

On stage/off stage concept with students on interior and patients entering from exterior, lounge space for patients

12 exam rooms 10x12, 4 exam rooms 10x20

- Ceiling: height – 9'
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Resilient with rubber base 4"
- Casework: 3' laminate upper and lower with handwash sink and faucet (no plumbing) solid surface countertop
- Accessories: Glove box, etc. to mimic typical exam room
- Barn door, wood: (1) per room on student side
- Traditional swing door on patient side

OFF STAGE, STUDENT SIDE:

- Wall mounted charting stations outside each exam room
- Power in floor to accommodate clinical support space
- Ceiling: height – 12'
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Carpet tile with rubber base 4"

PATIENT AREA AND ON-STAGE CORRIDORS TO ACCESS EXAM ROOMS

- Ceiling: height – 12'
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Resilient floor with rubber base 4", insets of Carpet tile in lounge area only
- Lockers for patients 2 high laminate (total of 10 – 20 total)
- Restrooms similar to general RR

Debrief / conference areas:

- Ceiling: height – 12'
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Carpet tile with rubber base 4"

SIMULATION

(4) 400 sf spaces flexible use with central control room

SIMS:

- Ceiling: height – 12’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting, down lighting and structure above to accommodate specialty lighting for OR, etc.
- Walls: To deck for acoustic separation, std construction, painted gyp board
- Floor: Resilient (Medintech or similar) with flash cove base

SCRUB SINK AREA:

- Special requirements:
  - 6 surgical scrub sinks
- Ceiling: height – 9’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: Std construction, painted gyp board
- Floor: Resilient with rubber base 4”

DEBRIEF AREAS:

- Ceiling: height – 12’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: Std construction, painted gyp board
- Floor: Carpet tile with rubber base 4”

STORAGE / MANNEQUIN REPAIR

- Ceiling: height – 9’
  - 2x2 ACT
  - 2x2 Direct Indirect lighting
- Walls: Std construction, painted gyp board
- Floor: Resilient with rubber base 4”

CONTROL ROOM:

- One way glass – 5’ long into each sim room
- 4 built in counters for observation at each window
- Ceiling: height – 9’
  - 2x2 ACT
  - 2x2 dimmable down lights
- Floor: Carpet tile with rubber base 4”

GROSS ANATOMY

CADAVER LAB:

- Special requirements:
  - Downdraft tables (20) with mechanical chase per table
  - Safety Shower with eyewash station
  - Handwash sinks (8)
- Ceiling: height – 12’
  - 2x2 scrubbable ACT
  - 2x2 Direct Indirect lighting
  - Ceiling mount dissection lights (20), 1/table
- Casework: 24’ laminate upper and lower, prep sinks (2) with solid surface countertop
- Walls: To deck for environmental separation, std construction, painted gyp board with scrubbable finish
- Floor: Resilient (Medintech or similar) with flash cove base and floor drains

REFRIGERATED STORAGE:

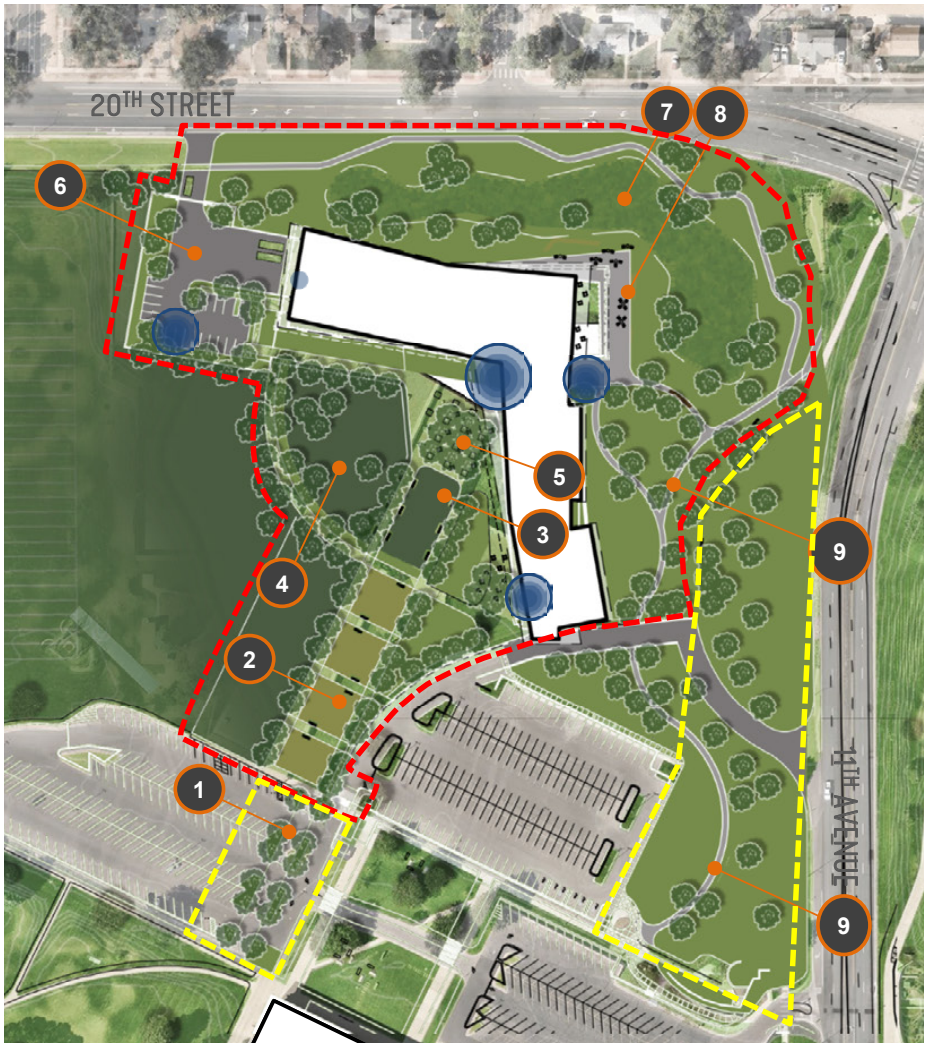
- Special requirements:
  - Morgue refrigerators (20)
- Ceiling: height – 10’
  - 2x2 scrubbable ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for environmental separation, std construction, painted gyp board with scrubbable finish
- Floor: Resilient (Medintech or similar) with flash cove base

PREP AREA:

- Ceiling: height – 10’
  - 2x2 scrubbable ACT
  - 2x2 Direct Indirect lighting
- Walls: To deck for environmental separation, std construction, painted gyp board with scrubbable finish
- Floor: Resilient (Medintech or similar) with flash cove base

3.3 CONCEPT DESIGN

The design of the new College of Osteopathic Medicine building was derived from a process that engages the essential threads of each design opportunity - its unique drivers, diverse points of view, and collaboration with the University of Northern Colorado. The College of Osteopathic Medicine's guiding principles were at the genesis of our exploratory conceptual design phase to understand and discover the importance of the new school to campus and the surrounding Greeley community. The history of the University, aspirations of the Founding Dean, and response to the campus architecture and site shaped the building, in conjunction with the program. The design integrates with the local vernacular, holds the corner of the street at the appropriate scale, maximizes the topographic change, and strengthens the connection between Central and West Campuses while enhancing pedestrian circulation.



BUILDING ACCESS
PEDESTRIAN CIRCULATION
VEHICULAR CIRCULATION
PEDESTRIAN UNDERPASS
NATIVE LANDSCAPE
XERIC DEMONSTRATION
TURF LAWN
LIMIT OF CONSTRUCTION (PH 1)
LIMIT OF CONSTRUCTION (PH 2)

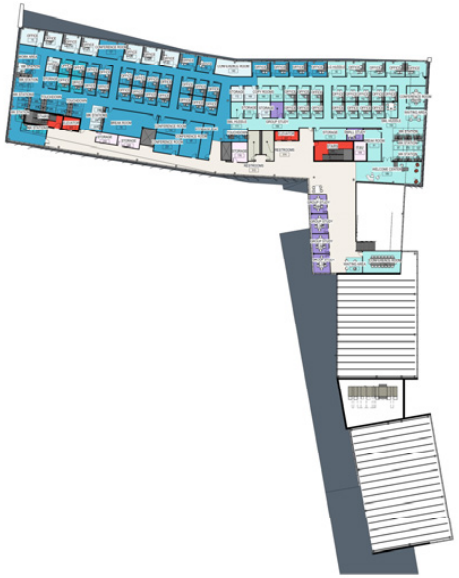
KEYNOTES

1. PEDESTRIAN LINK
2. XERISCAPE ART WALK
3. GAME LAWN
4. HAMMOCK PARK
5. GROVE PLAZA
6. SERVICE YARD / PARKING
7. STORMWATER BASIN
8. OVERLOOK PATIO
9. NATIVE LANDSCAPE TRAIL

The final massing and programmatic arrangement was derived from a combination of both the Spine and Portal options (see appendix). The dynamic form of the Portal scheme and the program adjacency of the Spine scheme were merged to satisfy the desire for a optimal layout and to have a prominent presence on the corner of 11th Avenue and 20th Street. The placement of the building on the site allows for future growth of campus, respects the recent investment in the parking lot to the south, and strengthens the connection between Central and West campus. The topography also created an opportunity tuck the loading dock under the building and away from sight. New pedestrian circulation is well integrated into campus and provides outdoor space for students gather and enjoy natural landscapes.

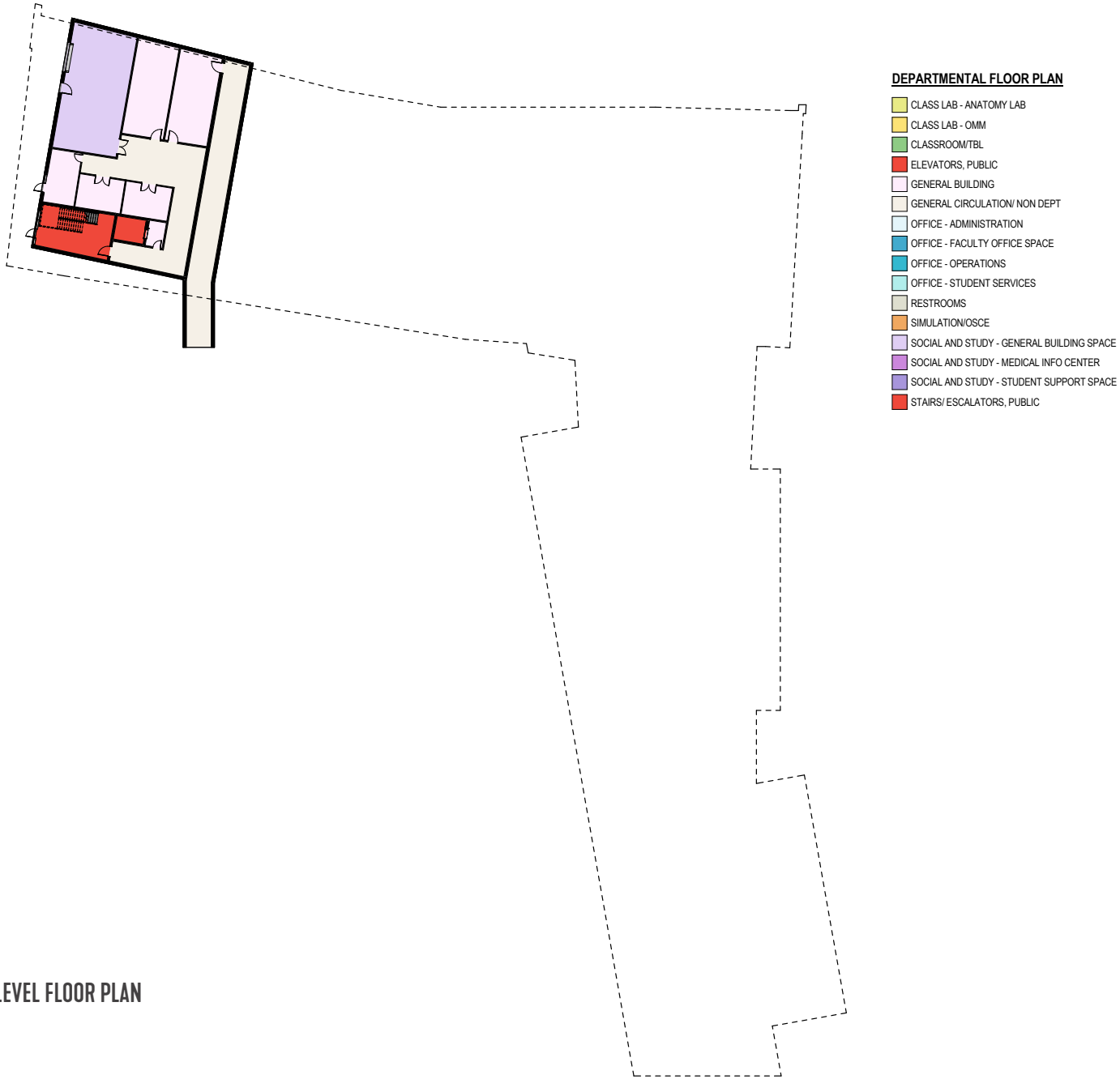
LOWER LEVEL

LEVEL 1



LEVEL 2

LEVEL 3

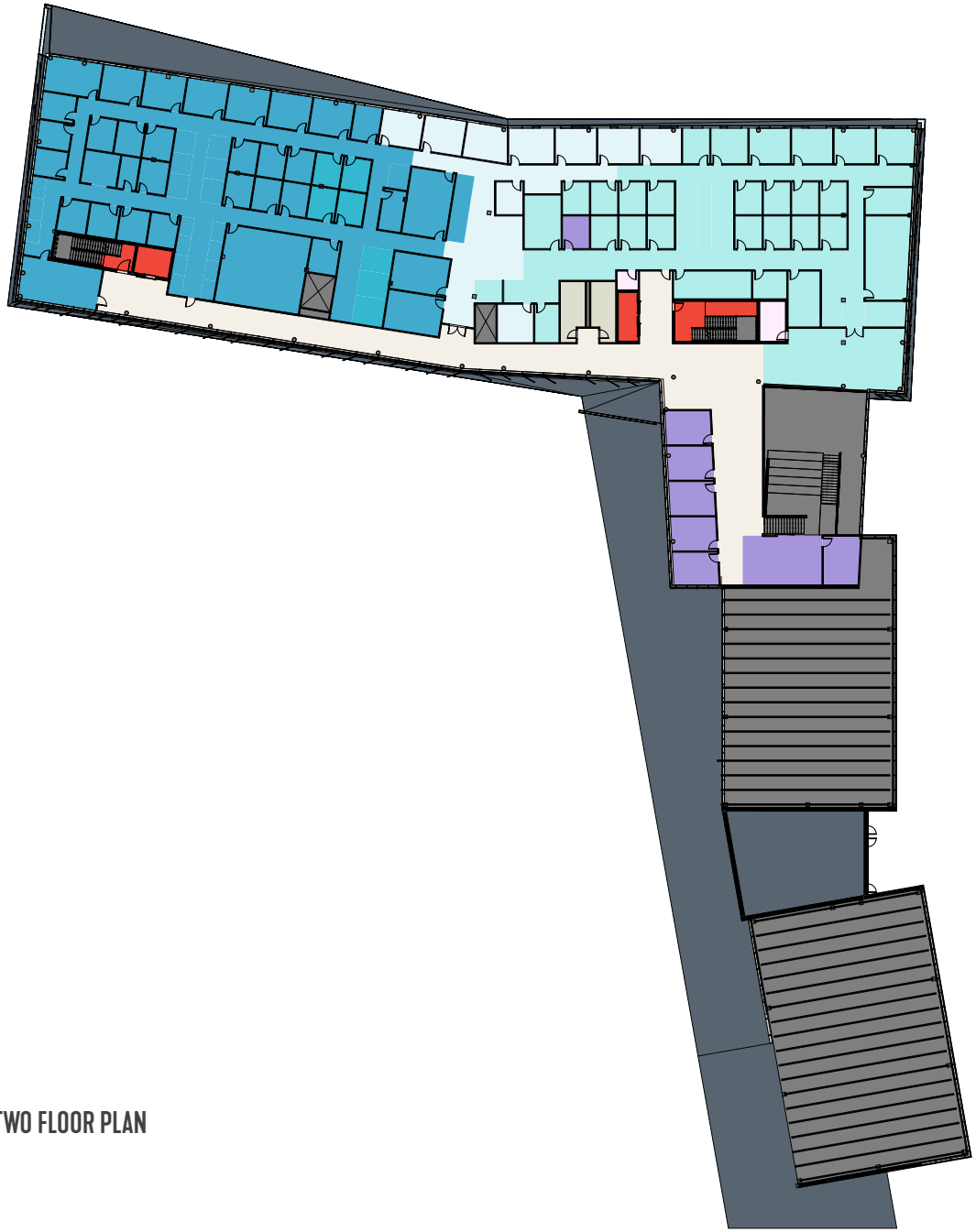


LOWER LEVEL FLOOR PLAN

DEPARTMENTAL FLOOR PLAN

- CLASS LAB - ANATOMY LAB
- CLASS LAB - OMM
- CLASSROOM/TBL
- ELEVATORS, PUBLIC
- GENERAL BUILDING
- GENERAL CIRCULATION/ NON DEPT
- OFFICE - ADMINISTRATION
- OFFICE - FACULTY OFFICE SPACE
- OFFICE - OPERATIONS
- OFFICE - STUDENT SERVICES
- RESTROOMS
- SIMULATION/OSCE
- SOCIAL AND STUDY - GENERAL BUILDING SPACE
- SOCIAL AND STUDY - MEDICAL INFO CENTER
- SOCIAL AND STUDY - STUDENT SUPPORT SPACE
- STAIRS/ ESCALATORS, PUBLIC

LEVEL ONE FLOOR PLAN



DEPARTMENTAL FLOOR PLAN

- CLASS LAB - ANATOMY LAB
- CLASS LAB - OMM
- CLASSROOM/TBL
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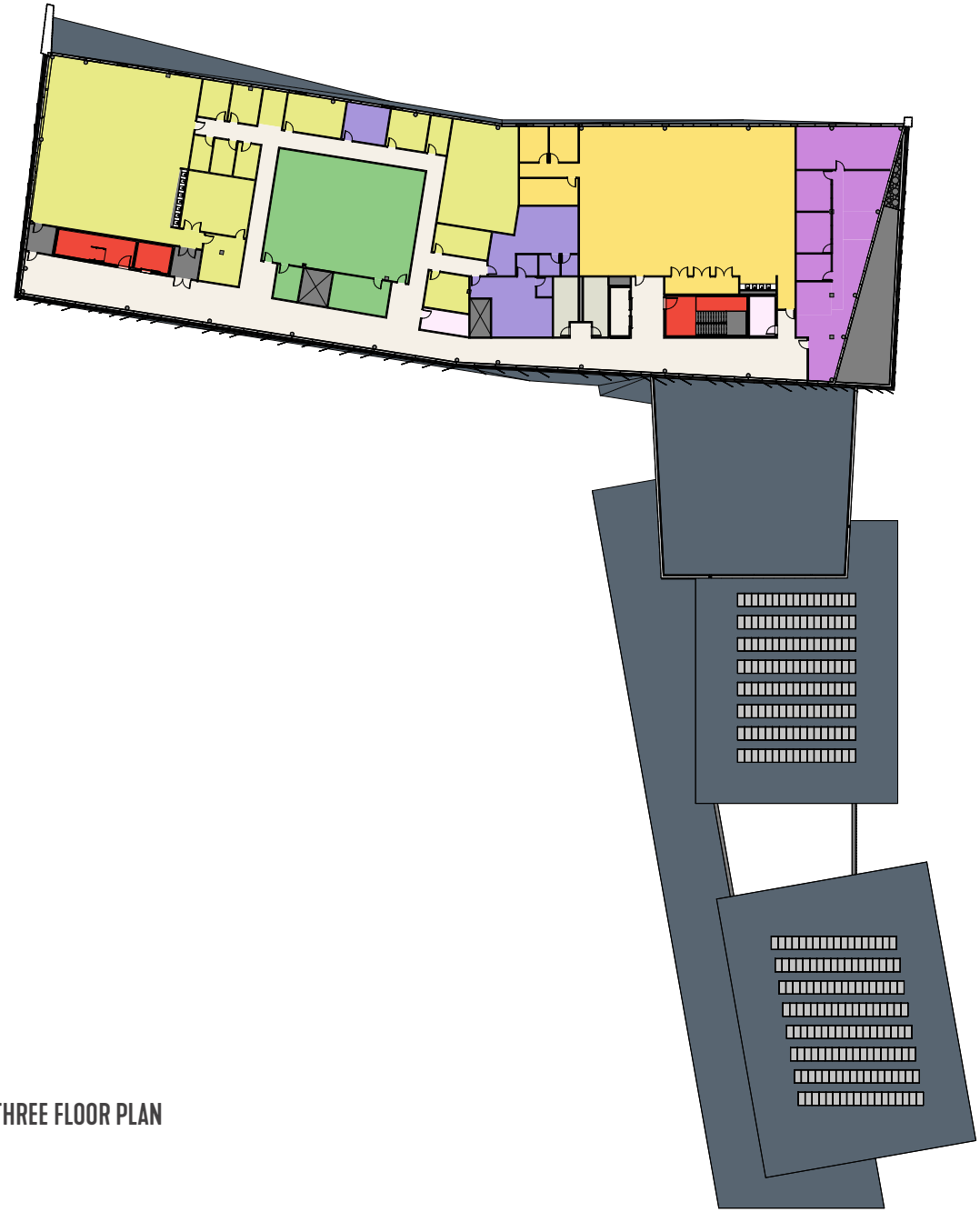
- RESTROOMS
- SIMULATION/OSCE
- SOCIAL AND STUDY - GENERAL BUILDING SPACE
- SOCIAL AND STUDY - MEDICAL INFO CENTER
- SOCIAL AND STUDY - STUDENT SUPPORT SPACE
- STAIRS/ ESCALATORS, PUBLIC

LEVEL TWO FLOOR PLAN



DEPARTMENTAL FLOOR PLAN

- CLASS LAB - ANATOMY LAB
- CLASS LAB - OMM
- CLASSROOM/TBL
- ELEVATORS, PUBLIC
- GENERAL BUILDING
- GENERAL CIRCULATION/ NON DEPT
- OFFICE - ADMINISTRATION
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- OFFICE - OPERATIONS
- OFFICE - STUDENT SERVICES
- RESTROOMS
- SIMULATION/OSCE
- SOCIAL AND STUDY - GENERAL BUILDING SPACE
- SOCIAL AND STUDY - MEDICAL INFO CENTER
- SOCIAL AND STUDY - STUDENT SUPPORT SPACE
- STAIRS/ ESCALATORS, PUBLIC

LEVEL THREE FLOOR PLAN

Aerial view looking east of new College of Osteopathic Medicine.

Perspective of new College of Osteopathic Medicine from intersection of 11th ave and 20th Street, looking southwest.

View of new COM Building looking west from 11th Ave.

Pedestrian view approaching from the south, looking north toward the new building.

View from green looking east toward main, south entrance of the new building.

Perspective from driving along 20th street, looking southeast to new COM building (west elevation and lower parking area).

Interior view (for character referenced only): View of social commons near main entrance.

Interior view (for character referenced only): View of social commons and grand staircase.

Interior view (for character referenced only): View of social commons from second level.

Interior view (for character referenced only): View of mezzanine area with informal student spaces.

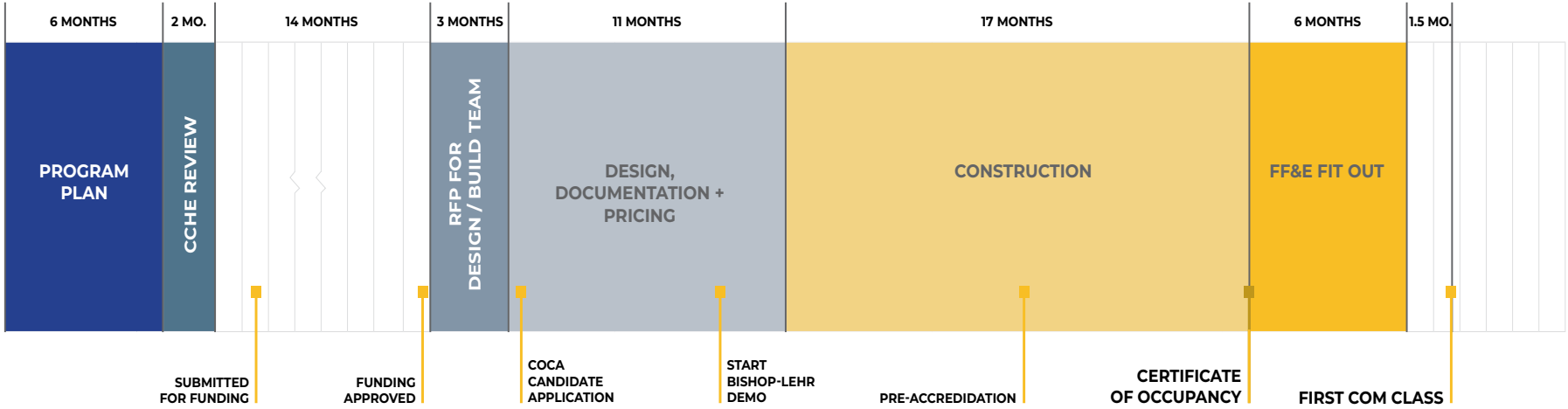
Interior view (for character referenced only): View of collaboration spaces along Team=Based Learning corridor.

3.4 PROJECT SCHEDULE, COST ESTIMATE, & FINANCIAL ANALYSIS

PROJECT SCHEDULE

The project schedule is based on the funding cycle for higher education projects in the State of Colorado. This Program Plan is the first step and will be completed in mid-January 2023. CCHE reviews and approves all Program Plan and the request for funding from the State will be submitted in 2023. Funding is approved the year following and UNC can issue a Request for Qualifications for a Design-Build team to design and execute the project. Once selected, the team takes the project through Design and Documentation, and the COM submits for Candidate Status from the Accrediting entity (COCA). Bidding of subcontractors and construction follows for an approximately 17 months. COCA requires that the building is substantially complete on December 31 of the year prior to the first class of students. FF&E fit-out occurs in the first half of the next year, with the first matriculating class starting in August.

