JUNE 2020

ENGINEERING BUILDING

PREDESIGN STUDY
EASTERN WASHINGTON UNIVERSITY
PROJECT 30000556

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PREPARED FOR:
STATE OF WASHINGTON OFFICE OF FINANCIAL MANAGEMENT

BY:
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CONSTRUCTION AND PLANNING SERVICES

IN COOPERATION WITH LMN ARCHITECTS

LMN

CONTENTS

CONTENTS

EXECUTIVE SUMMARY

PROBLEM STATEMENT

Engineering is one of the fastest growing but most physically constrained departments at EWU. The program has demonstrated sustained demand for enrollment and success in providing highly qualified graduates to the marketplace, but future growth is restricted by the lack of appropriate space for its core programs. The Engineering Department currently cannot accommodate additional growth due to space limitations.

Eastern Washington University's Cheney campus offers rigorous and pragmatic Mechanical Engineering and Technology (MENT) degrees that prioritize hands-on training and applied learning. The majority of students are enrolled in Mechanical Engineering, Mechanical Engineering Technology, Applied Technology, Construction Management Technology, and Manufacturing Technology with both a DFM and Process option. EWU's engineering classes are taught exclusively by faculty with industry experience.

Since inception in 2010, EWU's Mechanical Engineering and Technology program has experienced strong and sustained enrollment growth. The department has built highly successful outreach programs to rural and underserved prospective student populations and continuation programs with community colleges. Forecasted growth over the next ten years shows that the Mechanical Engineering and Technology program will remain one of the university's fastest growing fields.

EWU's engineering graduates are highly sought after in the growing regional mechanical engineering marketplace. Spokane and West Plains mechanical engineering companies have emerged as major players in their markets encouraging even more peer companies to the region. A 2009 survey of 2008 EWU Mechanical Engineering and Technology graduates showed that 85% were in full-time positions within the first six months after graduation, a rate that has held steady for the past three years, with 55% reporting salaries of over $60,000 *in their first year*.

Despite the demand for both enrollment and graduates, the Engineering Department capped enrollment in 2018-2019 due to lack of facility capacity. Lack of space also restricts the hiring of additional faculty FTEs to instruct engineering classes and has severely limited engineering research and on-campus industry collaboration.

The department has outgrown the only existing facilities suitable for the hands-on laboratory training which makes up a significant portion of Mechanical Engineering and Technology education. The existing facilities also have serious deficiencies including student safety concerns due to poor instructor sightlines, reduced overhead clearances and limited overhead services which restrict evolution with changing machine technology, aging technological infrastructure, ADA accessibility concerns, and lack of student interaction spaces among others.

PROPOSED SOLUTION

EWU proposes that a new building on the campus connected to the Computing and Engineering Building (CEB) is the best alternative to increasing facility capacity, solving facility deficiencies, and meeting future needs. The building is envisioned as an 74,155 GSF facility which will house hands-on teaching laboratories, research laboratories, lab support facilities, and student meeting and study areas. 23,650 GSF of CEB will be lightly modified to create physical connections, take advantage of available space suited to the program, and optimize instructional efficiencies.

The construction of the Engineering Building will allow continued program growth and degree production, with conservative forecasting showing enrollment increasing 47% in the first six years of building occupancy. The opportunity is clear: continuing the trajectory of EWU's engineering programs with the Engineering Building will not only change students' lifelong potential but also help lead Washington State in solving some of the 21st century's biggest challenges.

1.0 PROJECT ANALYSIS

State and Regional Context

Engineering is forecasted to be one of the top three projected STEM occupations in 2027 in Washington State and the Northeast Washington region. State reports indicate a ~43% gap in supply of engineering bachelor's degrees needed to meet workforce demand in Washington State in the next five years. All bachelors degrees and certificate programs offered by EWU's Engineering Department are designated STEM/High Demand by the State of Washington and prepare students for entry into cutting-edge engineering and related professions.

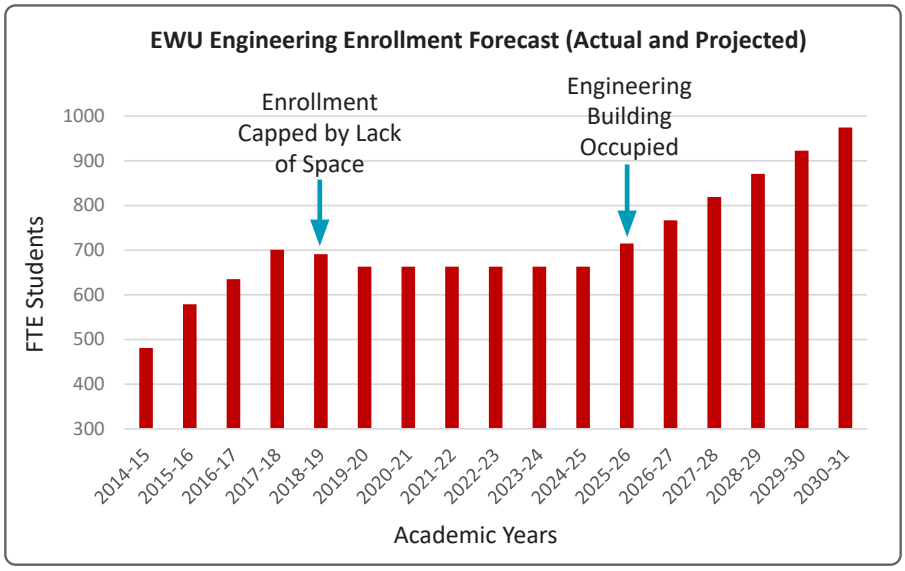
Institutional Context

The mission of Eastern Washington University is to expand opportunities for personal transformation through excellence in learning. The Engineering Building will support EWU's 2018-2023 Institutional Strategic Plan by:

- IGNITE Change: The Engineering Building will be a student centered environment. Its high quality, hands-on teaching and project laboratories, flexible work areas and student interaction spaces will inspire prospective students and fully support their unique engineering interests and ideas through degree completion.
- EMBRACE Equity & Social Justice: Not only will the Engineering Building provide the teaching facilities needed to meet the current and forecasted demand for enrollment which will increase access to high demand degrees, it provides critical space for community engagement with prospective rural and underserved students to participate in hands-on engineering activities.
- DRIVE Innovation: Increasing facility capacity will allow the department to hire additional FTE faculty. The Engineering Building's state-of-the-art teaching laboratories and collaboration spaces will support innovative instruction and exchange of ideas.
- TRANSFORM Our Region: The Engineering Building will increase interaction with the cutting-edge mechanical engineering and applied manufacturing industry in the region through dedicated laboratories for faculty and industry research and flexible space for departmental outreach. Bringing industry into the program will help students not only see their own future but how they can shape the future.