Schedule



COST ESTIMATE SUMMARY

Basis of Estimate

This estimate has been prepared at the request of SmithGroup and is to provide a program plan estimate of construction cost for the University of Northern Colorado College of Osteopathic Medicine project, located in Greeley, CO.

The estimate is based upon measured quantities and built-up rates prepared from the program plan narratives received December 9, 2022, and, the drawings received December 19, 2022, prepared by SmithGroup. This revised estimate includes Owner review comments provided by SmithGroup on January 18,2023 and scope changes made subsequent to the 2022 design documents.

The design is conceptual in nature. Where information was insufficient, assumptions and allowances were made.

It is understood that the project will be procured using a Design-Build (DB) procurement arrangement where the DB contractor will be required to receive a minimum of three subcontract bids for each trade. It has been assumed that the DB contractor will only be allowed to self-perform work for the project under competitive bidding circumstances.

Unit pricing is based on 1st quarter 2023 costs. Construction cost escalation has been carried at 11% in the estimate to the 2nd quarter 2025.

An estimating contingency has been included at 10%. Bidding contingency of 2.5% and construction contingency of 3.5% have been included.

Items Specifically Excluded

- Furniture, Fittings and Equipment (FF&E)
- Murals and works of art
- Work outside the site boundaries unless noted otherwise
- Costs associated with phasing the construction work
- Out of hours working
- Special testing & inspections
- Utility tap fees and charges
- Permits & plan review fees
- Owner's contingency
- Land and legal costs
- Geotechnical, traffic and all other studies
- Items marked as "Excl." in the estimate
- Escalation beyond the 2nd quarter 2025

GFA: Gross Floor Area

LOCATION SUMMARY

Ref	Location	GFA SF	GFA USD/SF	Total Cost USD
A	**Core & Shell**	**101,500**	**537.74**	**54,581,112**
B	**Interior Fitout**			
B1	Classroom	15,558	210.38	3,273,128
B2	Class Lab	12,254	341.58	4,185,739
B3	SIM + Specialty	12,604	335.78	4,232,134
B4	Office	22,166	240.98	5,341,557
B5	Social + Study	14,414	262.57	3,784,729
B6	General Building	6,803	221.09	1,504,093
B7	Public Circulation, Vertical Circulation & Restrooms	17,701	314.79	5,572,055
	B - Interior Fitout	**101,500**	**274.81**	**27,893,435**
C	**Sitework**			**17,192,245**
ESTIMATED TOTAL COST		**101,500**	**981.94**	**99,666,792**

Full cost estimate can be found in ***Appendix 4.4.***

FINANCIAL ANALYSIS

COLORADO Department of Higher Education

STATE OF COLORADO
DEPARTMENT OF HIGHER EDUCATION

Print Date: 2/6/2023

FY23-24 CAPITAL CONSTRUCTION/CAPITAL RENEWAL PROJECT REQUEST- *COST SUMMARY (CC_CR-C)**

(A)	(1) **Funding Type (Cash, CCF, Cash & CCF):**	**Cash & CCF**	(2) **Intercept Program Request? (Yes/No):**	Yes
(B)	(1) **Institution:**	University of Northern Colorado	(2) **Name & Title of Preparer:**	Kirk Leichliter
(C)	(1) **Project Title:**	College of Osteopathic Medicine	(2) **E-mail of Preparer:**	kirk.leichliter@unco.edu
(D)	(1) **Project Phase (Phase __ of __):**	1 of 1	(2) **State Controller Project # (if continuation):**	
(E)	(1) **Project Type (CC or CR):**	CC	(2) **Institution Signature Approval:**	Date
(F)	(1) **Year First Requested:**	FY _____25___	(2) **CDHE Signature Approval:**	Date
(G)	(1) **Priority Number (Leave blank for continuation projects):**	1 of ___	(2) **OSPB Signature Approval**	Date

(1)		(a) **Total Project Costs**	(b) **Total Prior Appropriation**	(c) **Current Budget Year Request**	(d) **Year Two Request**	(e) **Year Three Request**	(f) **Year Four Request**	(g) **Year Five Request**
	Land /Building Acquisition							
(2)	Land Acquisition/Disposition	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(3)	Building Acquisition/Disposition	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(4)	***Total Acquisition/Disposition Costs***	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Professional Services							
(5)	Planning Documentation	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(6)	Site Surveys, Investigations, Reports	$ 45,000	$ -	$ 45,000	$ -	$ -	$ -	$ -
(7)	Architectural/Engineering/ Basic Services	$ 12,000,000	$ -	$ 12,000,000	$ -	$ -	$ -	$ -
(8)	Code Review/Inspection	$ 336,000	$ -	$ 336,000	$ -	$ -	$ -	$ -
(9)	Construction Management	$ 350,000	$ -	$ 350,000	$ -	$ -	$ -	$ -
(10)	Advertisements	$ 10,000	$ -	$ 10,000	$ -	$ -	$ -	$ -
(11)	Other (Specify) Abatement consultant	$ 100,000	$ -	$ 100,000	$ -	$ -	$ -	$ -
(12)	Inflation Cost for Professional Services	$ 513,000	$ -	$ 513,000	$ -	$ -	$ -	$ -
(13)	Inflation Percentage Applied		0.00%	4.00%	0.00%	0.00%	0.00%	0.00%
(14)	***Total Professional Services***	$ 13,354,000	$ -	$ 13,354,000	$ -	$ -	$ -	$ -
	Construction or Improvement							
(15)	Infrastructure Service/Utilities	$ 4,445,000	$ -	$ 4,445,000	$ -	$ -	$ -	$ -
(16)	Infrastructure Site Improvements	$ 4,838,551	$ -	$ 4,838,551	$ -	$ -	$ -	$ -
(17)	**Structure/Systems/ Components:**							
(18)	Cost for New (GSF):	$ 75,208,952	$ -	$ 75,208,952	$ -	$ -	$ -	$ -
(19)	*New at $_____ X _____GSF*							
(20)	Cost for Renovation (GSF):	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(21)	*Renovation at $_____ X _____GSF*							
(22)	Cost for Capital Renewal (GSF):	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(23)	*Renewal at $_____ X _____GSF*							
(24)	Other (Specify) Abatement & Demo of Bishop Lehr	$ 2,274,086	$ -	$ 2,274,086	$ -	$ -	$ -	$ -
(25)	High Performance Certification Program	$ 250,000	$ -	$ 250,000	$ -	$ -	$ -	$ -
(26)	Prevailing Wage Requirement	$ 5,280,000		$ 5,280,000				
(27)	Inflation for Construction	$ 7,370,203	$ -	$ 7,370,203	$ -	$ -	$ -	$ -
(28)	Inflation Percentage Applied		0.00%	7.30%	0.00%	0.00%	0.00%	0.00%
(29)	***Total Construction Costs***	$ 99,666,792	$ -	$ 99,666,792	$ -	$ -	$ -	$ -
	Equipment and Furnishings							
(30)	Equipment	$ 1,970,000	$ -	$ 1,970,000	$ -	$ -	$ -	$ -
(31)	Furnishings	$ 2,000,000	$ -	$ 2,000,000	$ -	$ -	$ -	$ -
(32)	Communications	$ 200,000	$ -	$ 200,000	$ -	$ -	$ -	$ -
(33)	Inflation for Equipment & Furnishings	$ 125,100	$ -	$ 125,100	$ -	$ -	$ -	$ -
(34)	Inflation Percentage Applied		0.00%	3.00%	0.00%	0.00%	0.00%	0.00%
(35)	***Total Equipment & Furnishings Cost***	$ 4,295,100	$ -	$ 4,295,100	$ -	$ -	$ -	$ -
	Miscellaneous							
(36)	Art in Public Places	$ 996,668	$ -	$ 996,668	$ -	$ -	$ -	$ -
(37)	Relocation Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(38)	Other Costs [specify] technology Systems	$ 3,156,038	$ -	$ 3,156,038	$ -	$ -	$ -	$ -
(39)	Other Costs [specify]	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(40)	Other Costs [specify]	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(41)	Other Costs [specify]	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(42)	***Total Misc. Costs***	$ 4,152,706	$ -	$ 4,152,706	$ -	$ -	$ -	$ -
	Total Project Costs							
(43)	***Total Project Costs***	$ 121,468,598	$ -	$ 121,468,598	$ -	$ -	$ -	$ -
	Project Contingency							
(44)	5% for New	$ 6,073,430	$ -	$ 6,073,430	$ -	$ -	$ -	$ -
(45)	10% for Renovation	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(46)	***Total Contingency***	$ 6,073,430	$ -	$ 6,073,430	$ -	$ -	$ -	$ -
	Total Budget Request							
(47)	***Total Budget Request***	$ 127,542,028	$ -	$ 127,542,028	$ -	$ -	$ -	$ -
	Funding Source							
(48)	Capital Construction Fund (CCF)	$ 114,787,825	$ -	$ 114,787,825	$ -	$ -	$ -	$ -
(49)	Cash Funds (CF)	$ 12,754,203	$ -	$ 12,754,203	$ -	$ -	$ -	$ -
(50)	Reappropriated Funds (RF)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
(51)	Federal Funds (FF)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	TOTAL	127,542,028	-	127,542,028	-	-	-	-

SECTION 4 – APPENDIX

4.1 DESIGN PROGRESS MEETING MINUTES

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PROJECT	UNC Greeley College of Osteopathic Medicine (UNC COM)	MEETING NO.	Workshop #1
PROJECT NO.	14147.00	MEETING DATE	9/8/2022
PROJECT LOCATION	501 20 St. Greeley, Colorado 80639	MEETING TIME	1:30pm–4pm MDT
SUBJECT	Workshop #1	MEETING LOCATION	On-Site@ UNC
PREPARED BY	Alexander Person III		

ATTENDEES

ITEM DESCRIPTION

Dr. Beth Longnecker	UNC	beth.longenecker@unco.edu
Kirk Leichliter	UNC	Kirk.Leichliter@unco.edu
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Kamel Haddad	UNC	kamel.haddad@unco.edu
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Keri Stevenson	DPS	keris@dpsdesign.org
David Johnson	SmithGroup	David.johnson@smithgroup.com
Mecayla Cobb	SmithGroup	Mecayla.Cobb@smithgroup.com
Alexander Person III	SmithGroup	Alexander.person@smithgroup.com

1.0 Guiding Principles

- Program Plan –
  - Requirements
  - Timeline
- Invite the President, Andy Feinstein, to these workshops:
  - Workshop #3
  - Workshop #5 (maybe)
- D/B Teams – Solicit for teams in February 2023 – Have them selected and under contract by June 2023
- Talked to a Contractor – 7-8 months before Foundation/Bid Package (Feb 2024)
- Final Completion - August 2025
- Schedule – Very realistic expectation
- Bridging Space?

1.1 Comparison Costs

- None of the examples have clinical space.

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- Dr. Longenecker – Request her business plan for the school.
-
-

1.2 Benchmarking

- Lecture space for year one and two – each. Beth likes flexibility – operable wall. (2) 160-person TBL Room
- 162 class size – 8% over. Maximum expansion to 175-180 max.
  - Plan for 180 student class size – room to grow.
- Looking for non-significant lecture space. Hoping to do TBL mainly.
- Will 162 be divided into smaller sections?
  - Small groups will meet through out the morning.
  - (15) rooms – to seat 8-10 people, quiet, contained, whiteboard sessions.
  -

1.3 How, Now, Wow

- David presented what was discussed in the interview where we workshopped it.
- Summary:
- How
  - Interest in flexible use of space – social infrastructure
  - Co-develop curriculum, platform for interprofessional education
- Now –
  - Sustainability, carbon neutral facilities
  - Outreach to K-12
- Wow
  - Creating a regional health sciences campus.
    - Research potential
    - Clinical patient facilities

1.4 Kick-off Ecercise

- I like, I wish, I wonder
  - Like - Things that are working well that we should maintain
  - Wish - Are there aspects of UNC that could be enhanced?
  - Wonder - Things that can be transformational
- Like –
  - Idea of being accessible – experientially accessible, welcoming
  - First generational students feeling welcomed on the campus
  - Increase the awareness of what others do – people in public health, school of med, etc. Proximity in space – Master of Public Health is running in the same space.
  - "Can-do" spirit
- Wish
  - Every learning space can be flexible
- Wonder
  - "K-22" – Connections to the K-12, undergrad, etc.

Kamel - Space Matters
- Could we be the first school that
- Grant – Rural Health – Received funding form the state to put a program together, providing scholarships, developing the program and implementing it.

Melissa –
- Where she went to school, there were sperate buildings, but had a share space in the health sciences where they co-mingle.
- Strategically put people close to the natural synergy – Ross, Gunter, new building, etc.
  - Impacts proximity to departments
  - Reinforces faculty are ALL UNC faculty.
  - Integrating with the rest of the campus – a big drive for Beth and why they chose her.

Jared –
- Founding Dean of Univ of Texas Public Health – his father
  - Designed the curriculum and structure of departments so it wasn't siloed. More of a matrix.
  - Rural Health – Looking at prevention, education, health services, communication channels from medical facilities, etc. It's multifaceted.
- Interdisciplinary Curriculum
  - You are a part of a continuum in education.
  - Counseling and Rural Health is in School of Education = possible overlap
- Innovation
  - Leveraging the proximity as a goal.
  - Where is the existing center of gravity on campus.
- Drawbacks of the Campus –
  - Very spread out.

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1.5 Engagement with Community
- Education
  - Origins of the University were all about the Community servicing.
  - Think of college alums statewide.
  - Relationships with Greeley are in a good spot right now.
  - Clinical teachers all over the city.
  - Many programs that outreach into the community. They do NOT have many that feed back to the university – Jared would like more of this exchange.
- Greeley Community Events to engage UNC
  - Mobile Kitchen
  - Doing events on the campus
  - Lifestyle Medicine clinic
  - Performing and Visual Fine Arts – their performances bring the community in.
  - Possible: Health Fairs, Parental Education, pipeline program in K-12, etc.

1.6 Benchmarking
- How do you want to support these students through med ed?
  - The example projects don't have a lot of the additional support spaces for students, which drives up the multiplier/net to gross.

1.7Mental Health Services
- Have some collaborative space between counselling and med. No existing space could service this need in the McKee Hall/ Education Building.

1.8 Additional Resources
- How does UNC reach out to FFA, Four-H, Hispanic Speaking HS, etc? Summer programming that is destigmatized.
- Budget is going to need to reflect a higher level of student support services.
  - State of CO funding will continue to go to CU Anschutz – UNC will be more tuition dependent - more like 55%.

1.9 School of Nursing
- Clinical Skills spaces and Classrooms are their biggest pinch point. No modular or flexible learning.
- Sim Space – Great, but no space for debriefing. They are currently using faculty offices.
  - Cohort sizes are 36 students.
  - Ideally, they would be 45-50. And, would need space to hold a class
  - 108 total students. Would like to expand to 150 students.
- Space, Clinical Placements and Faculty Needs are the 3 biggest hurdles to the School of Nursing currently.
- Sim and Lab happened early in the semester, and then later they go out into the clinical environments.
  - Would med and nursing be there at the same time of the semester?
- Simulation Space
  - IPE Shared (among Med and Nursing)
    - Med Surge Rooms
    - Labor, Delivery and Recovery
    - Standardized Patient Rooms
    - OSCI (Objective Structured Clinical Evaluations) Rooms
    - Nursing

- In the past, they conducted a simulation with AIMS for EMT, RNs, and Acute Care

- Anatomy
  - Cadaveric or AR/VR or Both?
  - Displeasure with strictly one or the other. Too video game.
  - Her goal: 20 cadavers in her budget.
  - Alternating dissections model – reduces the number of cadavers, but someone doesn't get to partake in certain dissection.
  - UNC Nursing students go to FRCC in Fort Collins now to experience cadavers.
- Learning Resource Center
  - Limited numbers of textbooks, ones you can't get online. Minimal stack space.
  - Printers they can access.
  - They had WAY too much stack space that they were not using at OU.

1.10 Sites

- **Infill on Central Campus**?
  - Pros: Density, curriculum co-location of Nursing, Allied Health and College of Med.
  - Cons: Site constrained. Central campus is already tight on parking, so UNC would have to relocate that need elsewhere.
    - Electrical capacity
    - Sewer is a disaster
    - Waterline between the hill side and Bishop Lehr
  -
- **West Campus**
  - The original campus plan designed/routed infrastructure and utilities for a future building on the site between McKee and Candelaria.
  - Nursing could move more easily, then co-locating School of Med on Central Campus.
  - Nursing could have some space in Ross Hall: Kamel shared that some programs in Ross Hall that do not need research/lab space.
  - Hot Water (400 PSI) Service (not steam) - High Temp Hot Water System
    - UNC has capacity
    - Cooling is electric
    - Sanitary is fine
    - Stormwater would have to be determined on the site.

1.11 Budget

- $86M Total Project Cost
  - $69M Construction Cost - includes prevailing wage, LEED and inflation. $552/SF
  - Public Art
  - 125,000 GSF

1.12 Bridging Space

- **Interim Plan**
  - Beth provided some SF for space needs. They do not have enough back space
    - Anatomy and O&M Lab, and Clinical Skills
      - Dining Hall
        - Currently serving as a huge classroom, but would be adequate for the Anatomy and O&M Lab.
      - Harrison – On West Campus. By Rec Center.
    - Clinical Skills
      - 1,000 SF
    - Classroom
      - Mitchener – Currently has a classroom in SE corner on Lower Level. Rm L174.
    - Study
      - Library's 24-Hour Study Area – could be use for study space…but shared with other occupants.
    - Faculty, Meditation Rooms – Nothing yet. Space for IT they must kick others out of? Shared office space?
      - 12-15 faculty or more.

PROJECT	UNC Greeley College of Osteopathic Medicine (UNC COM)	MEETING NO.	Workshop #2
PROJECT NO.	14147.00	MEETING DATE	9/30/2022
PROJECT LOCATION	501 20 St. Greeley, Colorado 80639	MEETING TIME	8:30am–4pm MDT
SUBJECT	Workshop #2	MEETING LOCATION	On-Site @ UNC
PREPARED BY	Alexander Person III		

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ITEM DESCRIPTION

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WORKSHOP 2 NOTES
DAY #1 2022-09-29

Tour Feedback of CHSU, BCOM, and review of ICOM plans and images

CHSU comments

- Beth Longenecker (referred to as "BL") – food service is not required as new building will be on campus
- BL – prefers a separate de-brief space and onstage /offstage student space for OSCE (not as wide)
- BL – ED/ICU seems too large
- BL – Likes the SIM center, but it could be smaller for this project
  - Need 4 rooms that are flexible for SIM
  - Prefers a centralized control space (like at OU)

- BL – need to incorporate a scrub area – more sinks
- BL – hybrid anatomy with VR HoloLens
  - At minimum provide space for cadaveric dissection, with potential for future body donor program (which would require embalming)
  - BL – potentially provide the infrastructure and ability to convert the cadaver space
- BL – Need a larger mediation room
- BL – Gross Anatomy to be:
  - Private space
  - High windows are ok
- Library
  - To be called "learning resources" instead of library
  - Provide office space for librarian
  - No need for a separate computer lab
    - Provide printing services in the library
- Storage
  - Need space for bone boxes – can be stored in the library or anatomy spaces
- Small Study spaces
  - 15-20 spaces that fit 8-10 people
  - These also double as small group rooms for curricular activity if they hold 10
- OMM / OPP
  - CHSU felt that OPP lab is too small as they have the same class size as UNC COM
  - No screen or curtain required for OMM, can use portable screens as needed
  - Likes instructors on perimeter instead of in center of space
- BL – Students at OU liked quiet study space
- Would consider incorporating 2-4 person offices for part-time faculty
  - Would need locker space

BCOM Comments

- General Comments
  - SIM center is too small
  - Lounges have multiple microwaves and refrigerators – same for UNC
- Level 1 Comments
  - Was built on an office model as an exit strategy
  - Lecture Halls are two story spaces
    - Not preferred as entries are at the front of the classrooms - flat floor TBL is preferred

ICOM Comments

- Likes
  - Plenty of natural light
  - Mingled faculty and student lounge
  - Shaded outdoor space
  - Multiple varieties of study and social space

- No need for separate skills lab – would be doing skills in OMM and/or other flex space
- Do not want lecture halls – flat floor TBL
- Not sure if a separate ER in SIM is necessary; if sim is large enough for 2+ patients, this can be used for ER
- 12 min, 16 ideal number of SP rooms
    - Need locker room for SP actors plus 4 gender neutral changing rooms
- Additional comments from BL
    - Anatomy needs a space where students can flex into groups
    - Can do skills in the OMM Lab, and wants it closer to TBL
    - Prefers to have conference room debrief space
    - 16 rooms ideal for SP

Guiding Principles

1. **Focus on Team Based Learning (TBL) and IPE**
    a. Nursing Skills lab in the new COM would allow them to add a cohort
        i. 3 labs, 50 people each
    b. Larger SP for IPE is a possibility
        i. 12 regular and 1-4 larger spaces
    c. Possibility to convert one room into residential setting for nursing and EMT
    d. Small group work/study areas
    e. Preclinical simulation tailored to primary care
2. **Engage our community and become a regional resource**
    a. Inclusivity for students is key
    b. Initially an event space rather than clinical space
    c. No farmers market
    d. Pop-up clinics would be ideal
    e. Children events, health screening
    f. Teaching Kitchens available – nutrition kitchen in Gunther and Wells County mobile kitchen
    g. Need space allocation for community engagement
    h. Community should apply to both external and internal to UNC
3. **Create a supportive environment for students, faculty, and staff (#1 priority)**
    a. Eventually will have distinction tracks
    b. Provide exhibit space for scholarship
    c. Wants certificate programs (like public health) in which nursing/allied health can participate in
    d. Provide faculty touch down spaces and engagement zones
    e. One-stop shop model is preferred
    f. Learning communities (house model) can break up the class too much, separate sessions are okay
        i. Intentional use of small group sessions and other venues can achieve much of the same effect
    g. Provide gender neutral restrooms and changing rooms

4. Respond to change while respecting culture
    a. Plan for growth, and design building to be expandable
    b. Plan for future technology integration
    c. refer terms flexible and adaptable layouts to "easily reconfigurable"
        i. Provide flexible furniture and minimal built-in casework, not movable walls
        ii. Plan and design the infrastructure to support multiple learning models
    d. Create a new "front door" to campus
    e. Create a transparent and honest environment
    f. Future HSC Campus – Nursing, Allied Health, Clinical partners
    g. Phasing plan is to be requested by the State
    h. COCA requires a bridging plan in case the building is not open at time of start
5. Commitment to Sustainability and Wellbeing
    a. WELL certification is not required, incorporate principles
    b. LEED Gold certification is required
        i. Use of energy efficient systems and water conservation strategies
        ii. Orient the building to optimize climatic conditions
        iii. Use of low emitting materials
        iv. Ability to control temperature and lighting
        v. Thoughtful use of regional, recycled, or otherwise sustainable materials

Programming

- Classroom
    - Prefers (2) 180 person TBLs
        - One separate and one dividable with movable partitions
            - Dividable can be problematic for testing
            - If there is only one large, dividable room, 2 rooms takes care of that problem
        - Can be stacked on 2 floors
        - Each need an AV and recording room
        - Would not need 50 person classroom if there are (2) TBLs
        - 75-80 person classroom is more useful than the 50 person
            - Not that this is not a lecture hall but an additional classroom for use for messy procedures, debriefs and other activities
        - Ideal group size is 8 (revise tables)
        - Monitor is not needed at each table head, rather use monitors on the walls
    - Ohio Heritage has a central control room
    - No traditional classroom configurations
    - Would like to include flexible skills space
        - For low-tech SIM, ultrasound, etc.
        - Proximity to anatomy is preferred
        - Sized to accommodate 90 students with flexible furniture and adjacent furniture storage space
        - Should be a wet room with (6) utility sinks and resilient flooring

- Class / LAB
  - Gross Anatomy
    - 20 tables in gross anatomy, up 5 students per table
    - Consider single room with cadaver devoted to upper-level students and individual work (Follow up: add 1 cadaver to gross anatomy for this sue)
    - Write-up areas not required (no one uses these)
    - Needs eyewash station
    - Need to add space for body donor program (ref UNM); or contract with local funeral home for embalming
      - Donor program needs private office rather than workstation
    - 2 Locker rooms, separated men's / women's
      - Gender neutral can utilize the student space
    - Proximity to other labs (Skills Lab) is preferred for debrief
  - Virtual Anatomy
    - VR Studio can size down to 600 sf / 150 sf per team
    - HoloLens may be the preferred solution
  - OMM
    - 50 tables seem adequate 1 faculty to 8 student ratio
      - This would allow for a class size expansion over time
    - 4 person office adjacent will work for faculty touchdown spaces - this can be used as flexible space
      - Can become scholars' office with 3-4 people sharing
    - (2) 3 person offices adjacent
    - Prefer instructional platform on perimeter
    - Increase to (4) handwash sinks for future class size expansion
    - Don't need permanent screened area, will use mobile screens if needed
  - Simulation
    - 4 identical sim spaces at 400 each – use can be flexible
      - Will need SIM director office and a 2-person office for techs
    - Will use centralized control
    - Provide conference room for debrief
      - 20-person and position close to OSCE/SP for shared use
    - No ED/ICU
    - Consider ICU doors
    - Current storage room of 250 sf to grow to 500sf
    - Do not need a lift to transport mannequin
    - Plan for immersive SIM in the future
    - Students will likely be in rural hospitals and will not have high tech facilities
      - Plan more traditional clinical settings
    - Telehealth can be accommodated in other settings
    - Scrub space at SIM to accommodate 6 students

    - Large scale event simulation can use TBL or lobby
    - Use UNC recording studio
      - Michener L050 or similar existing space
  - OSCE/Standarized Patient
    - 12 standard, plus 4 larger spaces (16/4 total would be ideal)
    - Can train SPs in lounge, provide lockers
    - Conference room to accommodate 20 for intake
      - Shared conference for 20 pers for debrief
    - Provide 2 non-gender changing rooms
      - Open to all standardized patients and students
      - Staff won't be using these changing rooms
    - On-stage, off-stage layout of rooms preferred
    - Confirm standing charting station – Beth will think about this
    - Control room needs space for 2 faculty to observe
    - Private office for 3 instead of 2 and include CTAC coordinator
    - Eliminate tech workspace if a slightly larger control room is included
- Student Services
  - Genius bar model where initial services can be done on a phone
  - Not integrated with main campus student services
  - Concierge could come from admissions staff
  - Add touchdowns for grad students, counselors
  - Add one office for DEI
  - Add student orgs private office
  - Dir alumnae relations could be here or in admin
  - Need space for 3 financial aid counselors
    - Different from Univ. financial aid
  - Clinical coordinator could be in student support
  - FSAs in admissions ok in WS but needs screening
  - Conference room reduce to 20 ppl
  - Add 2-3 huddle rooms - (1) 6 person and (2) four person
  - Add break space for student services
  - Increase storage to 250sf
  - Need conference room right off admission
  - Clinical education coordinators communicate with regularly with students
- Admin
  - FSA – special asst to COM leadership needs private office
  - Add support staff, 3 in workstations
  - AD clinical affairs and Asst Dean/Dir GME may end up with clin ed
  - Asst Dean/Dir Assessment and AD preclinical ed and Asst Dean faculty affairs may all end up with faculty
  - Prefer not to group faculty by department
  - Add 1 support staff to operations

- Dean's office to fit desk and 4 person table (200sf)
- Beth is in process of calculating faculty needs; est. 20 full-time, 3 shared offices, 12 touchdown spaces
- Plan for additional space (office and touchdown) for potential future growth
- May need another office for anatomy support person
- Larger break room for all admin and faculty
- Admin conference room should be increased to 20ppl, not visible from waiting area
- Add (1) 20-person and (4) 10-person conference rooms to faculty space

- Social and Study
  - Medical information center and quiet study
    - No circulation at library (learning resource center)
      - Check out books at Michener
    - Group study rooms don't need to be included here, add 2 if budget allows
    - Need 3 private office for learning specialist over time
    - Student copy / resource space
    - Move carrels to quiet study
  - Student support space
    - No student houses
    - Increase 1,200sf student lounge
    - Follow OU model for lockers and changing rooms but with 4 total changing rooms, 2 with showers
    - Decrease to 4 small study rooms
    - No carrels here
    - Better to have separate quiet study room in LRC
    - No separate game room
  - General building space
    - No mailroom
    - No fitness center
    - Provide vending and refrigeration in student lounge
    - Keep server room as placeholder – TBD
      - Currently UNC has all the servers in Carter Hall, IT also has 2 locations on West Campus and another on Central Campus
    - Bishop-lehr has a switch from CenturyLink that still has a few lines, see if they can be eliminated
    - Increase meditation to 100sf
    - Increase to 2 total lactation rooms, for interchangeability between faculty and staff and students
    - Take out grab and go as there are facilities in Michener, Univ. Commons, etc
    - Need dock space and service elevator
      - To bring in cadavers
      - Service area
      - At grade dock is ok

    - Provide custodial with break room, drop down, locker space – custodial is the only one from facilities that needs a home in the building
    - Provide equipment room and supply room. Suggest a parts room
    - Increase lobby size to 2500 sf
    - Add small kitchen off multipurpose room for nutrition classes – could be in a future phase if not cost feasible

Other comments

- Review OU plans
- Generators on campus
  - Only a couple of buildings are fully redundant
  - All are diesel except 1 (gas)
  - Ross is the closest example of generator backup power
- General comments
  - Locate flex space/skills lab near anatomy that can be used for breakout activities (ultrasound, etc.)
  - Individual study space, comfy seating near windows highly desired
  - Beth does not anticipate need for teaching kitchen; one currently in Gunter; nice but not a priority item
  - No student houses; Beth believes concept can be addressed without space needs
  - Beth would like shell space for flexibility
  - Nursing plans to apply for grant – could ask for interdisciplinary, maybe help fund expanded simulation or equipment purchase; possibly shell space near sim for easy expansion – 20 suites would support all the health sciences
  - No warming kitchen needed – have catering services on campus
  - Include informal study spaces in front of windows
  - Include outdoor space
  - Transformers to be in a yard

DAY #2 2022-09-29

Utility Diagram Discussion

STORMWATER

- CIVIL COMMENTS
  - Lots of culvert type pipes
  - LEED credits factor into the ultimate design of storm sewer
  - Goal is to try to infiltrate a 5-year storm
  - Mature trees on the NW corner, how can those add value by keeping them
  - Stormwater / detention pond on NW corner of new site is an option
    - Anticipate detention here, potentially could be underground
    - Nate: Subsurface Pond could pose issues with getting the water out
- Kirk: carefully design this pond as it will be the first thing seen when arriving to the new building / west campus

- Relocating gas on NW corner is not going to happen
  - Screening it is a possibility (currently has a fence and some vegetation surrounding it)
  - Screening could potentially become part of scope
- Elevate parking and adjacent areas to run stormwater out
- FFE will be important – new building will likely be sim to existing BL
- Surface flow not desired by city
  - Happens frequently here
  - Not common to rest of city
- Underground vs surface: multiples more expensive than piped
- Existing trees – could be incorporated into gateway concept

SANITARY SEWER

- Is currently 30 ft deep, 8 inch man holes
- SS would be run southeast to match existing Bishop Lehr route
- Modern fixtures are more efficient, so typically see a reduction in need
- Should scope existing lines – have been dry for some time
- Lots of capacity, good for a new building
- Negative capacity on SE area of west campus
- Nate: likes to think the sanitary from bishop-lehr could be reused
  - May need to be re lined, building and system has been vacant for some time

UTILITY TUNNEL

- Domestic water is not in the tunnel
  - Tunnel does have heating water, high voltage lines, electrical, and all coms. / IT
- Able to walk in the tunnel, sidewalk is the "lid" for the tunnel
  - Current tunnel has flooding issues
  - 6" of concrete has been added to the "lid", topped the tunnel when new parking lot went in
  - Access utility tunnel through pedestrian tunnel underneath 11th
- Tunnel along East of bishop-lehr is part of building foundation, will be demoed with the demo of the building

WATER

- Reevaluate condition of water line heading into Bishop-Lehr from the parking lot
- 10" diagonal through parking lot, probably in good condition
- 4" heading north
- West campus has very good water pressure, ~100 psi; assumed new building will not need a fire pump
- *Hot Water (high temp water) on slide: has been abandoned and is no longer accurate
  - Now comes up through the utility tunnel

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- For anything coming to the building, need to come off the UNC lines (10" loop)
- Fire hydrants could come out of city main and streets
- Domestic water is master metered
- Meter locations are on 14th and towards central campus
- Civil comment: small main will be needed as well
- Central campus fire hydrants are from the city
- A domestic meter must be put in for the building as well
- Backflow for fire and DW
- Allowing for a fire lane would be desirable, incorporating fire water and access into the program plan would be beneficial

GAS

- There is gas to Bishop-lehr, not all buildings have that, probably not active
- Gas historically used for labs, not heating
- Not anticipated to need gas in the new building except for research spaces (these spaces will be in Ross at this time)
  - Lab expansion would be apart of phase two for medical school/health professions development in an additional building
  - Gas not anticipated for programmatic needs
- ATMOS deals with gas through meter, UNC does not manage these pipelines
- Would want a new line due to age of existing

ELECTRICAL

- Electrical Plan is the lighting plan
- MV though tunnel
- Routing to transformer pick up at tail end of tunnel
- Feeds for lighting that are there now could go away, would need to be updated anyway
- A lot of site lighting comes out of the tunnel system
- Direct bury should go away. What is in the new parking lot is ok, the rest should go away
- New parking lot is being fed from the campus commons
- All new lighting to be fed from the new building
- Lighting is controlled through the building automation system (BAS)
- Photocell backup / timeclock on/off main
  - Can be overridden when necessary

TELEPHONE

- Is the existing switch room in Bishop Lehr still active? / what needs to happen there
  - Existing switch room that Century Link has in building may or may not be active still
- New phones will all come from the UNC data network, VOIP phones
  - Line from Cesar to Bishop is the one in question

- Running new Fiber line from McKee and Ross to the new building would be priced as part of the concept

LEED Discussion

- Lisa Denlinger leads SG sustainability efforts, based in Phoenix
- Vision for sustainability
  - Sustainability plan is currently in the works for the overall campus
  - Project specific - Want to be flexible for the new CMP
  - Impact this project could have for campus is how the tone can be set for the rest of campus
  - Mandated, but new BIG, creative concepts
    - High visibility, high goal setting, set the tone for sustainability on campus
  - Natural Gas is already burned on campus and provides domestic water, chilled water, and heating
  - Switching over to electrification would not be as efficient as the current system
    - Cannot electrify the heat plant and maintain efficiency
    - They are also not familiar with those systems
    - High cost, but big impact later
    - Considering / researching electrification is mandated by the Governor for UNC
  - Current rooms on campus that are heated by electricity are storage rooms or smaller
    - Rest is on the HTHW system (Burns Natural Gas)
  - Balance with payback and prudent systems
    - Traditional campus values of payback and reliability vs. cutting edge; may not have the funds or capacity to be cutting edge; innovation vs life cycle cost
  - Worries/afraid of cutting edge tech, but want do the right thing at the same time
    - UNC doesn't have a large internal technical capability
    - Don't want to be a beta-site for new tech, they prefer sure/proven technology
    - Want to take proven technology and implement them as well
    - Worries of cost are also an issue
      - State funding and donations, fiscally responsible
    - Nate's departments priority
      - Most efficient HVAC preferred
      - Would like to look specifically at energy efficient to drive down BTUs, kilowatts, and energy consumption
  - Beth Longenecker additional comments
    - Creation of a wellness corridor, an environment that is welcoming
    - Desire for recycling opportunities and ample natural light
    - As energy sustainable as possible
    - Balance between efficiency and student health
      - Sustainable, but not at the cost of student/faculty wellbeing
  - If the project only achieved one thing what would that be?

    - Chris – wants it to be the most efficient building
    - Nate – same as Chris (above)
      - Not too high of a bar based on other campus buildings and as technology advances
    - Nate Patrick – feel and experience of the building
    - Beth – tie to community and campus, not an independent entity, ties to UNC and Greeley
    - Kirk – needs to be achievable, find the balance that allows them to proceed
      - Could exceed LEED Gold, if possible without being heroic
      - State requirement is LEED Gold, LEED platinum would be better
    - Lisa – Shooting for WELL certification speaks to personality of the school
    - Andrea – will design with basic principles, not necessarily to get the certification
  - For this building, reuse the bishop-lehr site and not touch the athletic field
- Overview of LEED
  - Location and transportation
  - Urban site within ½ mi of diverse uses
  - Public transit access within ¼ mi
  - High bike ability
  - Car dependent
  - Opportunity to provide EV charging stations
    - Kirk and Chris fully support this
    - Very interested in solar covered parking spots
      - For both future projects, and for this specific project
    - EV charging load – would be incidental
    - Parking lot will be shared between schools
    - 400 people parking for osteopathic
      - Possibility to permit the new lot only for medical students
    - Carsharing is likely off the table
      - Have already tried this and it was not successful
    - Closest system to car sharing: Regional bus, drops off at central campus, within a ¼ mile
      - Poudre express, drops at 10th/ 20th street location
  - Showers and changing rooms
    - Are a necessity for any spills in the anatomy labs
  - UNC traditionally struggles with public transit LEED points
  - Sustainable sites
    - New lights are full cut off, old ones are not
    - Landscape
      - Very open to native grasses and xeriscapes
      - In state of CO, water has to be release within 72 hours
      - Percolation and infiltration tests are important
      - Clay soils have a low infiltration rate

        - Chris – all weathered sandstone / bedrock on the site currently
        - School has water rights to non-potable ditch water
        - UNC may have soils report available
        - Civil: trick is having equal areas around building, parking lot, that will spread the water out
        - Open to a geogrid or permeable solution
- Roof
    - Traditionally don't like white roofs
    - Reduces heat gain needed in the winter
    - Consider sloped tile roofs as part of architectural standards for this project
- Outside learning / teaching labs
    - Use for outdoor gathering and study
    - Outdoor teaching/labs do not align with this college's program
- Water Efficiency - Chris: desire is to meter everything (water wise)
    - Hopes this project would tie into existing non-potable water
        - It is not gray water, it is irrigation water
        - Don't have gray water piping currently
        - No objection for gray water for this building/project specifically
        - Would like to consider pricing
    - Also desire to energy meter
- Energy Efficiency:
    - Big fans for commissioning
    - Enhanced commissioning
    - Envelope commissioning - they have not done in the past, but would like to pursue for this project
    - Lot of opportunity in the energy and atmosphere category
        - Nate feels like there's a lot of opportunity for optimize energy performance not currently reflected in the scorecard: ties into upfront efficiency and long-term sustainability for the project
- HCPE
    - Nate believes Daylighting is required
    - Most of this is built-in and can be discussed later
- Solar
    - Students across campus support "doing solar"
    - Strongly consider solar on this project
        - High visibility and good location
        - Educational opportunities
    - Solar canopies on parking are a possibility
    - Resistant to rooftop solar for cost of taking them off to repair roof
        - Could use parking covers for solar instead
    - Have an ISOC agreement
    - Receive ½ million dollars a year from XCEL

MECHANICAL DISCUSSION

- Have utilized heat recovery without recirculation on campus
- UNC is in a very heavily heating region
- High temp water generated at heat plant, no longer have a Cogen system
    - 8" high temp lines
- Heat recovery
    - Konvekta system is a run-around coil system (UNC not familiar)
    - Have used coils, plates, and wheels
- Direct evaporation
    - UNC has typically used indirect in the past
    - Main concerns with direct are with water treatment and the level of effort involved
    - UNC does very little humidification
        - Typically used humidification for storage spaces
    - Typically would not see any steam in the building
- New building will need
    - Preserved body and cadaver room storage
- AHU configuration
    - UNC a fan of fan wall tech
- Heat recovery chillers
    - Potential hybrid system = water-cooled chillers + heat recovery chillers + waste heat recovery + HTHW campus system
    - Water-cooled chillers traditionally the standard on campus, have also done air chilled
        - More open to air-cooled chillers, a way to reduce chemical treatment
        - Air cooled preferences
            - One the roof, need to screen in
            - Leaning towards placement on grade
    - Open to mag bearing
- UNC believes we are headed in the right direction
    - Prioritize heat recovery
    - Prioritize adequate space in mech rooms
    - Scalability of cooling systems – tend to overdesign these systems
    - Roof-mounted equipment should be screened; noise is a concern; prefer to put at grade and screen it low

ELECTRICAL DISCUSSION

- West Campus primary distribution
    - 2 minute max parallel allowed
    - Do not parallel the load shed
    - Two loops to west campus for distribution, but loops are interconnected for emergency situations
    - Nate can send markups for most recent version

- New building power
  - Replace BL (Bishop-Lehr) switch with a new PMH-9 in anticipation of future builds on site
- High likelihood there will be more buildings on this site at some point
- Campus distribution capacity
  - No capacity issue for primary
  - Building level meters
  - Utility metering
  - Generators – should be able to add another building, but should verify; load shed seq of ops (individual equipment – campus chillers)
  - No concern for capacity on main switchgear
  - No concern for capacity on loops, but should verify
- Continuity of power
  - No other buildings planned for construction at the same time
  - No portions of loop missing or not operational
  - Only site lighting on BL site should stay operational
  - Phone switch – may be some pass through, should confirm
  - Abandoned high temp under site
  - SS, SD under site, but related to site (not passing through)
- Emergency and standby loads
  - Life safety
  - Legally required
  - Optional
    - Provide allowance
    - Would want to be on a local
  - Refer to design guidelines for products; will be updated by the end of the year
  - 1 gas powered, rest of the generators on the campus are diesel
  - UPS would likely be POU for this building (rack mounted for IT, distributed for equipment)
  - Cooling for data rooms independent of main system; cooling systems for buildings are not used all year; transfer air can be considered
  - Ok with single generator
- Metering
  - No tenants planned
  - UNC has building level meters of varying qualities
- Innovation
  - No foreseeable use for battery storage or peak shaving
  - Can we use batteries for life safety?
- UNC standards
  - No panels in classrooms or labs (labs could be case by case)
  - Is comm required to utility? will tie into campus, not utility
  - No campus lighting control standard
  - Some flexibility in building-mounted fixtures

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- EV charging
  - Interested in expanding
  - University center has 2, 1 other elsewhere on campus
  - LEED minimum, would consider going past that
  - Equipment to be provided by this project

CIVIL DISCUSSION

- Domestic water 10 inch on the southside
- Sanitary Sewer – capacity issue, will look at that
  - No other projects at this time tying into that system
- Above 30 foot height of building is where the fire lane position/width changes

GENERAL COMMENTS

- Kirk – does not want to remove the newly paved parking lot

PROJECT	UNC Greeley College of Osteopathic Medicine (UNC COM)	MEETING NO.	Workshop #3
PROJECT NO.	14147.00	MEETING DATE	10/21/2022
PROJECT LOCATION	501 20 St. Greeley, Colorado 80639	MEETING TIME	8:30am–4pm MDT
SUBJECT	Workshop #3	MEETING LOCATION	On-Site @ UNC
PREPARED BY	Alexander Person III		

ATTENDEES

ITEM DESCRIPTION

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WORKSHOP 3 NOTES
DAY #1 2022-10-21

Revised Program Review

Morning Conversation

- Currently carrying a 10% space contingency on top
- We are looking at this site as a health sciences campus (Andrea)
  - Nursing would require 3 big skills labs and offices
  - State wants to know how Nursing will grow – needs to be in the Program Plan
- Concern by UNC that Nursing funding will be cut

Revised Guiding Principles and Program

1. GP (Guiding Principles) Focus on team-based learning (TBL)
2. GP Engage our community and become a regional resource

   a. This principle has changed from the previous version by including the UNC community
3. GP Create a supportive environment for students, faculty, staff
   a. Accessible, friendly environment, welcoming
   b. Think about space for student scholarship (posters, monitors, etc.)
4. GP Respond to change while respecting
   a. New Change - were previously using the word that implied potential movable walls, this has been removed
   b. Has been updated to flexible use instead
5. GP Commitment to sustainability and wellbeing

Benchmarking

- Beth: curious how our program compares to the California Health Sciences and other projects' program

Model Program Overview

- Slight reduction in classroom, now 2 classrooms with skills lab
- Social spaces distributed throughout
- New sqft is closer to 100,000 sqft (99,807sqft)
  - Usable space is 64,810 sqft, 71,291 sqft (with 10% contingency)

Space Program:

Classrooms

- Kept the 2 TBLs, one with a divider
- Layout of skills lab can change based on the use of the room
- Beth: Nursing could use the skills lab
- Skills Lab
  - A storage room should be added for this space for flexible furniture storage
- Are the TBLs big enough? (Andrea)
  - Each is currently 5650 sqft (11300 sqft total between the 2)
  - Beth: A little larger than Ohio's would be preferred
  - The currently sqft accounts for room for expansion
  - Beth: Concerns about acoustics in the TBL
    - Verify with Kelly from NV5 about acoustic solutions
  - Currently showing monitors around the perimeter

Class Lab / Anatomy Labs

- Originally had write-up areas, those have been removed
- Added a workstation for support staff
- Skills lab will be adjacent to this space
- Beth: is it feasible to build a standalone anatomy lab in case the building is not ready by the needed time?
  - Kirk: would still need the same utility infrastructure as the actual building
    - Not sure if it could be built fast enough to meet needs
  - Beth: Space needs is not a valid reason to change curriculum
- Beth: about 3,500 sqft of this space would average at $700 /sqft
- Beth: need eyewash stations in addition to the sinks
- Andrea: how to get ventilation out of the building
  - Kirk: plaza above this area of Michener
    - Does not have operable windows
    - Makes ideal for ventilation
    - Have to verify plumbing still

- Issue is needing all the same infrastructure as the final building will need
  - No space in Ross that is usable

Class Lab / OMM Lab
- Number of handwash sinks has been revised to include 4 sinks
- OMM has OMM tables and monitors
- Beth: we can go up to the full 8% overage for student count
- Beth: do not need to use the most expensive/fancy tables for this space

Simulation
- Now have a more generic approach for this space with four equal sims
- Is there a need here for a nurse station? (Andrea)
  - Beth: does not believe this is necessary or to be built into the building
- Conference room here should say 20 person, not 16 person

Standardized Patient (SP)
- Conference room here is shared between SIM and SP
  - Conference room needs to grow to 400 sqft / 20 person room
- Smaller conference room could be a place to onboard students (Beth)
- Configuration includes a centralized control room
- A TBL could be used for large scale SIM / community use
- On stage / off stage flow
  - Flip-up charting stations should be used in this space

Office / Student Services
- There is a director of student orgs, add this terminology
- Huddles are directly adjacent to the welcome center
- Mental Health
  - Larger, include a social setting
  - Prefer a second exit
- Do interview rooms need to be added to this space? 16 potential students per day
  - Beth: will need interview space
    - Minimum of 3-4 people in those rooms
    - Use group study spaces and conference rooms for interviews
    - Faculty offices can be used as well, use Huddle if staff does not have an office
  - Prefer the smaller huddle rooms to be enlarged
    - Enlarge them to 120 sqft
- May have expansion needs
  - Will need up to 3 additional support staff – add 3 private offices
  - Clinical board, financial aid, etc.

Office / Clinical and GME
- Do clinical and GME need to be moved into student services? (Andrea)
  - Beth: Clinical Ed support coordinators, and Clinic Ed Manager, research support and statistical support - yes
    - Move everything but the (2) private offices to student services
    - 2 FSA / Preclinical asst. to go up with the faculty (private offices/admin)
  - Leave AD clinical affairs and Asst. Dean with faculty admin

Office / Admin
- Eliminated associate dean position (SAD Med Ed), convert to future staff member for expansion needs
- Would be ok to have the extra office still in case of expansion / growth

Office / Faculty
- Will need 2 more chairs (increase private office to 4 total)
  - Biomedical sciences and specialty medicine/surgery

- Conference rooms
  - Update conference rooms to reflect the following
  - 1 large (400sqft)
  - 1 medium (250sqft)
  - 2 small (200sqft)
  - Take 2 of the small conference rooms (200sqft each) and add it to the breakroom space to increase the size of the breakroom to 700 sqft

Office / Operations
- Kirk: only staff from facilities standpoint is the custodial staff
  - A building lead - provide a touchdown spot for that position
  - 8x8 workstation would suffice for the building lead (150 sqft)
  - A break room for 4-5 people that will be moved from Ops to general building
    - In addition, need storage and equipment rooms
    - 150 sqft for each
- Facilities support moves to general building space

Medical Info Center + Quiet Study
- Storage room here to have models for student use 150 sqft
  - Models are not checked out, cannot remove them from the building
- Separate quiet (carrels) and loud (group study) spaces from each other

Carrel spaces should be behind a closed door with access from MIC and outside the spaceSocial Study / Student Support Space
- Help desk should be an IT function – in General Building
  - Student work area and help desk could go away
- Student lounge
  - To absorb the vending/break room
- Increase study rooms up to 14-16 rooms (increased from 12)
  - Add two in library
  - 12 is ok, 16 is ideal
- Need to include 3-person office for SGA (120 sqft)
- Keep one student org space, remove oneKeep 1,000 sqft storage room
  - Reallocate the other 1,000 sqft
- 150 sqft from student work area in Social/Study to be moved to increase the IT space in the lobby/general building area
- Keep receiving space
  - Should be near the dock area
  - Is not necessarily a mailroom
- Beth: multipurpose, multi storage, and teaching kitchen are negotiable and can be removed if needed to help costs
- Server room could potentially shrink, verify with IT consultant / UNC IT

Overall total gross update
- About 101,000 sqft GSF now with all these changes
- NSF is closer to 66,000 sqft

Cost Presentation
- $85 million is the project cost
- $59,500,000 is the construction cost
- $566 - $626 cost per sqft
- Roughly $120k to demo Bishop-Lehr
  - This is to be included in the estimate

- Kirk: RLB usually bids lower than what the actual cost ends up being
  - Mecayla: has heard RLB is typically 20% below

NV5 / Technology Trends

Medical Education - Today Simulation Center
- Beth has met with the platform vendors
- Kelly recommends setting up visioning sessions
  - Where they show their interface and demos in person
  - Create a sandbox account
- B-line/Laerdal, KbPort, CAE
  - These are open concept, they talk to each other
  - CAE is already on campus for nursing
    - Verify if nursing has cloud solution or on-premise
- Trends being seen
  - Flexibility / movable partitions
  - Three bed triage
  - Large monitors
- Beth's previous experience with Sim Centers
  - Likes the flexibility
  - Don't need a big ward
  - Beth prefers a central observation room

Medical Education - Today and Future Augmented Reality
- CAE is the front runner right now
- All platforms have audio customization to make the voice more realistic
- Key to technology success is a robust wireless network

Virtual Reality
- Beth: Infrastructure should include connections for this, but it may not be a part of the initial buildout
- Useful for empathy training

Classrooms and Flex Skills Labs
- OMM needs the ability to record and capture, and to watch back
- Also need that ability in the TBLs
- Camera with multiple views on the table
- Keep option for students to share results from their personal devices
- Beth likes the capturing and stored, and ability to watch back
- Flex skills will be flexible space with one dedicated location for capture

Standardized Patient
- Beth: don't think a motion lab will be needed, may already be a space in Gunter Hall (1750 Biomechanics Lab or 1610 Exercise Physiology Lab)

Anatomy with Virtual Component
- Ohio had a portable camera vs a camera at every station
- Demo can be displayed throughout the room
- Beth can sacrifice the movable screens on arms

Debrief
- Minimum of 8 students

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- After a sim, 16 people for debrief
- COCA review standards for recording requirements

Acoustics
- Kelly: make the ceiling have a high level of absorption
- Have tables as far apart as possible
- Strategically locating wall panels
- Background mechanical noise must be very low as well

Other notes
- Since CAE is being used for Nursing, Kirk believes that there wouldn't need to be open bids for other software/tech
- Will the simulation room be used by outside sources ie. Banner
- Need to budget for the cloud-based licensing if that is the chosen route
  - Between $50,000-$100,000
- Have capability to use a reservation system for reservable spaces through the Library