Enrollment Growth

Degree production by EWU's Engineering Department has increased dramatically in the past ten years but, despite demand, is currently capped due to lack of facilities. The availability of new facilities will allow for growth to resume.



2.0 PROGRAM ANALYSIS

The program for the Engineering Building and renovation of CEB was developed in conjunction with campus and Engineering Department leadership and is summarized in the following table:

PROGRAM ELEMENT	AREA (ASF)	
ENGINEERING BUILDING		
Teaching Labs	17,787	
Research Labs	5,808	
Projects Labs	7,260	
Lab Support	3,800	
Offices & Office Support	725	
Collaboration	5,405	
Total Engineering Building (ASF)	**40,785**	
Estimated Net/Gross Ratio	55%	Ratio consistent with
Estimated Engineering Building Area (GSF)	**74,155**	other science buildings
CEB RENOVATED SPACES		
Teaching Labs	6,171	
Projects Labs	1,089	
Classrooms	2,800	
Offices & Office Support	3,271	
Collaboration	5,263	
Total CEB Renovated Space (ASF)	**18,594**	
Estimated Net/Gross Ratio	79%	
Estimated CEB Renovated Space Area (GSF)	**23,650**	

EWU aspires to at minimum achieve the mandatory LEED® Silver certification; higher certification levels and other methods to reduce greenhouse gas emissions will be explored in future phases.

3.0 ANALYSIS OF ALTERNATIVES

Three alternatives were considered for addressing the identified needs:

- No action
- Major renovation of the existing facilities
- A new building on the existing campus connected to existing facilities

Preferred Alternative

Satisfaction of the identified needs can best be achieved through construction of a new building on the Cheney campus. The preferred alternative ensures continued Engineering Department growth and degree production, improves the quality and safety of laboratories, increases faculty and industry research opportunities, supports community outreach activities particularly with rural and under-served populations, and encourages student engagement with each other, the Engineering Department and the regional engineering industry.

The preferred alternative will construct a new three story, 74,155 gross square foot facility on the EWU campus in Cheney, Washington that will house engineering teaching laboratories, research laboratories, lab support facilities, work areas, and student collaboration and study areas and which will be integrally connected to the adjacent existing Computing and Engineering Building (CEB). The direct connection with CEB takes advantage of CEB's strengths and offers many efficiencies such as shared departmental and instructional resources, direct access to faculty and administrative offices, shared student amenities, and reduced building envelope.

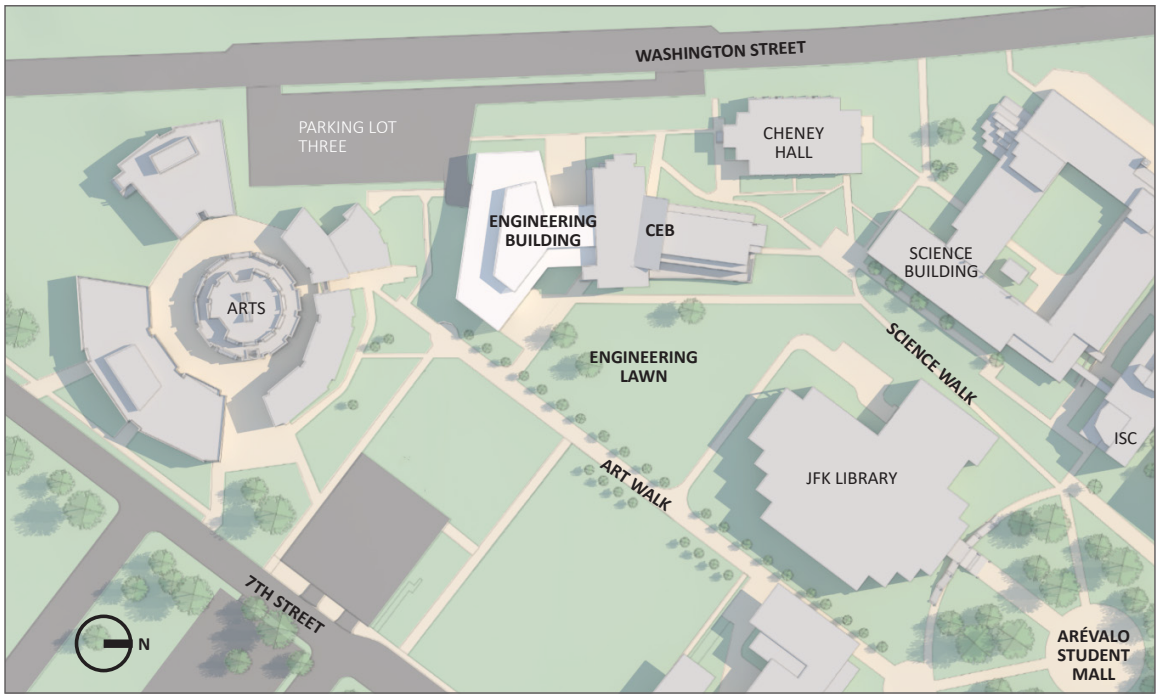
Originally designed as primarily a classroom and office building, CEB will require partial light modification of 23,650 GSF to create connections between the buildings and to complete the project program. Square footage in the Engineering Building is reduced by taking advantage of spaces in CEB which require only light modification to become suitable to the project program.

The demolition of Cadet Hall is also included in the project scope. See Section 4.0 Site Analysis for more detailed discussion of Cadet Hall and relocation of its current program.

4.0 SITE ANALYSIS

Five candidate sites on the Cheney campus were identified and evaluated to determine a preferred site for the Engineering Building. Evaluation of the sites included consideration of numerous issues. Key factors in the site selection were appropriate area available, proximity and possible connections to the existing CEB, increasing proximity to Washington Street for greater visibility to industry and community, connections to campus pedestrian and ADA circulation, and disruption to existing buildings and landscape. Topography, solar orientation, access to utilities, service access, parking impact, and future campus expansion were also considered.

The site selected is Site C: Cadet Hall, which is located immediately south of the existing CEB and east of Washington Street. The site best meets the factors above and responds to EWU's 2014 Master Plan Goals of connecting to the larger community and enhancing open space.