Block and Stacking

- 2 story - 90' bay
  - Flip clinical ED and GME to first floor and Operations to 2nd level
  - Beth likes OMM and Anatomy close / on the same floor
  - Beth: Changing for OMM needs to be on the same floor / next to OMM
  - Beth likes anatomy being on an upper floor for ventilation purposes
- 3 story scheme - 90' bay
  - Beth would prefer OMM and Anatomy close to each other, not on separate floors
  - A 3 story is more efficient from a cost standpoint
  - Review whether anatomy needs additional structure for its mechanical systems (weight concerns from Beth)
  - Move the OMM up and some of the student support up to the 3rd floor
    - Create an academic and study floor on the 3rd floor
      - Proximity to spaces for private conversations are important
    - 2nd floor becomes mainly faculty admin as an option
  - Look further into the option of building the anatomy lab separate on its own first
  - Could look at making the second floor primarily office space
    - Could mix study social with faculty
  - Beth agrees that separating the office spaces helps to not create one group owning any one floor
  - This is the most compacted option
  - Beth
    - Could SIM and OSCE swap spaces with student services and general building
    - This would create a separate wing for SIM
    - Orange, pink, blue from left to right on the first floor
- 3 story scheme V2 - 90' bay
  - Beth: good to have SIM and OSCE in its own wing
  - SG + DPS to determine what height the TBL classrooms need to be
  - Kirk: could pose challenges for the TBL
  - Beth thinks this option is more architecturally interesting
    - Likes connection space underneath the building

- Student Support to be called STUDY SOCIAL from now on

Bridging Plan / Plan B

Potentially using Ross for Gross Anatomy
- Lecture Halls 1010 and 1040
  - About 2,000 sq ft each
  - These spaces are tiered, poses a tough conversion
  - Could be prime space for Cadaver use
    - Where would delivery of cadavers and other deliveries occur here?
  - Would need to conduct an exit study for this space / building
  - SG/DPS to add this an option and to look at costs
  - It is a stepped floor, going down towards the stage / plan east side
  - This would become the permanent home
    - Promotes spirit of integration (Dr. Kamel)
  - COM building would then absorb traditional undergraduate classroom space
  - This could be phased as a plan B, because it needs to be done prior to the new building
    - Possibility of opening in 2026 due to capital funding
- 1060, 1080, 1090
  - Much smaller

Plan B / Michener Library Option 1 for Anatomy
- This plan provides 9, not 10 tables for gross anatomy
  - Potential to move cold storage wall plan west to make more room for the 10th gross anatomy table

Plan B / Michener Library Option 2 for Anatomy
- This plan allows for the 10 tables

Plan B / Michener Library Option 1 for OMM
- Not currently getting required table count
  - This layout would mean 4 OMM labs per day, not enough staff for this
  - Could potentially divide OMM to 2 rooms and divide the faculty between the two rooms as long as they are close
    - Could potentially use multipurpose L172 room for 2nd OMM lab
    - Just need monitors and table, no need for any wall changes
  - Potential for OMM to go to Harrison and classroom to come to Michener

Plan B - Harrison, Classroom, and Study
- Could potentially use group study rooms for OMM
- Beth: need at least 5 small group study rooms

- Beth and Kirk to set up time with other departments to explore potential of Plan B
- Beth to talk with Tom and John about how having separate lab spaces has impacted student experience and flow

Massing Options

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- UNC group heard previously that Rec Center wants Bishop-Lehr site
- The goal of this project is to elevate UNC
- Kirk: Trees on NE corner are not sacred, do not need to design around as a starting point
  - Nate: what is the LEED impact of removing or keeping the landscape
- Kirk: the last master plan removed McKee
  - McKee is getting old, not well beloved, but also no imminent plans for replacement
- No conversation from neighborhood yet about building relationship

Option A - Gateway
- Most compact option
- Andrea: think of this as a health science campus in the long-term
- Nursing could potentially be the building closest to 11th (Beth)
- Andrea: could possibly place clinical along 14th
- Building could be shifted further East
- This scheme respects the parking
- Kirk: the pedestrian bridge is not realistic
  - Ceremonial bridge / portal also probably not realistic
  - Rest of campus has low monument signs . Follow that approach for the COM
  - Open to feedback about the bridge however
  - Kirk: NE to SW bridge would be better
- Andy views NE corner where gas is located is important
  - Wants it cleaned up and become an entry point
- Beth thinks this plan is so far away and may feel lost

Option B - Portal
- Beth likes the multiple layers / stepping down of building heights
- Focal point could be public art installation (Beth)
- Beth and Kirk both like the outdoor space in this plan
  - Would draw students to the building
- Beth likes this option better than gateway aesthetically

- Frazier could go in the SE corner of the site in this plan

Option C - Spine
- Andrea: 3 stories, and 1 story is also an option for this plan
- The gap between the buildings should be smaller
- Andrea: want to connect visually the commons / entry to student social space which could be located on the bridge

Those to pursue
- Beth prefers B + C
- B is preferred by Kirk and Beth
- Look at a 3/1 story for option C

Option D - Master Plan input design

This option is in response to feedback received from the SmithGroup UNC Masterplan team that purposed the corner of 20th Street and 11th Ave been reserved for a use more focused on

undergraduates. The building was placed to the west on top of the existing Doubenmier Field. This location allows for proximity to the underutilized parking (west of Candelaria), less obstructed view from 20th Street to enhance its prominence, acknowledges the demolition of Bishop Lehr, and would be closer to existing buildings that perceived as more integrated with West Campus without relying on future development. The massing implies a taller 3-story form along 20th Street and would step down as it turns south toward Candelaria.

- Most of the students who will be doing IPE with are currently on central campus
- Club baseball uses the West fields next to Bishop-Lehr (Kirk)
- Beth: concerns about crossing from far west parking to new building, need to look further into this
- This idea increases distance from Michener, Ross, and the University Commons
    - No longer convenient for the MED students
    - Less integration into the campus
- Beth: does not address that "gateway" at the NE corner
- NW corner is intriguing for Frazier in the distant future

Sketch from Neal

Sketch provided by the SmithGroup UNC Masterplan team conceptualized the COM at the northeast corner of the site and a undergraduate program just north of the pedestrian underpass. This concept is organized around a green space that extends from West Campus and terminates at the new COM building with future expansion to the west. It also removes parking from the interior of campus and moves it to the edges.

- Beth: willing to push the building into the NW corner
- Allows for space for Frazier/undergrad to the southwest corner of the site
- Music library could move into Michener

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PROJECT	UNC School of Osteopathic Medicine	MEETING NO.	
PROJECT NO.	14147	MEETING DATE	11/16/2022
PROJECT LOCATION	Greeley Colorado	MEETING TIME	9:00 am
SUBJECT	Workshop 4	MEETING LOCATION	Hybrid
PREPARED BY	DPS / SG		

ATTENDEES

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Mecayla Cobb	SmithGroup	mecayla.cobb@smithgroup.com	
Darin Daguanno	SmithGroup	darin.daguanno@smithgroup.com	
Andrea Hanson	DPS	anandreah@dpsdesign.org	
Keri Stevenson	DPS	keris@dpsdesign.org	
Alexander Person III	SmithGroup	alexander.person@smithgroup.com	
Cristal Castro	SmithGroup	cristal.castro@smithgroup.com	
Dustin Simmons	SmithGroup	dustin.simmons@smithgroup.com	

- Introductions
- Review schedule
  - AP to review WS6 date and time with Nate
- Review GP
  - Teaching kitchen and po-up clinic not a big program driver (these amenities on campus) but provide space for community engagement
  - UNC would ideally like to move nursing near COM in future
- Review model program
  - Looks good
  - Feel comfortable where we are until we get some pricing, then may need to adjust
- Where are we with other colleges
  - Yes, IPE, other learners
  - Flow of funds within the college

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- Site assessments
  - Previous discussion
    - Neil's sketch
      - Create campus space grace
  - Recap overarching design parameters
    - Master plan and overall relationship
    - Site scale and parking
    - Remove access road
- Portal option – site
  - What is the pedestrian experience around the building
  - What is the vehicular connection
  - Utilizing the elevation changes on site
  - "dress up" the service entrance, screen
  - Demonstration path
  - Overlook patio
  - Phase 2 and 3
  - Framing outdoor amenities with different buildings and uses
  - Future clinic
    - Would be smaller (maybe an OMM clinic) because of clinic space already present within a mile
    - At Ohio, they had ~20 spaces for their clinic
  - New lot and E lot north of Ross also serve UC and Commons (large events can happen simultaneously)
  - Structure/garage in long term plan?
  - Breezeway is heavily used
  - Important to make med school integrated part of campus – more flow is better
  - STEAM integration
- Portal option – massing
  - Not a final space plan, but laid out with correct sf allowances so we know it will work; shown with TARE included; spaces can be rearranged
  - Ground level – sim, OSCE, teaching, student services, lobby/commons
  - Level 2 – OMM, admin and ops, MIC and quiet study, general building
  - Level 3 – anatomy and skills lab, showers and lockers, faculty
  - Anatomy, SP justified to west side, service entrance and freight elevator
  - Would like to co-locate admin and faculty
    - Could swap skills and admin to put admin on third floor
    - Skills is a good place for ultrasounds, so it is a tradeoff if not located next to anatomy; good to have stairs close if on two floors
  - Mechanical visible on lower roof – less desirable
  - Usable roof space would complicate exiting, may require additional stair
  - Massing renders
- Spine option – site

- In a lot of ways, site will develop similarly to option 1
- Pedestrian circulation is more organic on east side of site
- Hierarchical outdoor space – multiple outdoor spaces of varying size around the building created by building shape
- Phase 2 creating stronger pedestrian link
- Phase 3 further emphasizes pedestrian link, creates shared plaza between COM and future building, creates central quad
- Positioning of future buildings is high level – grade change will drive future placement; these slides show a bigger picture space planning perspective
- Footprint is similar to portal scheme
- Contrast with previous scheme
  - Economy of envelope to enclose portal
- Level 1 – TBL, OSCE and sim, study/social, lobby
- Level 2 – student services, ops, faculty admin, second level of social and study
- Level 3 – anatomy, skills, lockers, OMM, MIC and quiet study
- Like faculty and admin on Lvl2
- Like students on top and bottom floors
- Maybe move student services to lower floor, justify faculty and admin to west side

- Spine option – massing
  - Mid-century modern aesthetic in form
  - Can provide tactility and warmth through materials
  - Simplicity of form lends itself to different types of structure, possibly timber
  - Linear materiality
  - Like the more compact evolution of this option
- Massing comparisons
  - Andy will need to weigh in – Beth would like slides today for meeting tomorrow
  - Can merge some aspects of both options
  - Option 1 can be “signature building”
  - Option 2 impact can be defined through rationality and materiality
  - Kamel prefers Portal, “more dynamic”
  - Beth anticipates a hybrid
  - Will present to Andy as option A, option B, or hybrid
- Other discussion
  - No server room required
  - Leave in additional server space for sim as placeholder for future
  - Beth will be out the week of the 5th of December
- Taste test
  - Site
    - Like:
      - Mix of manicured and natural
      - Different seating options, lots of seating

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      - Shading
      - Softness to landscape
    - Don’t like:
      - Cityscape look
      - Too much hardscape
      - Harshness of material
  - Exterior
    - Like:
      - Mix of materials
      - Different textures
      - Lots of glass
    - Don’t like:
      - Ultra-modern
    - Other comments:
      - Need to incorporate campus standards
      - Not committed to any one of the more recent buildings (Ross, Commons)
  - Interior
    - Like:
      - Wood, natural materials
      - Warm materials
      - Combinations of materials, textures
      - Natural light
      - Intimacy
    - Don’t like:
      - Large atrium
      - Too sterile
      - Too modern
      - Round TBL
  - Alexander will scan and send images of boards to UNC
  - Can have follow up meeting to download Andy’s thoughts
- Banner review
  - Only a handful of larger spaces
  - Basement back-up morgue could be used for cold storage
  - Next steps
    - Code analysis based on existing conditions and added program
      - Which of their program spaces will be intermingled with our egress?
      - Traffic from parking garage will pass through C
      - How to control through-traffic
    - Need Banner to clarify what spaces are available

        - Which spaces won't work?
    - Financial model
        - Will Banner cover asbestos abatement?
        - What is the model for paying rent?
        - 10-year lease
        - Would Banner have to put it back?
    - No space that would accommodate TBL
    - Option 1 – put everything in Banner site
        - Not possible that will fit current program model
    - Option 2 – take nothing at Banner
    - Option 3 – take some at Banner
    - Option 4 – Plan B at Banner
        - Second floor classrooms?
- Plan B on campus
    - New spaces – Centennial
    - Harrison –
        - this could be one TBL instead of classroom plus group study
        - could expand to 80-person classroom and a couple fewer group study rooms
    - Michener
        - Library would like for us to not take left OMM room
    - Ross
        - Other places on campus could support lecture hall space
        - UNC to check scheduling for lecture halls
        - Need to add elevator and vestibule to Ross
    - Could move TBL classroom for 80 to Centennial, has a 1771 sf; have OMM in Harrison with possibly a couple of group studies
    - If anatomy goes in Ross, anatomy space in Michener could be group study
    - Sim and OSCE on a dorm floor
    - Can we do sim and OSCE at Banner?
        - Take over one floor for sim and OSCE
        - Could also be a beta test of Banner/UNC relationship
    - Next steps
        - Revise blow-ups
        - Produce site plan that locates all the spaces on campus
        - Bluebeam block of Banner spaces
    - Schedule
        - Funding will not be available until 6/2024
        - Self-fund design? Will force CMGC
        - UNC prefers design build
        - Cost estimates
            - Money for Michener (temporary)
            - Money for Ross (permanent)

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    - Upcoming meetings
        - Feedback from Andy – week of Thanksgiving
        - Concept review call on 12/1 or 12/2 (1-2 hrs)
        - Workshop 5 – 12/15
        - Workshop 6 – 1/5

ATTACHMENTS
N/A

PROJECT	UNC School of Osteopathic Medicine	MEETING NO.	
PROJECT NO.	14147	MEETING DATE	12/15/2022
PROJECT LOCATION	Greeley Colorado	MEETING TIME	9:00 am
SUBJECT	Workshop 5	MEETING LOCATION	Microsoft Teams
PREPARED BY	DPS / SG		

ATTENDEES

NAME	COMPANY	EMAIL	PHONE
Beth Longenecker	UNC	beth.longenecker@unco.edu	
Kamel Haddad	UNC	haddad.kamel@unco.edu	
Nate Patrick	UNC	nate.patrick@unco.edu	
Norma Juarez	UNC	Norma.Juarez@unco.edu	
Mecayla Cobb	SmithGroup	Mecayla.Cobb@smithgroup.com	
Darin Daguanno	SmithGroup	Darin.Daguanno@smithgroup.com	
Mike Bucher	SmithGroup	Mike.Bucher@smithgroup.com	
Andrea Hanson	DPS	dreah@dpsdesign.org	
Keri Stevenson	DPS	KeriS@dpsdesign.org	

ARCHITECTURE

- The brick of the TBL wing is overwhelming. Consider how to break down the walls with materiality or changes in plane.
- West elevation of the TBL gallery feels like vertical bars. Explore options to break up the patterning.
- Reconsider having the check-in and changing rooms for the Standardized Patient actors in the lower level. They will be changing into gowns and should not be required to use the elevator or stairs to reach the exam rooms.
- OSCE will be revised for on/off
- Multi-purpose room is sacrificial space if square footage is over
- Student Services needs a conference room for interviews that is not too remote.
- Culturally it may be better to have admin sprinkled into the faculty offices.
    - Equity builds culture.
- UNC to consider if admin takes the perimeter space of level 2
- Consider open stairs to promote use.
- The Simulation suite should be arranged in a 'pin-wheel' layout with the control room located in the middle.
- Conference room in Student Services is not discrete enough for sensitive meetings.
    - It should be relocated to a more private portion of the floor plan to avoid stigmatization.

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    - Is a waiting area necessary at conference rooms?
- PLAN B
    - Ross Hall reno at $1300/sf and 6500 sf is ~$8.5M
    - Michener reno for gross anatomy would be ~$2M
    - Swap gross anatomy and OMM in Banner
    - Beth would like to see pricing for both anatomy options including impact of including classroom space in new building in lieu of gross anatomy if GA moves into Ross

MECHANICAL / PLUMBING

- Confirmed that dedicated exhaust should be provided for the Gross Anatomy Lab.
- Proposed mechanical systems for the building: campus HTHW, air-cooled chillers, outdoor VAV AHUs with airside economizer and direct evaporation cooling coil and single duct VAVs with heating hot water coils.
- Chillers and two AHUs will be located on the Level 3 roof. One AHU is located on the single story roof.
- Extend the existing tunnel to southwest corner of the building.
- Hot water heat exchangers and equipment for anatomy lab will be in the lower level.
- Domestic water, natural gas and fire protection will enter the mechanical room in the lower level.
- Chilled beam system can be explored based on sustainability goals and
- Anatomy lab will have dedicated exhaust fan located on the roof above the lab.
- Energy model will have to account for utilizing the campus HTHW plant. This will not provide energy savings since it's an existing system. The energy model will have to be looked at closely to help achieve a LEED Gold rating. Other sustainable aspects may have to be looked at based on energy model results.
-

ELECTRICAL

- Refrigerators will be on emergency back-up power. Details will be outlined in the electrical narrative.

SUSTAINABILITY

- For UNC: Is irrigation provided from storm or potable water?
- Credits in dark green column "Y" should be able to achieve based on current program.
- Credits highlighted in light green ("Y-P") will need to be pursued to get to LEED Gold. These should be achievable, through careful planning. Some credits will have cost implications.
- Optimized Energy Performance credit: 15% improvement on energy performance is a State required strategy. Assuming the project will get 16% GHG Emissions performance cost index (PCI) below the PCI target.

SCHEDULE

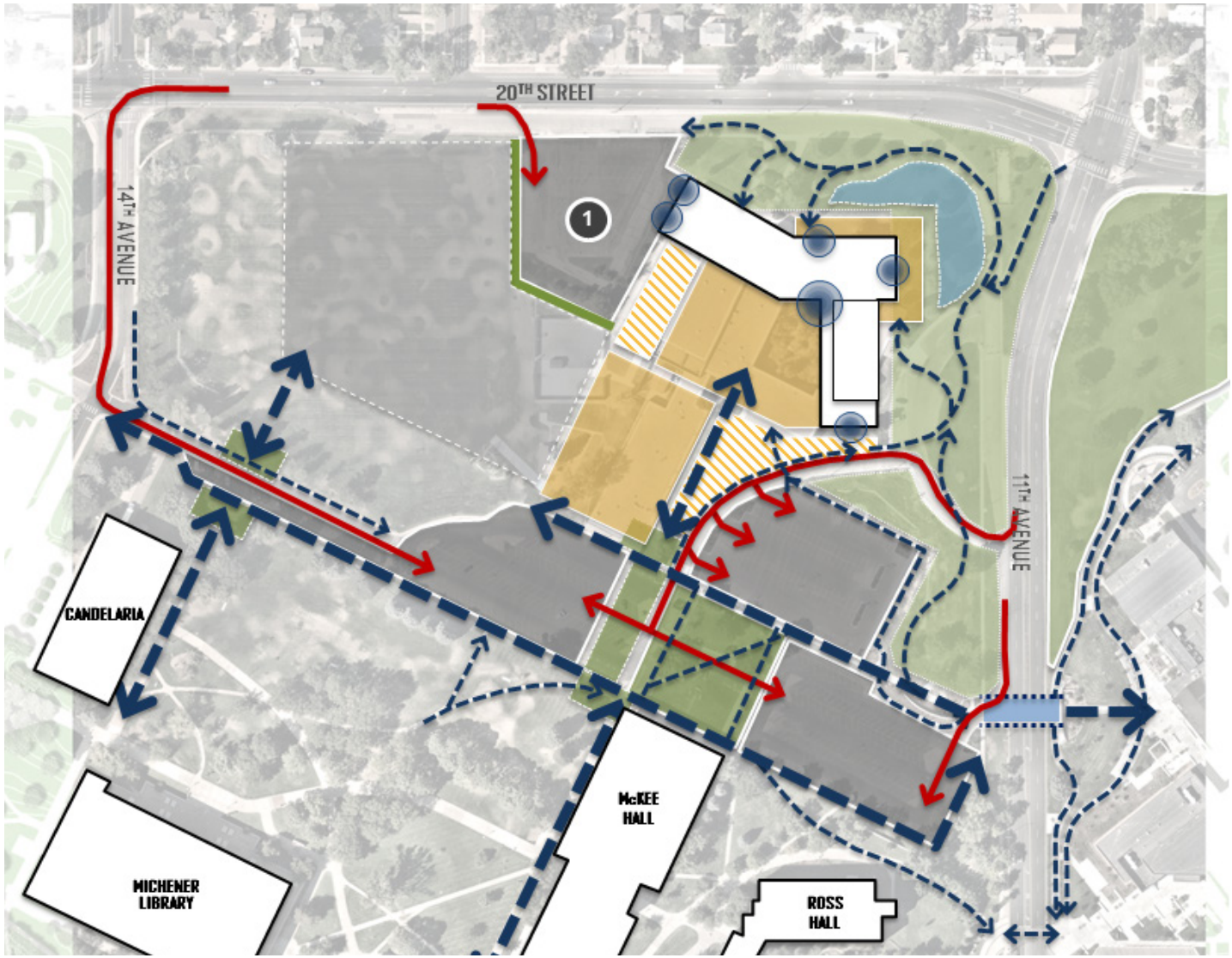
- Can the schedule be shortened?
  - Are there make ready projects that can be completed prior to the issuance of full funding?
  - SG/DPS will research past projects that were able to proceed with phased funding
    - CSU Hydro Building may be an example.
- Summarize a path to opening in 2026 in the program plan document
- Can UNC solicit design services in 2023 and pause until full funding becomes available?

ATTACHMENTS
N/A

4.2 CONCEPTUAL DEVELOPMENT

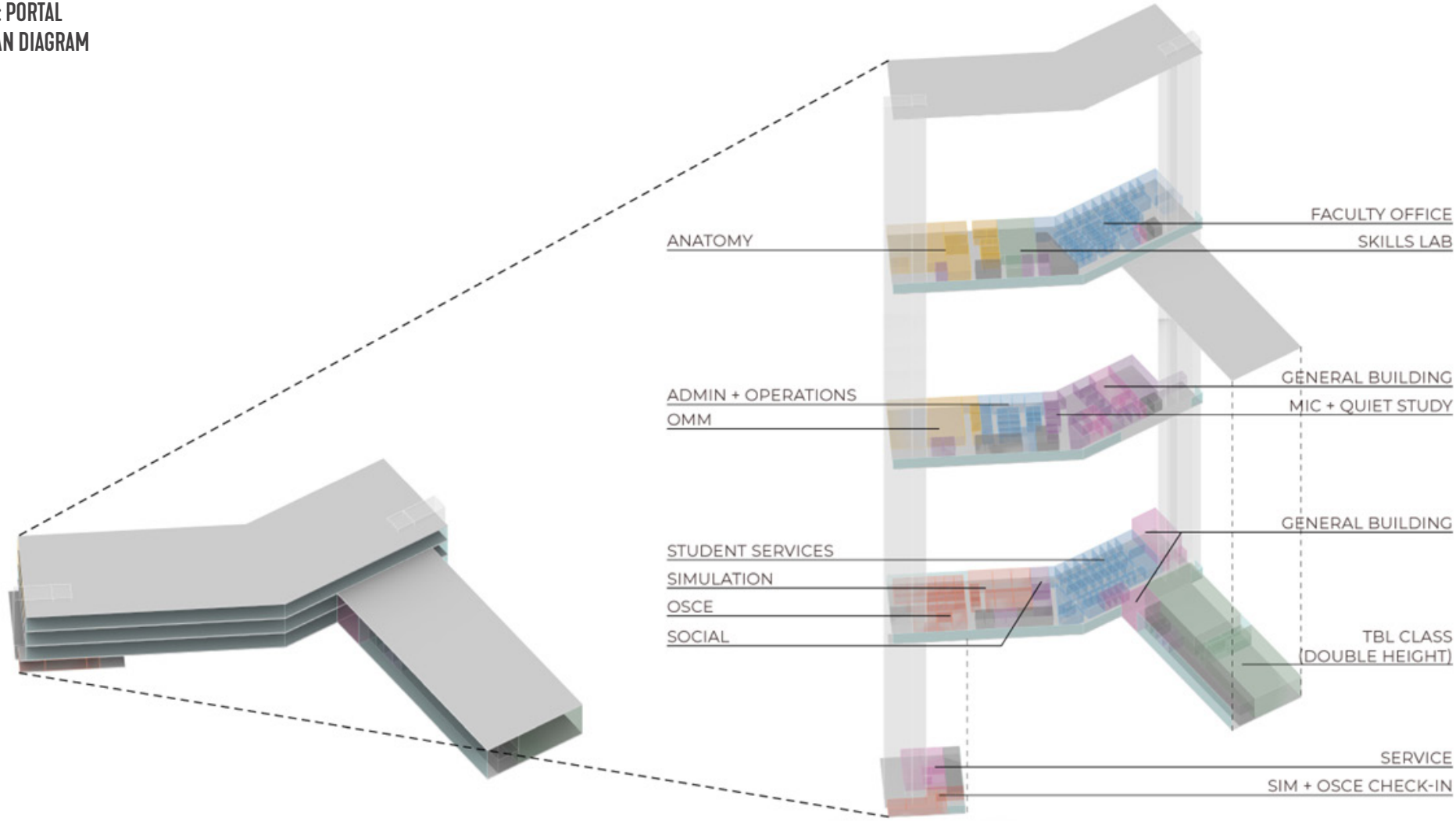
During the process of our programming and conceptual design exercise, our team tested multiple schemes on the Bishop Lehr site. On the following pages, we illustrate the two main concepts we discussed during tis study:

- Option 1: Portal concept
- Option 2: Spine concept

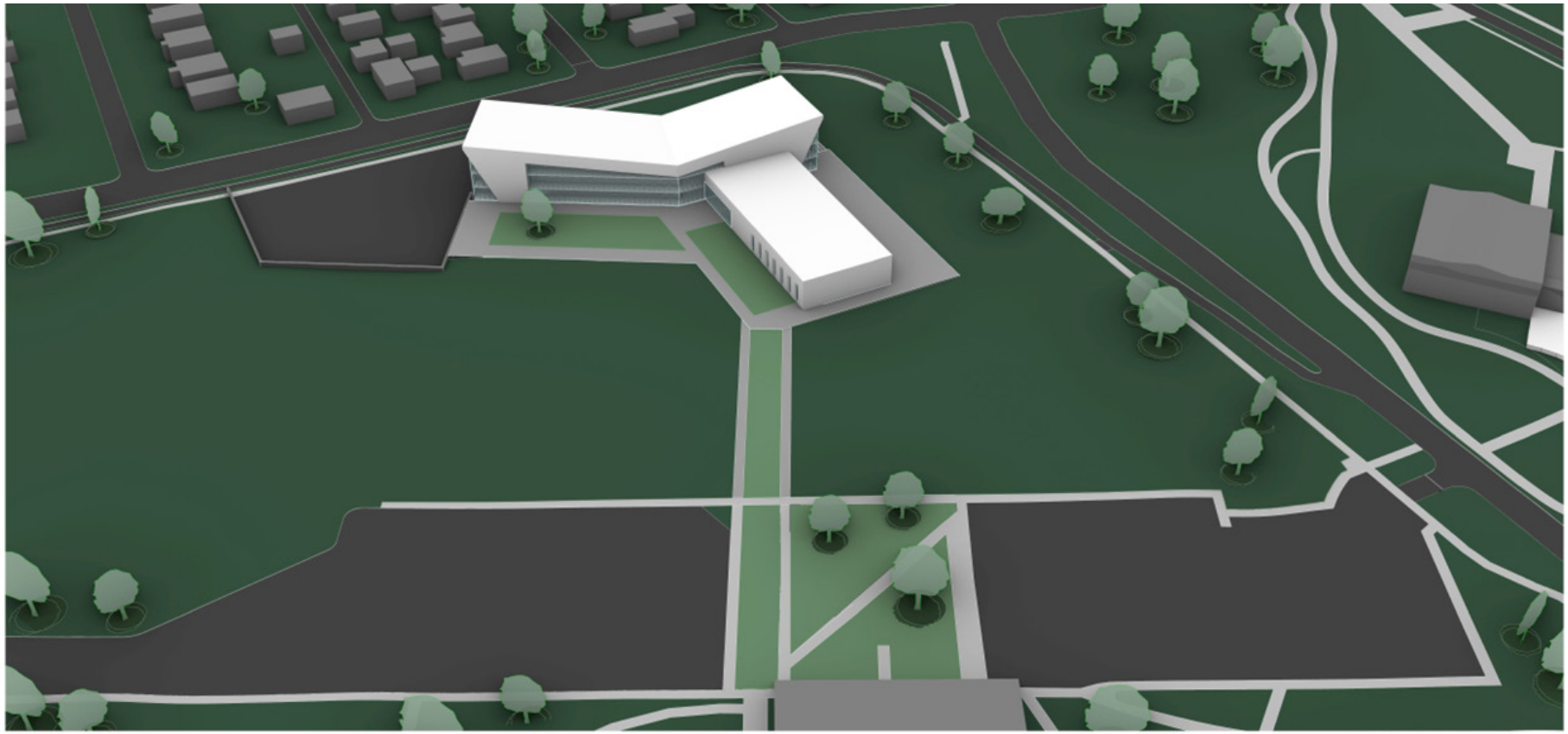


OPTION 1: PORTAL
SITE PLAN/IDEAS

OPTION 1: PORTAL
AXON PLAN DIAGRAM



OPTION 1: PORTAL



AERIAL VIEW FROM SOUTH

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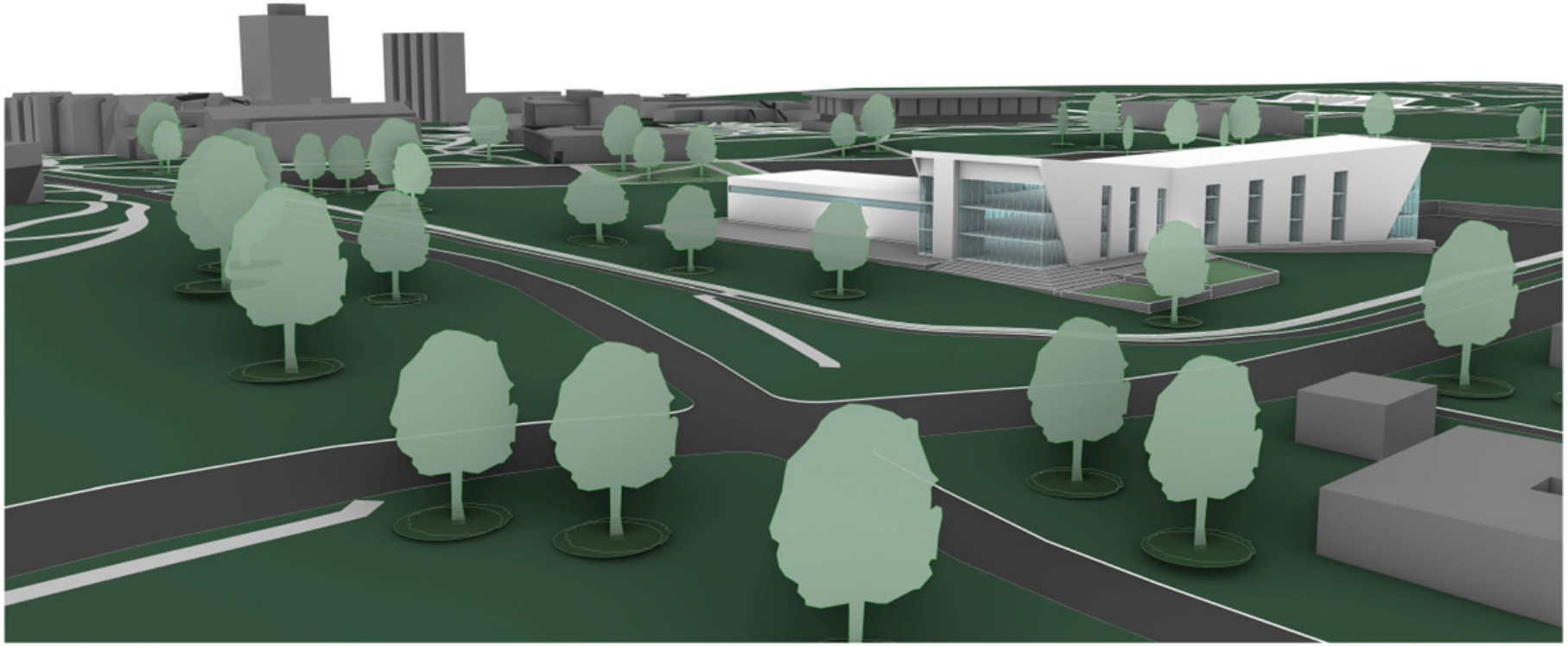
OPTION 1: PORTAL



AERIAL VIEW INTERSECTION AT 20TH ST/ 11TH AVE

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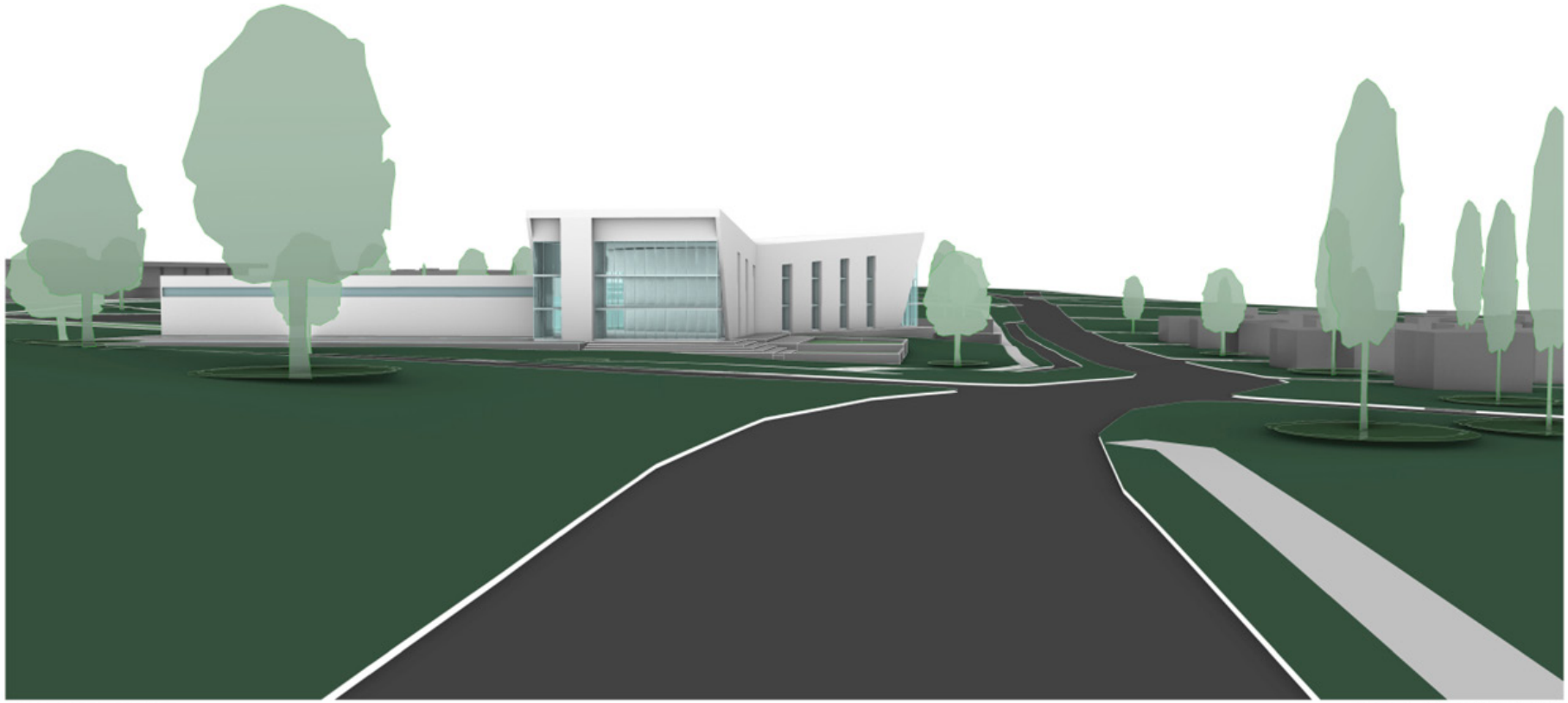
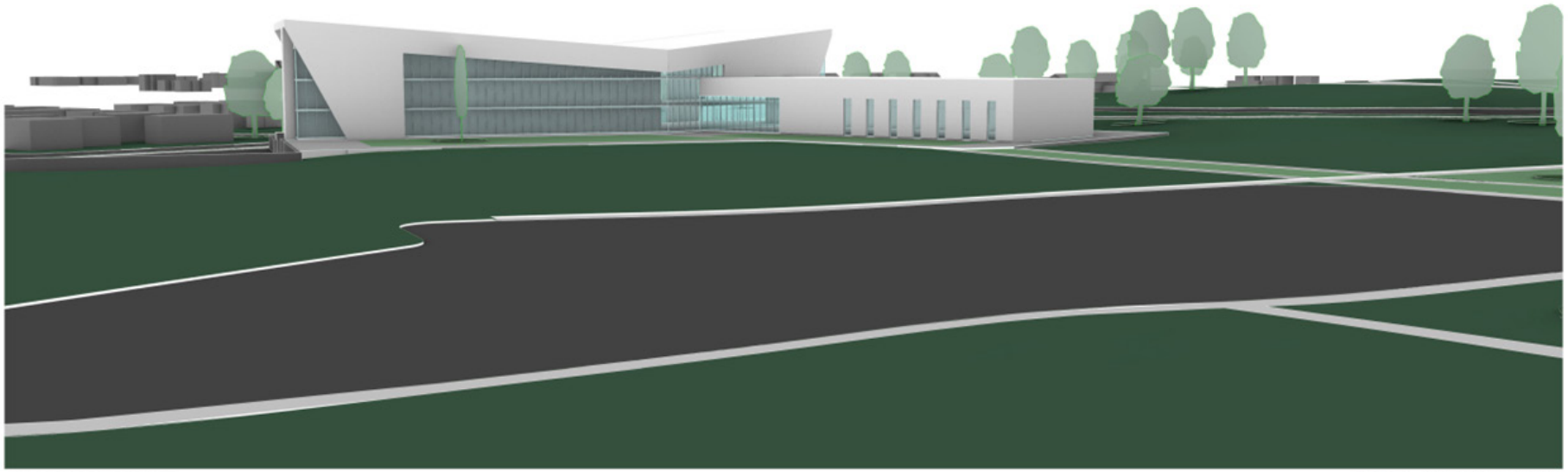
OPTION 1: PORTAL



PERSPECTIVE FROM 20TH, LOOKING WEST

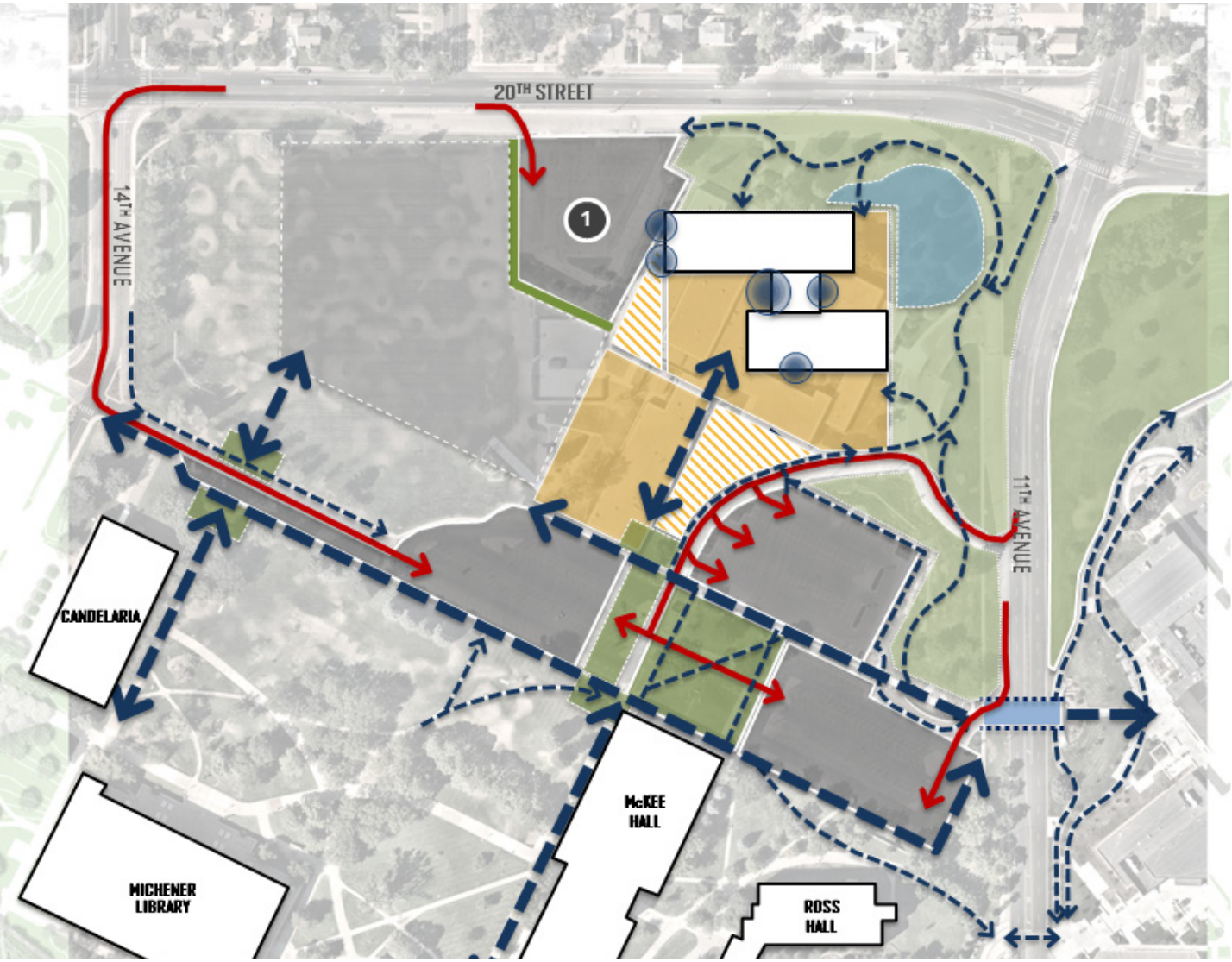
DPS | SMITHGROUP

OPTION 1: PORTAL



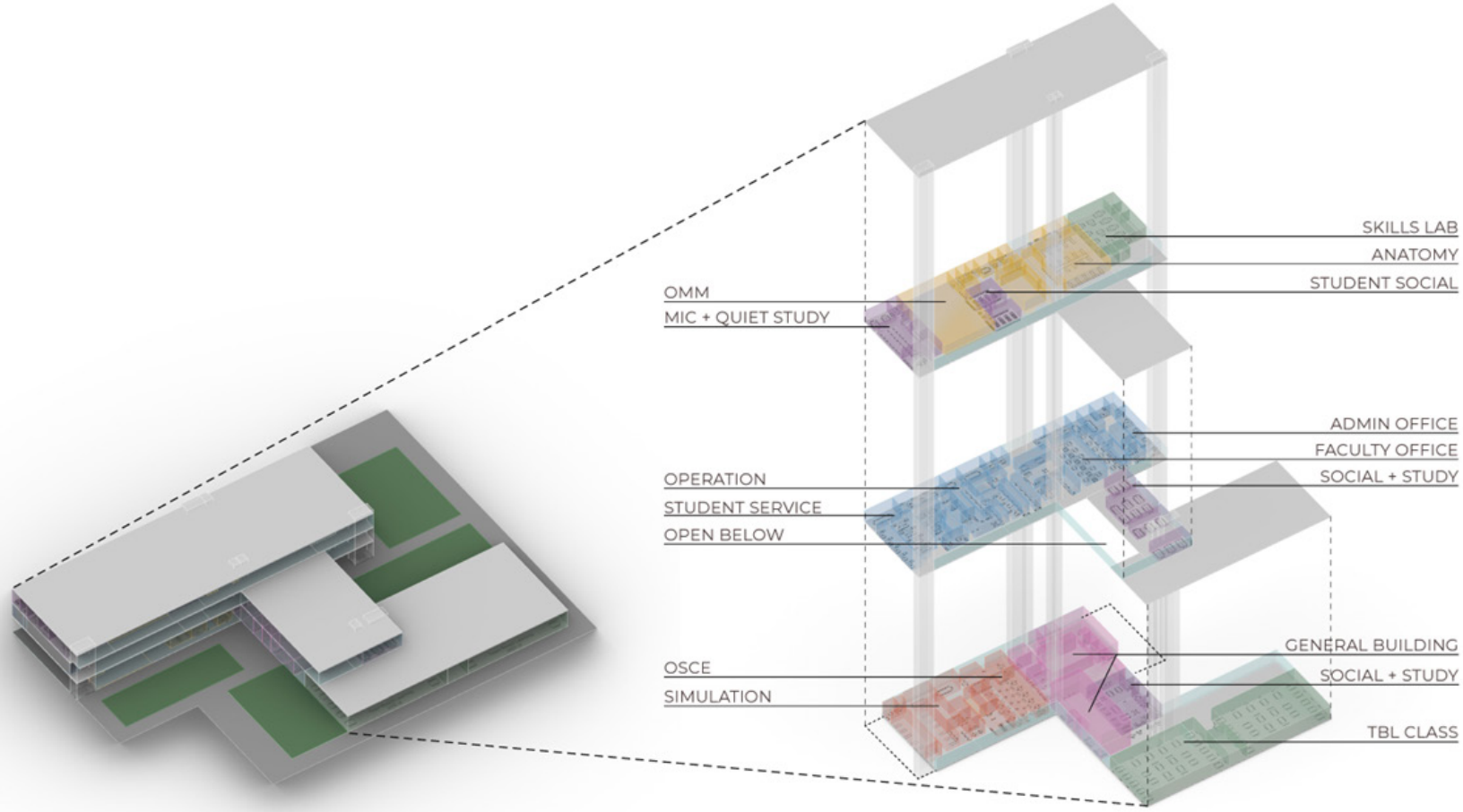
PERSPECTIVE FROM SOUTH CAMPUS

DPS | SMITHGROUP



OPTION 2: SPINE
SITE PLAN/ IDEAS

OPTION 2: SPINE



BUILDING MASS

EXPLODED AXON

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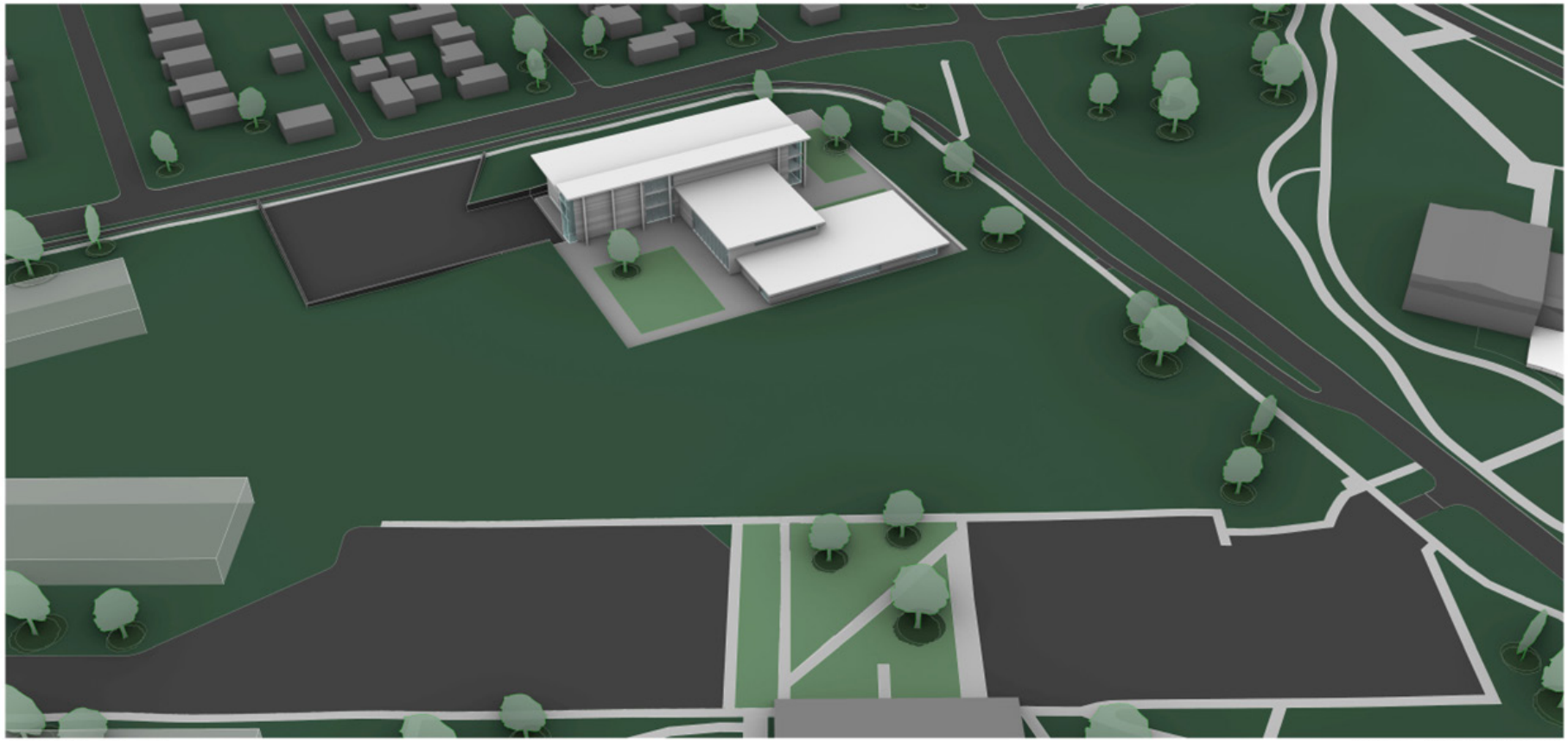
OPTION 2: SPINE



AERIAL VIEW FROM SOUTH

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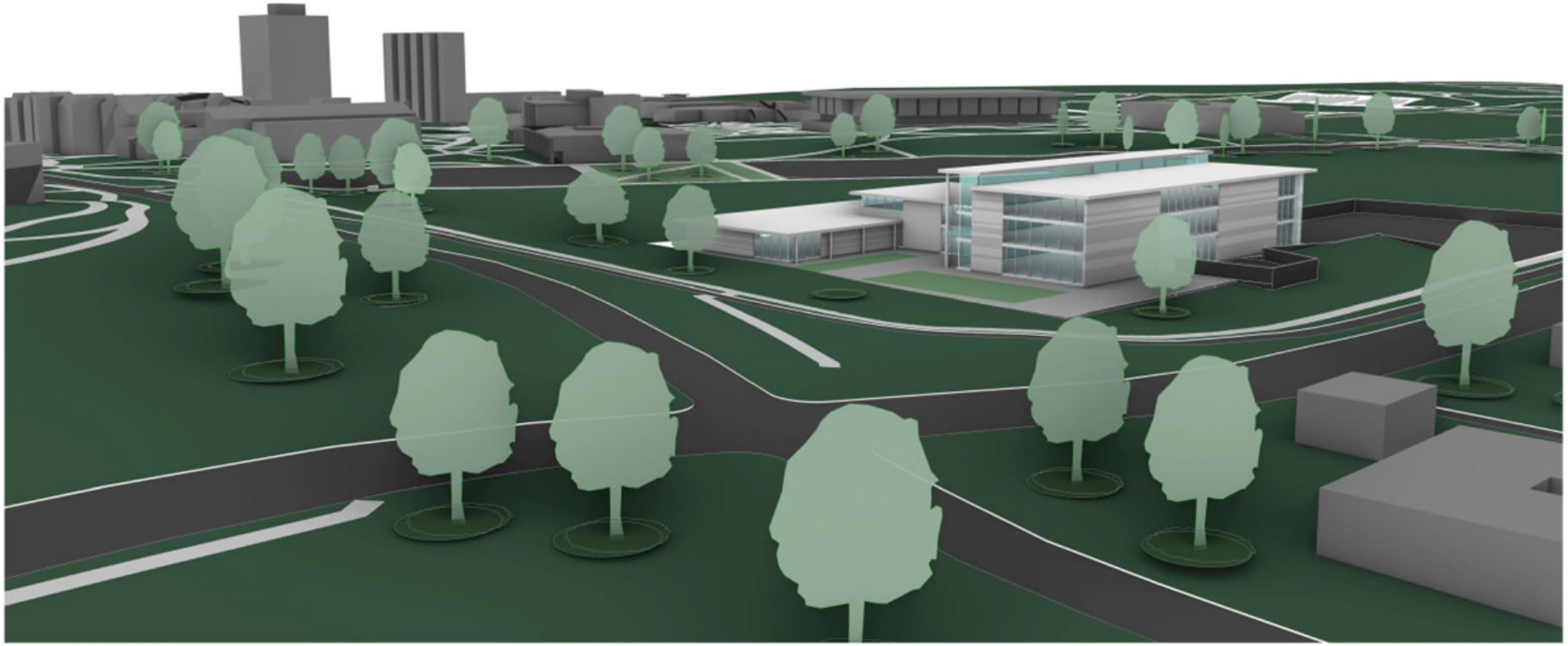
OPTION 2: SPINE