EWU Engineering Building Site Plan

5.0 PROJECT SCHEDULE SUMMARY

Predesign	March 2020 – June 2020
Design	November 2021- January 2023
Building Permit	November 2022- February 2023
Bidding	March 2023- June 2023
Construction	July 2023- February 2025
Closeout & Commissioning	March 2025- May 2025
Move In	June 2025- July 2025
Classes begin in Engineering Building	September 2025

6.0 BUDGET ANALYSIS

Escalated project costs for the Engineering Building are summarized as follows:

Acquisition Costs	$0
Consultant Services	$5,939,232
Construction Contracts	$56,634,316
Equipment	$4,025,828
Art Work	$347,007
Other Costs	$860,160
Project Management	$1,941,823
Total Project Request	**$69,748,366**

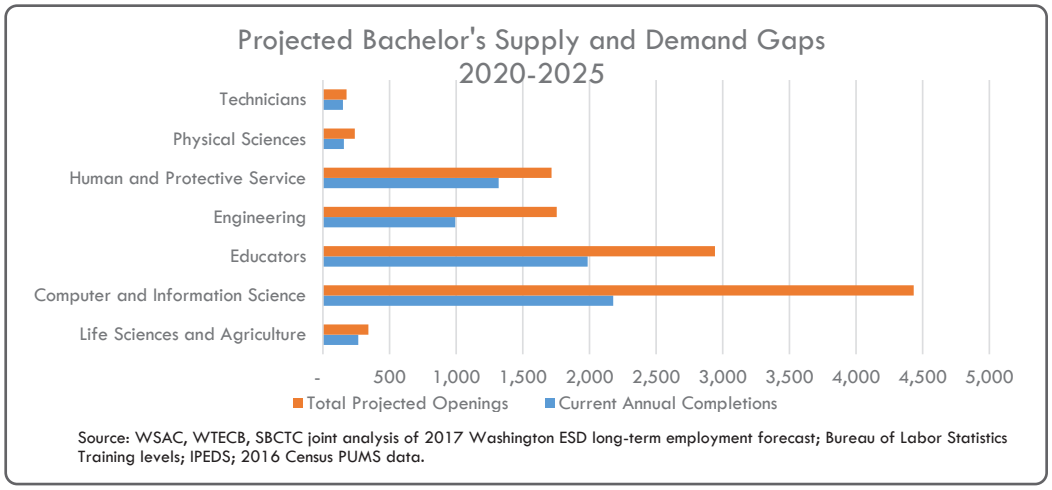
Detailed project costs have been submitted to OFM through the online Capital Budgeting System. The C100 and detailed preliminary construction cost estimate are included in the Appendix.

1.0 PROJECT ANALYSIS

1.1 STATE OF WASHINGTON CONTEXT

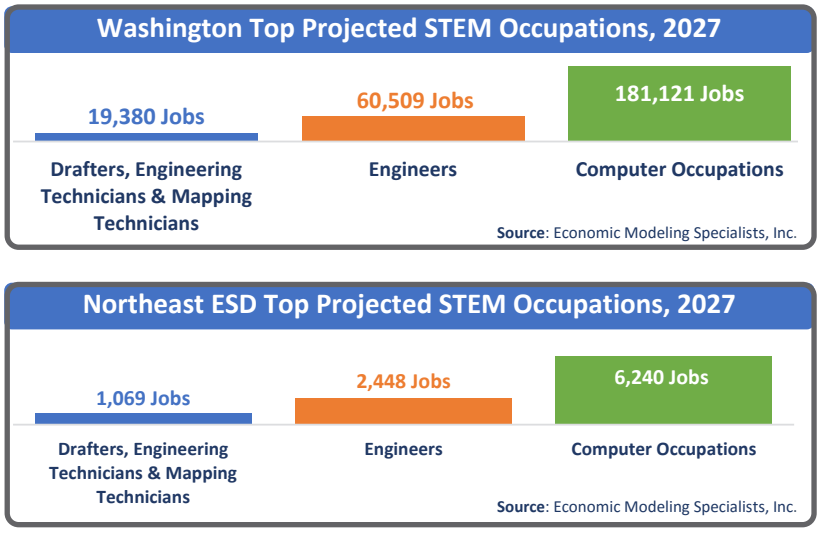
Higher Education Objectives

The Education and Research Data Center [ERDC] of the Washington Office of Financial Management has identified engineering as a STEM/High Demand field. "A Skilled and Educated Workforce 2017" issued jointly by the Washington Student Achievement Council, the State Board for Community and Technical Colleges and the Workforce Training and Education Coordinating Board forecasts an ~43% gap in supply of Engineering bachelor's degrees needed to meet workforce demand in Washington State in the next five years. All bachelors degrees awarded by EWU's Engineering Department apply toward filling this gap.



Source: A Skilled and Dedicated Workforce 2017

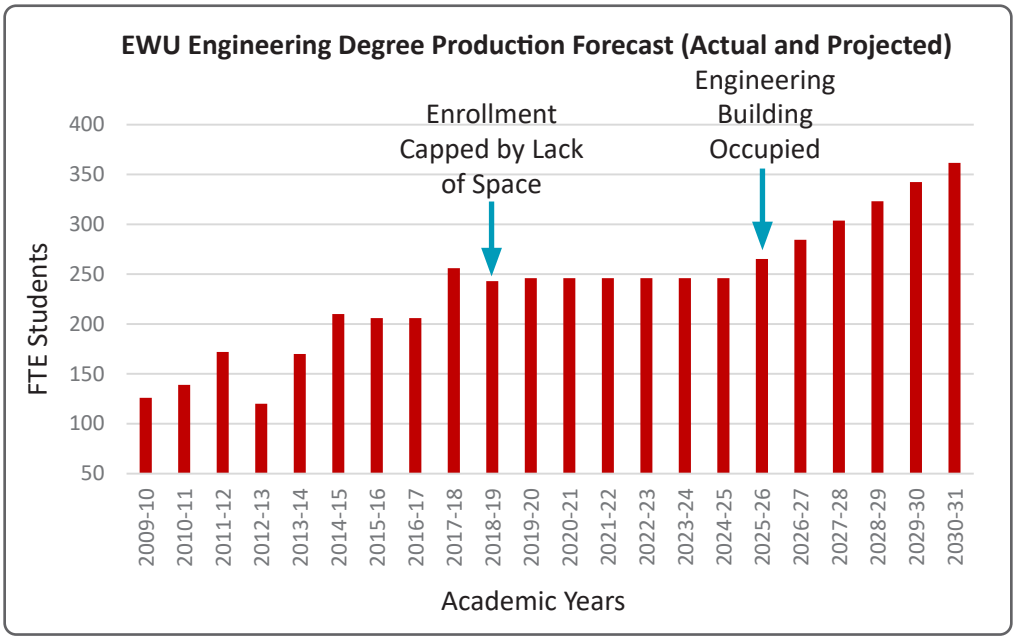
The "Washington State Regional Needs Assessment 2017" report issued by the Western Interstate Commission for Education with support from the Washington Student Achievement Council forecasts engineers as one of Washington State and the Northeast Washington region's top three projected STEM occupations in 2027. The programs offered by EWU's Engineering Department are all focused on training graduates who can serve this predicted regional need.