AERIAL VIEW INTERSECTION AT 20TH ST/ 11TH AVE

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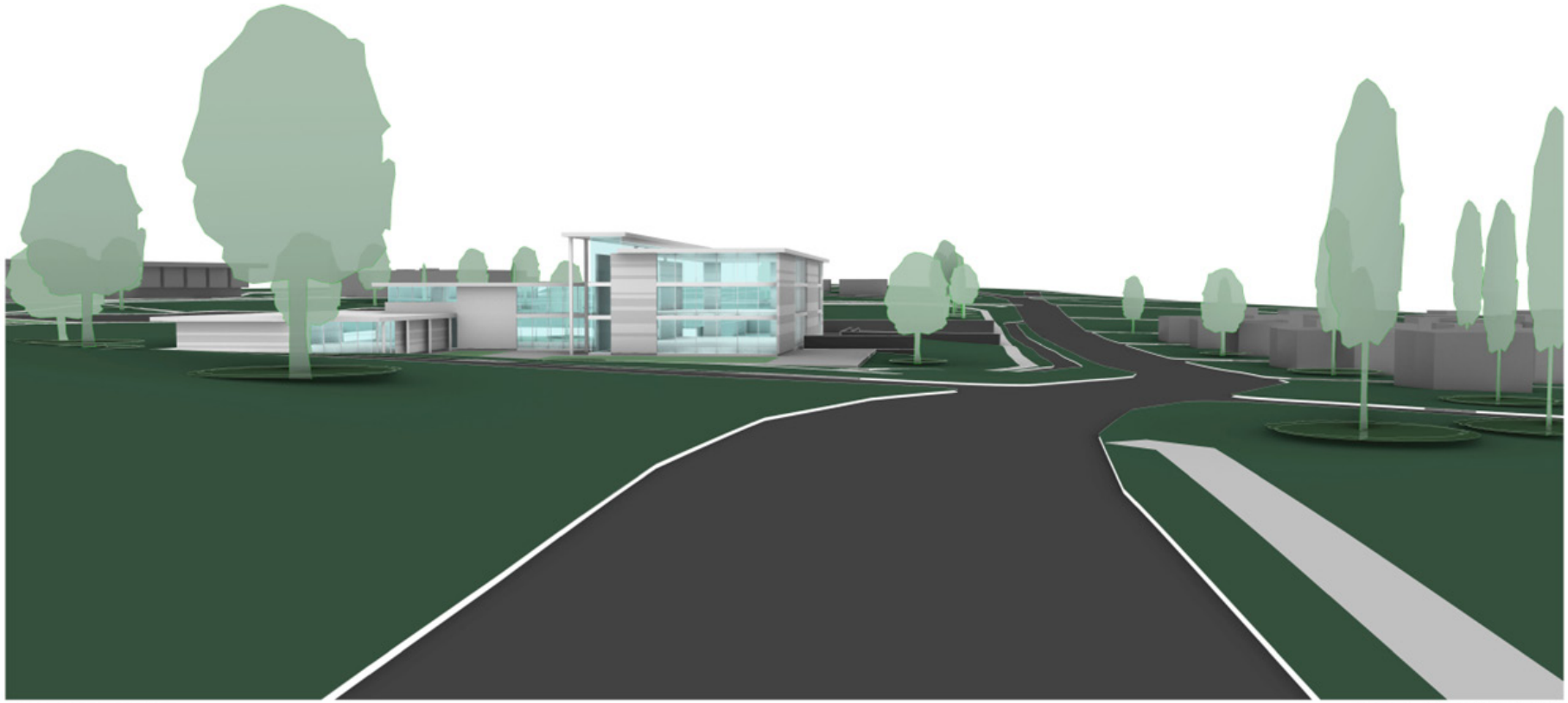
OPTION 2: SPINE



PERSPECTIVE FROM 20TH, LOOKING WEST

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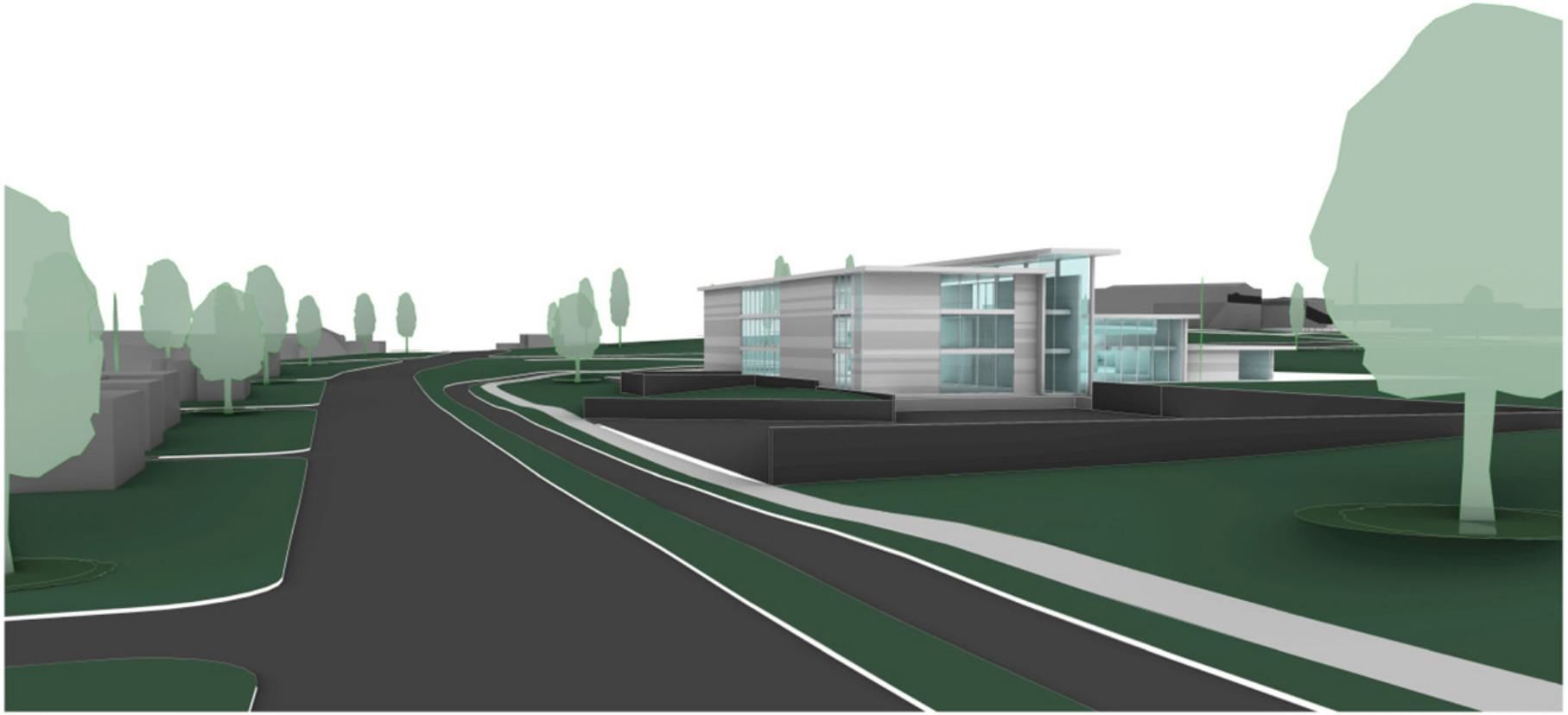
OPTION 2: SPINE



PERSPECTIVE FROM 20TH, LOOKING EAST

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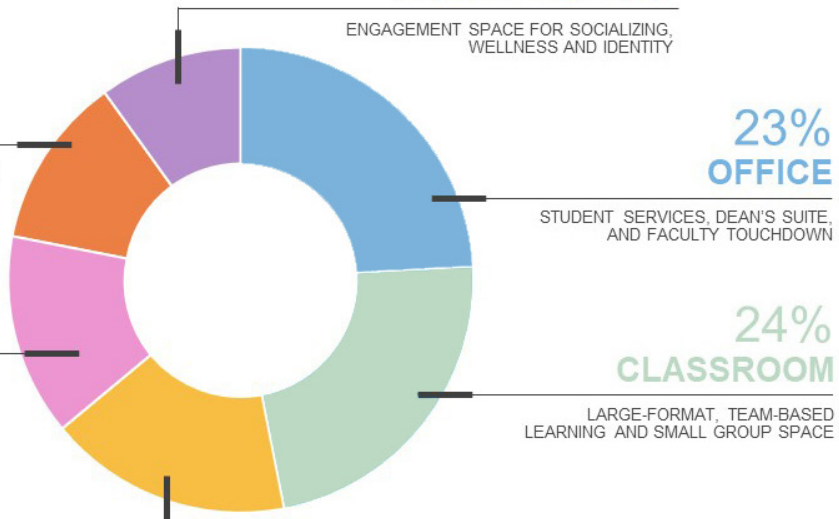
4.3 BENCHMARKING STUDY

This benchmarking study compares the space distribution of the programmed spaces for the UNC COM with other Colleges of Osteopathic Medicine that the design team has worked on, as shown on the graph below. The Space Use Categories are from the Post-Secondary Education Facilities Inventory Classification Manual (FICM). All assignable spaces are classified into 1 of the 10 major assignable use categories.

The data is also presented in a donut chart that further highlights the percentages of each use category, as established in the Model Program for the facility. These areas are in Assignable Square Feet (ASF) and the grossing factors are indicated as a 10% programming contingency factor and an additional 60% efficiency factor to arrive at a total Gross Square footage for the building.

MODEL PROGRAM OVERVIEW



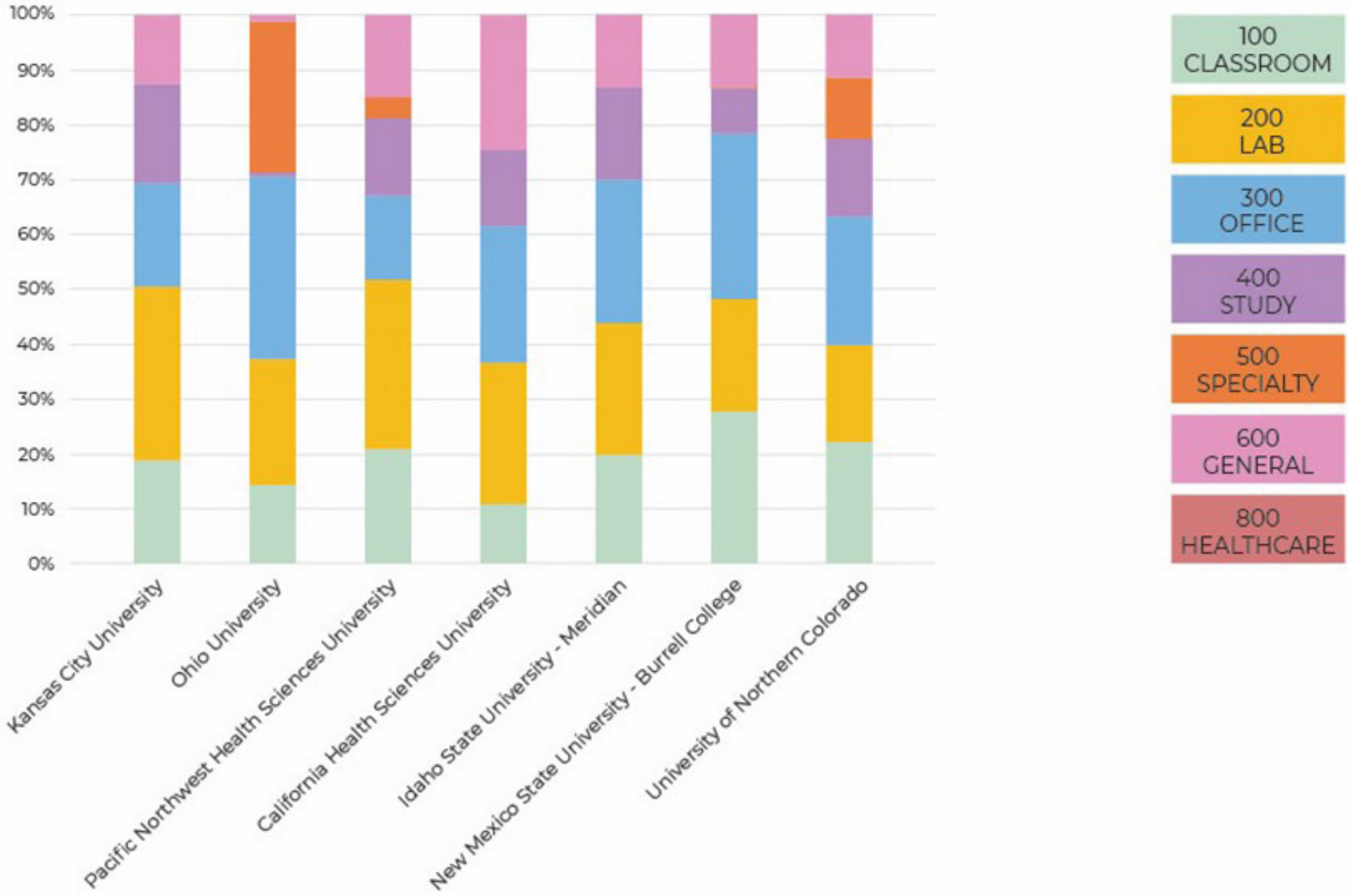
QUICK FACTS

66,010 NSF
TOTAL NET AREA

72,611 NSF
(WITH 10% PROGRAM SPACE CONTINGENCY)

101,655 GSF
TOTAL GROSS AREA
(60% EFFICIENCY)

BENCHMARKING COMPARISON BETWEEN SIMILAR FACILITIES



4.4 COST ESTIMATE

PROGRAM PLAN

UNC COLLEGE OF OSTEOPATHIC MEDICINE

GREELEY, CO

Prepared For
SmithGroup
Submitted On
27 January 2023

Prepared By
RLB | Rider Levett Bucknall
RLB.com

Our Ref
5
Project Number
DEN10191

RLB Rider Levett Bucknall

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

PROJECT DETAILS

Basis of Estimate

This estimate has been prepared at the request of SmithGroup and is to provide a program plan estimate of construction cost for the University of Northern Colorado College of Osteopathic Medicine project, located in Greeley, CO.

The estimate is based upon measured quantities and built-up rates prepared from the program plan narratives received December 9, 2022, and, the drawings received December 19, 2022, prepared by SmithGroup. This revised estimate includes Owner review comments provided by SmithGroup on January 18,2023 and scope changes made subsequent to the 2022 design documents.

The design is conceptual in nature. Where information was insufficient, assumptions and allowances were made.

It is understood that the project will be procured using a Design-Build (DB) procurement arrangement where the DB contractor will be required to receive a minimum of three subcontract bids for each trade. It has been assumed that the DB contractor will only be allowed to self-perform work for the project under competitive bidding circumstances.

Unit pricing is based on 1st quarter 2023 costs. Construction cost escalation has been carried at 11% in the estimate to the 2nd quarter 2025.

An estimating contingency has been included at 10%. Bidding contingency of 2.5% and construction contingency of 3.5% have been included.

Items Specifically Excluded

. Furniture, Fittings and Equipment (FF&E)
. Murals and works of art
. Work outside the site boundaries unless noted otherwise
. Costs associated with phasing the construction work
. Out of hours working
. Special testing & inspections
. Utility tap fees and charges
. Permits & plan review fees
. Owner's contingency
. Land and legal costs
. Geotechnical, traffic and all other studies
. Items marked as "Excl." in the estimate
. Escalation beyond the 2nd quarter 2025

Program Plan
DEN10191-5 Printed 26 January 2023 11:52 AM

Page 1 of 1

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

GFA: Gross Floor Area

LOCATION SUMMARY

Ref	Location	GFA SF	GFA USD/SF	Total Cost USD
A	**Core & Shell**	**101,500**	**537.74**	**54,581,112**
B	**Interior Fitout**			
B1	Classroom	15,558	210.38	3,273,128
B2	Class Lab	12,254	341.58	4,185,739
B3	SIM + Specialty	12,604	335.78	4,232,134
B4	Office	22,166	240.98	5,341,557
B5	Social + Study	14,414	262.57	3,784,729
B6	General Building	6,803	221.09	1,504,093
B7	Public Circulation, Vertical Circulation & Restrooms	17,701	314.79	5,572,055
	B - Interior Fitout	**101,500**	**274.81**	**27,893,435**
C	**Sitework**			**17,192,245**
ESTIMATED TOTAL COST		**101,500**	**981.94**	**99,666,792**

Allowances:

1	**Include 1% for Art**	**996,668**
2	**New site utility tunnel extension - 425' x 10' x 8'**	**Included**
3	**Emergency generator, feeder, etc.**	**Included**
4	**Design Build Architectural & Engineering Fees at 7%**	**6,976,676**
5	**Maintenance equipment - roof fall protection**	**Excluded**
6	**Demolition of existing Bishop-Lehr building**	**Included**
7	**Demolition of existing tunnel section - 260' x 5' x7'**	**Included**
8	**Budget allowance for Furniture Fittings & Equipment (FF&E)**	**5,000,000**
9	**Add AV systems**	**3,156,038**
ESTIMATED TOTAL COST INCLUDING ALLOWANCES		**115,796,174**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

Gross Floor Area: 101,500 SF
Rates Current At January 2023

CORE & SHELL - ELEMENTS SUMMARY

Ref	Description	GFA USD/SF	Total Cost USD
A1010	**Standard Foundations**	**6.76**	**686,148**
A1020	**Special Foundations**	**3.37**	**342,452**
A1030	**Slab on Grade**	**4.91**	**498,257**
A2010	**Basement Excavation**	**2.82**	**285,897**
A2020	**Basement Walls**	**4.84**	**491,232**
B1010	**Floor Construction**	**47.15**	**4,786,128**
B1020	**Roof Construction**	**26.72**	**2,711,891**
B2010	**Exterior Walls**	**67.39**	**6,840,019**
B2020	**Exterior Windows**	**46.14**	**4,683,140**
B2030	**Exterior Doors**	**1.56**	**158,000**
B3010	**Roof Coverings**	**13.05**	**1,324,334**
B3020	**Roof Openings**	**0.16**	**16,120**
C1030	**Fittings**	**0.39**	**40,000**
C2010	**Stair Construction**	**3.03**	**307,225**
D1010	**Elevators & Lifts**	**5.36**	**543,750**
D2010	**Plumbing Fixtures**	**0.10**	**10,150**
D2020	**Domestic Water Distribution**	**6.00**	**609,000**
D2030	**Sanitary Waste**	**4.00**	**406,000**
D2040	**Rain Water Drainage**	**3.50**	**355,250**
D2090	**Other Plumbing Systems**	**1.90**	**193,040**
D3010	**Energy Supply**		**Excl.**
D3020	**Heat Generating Systems**	**9.00**	**913,500**
D3030	**Cooling Generating Systems**	**7.50**	**761,250**
D3040	**Distribution Systems**	**39.00**	**3,958,500**
D3060	**Controls & Instrumentations**	**6.00**	**609,000**
D3070	**Systems Testing & Balancing**	**2.00**	**203,000**
D3090	**Other HVAC Systems & Equipment**	**5.08**	**515,620**
D4010	**Sprinklers**	**4.00**	**406,000**
D5010	**Electrical Service & Distribution**	**23.00**	**2,334,500**
D5020	**Lighting and Branch Wiring**	**2.59**	**263,000**
D5030	**Communications & Security**	**8.50**	**862,750**
D5090	**Other Electrical Systems**	**5.69**	**577,465**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

CORE & SHELL - ELEMENTS SUMMARY

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	GFA USD/SF	Total Cost USD
E1030	**Vehicular Equipment**		**Excl.**
E1090	**Other Equipment**		**Excl.**
ESTIMATED NET COST		**361.50**	**36,692,618**
	MARGINS & ADJUSTMENTS		
	Design & Estimating Contingency - 10%		3,669,261
	Escalation for 2nd Quarter 2025 Construction Start - 11%		4,036,186
Subtotal		**437.42**	**44,398,065**
	Bidding Contingency - 2.5%		1,109,952
	Construction Contingency - 3.5%		1,553,933
Subtotal		**463.66**	**47,061,950**
	Subcontractor Default Insurance - 1.2%		564,744
Subtotal		**469.23**	**47,626,694**
	General Conditions and General Requirements - 8%		3,810,136
	Preconstruction Services - 0.25%		91,731
Subtotal		**507.67**	**51,528,561**
	Contractor's Fee - 4%		2,061,143
Subtotal		**527.98**	**53,589,704**
	General Liability Insurance - 0.85%		455,511
	Builders Risk Insurance - Excluded		Excl.
	Contractor Payment and Performance Bond - 1%		535,897
TOTAL CONSTRUCTION COST		**537.74**	**54,581,112**
	Architectural & Engineering Fees - Excluded (see summary Allowances)		Excl.
ESTIMATED TOTAL COST		**537.74**	**54,581,112**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
A1010	**Standard Foundations**				
1	Excavation to standard foundations	CY	1,602	24.50	39,249
2	Backfill at standard foundations using on-site soils	CY	1,023	28.75	29,411
3	Haul surplus standard foundations soils off-site	CY	579	22.00	12,738
4	Perimeter drain	LF	1,279	34.00	43,486
5	Concrete grade beams	CY	249	825.00	205,425
6	Concrete pier caps	CY	83	775.00	64,325
17	Concrete tie beams	CY	322	710.00	228,620
7	Concrete elevator pit walls	SF	525	50.00	26,250
9	Fluid-applied dampproofing & protection board to perimeter grade beams	SF	4,476	3.50	15,666
10	Insulation to perimeter grade beams - 2" thick	SF	4,476	3.25	14,547
11	Waterproofing to elevator pit walls	SF	525	12.25	6,431
	A1010 - Standard Foundations			**6.76/SF**	**686,148**
A1020	**Special Foundations**				
12	Deep foundations mobilization	LS	1	15,000.00	15,000
13	24" drilled pier foundations (assume 20' avg. length)	LF	1,000	115.00	115,000
14	30" drilled pier foundations (assume 20' avg. length)	LF	675	170.00	114,750
15	36" drilled pier foundations (assume 20' avg. length)	LF	400	220.00	88,000
16	Haul surplus deep foundations soils off-site	CY	441	22.00	9,702
	A1020 - Special Foundations			**3.37/SF**	**342,452**
A1030	**Slab on Grade**				
18	Over-excavate, moisture-condition and re-compaction of on-site soils at slab-on-grade - 4'-0" deep	CY	6,366	8.50	54,111
19	Fine grading at slab-on-grade	SF	42,966	0.50	21,483
20	Aggregate base course below slab-on-grade - 6" deep	CY	796	45.00	35,820
21	Vapor barrier at slab-on-grade	SF	42,966	0.90	38,669
22	Concrete slab-on-grade - 5" thick	SF	42,650	8.00	341,200
23	Concrete slab-on-grade - 12" thick	SF	317	22.00	6,974
	A1030 - Slab on Grade			**4.91/SF**	**498,257**
A2010	**Basement Excavation**				
25	Mass basement excavation	CY	7,719	12.75	98,417
26	Backfill using on-site soils	CY	2,940	28.00	82,320
27	Haul mass excavation soils off-site	CY	4,780	22.00	105,160
	A2010 - Basement Excavation			**2.82/SF**	**285,897**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
A2020	**Basement Walls**				
28	Concrete foundation walls - 12" thick	SF	6,528	59.75	390,048
29	Waterproofing to concrete foundation walls	SF	6,528	12.25	79,968
30	Insulation to concrete foundation walls - 2" thick	SF	6,528	3.25	21,216
	A2020 - Basement Walls			**4.84/SF**	**491,232**
B1010	**Floor Construction**				
31	Cast-in-place concrete stair/elevator core walls	SF	16,184	60.00	971,040
32	First level floor structure (above basement) - structural steel framing including columns, beams, girders, braced frames, etc. - 15 psf	T	39.80	5,500.00	218,900
33	First level floor structure (above basement) - 3" deep x 20ga composite metal floor deck	SF	5,306	9.50	50,407
34	First level floor structure (above basement) - spray-applied fireproofing to structural steel framing	SF	5,306	4.25	22,551
35	First level floor structure (above basement) - 4-1/2" deep concrete topping on 3" composite deck (7-1/2" total thickness)	SF	5,306	10.10	53,591
36	Second level floor structure - structural steel framing including columns, beams, girders, braced frames, etc. - 15 psf	T	211.94	5,500.00	1,165,670
37	Second level floor structure - 3" deep x 20ga composite metal floor deck	SF	28,258	9.50	268,451
38	Second level floor structure - spray-applied fireproofing to structural steel framing	SF	28,258	4.25	120,097
39	Second level floor structure - 4-1/2" deep concrete topping on 3" composite deck (7-1/2" total thickness)	SF	28,258	10.10	285,406
40	Third level floor structure - structural steel framing including columns, beams, girders, braced frames, etc. - 15 psf	T	187.28	5,500.00	1,030,040
41	Third level floor structure - 3" deep x 20ga composite metal floor deck	SF	24,970	9.50	237,215
42	Third level floor structure- spray-applied fireproofing to structural steel framing	SF	24,970	4.25	106,123
43	Third level floor structure - 4-1/2" deep concrete topping on 3" composite deck (7-1/2" total thickness)	SF	24,970	10.10	252,197
44	Floor expansion joint including cover	LF	37	120.00	4,440
	B1010 - Floor Construction			**47.15/SF**	**4,786,128**
B1020	**Roof Construction**				
45	Second level roof structure (north-south wing) - structural steel framing including columns, bar joists, beams, girders, braced frames, etc. - 12 psf	T	95.10	6,000.00	570,600
46	Second level roof structure (north-south wing) - 3" deep x 20ga metal roof deck	SF	15,850	9.50	150,575