Source: Washington State Regional Needs Assessment 2017

EWU Engineering Degree Production

EWU's Engineering Department is focused on educating students who seek degrees in STEM, high demand engineering professions. The number of engineering graduates at EWU has grown significantly and regularly in the past decade. As described further in Section 1.3 Operational Context, despite the continued demand, enrollment will need to be capped in future years due to lack of facilities. Once the additional facility space in the Engineering Building is available, the department forecasts a 47% growth in degree production in six years.



1.2 INSTITUTIONAL CONTEXT

EWU's Mission & Vision:

The proposed Engineering Building will support EWU's mission and vision by providing facilities which will allow increased enrollment, support community outreach activities with rural and underserved populations, improve the quality and safety of laboratories, and encourage student engagement with each other, the Engineering Department and the regional engineering industry.

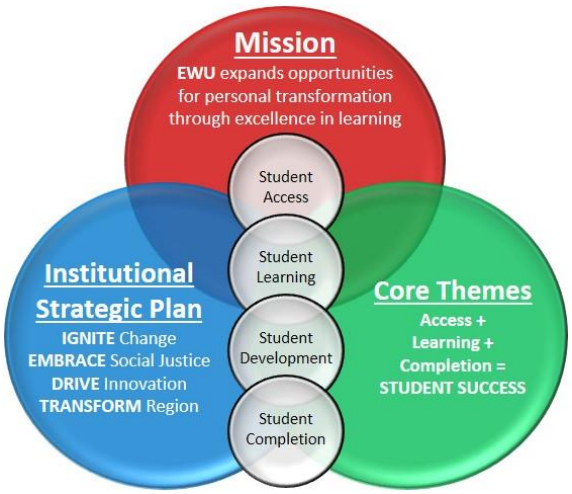
EWU Mission: Expand opportunities for personal transformation through excellence in learning.

- Enhancing access to higher education in the Inland Northwest and beyond by recruiting and supporting traditional college-bound students and those from underserved populations;
- Delivering high quality academic programs that undergo regular, rigorous review informed by data and assessment of student learning;
- Delivering a high quality co-curriculum designed for development of the intellectual, cultural, personal, and practical aspects of students' lives; and,
- Promoting student success by supporting student engagement and timely degree completion.

EWU Vision: EWU is a driving force for the culture, economy, workforce and vitality of Washington state. Our graduates think critically and make meaningful contributions to both their career fields and their communities. EWU is the public university whose students, faculty, staff and alumni make profound and significant contributions to the economic and social vitality of the region. EWU remains the best value for higher education in the state.

EWU's Strategic Plan

The proposed Engineering Building will support EWU's 2018-2023 Institutional Strategic Plan as follows:



Source: EWU Strategic Plan 2018-2023

EWU Strategic Plan Pillars	Engineering Building's Role In Pillars
IGNITE Change: EWU engages a diversity of students and ignites generational transformation. We inspire students through engaged learning experiences that encourage pathways to graduation. We collaborate with families, employers, and communities to solve complex issues and improve quality of life.	The Engineering Building will be a student centered environment. Its high quality, hands-on teaching and project laboratories, flexible work areas and student interaction spaces will inspire prospective students and fully support their unique engineering interests and ideas through degree completion.
EMBRACE Equity & Social Justice: We are recognized as a model diversity-serving institution. We embrace changing demographics and changing societal needs. Through culturally responsive curricula and campus activities, we work tirelessly to promote understanding and reduce disparity and inequity.	Not only will the Engineering Building provide the teaching facilities needed to meet the current and forecasted demand for enrollment which will increase access to high demand degrees, it provides critical space for community engagement with prospective rural and underserved students to participate in hands-on engineering activities.
DRIVE Innovation: We invest in the faculty and staff—as well as the tools, resources, and opportunities—that promote interdisciplinary collaboration and innovative instruction. We celebrate faculty and staff who make extraordinary contributions to our students and our mission!	Meeting enrollment demand by increasing facility capacity will allow the department to hire additional FTE faculty. The Engineering Building's state-of-the-art teaching laboratories and collaboration spaces will support innovative instruction and exchange of ideas.
TRANSFORM Our Region: We develop curricula that meet changing needs of students, employers, and communities. We commit to applied research and community partnerships that engage and inspire while preparing students for success after graduation. We develop the professional workforce and strengthen our economy through strategic and creative programming.	The Engineering Building will increase interaction with the cutting-edge mechanical engineering and applied manufacturing industry in the region through dedicated laboratories for faculty and industry research and flexible space for departmental outreach. Bringing industry into the program will help students not only see their own future but how they can shape the future.

EWU's Master Plan

In 2014, the university updated the Cheney Campus Comprehensive Master Plan. In Horizon 1 (2013 to 2023) 1.4.5, the plan states: Construct addition to the Computer and Engineering Sciences Building. EWU's planning process integrates comprehensive campus planning with its facilities master plan and ten-year capital plan. This process provides short and long range planning that are thoughtful and targeted but still dynamic and flexible enough to meet current and future campus needs.

The Master Plan describes five planning principles which the Engineering Building follows:

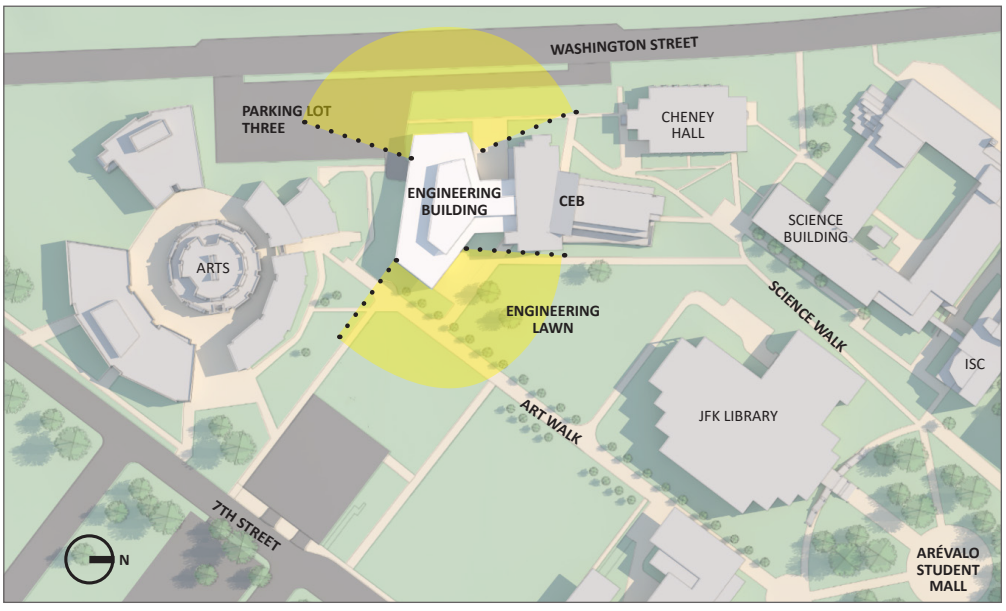
- *Carefully evaluate each project with regard to renovation vs. replacement opportunities*
  See Section 3.0 for renovation vs. replacement studies.

- *Locate and size all new or replacement buildings to optimize site utilization*
  See Section 4.0 for site optimization studies.

- *Improve the overall character of the campus with the implementation of each project*
  The Engineering Building will have two front doors to engage students on campus at the Engineering Lawn and the regional community on Washington Street. It will be visible from the southeast corner of Arévalo Student Mall at the entry to the Art Walk.

- *Create and follow a framework that welcomes EWU's neighbors and accommodates future campus expansion beyond existing boundaries*
  The building has been intentionally sited on Washington Street to present a new, dynamic front door for the Engineering Department and EWU that is highly visible and accessible to the surrounding community. Space for community outreach programs and events will be located just inside the Washington entrance.

- *Reinforce and improve the overall cohesion of campus, specifically linkages across Washington Street, whenever possible*
  Extending the Engineering Building to the East from Washington Street introduces a strong edge to the existing Engineering Lawn, complementing the edge created by JFK Library. The Engineering Building's student entrance on the Engineering Lawn and a new pathway to this entrance from Science Walk will further activate the Engineering Lawn. The building will improve and the pedestrian experiences of the Art Walk and 7th Street.



Engineering Building Site Plan: Dual Orientation Toward Washington & the Engineering Lawn

1.3 OPERATIONAL CONTEXT

Background

The Computing and Engineering Building [CEB] was built in 2005 to house the then intertwined disciplines of computer science and engineering. In the years since, the disciplines have become distinct and both have seen dramatic growth in employer demand for bachelor degree graduates and in student demand for enrollment in their degree programs.

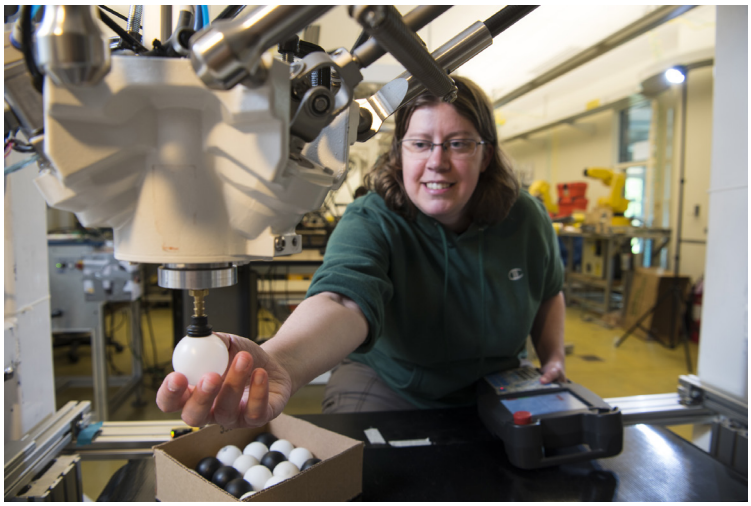
Since 2005, the fields have also seen significant shifts in the northeast region. The regional computer science industry has grown and consolidated in the Spokane City Center and mechanical engineering has taken centerstage as Spokane and West Plains mechanical engineering companies have emerged as major players in their markets. EWU has been a long time leader in regional bachelor degree production for both disciplines; the Mechanical Engineering program was accredited in 2011.

To reflect these regional shifts and to keep up with demand for enrollment and graduates, EWU's Computer Science Department will relocate to EWU's Spokane city center campus in fall 2020 and EWU's Cheney campus will focus on its Mechanical Engineering and Technology degree programs.

Engineering Program

Eastern Washington University's Cheney campus offers rigorous and pragmatic Mechanical Engineering and Technology (MENT) degrees that prioritize hands-on training and applied learning. The majority of students are enrolled in Mechanical Engineering (ME), Mechanical Engineering Technology (MET), Applied Technology, Construction Management Technology, and Manufacturing Technology with both a DFM and Process option. EWU's engineering classes are taught exclusively by faculty with industry experience. The Engineering program makes up approximately 9% of EWU's total enrollment.

EWU's Engineering Department is unique in Washington State in that it takes a systems level view of manufacturing including robotics which is typically part of Electrical Engineering. Students learn not just how to program machines and robots but how to design them. For example, EWU students design, 3D print, install and program custom manipulators for robotic arms and other machine parts. This corresponds directly to the needs of local mechanical engineering companies which focus on advanced manufacturing, large scale mechanics and heavy industry robotics. EWU's degree programs involve classroom, laboratory and project work that results in graduates who have not only learned about mechanical engineering, they know how to apply it.