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
47	Second level roof structure (north-south wing) - spray-applied fireproofing to structural steel framing	SF	15,850	4.25	67,363
48	Second level roof structure (recessed well to mechanical unit) - structural steel framing including columns, beams, girders, braced frames, etc. - 15 psf	T	14.09	5,500.00	77,495
49	Second level roof structure (recessed well to mechanical unit) - 3" deep x 20ga composite metal floor deck	SF	1,879	9.50	17,851
50	Second level roof structure (recessed well to mechanical unit) - spray-applied fireproofing to structural steel framing	SF	1,879	4.25	7,986
51	Second level roof structure (recessed well to mechanical unit) - 4-1/2" deep concrete topping on 3" composite deck (7-1/2" total thickness)	SF	1,879	10.10	18,978
308	Third level roof structure (north-south wing) - structural steel framing including columns, bar joists, beams, girders, braced frames, etc. - 12 psf	T	20.38	6,000.00	122,280
309	Third level roof structure (north-south wing) - 3" deep x 20ga metal roof deck	SF	3,397	9.50	32,272
310	Third level roof structure (north-south wing) - spray-applied fireproofing to structural steel framing	SF	3,397	4.25	14,437
321	Third level roof structure (roof terrace) - structural steel framing including columns, beams, girders, braced frames, etc. - 15 psf	T	7.54	5,500.00	41,470
322	Third level roof structure (roof terrace) - 3" deep x 20ga composite metal floor deck	SF	1,005	9.50	9,548
323	Third level roof structure (roof terrace) - spray-applied fireproofing to structural steel framing	SF	1,005	4.25	4,271
324	Third level roof structure (roof terrace) - 4-1/2" deep concrete topping on 3" composite deck (7-1/2" total thickness)	SF	1,005	10.10	10,151
52	Fourth level roof structure (east-west wing) - structural steel framing including columns, bar joists, beams, girders, braced frames, etc. - 12 psf	T	188.94	6,000.00	1,133,640
53	Fourth level roof structure (east-west wing) - 3" deep x 20ga metal roof deck	SF	31,489	9.50	299,146
54	Fourth level roof structure (east-west wing) - spray-applied fireproofing to structural steel framing	SF	31,489	4.25	133,828
	B1020 - Roof Construction			**26.72/SF**	**2,711,891**
B2010	**Exterior Walls**				
55	Brick veneer exterior wall cladding	SF	13,892	32.50	451,490
56	Single skin concealed fastener metal panel system exterior wall cladding	SF	9,056	60.00	543,360
59	Fluid-applied membrane air and weather resistive barrier to exterior wall	SF	26,617	5.75	153,048
60	Mineral fiber insulation board to exterior walls - 3-1/2" thick	SF	26,617	7.50	199,628

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
61	Cold-formed metal framing to exterior walls including sheathing	SF	26,617	23.30	620,176
62	Caulking and sealants to exterior enclosure	SF	26,617	0.50	13,309
63	Rough carpentry to exterior walls	BF	1,560	6.75	10,530
64	Metal coping to exterior walls	LF	780	28.50	22,230
65	Roofing membrane to backrun of parapet walls	SF	5,369	10.50	56,375
66	Perforated metal panel exterior wall cladding to roof screen wall	SF	3,757	75.00	281,775
67	Miscellaneous metals: galvanized support steel to roof screen wall	Lb	26,297	4.05	106,503
100	Miscellaneous metals: galvanized brick ledger angle	Lb	34,730	4.05	140,657
68	Fire safing to slab edge	LF	2,465	27.50	67,788
69	Fixed louvers	SF	500	95.00	47,500
70	Level 2 canopy (north-south wing) including structure, soffit cladding, fascia, roof coverings, etc.	SF	5,406	250.00	1,351,500
320	Level 2 overhang above clerestory (north-south wing) including structure, soffit cladding, fascia, roof coverings, etc.	SF	1,435	250.00	358,750
314	Level 2 overhang (east-west wing) including structure, soffit cladding, fascia, skyward-facing paneling/waterproofing, etc.	SF	3,457	325.00	1,123,525
315	Level 2 soffit to underside of floor structure (east-west wing) including soffit cladding and framing	SF	2,541	125.00	317,625
328	Level 4 overhang (north-south wing) including structure, soffit cladding, fascia, roof coverings, etc.	SF	3,457	250.00	864,250
71	Expansion joints at exterior walls	LS	1	10,000.00	10,000
72	Budget allowance for mockups	LS	1	100,000.00	100,000
	B2010 - Exterior Walls			**67.39/SF**	**6,840,019**
B2020	**Exterior Windows**				
57	Aluminum storefront	SF	1,220	80.00	97,600
58	Aluminum curtain wall with high performance glazing	SF	24,934	130.00	3,241,420
316	Aluminum curtain wall with phenolic wood-look panel infill - Excluded	SF	6,335		Excl.
479	Phenolic wood-look panel exterior wall cladding at curtain wall	SF	6,335	105.00	665,175
480	Fluid-applied membrane air and weather resistive barrier to phenolic wood look panel	SF	6,335	5.75	36,426
481	Mineral fiber insulation board to phenolic wood look panel - 3-1/2" thick	SF	6,335	7.50	47,513
482	Cold-formed metal framing to exterior walls including sheathing	SF	6,335	23.30	147,606
317	Exterior glazing to clerestory (assume as curtainwall)	SF	1,990	135.00	268,650
99	Curtain wall parapet	LF	286	625.00	178,750

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
73	Architectural metal shading scrim and aluminum support framing - Excluded	SF	1		Excl.
	B2020 - Exterior Windows			**46.14/SF**	**4,683,140**
B2030	**Exterior Doors**				
80	Single HM exterior door including frame and hardware	EA	4	2,550.00	10,200
81	Pair of HM exterior doors including frame and hardware	Pair	2	3,800.00	7,600
82	Single AL exterior door with glazing to full leaf including hardware	EA	6	6,000.00	36,000
83	Pair of AL exterior doors with glazing to full leaf including hardware	Pair	6	12,000.00	72,000
84	Paint exterior HM door frame	EA	6	80.00	480
85	Paint exterior HM door leaf	EA	8	90.00	720
86	Overhead coiling exterior door - 12'-0" x 14'-0"	EA	1	12,750.00	12,750
87	Miscellaneous metals: support steel to exterior overhead coiling doors	Lb	1,400	3.75	5,250
88	ADA operator	EA	2	6,500.00	13,000
	B2030 - Exterior Doors			**1.56/SF**	**158,000**
B3010	**Roof Coverings**				
89	Second level roof (north-south wing) - 90mil EPDM roof system (R-30)	SF	15,850	21.50	340,775
90	Second level roof (north-south wing) - sheet metal and flashings to roof	SF	15,850	0.75	11,888
91	Second level roof (north-south wing) - roof walk pads	SF	793	15.50	12,292
92	Second level roof (recessed well to mechanical unit) - 90mil EPDM roof system (R-30)	SF	1,879	21.50	40,399
93	Second level roof (recessed well to mechanical unit) - sheet metal and flashings to roof	SF	1,879	0.75	1,409
94	Second level roof (recessed well to mechanical unit) - roof walk pads	SF	94	15.50	1,457
311	Third level roof (north-south wing) - 90mil EPDM roof system (R -30)	SF	3,397	21.50	73,036
312	Third level roof (north-south wing) - sheet metal and flashings to roof	SF	3,397	0.75	2,548
313	Third level roof (north-south wing) - roof walk pads	SF	3,397	15.50	52,654
325	Third level roof structure (roof terrace) - hot fluid-applied waterproofing	SF	1,005	18.75	18,844
326	Third level roof structure (roof terrace) - rigid insulation	SF	1,005	9.00	9,045
327	Third level roof structure (roof terrace) - concrete pavers on pedastals	SF	1,005	28.50	28,643

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
95	Fourth level roof (east-west wing) - 90mil EPDM roof system (R -30)	SF	31,489	21.50	677,014
96	Fourth level roof (east-west wing) - sheet metal and flashings to roof	SF	31,489	0.75	23,617
97	Fourth level roof (east-west wing) - roof walk pads	SF	1,575	15.50	24,413
98	Roof expansion joint and cover	LF	45	140.00	6,300
	B3010 - Roof Coverings			**13.05/SF**	**1,324,334**
B3020	**Roof Openings**				
318	Roof hatch	EA	2	3,500.00	7,000
319	Miscellaneous metals: access ladder to roof hatch	LF	32	285.00	9,120
	B3020 - Roof Openings			**0.16/SF**	**16,120**
C1030	**Fittings**				
424	Signage - exterior building	LS	1	40,000.00	40,000
	C1030 - Fittings			**0.39/SF**	**40,000**
C2010	**Stair Construction**				
350	4'-6" wide, concrete filled metal pan Egress stair including handrails and guardrails - per riser	EA	168	1,130.00	189,840
351	Concrete fill to metal pan stair treads and landings of Egress stair	SF	1,210	18.50	22,385
354	6'-0" wide Commons stair including handrails and guardraills	EA	24	2,250.00	54,000
355	Wood finish platform stair including railngs	SF	205	200.00	41,000
	C2010 - Stair Construction			**3.03/SF**	**307,225**
C3030	**Ceiling Finishes**				
490	Large format ceiling tiles - level 3 public circulation along glazing	SF		24.00	
	C3030 - Ceiling Finishes				
D1010	**Elevators & Lifts**				
356	Passenger elevator 3,500 Lbs., traction - 3 stop	EA	1	210,000.00	210,000
359	Freight elevator - 4 stop	EA	1	300,000.00	300,000
357	Premium cab finishes - passenger elevator - Excluded	EA	1		Excl.
358	Miscellaneous metals: elevator steel	Lb	9,000	3.75	33,750
	D1010 - Elevators & Lifts			**5.36/SF**	**543,750**
D2010	**Plumbing Fixtures**				
101	Plumbing fixtures - Core & Shell	SF	101,500	0.10	10,150
	D2010 - Plumbing Fixtures			**0.10/SF**	**10,150**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
D2020	**Domestic Water Distribution**				
155	Domestic water distribution - Core & Shell	SF	101,500	6.00	609,000
	D2020 - Domestic Water Distribution			**6.00/SF**	**609,000**
D2030	**Sanitary Waste**				
162	Sanitary waste & vent - Core & Shell	SF	101,500	4.00	406,000
	D2030 - Sanitary Waste			**4.00/SF**	**406,000**
D2040	**Rain Water Drainage**				
169	Rain water distribution - Core & Shell	SF	101,500	3.50	355,250
	D2040 - Rain Water Drainage			**3.50/SF**	**355,250**
D2090	**Other Plumbing Systems**				
261	RO to heating equipment - Core & Shell	LS	1	50,000.00	50,000
177	Subcontractor GCs/GRs	Sum			143,040
	D2090 - Other Plumbing Systems			**1.90/SF**	**193,040**
D3010	**Energy Supply**				
178	Natural gas distribution - not required	SF	101,500		Excl.
	D3010 - Energy Supply				**Excl.**
D3020	**Heat Generating Systems**				
179	Heat generating systems - Core & Shell	SF	101,500	9.00	913,500
	D3020 - Heat Generating Systems			**9.00/SF**	**913,500**
D3030	**Cooling Generating Systems**				
186	Cool generating systems - Core & Shell	SF	101,500	7.50	761,250
	D3030 - Cooling Generating Systems			**7.50/SF**	**761,250**
D3040	**Distribution Systems**				
262	AHUS - Core & Shell - includes upsizing due to eliminating shading	SF	101,500	25.00	2,537,500
193	HVAC distribution - Core & Shell	SF	101,500	14.00	1,421,000
	D3040 - Distribution Systems			**39.00/SF**	**3,958,500**
D3060	**Controls & Instrumentations**				
200	Controls - Core & Shell	SF	101,500	6.00	609,000
	D3060 - Controls & Instrumentations			**6.00/SF**	**609,000**
D3070	**Systems Testing & Balancing**				
207	Testing & balancing - Core & Shell	SF	101,500	1.50	152,250
208	Commissioning - Core & Shell	SF	101,500	0.50	50,750
	D3070 - Systems Testing & Balancing			**2.00/SF**	**203,000**

CORE & SHELL - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
D3090	**Other HVAC Systems & Equipment**				
209	Subcontractor GCs/GRs	Sum			515,620
	D3090 - Other HVAC Systems & Equipment			**5.08/SF**	**515,620**
D4010	**Sprinklers**				
210	Fire suppression system - Core & Shell	SF	101,500	4.00	406,000
	D4010 - Sprinklers			**4.00/SF**	**406,000**
D5010	**Electrical Service & Distribution**				
217	Normal & emergency power - Core & Shell	SF	101,500	23.00	2,334,500
	D5010 - Electrical Service & Distribution			**23.00/SF**	**2,334,500**
D5020	**Lighting and Branch Wiring**				
224	Light fixtures, controls & wiring - Core & Shell	SF	101,500		Excl.
280	Building exterior facade lighting	LS	1	60,000.00	60,000
231	Branch power devices & wiring, LV rough-in - Core & Shell	SF	101,500	2.00	203,000
	D5020 - Lighting and Branch Wiring			**2.59/SF**	**263,000**
D5030	**Communications & Security**				
238	Low voltage systems (Comms, PA, DAS, Security) - Core & Shell	SF	101,500	5.00	507,500
245	Fire alarm systems - Core & Shell	SF	101,500	3.50	355,250
	D5030 - Communications & Security			**8.50/SF**	**862,750**
D5090	**Other Electrical Systems**				
252	Grounding & bonding	SF	101,500	0.50	50,750
253	Lightning protection	SF	101,500	1.75	177,625
255	Subcontractor GCs/GRs	Sum			299,090
273	Temporary power to site lighting during demolition/contstruction	LS	1	50,000.00	50,000
283	PV Systems - excluded	SF	19,000		Excl.
	D5090 - Other Electrical Systems			**5.69/SF**	**577,465**
E1030	**Vehicular Equipment**				
76	Loading dock equipment - dock bumpers - Excluded	Set	1		Excl.
77	Loading dock equipment - dock seals - Excluded	EA	1		Excl.
78	Loading dock equipment - truck restraints - Excluded	Set	1		Excl.
79	Loading dock equipment - dock leveler - Excluded	EA	1		Excl.
	E1030 - Vehicular Equipment				**Excl.**
E1090	**Other Equipment**				
382	Maintenance equipment - roof fall protection - Excluded	LS	1		Excl.
	E1090 - Other Equipment				**Excl.**
ESTIMATED NET COST				**361.50/SF**	**36,692,618**

INTERIOR FITOUT - ELEMENTS SUMMARY

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	GFA USD/SF	Total Cost USD
C1010	**Partitions**	**36.39**	**3,693,876**
C1020	**Interior Doors**	**6.03**	**611,800**
C1030	**Fittings**	**6.37**	**646,976**
C2020	**Stair Finishes**	**0.67**	**67,950**
C3010	**Wall Finishes**	**8.02**	**814,126**
C3020	**Floor Finishes**	**9.34**	**948,364**
C3030	**Ceiling Finishes**	**13.57**	**1,377,698**
D2010	**Plumbing Fixtures**	**2.94**	**298,538**
D2020	**Domestic Water Distribution**	**3.40**	**345,377**
D2030	**Sanitary Waste**	**2.83**	**287,168**
D2090	**Other Plumbing Systems**	**2.91**	**295,299**
D3020	**Heat Generating Systems**	**6.12**	**620,748**
D3030	**Cooling Generating Systems**	**0.37**	**37,812**
D3040	**Distribution Systems**	**20.09**	**2,039,379**
D3060	**Controls & Instrumentations**	**3.92**	**397,441**
D3090	**Other HVAC Systems & Equipment**	**2.44**	**247,630**
D4010	**Sprinklers**	**2.99**	**303,289**
D5010	**Electrical Service & Distribution**	**3.87**	**392,543**
D5020	**Lighting and Branch Wiring**	**30.06**	**3,051,404**
D5030	**Communications & Security**	**8.50**	**862,611**
D5090	**Other Electrical Systems**	**3.39**	**344,525**
E1020	**Institutional Equipment**	**2.96**	**300,000**
E1090	**Other Equipment**	**0.60**	**60,800**
E2010	**Fixed Furnishings**	**6.96**	**706,240**
ESTIMATED NET COST		**184.74**	**18,751,594**
MARGINS & ADJUSTMENTS			
Design & Estimating Contingency - 10%			1,875,161
Escalation for 2nd Quarter 2025 Construction Start - 11%			2,062,677
Subtotal		**223.54**	**22,689,432**
Bidding Contingency - 2.5%			567,236
Construction Contingency - 3.5%			794,130

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

INTERIOR FITOUT - ELEMENTS SUMMARY

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	GFA USD/SF	Total Cost USD
	MARGINS & ADJUSTMENTS (continued)		
	Subtotal	**236.95**	**24,050,798**
	Subcontractor Default Insurance - 1.2%		288,609
	Subtotal	**239.80**	**24,339,407**
	General Conditions and General Requirements - 8%		1,947,153
	Preconstruction Services - 0.25%		46,880
	Subtotal	**259.44**	**26,333,440**
	Contractor's Fee - 4%		1,053,338
	Subtotal	**269.82**	**27,386,778**
	General Liability Insurance - 0.85%		232,789
	Builders Risk Insurance - Excluded		Excl.
	Contractor Payment and Performance Bond - 1%		273,868
	TOTAL CONSTRUCTION COST	**274.81**	**27,893,435**
	Architectural & Engineering Fees - Excluded (see summary Allowances)		Excl.
	ESTIMATED TOTAL COST	**274.81**	**27,893,435**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
C1010	**Partitions**				
462	GWB-lined, metal stud-framed partitions - 1-sided	SF	42,246	10.85	458,369
463	GWB-lined, metal stud-framed partitions - 2-sided	SF	153,619	15.85	2,434,861
464	GWB-lined, metal stud-framed partitions - shaft wall	SF	13,826	19.85	274,446
465	Interior glazing	SF	2,585	75.00	193,875
452	One-way mirrored observation window	SF	140	90.00	12,600
468	Blocking and rough carpentry - interiors	SF	101,500	2.10	213,150
470	Caulking and sealants - interiors	SF	101,500	0.90	91,350
471	Miscellaneous metals - miscellaneous fabriations	SF	101,500	0.15	15,225
	C1010 - Partitions			**36.39/SF**	**3,693,876**
C1020	**Interior Doors**				
472	Single interior door including frame, hardware and finish	EA	204	2,350.00	479,400
473	Pair of interior doors including frame, hardware and finish	Pair	20	3,600.00	72,000
475	Sliding WD barn door including hardware	EA	16	3,400.00	54,400
476	Access doors	LS	1	6,000.00	6,000
	C1020 - Interior Doors			**6.03/SF**	**611,800**
C1030	**Fittings**				
399	Toilet compartments - solid plastic urinal screen	EA	8	900.00	7,200
400	Toilet compartments - solid plastic toilet partition, floor mounted-mounted	EA	25	2,000.00	50,000
401	Toilet compartments - solid plastic ADA toilet partition, floor-mounted	EA	8	2,450.00	19,600
403	Toilet accessories - toilet roll holder	EA	33	120.00	3,960
404	Toilet accessories - seat cover dispenser	EA	33	150.00	4,950
405	Toilet accessories - coat hook	EA	33	50.00	1,650
406	Toilet accessories - pair of grab bars	Pair	8	180.00	1,440
407	Toilet accessories - paper towel dispenser/waste receptacle	EA	8	675.00	5,400
408	Toilet accessories - touchless soap dispenser	EA	38	320.00	12,160
409	Toilet accessories - under lavatory piping guard	EA	38	175.00	6,650
411	Toilet accessories - frameless bathroom mirror	SF	603	32.00	19,296
412	Toilet accessories - napkin disposal	EA	22	130.00	2,860
413	Toilet accessories - napkin vendor	EA	4	600.00	2,400
415	Toilet accessories - shower curtain and rod	EA	2	175.00	350
416	Toilet accessories - set of shower grab bars	Set	2	235.00	470
417	Toilet accessories - soap dish	EA	2	65.00	130
418	Toilet accessories - folding shower seat	EA	2	600.00	1,200

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
419	Toilet accessories - towel pin	EA	2	50.00	100
420	Toilet accessories - mop holder with shelf	EA	4	225.00	900
421	Wall and door protection	SF	101,500	0.80	81,200
422	Signage - code-required	SF	101,500	0.30	30,450
423	Signage - wayfinding	SF	101,500	1.25	126,875
425	Visual display units	SF	101,500	0.50	50,750
457	Metal locker - student locker rooms	EA	196	400.00	78,400
458	Locker bench - student locker rooms	EA	245	120.00	29,400
483	Metal locker - fac locker rooms	EA	87	400.00	34,800
484	Locker bench - fac locker rooms	EA	108	120.00	12,960
427	Fire protection specialties - fire extinguisher and cabinet	EA	39	375.00	14,625
428	Railings - glass balustrade to atrium space	LF	72	650.00	46,800
	C1030 - Fittings			**6.37/SF**	**646,976**
C2020	**Stair Finishes**				
352	Paint to concrete-filled metal pan stairs, handrails and guardrails of Egress stair	Flight	6	2,250.00	13,500
353	Rubber treads and landings to concrete-filled metal pan Egress stair	SF	1,210	45.00	54,450
	C2020 - Stair Finishes			**0.67/SF**	**67,950**
C3010	**Wall Finishes**				
329	Paint to GWB walls	SF	295,061	1.25	368,826
348	Large format ceramic wall tile - restrooms	SF	2,656	20.00	53,120
347	Wall tile - showers	SF	397	20.00	7,940
365	Acoustic wall panels	SF	2,844	35.00	99,540
344	Specialty wall coverings - student study/social	SF	3,623	35.00	126,805
447	Acoustic treatments - AV/recording	EA	2	10,000.00	20,000
339	Wood wall panels	SF	583	65.00	37,895
370	Budget allowance for premium wall finishes - level 1 public circulation	LS	1	50,000.00	50,000
374	Budget allowance for premium wall finishes - level 2 public circulation	LS	1	25,000.00	25,000
375	Budget allowance for premium wall finishes - level 3 public circulation	LS	1	25,000.00	25,000
	C3010 - Wall Finishes			**8.02/SF**	**814,126**
C3020	**Floor Finishes**				
334	Carpet tile flooring	SF	58,468	5.50	321,574
485	Carpet flooring - level 1 public circulation along glazing	SF	6,256	5.50	34,408

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
486	Carpet flooring - level 2 public circulation along glazing	SF	2,838	5.50	15,609
487	Carpet flooring - level 3 public circulation along glazing	SF	4,759	5.50	26,175
335	Walk-off carpet flooring	SF	377	8.25	3,110
363	Resilient flooring (assumed sheet flooring)	SF	14,234	7.75	110,314
349	Large format ceramic floor tile - restrooms	SF	1,437	19.00	27,303
336	Large format porcelain floor tile	SF	2,743	22.00	60,346
346	Thick-set floor tile - assumed at showers	SF	84	23.00	1,932
342	Concrete sealer	SF	10,309	1.00	10,309
477	Moisture testing	EA	74	120.00	8,880
337	Moisture mitigation treatment - carpet - Excluded	SF	58,844		Excl.
372	Moisture mitigation treatment - carpet - public circulation - Excluded	SF	13,852		Excl.
364	Moisture mitigation treatment - resilent flooring	SF	14,234	4.50	64,053
338	Crack suppression membrane/waterproofing - floor tile	SF	2,827	3.75	10,601
343	Wall base	SF	101,500	2.50	253,750
	C3020 - Floor Finishes			**9.34/SF**	**948,364**
C3030	**Ceiling Finishes**				
330	GWB ceilings	SF	1,899	10.50	19,940
331	GWB bulkheads	SF	6,658	15.00	99,870
332	Paint to GWB ceilings	SF	8,557	1.25	10,696
333	Linear wood ceilings	SF	2,743	90.00	246,870
360	Acoustic ceiling tile - 2' x 2'	SF	60,618	7.50	454,635
366	Acoustic ceiling tile - 2' x 2' scrubbable	SF	5,270	8.00	42,160
340	Large format ceiling tiles	SF	11,572	24.00	277,728
488	Large format ceiling tiles - level 1 public circulation along glazing	SF	6,256	24.00	150,144
489	Large format ceiling tiles - level 2 public circulation along glazing	SF	2,838	24.00	68,112
490	Large format ceiling tiles - level 3 public circulation along glazing	SF		24.00	
341	Light fixture with felt acoustic baffles - Included (see electrical)	LS	1		Incl.
378	Exposed structure - paint (assume above linear wood ceilings)	SF	2,743	2.75	7,543
345	Exposed structure - unfinished	SF	10,309		Excl.
	C3030 - Ceiling Finishes			**13.57/SF**	**1,377,698**
D2010	**Plumbing Fixtures**				
149	Plumbing fixtures - Classroom	SF	15,558	1.00	15,558
154	Plumbing fixtures - Class Lab	SF	12,254	4.00	49,016