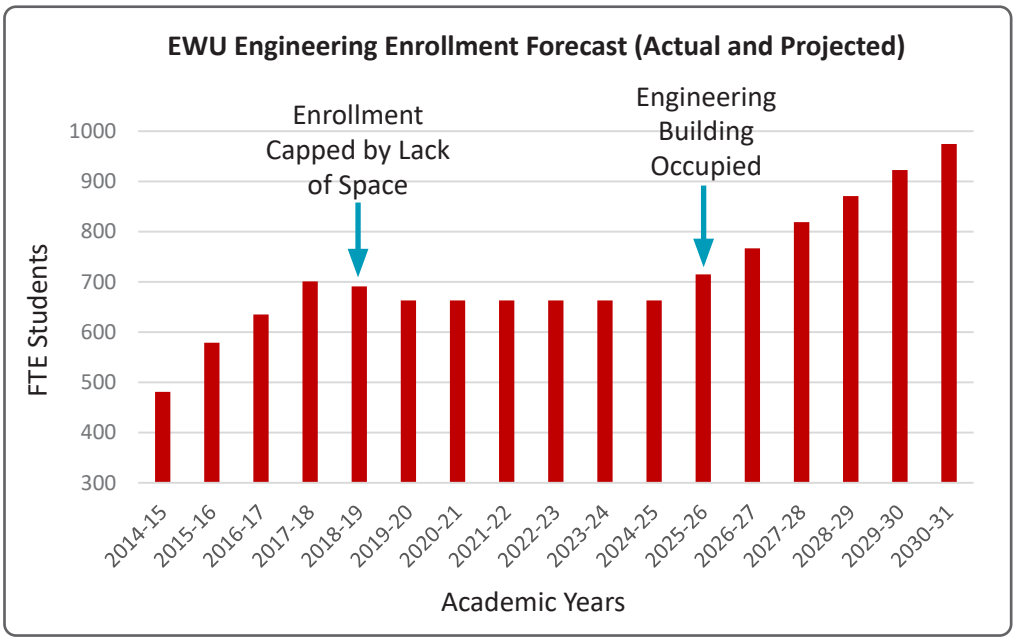


EWU Mechanical Engineering & Technology student in the Robotics Lab

The EWU Engineering Department strives to ensure students graduate with a resume not just a diploma and career placement data demonstrates that EWU's engineering graduates are sought after in the marketplace. A 2019 EWU Engineering Department survey of 2018 graduates showed that 85% of the ME and MET alumni report that they are employed full or part-time in the year following graduation, with most students employed within the first six months after graduation. This number has held steady over the last three years. 55% of the ME and MET respondents also reported salaries over $60,000 *in their first year*. Each year, the department organizes one of the biggest STEM-focused career fairs in Washington State.

Enrollment Forecast

Enrollment demand for EWU's engineering programs has increased significantly and consistently since their inception. Results of an independent market study commissioned by the EWU Engineering Department in 2017 show that the enrollment potential for first time, traditional college freshman in just the ME degree program is 135 per year. This result takes into account the broader public college enrollment decline forecasted by demographic changes in the next 10 years. Given that the department enrolled 68 first time, traditional college freshman in the ME program in Fall 2019 and that approximately half of all EWU's engineering students are transfers, there is enormous potential for growth.



The Engineering Department has built successful outreach programs to rural and underserved prospective student populations by providing hands-on engineering activities which directly correlate with subsequent enrollment at EWU and in the Engineering program. The department has built strong continuation programs with community college programs to move related Associate in Arts degrees holders (AA) into engineering bachelor's degrees at EWU.

Despite the increasing demand for enrollment and graduates and the department's strengths in outreach, the Engineering Department capped enrollment in 2018-2019 due to lack of facility capacity. Lack of space also restricts the hiring additional faculty FTEs to instruct engineering classes. The design and construction of the Engineering Building will allow continued program growth and degree production, with conservative forecasting showing enrollment increasing 47% in the first six years of building occupancy.

The sustained growth of the engineering programs will continue as the University continues

to provide high-level instructional support in facilities that support students' success. The opportunity is clear: continuing the trajectory of EWU's engineering programs with the Engineering Building will not only change students' lifelong potential but also help lead Washington State in solving some of the 21st century's biggest challenges.

Existing Facilities

EWU's Mechanical Engineering and Technology program did not exist when CEB was in construction. The program most closely related at the time was primarily focused on developing high school shop teachers. The basement of CEB was programmed and built to reflect those needs. The Engineering Department has changed dramatically since that time, now producing graduates prepared for advanced mechanical engineering jobs at cutting-edge regional companies.

While moving Computer Science to Spokane results in some vacant computer laboratories in CEB, these spaces are not suitable for the majority of Mechanical Engineering and Technology teaching laboratories due to their minimal mechanical, electrical and plumbing services and overhead clearances.

The department has outgrown the basement of CEB which contains the only spaces in the building with the mechanical, plumbing and electrical capabilities required for the hands-on materials and machine laboratory training which makes up a significant portion of Mechanical Engineering and Technology education. In addition, a primary concern of both faculty and accreditors is student safety due to poor sightlines in these spaces. Overhead clearances do not allow the relocation and addition of certain equipment, and overhead services are minimal resulting in space that is inflexible to the constantly evolving requirements of the field.

EWU Mechanical Engineering & Technology students in the Metallics Lab

Students must complete a team capstone project to graduate. These projects are often physically large and need to be located near hand-on laboratory spaces during their production. The very limited storage space in the CEB basement is not only insufficient for the current number of capstone projects but nonexistent for large projects which causes them to be stored in teaching laboratories or circulation zones which, in turn, become even more crowded and unsafe.

In 2006, several rooms in nearby Cheney Hall were renovated to provide additional labs required by the Electrical Engineering program. The program has since outgrown these labs as well. Further details on the existing facilities in CEB and Cheney Hall can be found in Section 2 of this report.

Certification & New Programs

While there has not been certification difficulty to date, accreditors consistently cite strong concerns regarding capacity and safety issues in the existing CEB engineering laboratories. The lack of flexible, interdisciplinary collaboration spaces will also make future degree certification challenging.

The department has goals of expanding its academic offerings to include graduate level courses, such as a Master of Science in Engineering and a Master of Science in Technology, as well as a Civil Engineering program. It will be impossible to introduce and accredit these additional programs and degrees in the future without additional quality teaching and research laboratory spaces.

Industry Involvement & Research

EWU's Engineering Department has a long history of strong relationships with the regional manufacturing industry including internships, company tours, career preparedness, guest lectures and instruction, on-campus interviews and engagement events. The current facilities can no longer accommodate the increased attendance at popular events such as capstone project demonstrations and the career fair, which must be held elsewhere on campus reducing the impact of the engineering experience for prospective students and industry partners. During on-campus job interviews, students are often interviewed in groups due to lack of suitable small spaces.

A department goal is to provide opportunities for students and industry partners to interact and work together in active, hands-on engineering settings at EWU. The department has provided on-campus testing and product development support to industry partners in the past but cannot provide these capabilities currently due to limited facilities. Companies have donated major robotics equipment in the past but the department has recently declined state-of-the-art robotics equipment donations due to lack of suitable facilities. Similar donations from mechanical engineering companies are restricted by the lack of suitable facilities.

The Department works closely with S3R3 (West Plains/Airport Area Public Development Authority) which states that "the West Plains Airport Area is a globally recognized innovation zone with advanced manufacturing and aerospace industry clusters." Access to an educated workforce is critical to prospective companies and EWU's Engineering Department is a major contributor to building advanced manufacturing technology industries in the region.

There is strong interest by current faculty and industry in strengthening mechanical engineering and advanced manufacturing research capabilities at EWU. Given the limited existing laboratory

EWU Mechanical Engineering & Technology student in the Robotics Lab

space appropriate for hands-on engineering work and the priority to educate and graduate students, engineering research has been severely limited and will continue to be limited without dedicated research space. An increase in faculty due to increase in enrollment will increase the demand for research space.