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
150	Plumbing fixtures - SIM + Specialty	SF	12,604	5.00	63,020
151	Plumbing fixtures - Office	SF	22,166	0.20	4,433
152	Plumbing fixtures - Social + Study	SF	14,414	0.75	10,811
153	Plumbing fixtures - General Building	SF	6,803	0.25	1,701
258	Plumbing fixtures - Public Circulation & Restrooms	SF	17,701	8.70	153,999
	D2010 - Plumbing Fixtures			**2.94/SF**	**298,538**
D2020	**Domestic Water Distribution**				
156	Domestic water distribution - Classroom	SF	15,558	1.50	23,337
157	Domestic water distribution - Class Lab	SF	12,254	5.00	61,270
158	Domestic water distribution - SIM + Specialty	SF	12,604		Excl.
159	Domestic water distribution - Office	SF	22,166	0.50	11,083
160	Domestic water distribution - Social + Study	SF	14,414	1.50	21,621
161	Domestic water distribution - General Building	SF	6,803	1.00	6,803
259	Domestic water distribution - Public Circulation & Restrooms	SF	17,701	12.50	221,263
	D2020 - Domestic Water Distribution			**3.40/SF**	**345,377**
D2030	**Sanitary Waste**				
163	Sanitary waste & vent - Classroom	SF	15,558	1.20	18,670
164	Sanitary waste & vent - Class Lab	SF	12,254	3.50	42,889
165	Sanitary waste & vent - SIM + Specialty	SF	12,604		Excl.
166	Sanitary waste & vent - Office	SF	22,166	0.20	4,433
167	Sanitary waste & vent - Social + Study	SF	14,414	0.75	10,811
168	Sanitary waste & vent - General Building	SF	6,803	1.00	6,803
260	Sanitary waste & vent - Public Circulation & Restrooms	SF	17,701	11.50	203,562
	D2030 - Sanitary Waste			**2.83/SF**	**287,168**
D2090	**Other Plumbing Systems**				
172	Specialty systems - Class Lab	SF	12,254	15.00	183,810
177	Subcontractor GCs/GRs	Sum			111,489
	D2090 - Other Plumbing Systems			**2.91/SF**	**295,299**
D3020	**Heat Generating Systems**				
180	Heat generating systems - Classroom	SF	15,558	7.00	108,906
181	Heat generating systems - Class Lab	SF	12,254	8.00	98,032
182	Heat generating systems - SIM + Specialty	SF	12,604	9.00	113,436
183	Heat generating systems - Office	SF	22,166	6.00	132,996
184	Heat generating systems - Social + Study	SF	14,414	5.00	72,070
185	Heat generating systems - General Building	SF	6,803	1.00	6,803

UNC COLLEGE OF OSTEOPATHIC MEDICINE
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RLB Rider Levett Bucknall

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
263	Heat generating systems - Public Circulation & Restrooms	SF	17,701	5.00	88,505
	D3020 - Heat Generating Systems			**6.12/SF**	**620,748**
D3030	**Cooling Generating Systems**				
187	Cool generating systems - Classroom	SF	15,558		Excl.
188	Cool generating systems - Class Lab	SF	12,254		Excl.
189	Cool generating systems - SIM + Specialty	SF	12,604	3.00	37,812
190	Cool generating systems - Office	SF	22,166		Excl.
191	Cool generating systems - Social + Study	SF	14,414		Excl.
192	Cool generating systems - General Building	SF	6,803		Excl.
267	Cool generating systems - Public Circulation & Restrooms	SF	17,701		Excl.
	D3030 - Cooling Generating Systems			**0.37/SF**	**37,812**
D3040	**Distribution Systems**				
194	HVAC distribution - Classroom	SF	15,558	16.00	248,928
195	HVAC distribution - Class Lab	SF	12,254	28.00	343,112
196	HVAC distribution - SIM + Specialty	SF	12,604	26.00	327,704
197	HVAC distribution - Office	SF	22,166	20.00	443,320
198	HVAC distribution - Social + Study	SF	14,414	20.00	288,280
199	HVAC distribution - General Building	SF	6,803	5.00	34,015
268	HVAC distribution - Public Circulation & Restrooms	SF	17,701	20.00	354,020
	D3040 - Distribution Systems			**20.09/SF**	**2,039,379**
D3060	**Controls & Instrumentations**				
201	Controls - Classroom	SF	15,558	4.00	62,232
202	Controls - Class Lab	SF	12,254	5.00	61,270
203	Controls - SIM + Specialty	SF	12,604	4.00	50,416
204	Controls - Office	SF	22,166	4.00	88,664
205	Controls - Social + Study	SF	14,414	3.50	50,449
206	Controls - General Building	SF	6,803	2.00	13,606
269	Controls- Public Circulation & Restrooms	SF	17,701	4.00	70,804
	D3060 - Controls & Instrumentations			**3.92/SF**	**397,441**
D3090	**Other HVAC Systems & Equipment**				
209	Subcontractor GCs/GRs	Sum			247,630
	D3090 - Other HVAC Systems & Equipment			**2.44/SF**	**247,630**
D4010	**Sprinklers**				
211	Fire suppression system - Classroom	SF	15,558	2.50	38,895
212	Fire suppression system - Class Lab	SF	12,254	4.00	49,016

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
213	Fire suppression system - SIM + Specialty	SF	12,604	4.00	50,416
214	Fire suppression system - Office	SF	22,166	2.50	55,415
215	Fire suppression system - Social + Study	SF	14,414	2.50	36,035
216	Fire suppression system - General Building	SF	6,803	3.00	20,409
270	Fire suppression system - Public Circulation & Restrooms	SF	17,701	3.00	53,103
	D4010 - Sprinklers			**2.99/SF**	**303,289**
D5010	**Electrical Service & Distribution**				
218	Normal & emergency power - Classroom	SF	15,558	3.50	54,453
219	Normal & emergency power - Class Lab	SF	12,254	8.00	98,032
220	Normal & emergency power - SIM + Specialty	SF	12,604	5.00	63,020
221	Normal & emergency power - Office	SF	22,166	3.50	77,581
222	Normal & emergency power - Social + Study	SF	14,414	3.50	50,449
223	Normal & emergency power - General Building	SF	6,803	2.00	13,606
271	Normal & emergency power - Public Circulation & Restrooms	SF	17,701	2.00	35,402
	D5010 - Electrical Service & Distribution			**3.87/SF**	**392,543**
D5020	**Lighting and Branch Wiring**				
225	Light fixtures, controls & wiring - Classroom	SF	15,558	18.00	280,044
226	Light fixtures, controls & wiring - Class Lab	SF	12,254	25.00	306,350
227	Light fixtures, controls & wiring - SIM + Specialty	SF	12,604	28.00	352,912
228	Light fixtures, controls & wiring - Office	SF	22,166	18.00	398,988
229	Light fixtures, controls & wiring - Social + Study	SF	14,414	18.00	259,452
230	Light fixtures, controls & wiring - General Building	SF	6,803	10.00	68,030
275	Light fixtures, controls & wiring - Public Circulation & Restrooms	SF	17,701	30.00	531,030
232	Branch power devices & wiring, LV rough-in - Classroom	SF	15,558	6.00	93,348
233	Branch power devices & wiring, LV rough-in - Class Lab	SF	12,254	15.00	183,810
234	Branch power devices & wiring, LV rough-in - SIM + Specialty	SF	12,604	15.00	189,060
235	Branch power devices & wiring, LV rough-in - Office	SF	22,166	8.00	177,328
236	Branch power devices & wiring, LV rough-in - Social + Study	SF	14,414	6.00	86,484
237	Branch power devices & wiring, LV rough-in - General Building	SF	6,803	4.00	27,212
276	Branch power devices & wiring, LV rough-in - Public Circulation & Restrooms	SF	17,701	5.50	97,356
	D5020 - Lighting and Branch Wiring			**30.06/SF**	**3,051,404**
D5030	**Communications & Security**				
239	Low voltage systems (Comms, PA, DAS, Security) - Classroom	SF	15,558	5.00	77,790

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
240	Low voltage systems (Comms, PA, DAS, Security) - Class Lab	SF	12,254	7.00	85,778
241	Low voltage systems (Comms, PA, DAS, Security) - SIM + Specialty	SF	12,604	11.00	138,644
242	Low voltage systems (Comms, PA, DAS, Security) - Office	SF	22,166	7.00	155,162
243	Low voltage systems (Comms, PA, DAS, Security) - Social + Study	SF	14,414	8.00	115,312
244	Low voltage systems (Comms, PA, DAS, Security) - General Building	SF	6,803	3.00	20,409
282	Low voltage systems (Comms, PA, DAS, Security) - Public Circulation & Restrooms	SF	17,701	4.00	70,804
297	AV & simulation systems - assume by Owner	LS	7		Excl.
246	Fire alarm systems - Classroom	SF	15,558	1.50	23,337
247	Fire alarm systems - Class Lab	SF	12,254	2.50	30,635
248	Fire alarm systems - SIM + Specialty	SF	12,604	2.00	25,208
249	Fire alarm systems - Office	SF	22,166	1.50	33,249
250	Fire alarm systems - Social + Study	SF	14,414	1.50	21,621
251	Fire alarm systems - General Building	SF	6,803	3.00	20,409
281	Fire alarm systems - Public Circulation & Restrooms	SF	17,701	2.50	44,253
	D5030 - Communications & Security			**8.50/SF**	**862,611**
D5090	**Other Electrical Systems**				
255	Subcontractor GCs/GRs	Sum			344,525
	D5090 - Other Electrical Systems			**3.39/SF**	**344,525**
E1020	**Institutional Equipment**				
379	Laboratory equipment - Excluded	LS	3		Excl.
380	Medical equipment - Excluded	LS	3		Excl.
381	Medical equipment support - disection light	EA	20	2,500.00	50,000
383	Mortuary equipment - morgue refrigerators (20)	LS	1	250,000.00	250,000
	E1020 - Institutional Equipment			**2.96/SF**	**300,000**
E1090	**Other Equipment**				
384	Residential equipment - dishwasher	EA	2	575.00	1,150
386	Residential equipment - range/oven	EA	2	1,200.00	2,400
385	Residential equipment - refrigerator	EA	2	2,500.00	5,000
387	Residential equipment - undercounter refrigerator	EA	2	750.00	1,500
388	Owner equipment - installation of Owner Furnished Contractor Installed (OFCI) equipment	SF	101,500	0.50	50,750
	E1090 - Other Equipment			**0.60/SF**	**60,800**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
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INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
E2010	**Fixed Furnishings**				
389	Window treatments - manually-operated single roller shade	SF	18,958	9.00	170,622
390	Window treatments - electrically-operated single roller shade (assume at clerestory glazing)	SF	1,990	17.50	34,825
391	Millwork - plastic laminate base cabinet - copy	LF	29	485.00	14,065
430	Millwork - plastic laminate base cabinet - breakroom	LF	37	485.00	17,945
433	Millwork - plastic laminate base cabinet - lactation	LF	11	485.00	5,335
440	Millwork - plastic laminate base cabinet - OMM lab	LF	16	485.00	7,760
448	Millwork - plastic laminate base cabinet - exam	LF	48	485.00	23,280
453	Millwork - plastic laminate base cabinet - anatomy lab	LF	23	485.00	11,155
443	Millwork - plastic laminate base cabinet - skills lab	LF	28	485.00	13,580
392	Millwork - plastic laminate overhead cabinet - copy	LF	29	380.00	11,020
431	Millwork - plastic laminate overhead cabinet - breakroom	LF	37	380.00	14,060
434	Millwork - plastic laminate overhead cabinet - lactation	LF	11	380.00	4,180
441	Millwork - plastic laminate overhead cabinet - OMM lab	LF	16	380.00	6,080
449	Millwork - plastic laminate overhead cabinet - exam	LF	48	380.00	18,240
454	Millwork - plastic laminate overhead cabinet - anatomy lab	LF	23	380.00	8,740
445	Millwork - plastic laminate overhead cabinet - skills lab	LF	28	380.00	10,640
393	Millwork - plastic laminate patient locker - 2 high per stack	EA	16	675.00	10,800
429	Millwork - solid surface countertop - copy	LF	29	420.00	12,180
432	Millwork - solid surface countertop - breakroom	LF	37	420.00	15,540
435	Millwork - solid surface countertop - lactation	LF	11	420.00	4,620
394	Millwork - solid surface countertop - restrooms (additional 4' counter)	LF	24	420.00	10,080
442	Millwork - solid surface countertop - OMM lab	LF	16	420.00	6,720
446	Millwork - solid surface countertop - AV/recording	LF	24	420.00	10,080
450	Millwork - solid surface countertop - exam	LF	48	420.00	20,160
451	Millwork - solid surface countertop - control	LF	28	420.00	11,760
455	Millwork - solid surface countertop - anatomy lab	LF	23	420.00	9,660
444	Millwork - solid surface countertop - skills lab	LF	28	420.00	11,760
395	Millwork - vanity - restrooms	LF	134	420.00	56,280
436	Millwork - reception desk - welcome center	LF	17	1,500.00	25,500
396	Millwork - welcome desk - building commons	LF	12	2,250.00	27,000
397	Millwork - booth seating - public circulation (adjacent to TBL)	LF	97	825.00	80,025
398	Millwork - benchtop at booth seating - public circulation (adjacent to TBL)	LF	49	220.00	10,780

UNC COLLEGE OF OSTEOPATHIC MEDICINE
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RLB Rider Levett Bucknall

INTERIOR FITOUT - ELEMENTS ITEM

Gross Floor Area: 101,500 SF
Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
426	Miscellaneous metals: wall-mounted bench supports	Lb	3,138	3.75	11,768
	E2010 - Fixed Furnishings			**6.96/SF**	**706,240**
ESTIMATED NET COST				**184.74/SF**	**18,751,594**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

SITE - ELEMENTS SUMMARY

Rates Current At January 2023

Ref	Description	Total Cost USD
G1010	Site Clearing	231,058
G1020	Site Demolition and Relocations	2,274,086
G1030	Site Earthwork	1,122,587
G2010	Roadways	49,320
G2020	Parking Lots	632,481
G2030	Pedestrian Paving	1,103,101
G2040	Site Development	1,250,000
G2050	Landscaping	450,000
G3010	Water Supply	625,000
G3020	Sanitary Water	200,000
G3030	Storm Sewer	900,000
G3040	Heating Distribution	200,000
G3050	Cooling Distribution	200,000
G3060	Fuel Distribution	Excl.
G4010	Electrical Distribution	1,300,000
G4020	Site Lighting	120,000
G4030	Site Communications & Security	100,000
G9010	Service and Pedestrian Tunnels	800,000
ESTIMATED NET COST		**11,557,633**
MARGINS & ADJUSTMENTS		
Design & Estimating Contingency - 10%		1,155,763
Escalation for 2nd Quarter 2025 Construction Start - 11%		1,271,340
Subtotal		**13,984,736**
Bidding Contingency - 2.5%		349,618
Construction Contingency - 3.5%		489,466
Subtotal		**14,823,820**
Subcontractor Default Insurance - 1.2%		177,886
Subtotal		**15,001,706**
General Conditions and General Requirements - 8%		1,200,136
Preconstruction Services - 0.25%		28,894
Subtotal		**16,230,736**
Contractor's Fee - 4%		649,229

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN

RLB Rider Levett Bucknall

SITE - ELEMENTS SUMMARY

Rates Current At January 2023

Ref	Description	Total Cost USD
MARGINS & ADJUSTMENTS (continued)		
Subtotal		**16,879,965**
General Liability Insurance - 0.85%		143,480
Builders Risk Insurance - Excluded		Excl.
Contractor Payment and Performance Bond - 1%		168,800
TOTAL CONSTRUCTION COST		**17,192,245**
Architectural & Engineering Fees - Excluded (see summary Allowances)		Excl.
ESTIMATED TOTAL COST		**17,192,245**

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SITE - ELEMENTS ITEM

Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
C3030	**Ceiling Finishes**				
490	Large format ceiling tiles - level 3 public circulation along glazing	SF		24.00	
	C3030 - Ceiling Finishes				
G1010	**Site Clearing**				
102	Clear & grub site - assume minimal	Acre	10.0	1,500.00	15,000
103	Temporary erosion and sedimentation controls including maintenance	SF	432,115	0.50	216,058
	G1010 - Site Clearing				**231,058**
G1020	**Site Demolition and Relocations**				
104	Site demolition	SF	432,115	0.75	324,086
105	Remove existing Bishop-Lehr building	LS	1	720,000.00	720,000
478	Budget allowance for abatement to Bishop-Lehr building	LS	120,000	10.00	1,200,000
142	Budget allowance for tunnel demolition - 260' x 5' x 7'	LS	1	30,000.00	30,000
	G1020 - Site Demolition and Relocations				**2,274,086**
G1030	**Site Earthwork**				
106	Site mobilization	LS	1	20,000.00	20,000
301	Strip topsoil and stockpile on-site	CY	2,668	8.85	23,612
107	Overlot site grading cut & fill	CY	48,013	8.10	388,905
108	Site fine grading	SF	432,115	0.50	216,058
302	Respread stockpiled topsoil	CY	2,668	9.00	24,012
141	Budget allowance for imported fill or haul-off of on-site soils as required to make site grades - scope of work TBD	LS	1	200,000.00	200,000
304	Budget allowance for mitigation of on-site highly corrosive soils	LS	1	250,000.00	250,000
	G1030 - Site Earthwork				**1,122,587**
G2010	**Roadways**				
119	Concrete loading dock drive - scarify and compact subgrade	SY	226	3.25	735
120	Concrete loading dock drive - aggregate base course - 6" deep	CY	38	45.00	1,710
118	Concrete loading dock drive - concrete paving - 8" thick	SF	2,032	20.50	41,656
109	Concrete curb & gutter (loading dock drive) - scarify & compact subgrade	SY	34	3.26	111
110	Concrete curb & gutter (loading dock drive) - aggregate base course - 6" deep	CY	3	45.00	135
111	Concete curb & gutter (loading dock drive) - concrete pavement	LF	153	32.50	4,973
	G2010 - Roadways				**49,320**

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Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
G2020	**Parking Lots**				
115	Concrete loading dock - scarify and compact subgrade	SY	1,260	3.25	4,095
116	Concrete loading dock - aggregate base course - 6" deep	CY	420	45.00	18,900
117	Concrete loading dock - concrete pavement - 8" thick	SF	11,336	20.50	232,388
112	Concrete loading dock - concrete-filled metal pipe bollard	EA	20	475.00	9,500
113	Concrete loading dock - paint concrete-filled metal pipe bollard	EA	20	90.00	1,800
264	Asphalt paving adjacent to loading dock - scarify and compact subgrade	SY	1,216	3.25	3,952
265	Asphalt paving adjacent to loading dock - aggregate base course - 9" deep	CY	304	45.00	13,680
266	Asphalt paving adjacent to loading dock - asphalt pavement - 5" thick	SY	1,216	26.50	32,224
114	Loading dock - line striping, pavement markings, signage, etc.	LS	1	1,000.00	1,000
277	Concrete curb & gutter (loading dock) - scarify & compact subgrade	SY	96	3.25	312
278	Concrete curb & gutter (loading dock) - aggregate base course - 6" deep	CY	16	45.00	720
279	Concete curb & gutter (loading dock) - concrete pavement	LF	428	32.50	13,910
298	Fire lane(s) to provide access to sides of the building	LS	1	300,000.00	300,000
	G2020 - Parking Lots				**632,481**
G2030	**Pedestrian Paving**				
124	Main entry plaza - scarify and recompact subgrade	SY	2,713	3.25	8,817
125	Main entry plaza - aggregate base course - 6" deep	CY	453	45.00	20,385
126	Main entry plaza - architecture-finished concrete paving	SF	24,417	25.00	610,425
305	East building plaza (east-west wing) - scarify and recompact subgrade	SY	417	3.25	1,355
306	East building plaza (east-west wing) - aggregate base course - 6" deep	CY	70	45.00	3,150
307	East building plaza (east-west wing) - architecture-finished concrete paving	SF	3,750	25.00	93,750
127	Concrete walks - scarify and recompact subgrade	SY	2,444	3.25	7,943
128	Concrete walks - aggregate base course - 6" deep	CY	408	45.00	18,360
129	Concrete walks - concrete paving - 4" thick	SF	21,993	12.00	263,916
130	Concrete walks - curb ramp	EA	20	2,250.00	45,000
296	Site stairs, ramps, bridges, etc.	LS	1	30,000.00	30,000
	G2030 - Pedestrian Paving				**1,103,101**

SITE - ELEMENTS ITEM

Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
G2040	**Site Development**				
131	Site development including site furnishings, site walls, etc.	LS	1	1,250,000.00	1,250,000
	G2040 - Site Development				**1,250,000**
G2050	**Landscaping**				
132	Landscaping including plantings, irrigation, trees, topsoil, etc.	LS	1	450,000.00	450,000
	G2050 - Landscaping				**450,000**
G3010	**Water Supply**				
133	Site water supply - hydrants and laterals	LS	1	100,000.00	100,000
144	Site water supply - new domestic water main extension to loop around building	LS	1	400,000.00	400,000
145	Site water supply - site domestic water service to building	LS	1	50,000.00	50,000
146	Site water supply - site fire water service to building	LS	1	75,000.00	75,000
	G3010 - Water Supply				**625,000**
G3020	**Sanitary Water**				
134	Sanitary sewer - sanitary sewer from building to existing 30' deep main	LS	1	200,000.00	200,000
147	Sanitary sewer - off-site sanitary sewer work - Excluded	LS	1		Excl.
	G3020 - Sanitary Water				**200,000**
G3030	**Storm Sewer**				
135	Storm sewer	LS	1	900,000.00	900,000
	G3030 - Storm Sewer				**900,000**
G3040	**Heating Distribution**				
256	Hot water site distribution - assume 250 LF of S&R piping with excavation, trenching etc.	LS	1	200,000.00	200,000
272	Snowmelt to entrances - assume 3,000 sf - Excluded	SF	3,000		Excl.
	G3040 - Heating Distribution				**200,000**
G3050	**Cooling Distribution**				
257	Exterior chiller and piping	LS	1	200,000.00	200,000
	G3050 - Cooling Distribution				**200,000**
G3060	**Fuel Distribution**				
148	Site fuel distribution - Excluded	LS	1		Excl.
	G3060 - Fuel Distribution				**Excl.**
G4010	**Electrical Distribution**				
299	Emergency generator, feeder, etc.	LS	1	800,000.00	800,000

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Rates Current At January 2023

Ref	Description	Unit	Qty	Rate USD	Total Cost USD
138	Site eletrical - including transformer, primary feeder, secondary feeder no longer than 300 LF, miscellaneous power	LS	1	500,000.00	500,000
	G4010 - Electrical Distribution				**1,300,000**
G4020	**Site Lighting**				
139	Site lighting, controls, and wiring	LS	1	120,000.00	120,000
	G4020 - Site Lighting				**120,000**
G4030	**Site Communications & Security**				
140	Site communications and security	LS	1	100,000.00	100,000
	G4030 - Site Communications & Security				**100,000**
G9010	**Service and Pedestrian Tunnels**				
143	Budget allowance for new tunnel extension - 425' x 10' x 8'	LS	1	800,000.00	800,000
	G9010 - Service and Pedestrian Tunnels				**800,000**
ESTIMATED NET COST					**11,557,633**

UNC COLLEGE OF OSTEOPATHIC MEDICINE
PROGRAM PLAN - PHASING ROM

1/27/2023

Ref	Description	Phase 1 Cost USD	Phase 2 Cost USD	Total Cost USD
	ESTIMATED NET COST	**58,060,886**	**8,940,959**	**67,001,845**
	ADDITIONAL PHASING DIRECT COSTS			
	Additional exterior enclosure to enclose phase 1 at phase 2	175,000		175,000
	Demo phase 1 envelope for phase 2 connection		28,000	28,000
	Hardscape/softscape at phase 2 footprint	89,170		89,170
	Site demo at phase 2 footprint		17,834	17,834
	Budget allowance for additional GC/GRs for extended schedule		100,000	100,000
	ESTIMATED NET COST INCLUDING ADDITIONAL PHASING DIRECT C	**58,325,056**	**9,086,793**	**67,411,849**
	MARGINS & ADJUSTMENTS			
	Design & Estimating Contingency - 10%	5,832,506	908,679	6,741,185
	Escalation for 2nd Quarter 2025 Construction Start - 11%	6,415,756	0	6,415,756
	Escalation for 2nd Quarter 2026 Construction Start - 15%	0	1,363,019	1,363,019
	Subtotal	**70,573,318**	**11,358,491**	**81,931,809**
	Bidding Contingency - 2.5%	1,764,333	283,962	2,048,295
	Construction Contingency - 3.5%	2,470,066	397,547	2,867,613
	Subtotal	**74,807,717**	**12,040,000**	**86,847,718**
	Subcontractor Default Insurance - 1.2%	897,693	144,480	1,042,173
	Subtotal	**75,705,410**	**12,184,480**	**87,889,890**
	General Conditions and General Requirements - 8%	6,056,433	974,758	7,031,191
	Preconstruction Services - 0.25%	189,264	30,461	219,725
	Subtotal	**81,951,106**	**13,189,700**	**95,140,806**
	Contractor's Fee - 4%	3,278,044	527,588	3,805,632
	Subtotal	**85,229,151**	**13,717,288**	**98,946,438**
	General Liability Insurance - 0.85%	724,448	116,597	841,045
	Builders Risk Insurance - Excluded	Excl.	Excl.	Excl.
	Contractor Payment and Performance Bond - 1%	852,292	137,173	989,464
	TOTAL CONSTRUCTION COST	**86,805,890**	**13,971,058**	**100,776,947**
	Architectural & Engineering Fees - Excluded	Excl.	Excl.	Excl.
	ESTIMATED TOTAL COST	**86,805,890**	**13,971,058**	**100,776,947**

Allowances:

1	**Include 1% for Art**	**868,059**	**139,711**	**1,007,769**
2	**New site utility tunnel extension - 425' x 10' x 8'**	**Incl.**	**Incl.**	**Incl.**
3	**Emergency generator, feeder, etc.**	**Incl.**	**Incl.**	**Incl.**
4	**Design Build Architectural & Engineering Fees at 7%**	**6,076,412**	**977,974**	**7,054,386**
5	**Maintenance equipment - roof fall protection**	**Excl.**	**Excl.**	**Excl.**
6	**Demolition of existing Bishop-Lehr building**	**Incl.**	**Incl.**	**Incl.**
7	**Demolition of existing tunnel section - 260' x 5' x7'**	**Incl.**	**Incl.**	**Incl.**
8	**Budget Allowance for Furniture Fittings & Equipment (FF&E)**	**4,211,185**	**788,815**	**5,000,000.00**
9	**Add AV systems**	**2,658,132**	**497,906**	**3,156,038**
	ESTIMATED TOTAL COST INCLUDING ALLOWANCES	**100,619,678**	**16,375,463**	**116,995,141**

4.5 THIRD PARTY REVIEW

Design a Better Future

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