Student Collaboration & Community Building

The Washington State Regional Educational Needs Assessment 2017 states that "a repeated concern of local employers was the lack of soft-skills among new and potential employees."

Table 2. Describe the skill sets you struggle to find locally

	Responses	Percent
Soft Skills	25	20%
Commercial Drivers	7	6%
Machinery	7	6%
Sales	6	5%
Skilled Trades	6	5%
Welders	6	5%
Total Responses	124	

n=124

Source: Washington State Regional Educational Needs Assessment 2017

EWU's Engineering Department is committed to developing graduates who not only have technical knowledge and the ability to apply it, but also have real world skills such as leadership, teamwork, and communication to succeed in their careers.

Unfortunately the current facilities do not have the student interaction and faculty-student interaction spaces to encourage the types of interpersonal interactions that develop these skills. Capstone projects are team based but there are no meeting spaces for students teams to gather in. Commuters comprise 80% of EWU students but there is limited space for students to study and interact in the current facilities.

There are limited informal meeting spaces for faculty to interact with individuals and teams of students outside of class. There is only one large meeting room in CEB. Departmental community-building events are now often too large to be held in CEB lobby and must be held elsewhere on campus.

Student clubs have limited to no space to work or meet. For example, the SAE Baha Club has access to a small space in Cheney Hall which they share with non-engineering student clubs and the Rocketry Club borrows space from offsite agencies. Both are in different buildings from the hands-on laboratories that the clubs utilize to construct their projects which creates logistical challenges. The department expects that enrollment in these and other applied engineering clubs would increase significantly given appropriate space with greater visibility to other students.

Community Outreach

Learning how to talk about their work with non-engineers is seen as a critical skill for EWU Engineering graduates, and the department supports that through community and industry outreach programs and events which the students are expected to participate in.

As noted previously, the Engineering Department has built successful outreach programs to rural and underserved prospective student populations by providing hands-on engineering activities, events and clubs with the community. It would be most impactful to host these events in the engineering facilities in order to allow prospective students to visualize a college engineering experience but the department currently cannot house these events due to the space constraints and safety concerns described earlier, and so most outreach is mobile.

1.4 PROJECT VISION, GOALS & OBJECTIVES

The predesign process began with a series of stakeholder work sessions which included administrators, faculty and staff from the College of STEM, the Engineering Department, EWU Facilities & Planning and LMN Architects. These work sessions resulted in the following vision, goals and objectives for the project which reflect the Operational Context described above and have guided the predesign process:

Project Vision

- Position EWU as THE source for mechanical engineering & advanced manufacturing job candidates.
- Position Spokane and the West Plains as THE location for mid-size mechanical engineering companies.

Project Goals

- Increase amount of job-ready graduates with mechanical engineering and advanced manufacturing expertise.
- Increase EWU's capabilities in teaching both applied and advanced mechanical engineering and advanced manufacturing.
- Increase the presence of mechanical engineering and advanced manufacturing on campus.
- Raise the bar for mechanical engineering and advanced manufacturing research in Washington State.
- Increase collaboration between EWU and local industry, especially applied engineering.

Project Objectives

- Transition Mechanical Engineering and Technology to the primary engineering program on campus through reprogramming or renovation of existing buildings and/or the addition of a new Engineering Building.
- Provide labs that allow hands-on mechanical engineering and advanced manufacturing opportunities.
- Design for flexibility in teaching, research, tools, and over time.
- Create spaces that support student collaboration and community building.
- Create spaces that enhance long term industry collaboration and regional community engagement.

EWU Mechanical Engineering and Technology student in the Metallics Lab

2.0 PROGRAM ANALYSIS

2.1 ASSUMPTIONS AND GUIDELINES

2.2 EXISTING FACILITIES

2.3 SPACE NEEDS ASSESSMENT

2.4 SPACE REQUIREMENTS

2.5 TECHNICAL PROGRAM REQUIREMENTS

2.6 FUTURE REQUIREMENTS

2.7 CODES/REGULATIONS

2.1 ASSUMPTIONS AND GUIDELINES

Programming is the phase in which the project needs are defined, goals are identified and initial budget information is developed. It forms the foundation upon which all subsequent design work is based. The following assumptions were utilized in forming the program requirements for the Engineering Building:

- The increased number of students taking and forecasted to take engineering courses has and will increase the need for teaching laboratories, in particular hand-on laboratories.
- Each engineering major must complete a capstone project in order to graduate. The increased number of engineering majors has and will increase the need for project laboratories and projects storage spaces required to accomplish those projects.
- Enrollment increases and the fact that 80% of EWU students are commuters have and will increase the need for student interaction spaces, in particular meeting rooms, study spaces, lounge spaces, and community areas.
- Current faculty interest in dedicated research space is strong, and enrollment increases will allow the hiring of new FTE faculty with similar aspirations.
- The Engineering Department's continued success in collaboration with local industry has caused a need for dedicated industry research space.
- Hands-on spaces for community outreach is critical to fulfilling EWU's strategic goals.

Programming Standards

Reference materials utilized in programming the new Engineering building included:

- Facilities Evaluation and Planning Guide (FEPG), Inter-institutional Committee of Space Officers representing the public four-year colleges and university in the state of Washington, 1994
- Postsecondary Education Facilities Inventory and Classification Manual (FICM), National Center for Education Statistics, 2006

FEPG recommendations for spaces and the corresponding areas used in the program for the Engineering Building and renovated spaces in CEB are shown in the following table:

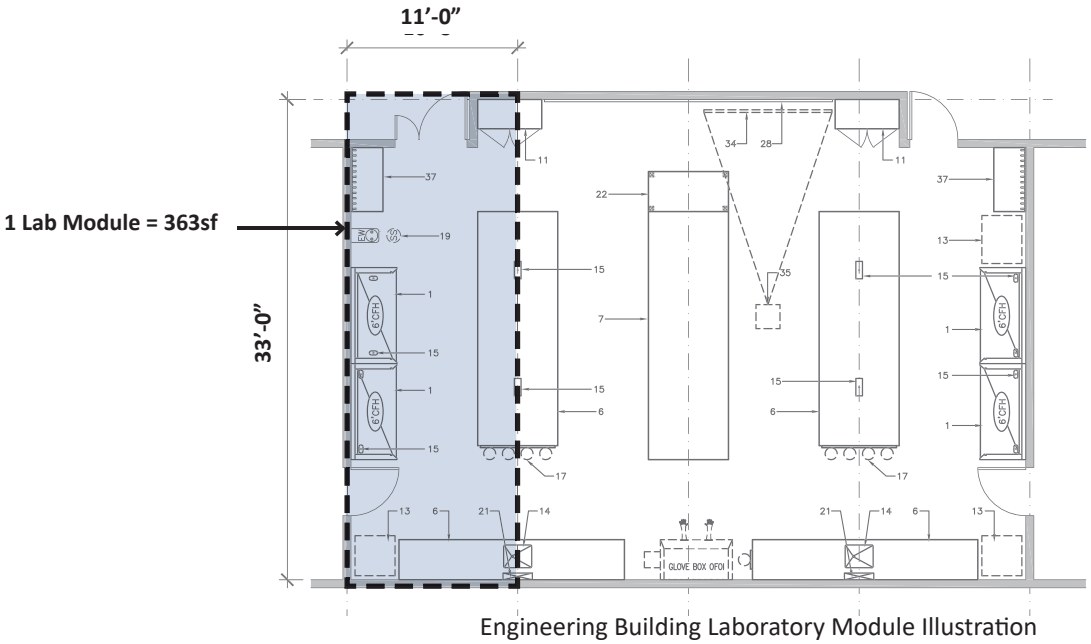
FEPG Room Classification Number	FEPG Room Classification Type	FEPG Recommendation (ASF/Station)	Program Area Applied to Project (ASF/Station)
110	Classroom	20 (Range = 16-26)	20
210	Class Laboratory - Mechanical Engineering	175 (Range = 35-180)	61-182 Varies based on engineering equipment sizes.
215	Class Laboratory Service	Depends on need	Based on identified need
220	Open Laboratory	Depends on need	Based on identified need
250	Research Laboratory	Depends on need	Based on identified need
255	Research Laboratory Service	Depends on need	Based on identified need
312	Dean Office	200	175 Existing space
316 & 317	Staff & Other Office	120	88-96 Existing spaces

Laboratory Module: To provide a baseline planning module for programming of teaching and research laboratories, a standard laboratory module was established by Research Facilities Design (RFD) based on industry standards and applicability to the types of laboratories included in the Engineering Building project.

The proposed laboratory planning module for the building was derived by analyzing the laboratory bench, equipment, and circulation space required for the engineering functions. The module is based on the bench space required for technical work stations, instruments, and procedures. The space required between benches is designed to allow people to work back-to-

back at adjacent benches, to allow for accessibility for disabled and still allow for movement of people and laboratory carts in the aisle.

The preliminary planning module utilized for the Engineering Building is 11’-0” wide by 33’-0” deep = 363 Assignable Square Feet. This module will provide adequate bench space plus space for floor standing equipment and fume hoods, and can be divided for smaller support spaces such as storage or instrument rooms.



Engineering Building Laboratory Module Illustration

Classrooms: Two classrooms are included in the project scope as the result of reprogramming existing spaces in CEB. An existing classroom which is underutilized due to its small size is being enlarged as part of the expansion of a new programmed class laboratory. In order to create a physical connection to the Engineering Building on the Second Floor, two classrooms will be combined into one larger classroom.

Class, Open and Research Laboratories: Preliminary areas for teaching, open and research laboratories were assigned based on benchmarks developed by Research Facilities Design from similar university laboratory facilities, reviews of sizes of existing and proposed engineering equipment required in each lab, and on discussions with the faculty, staff and administration. Areas were rounded to the nearest laboratory module. Room diagrams for each proposed laboratory can be found in the Appendix of this report.

Laboratory Service: The program size of lab support spaces was based on a comparison of existing spaces to identified needs.

Office Spaces: All offices spaces in project are existing offices in CEB which are proposed to be renovated without changes to existing footprints.

2.2 EXISTING FACILITIES

Two facilities currently house the engineering programs at EWU: the Computing and Engineering Building (CEB) and Cheney Hall. CEB houses the majority of the engineering program.

At the time of the construction of CEB in 2005, the Mechanical Engineering (ME) program did not exist at EWU and square footage to accommodate the subsequent accreditation and significant growth of the Mechanical Engineering program was not provided in CEB. Additionally, the Manufacturing Technology and Construction Management Technology degrees have seen increased demand for enrollment as described previously. Building an addition to CEB to accommodate these programs is noted in EWU's 2014 Comprehensive Campus Master Plan.

CEB was designed as primarily a classroom, computer lab and office building. Only the basement of CEB has the mechanical, electrical and plumbing systems suitable for the hands-on material and machine training which makes up a significant portion of Mechanical Engineering and Technology education. In 2006, several rooms in nearby Cheney Hall were renovated to provide additional labs required by the electrical engineering program.

The existing facilities have serious deficiencies which have been noted by accreditors and which are at odds with the university's mission to expand opportunities for personal transformation through excellence in learning. Deficiencies in the existing buildings include:

Pedagogical Deficiencies in the Computer Engineer Building (CEB)
Teaching and Research Lab Space Deficiencies: The current facilities in CEB with mechanical, electrical and plumbing systems suitable for the Mechanical Engineering and Technology program lack the appropriate amount of instructional and research space for current and forecasted enrollment. This has resulted in space that is limiting growth and research activities.

Teaching Lab Safety Deficiencies: The Mechanical Engineering, Mechanical Engineering Technology, and TECH programs all make extensive use of the hands-on shop laboratories located in the basement of CEB which has resulted in significant safety issues noted by both faculty and accreditors due to overcrowding and confinement. The awkward shapes of existing spaces do not allow instructors to have sightlines to all laboratory participants which is critical to student safety.

Teaching Lab Technical Deficiencies: Across the entire CEB basement, overhead clearances are minimal and do not allow the relocation and addition of certain equipment. Overhead electrical services are minimal resulting in space that is inflexible to the constantly evolving requirements of the field. Current laboratories do not have the vibration isolation and sound insulation that is required for high level experiments and research.

Mechanical engineering laboratories are heavy consumers of bulky materials such as metals, woods and plastics which are delivered frequently. The main loading dock is on the first floor and the current freight elevator opens directly into a primary hands-on teaching lab (Metallics) in the basement. All materials must be brought through that lab to other labs adding further safety and security concerns. Interior HVAC ductwork blocks the top three-four feet of the only basement loading door (which also happens to be in the Metallics Lab), rendering it almost useless for oversized deliveries, equipment access, or tall student projects. Metals deliveries arrive on semi-trucks, but exterior loading space in front of this basement door can only accommodate small delivery vehicles.

Pedagogical Deficiencies in Cheney Hall

Technological Deficiencies: The existing Cheney Hall building is unsuitable for today's educational technology. Data infrastructure—including wired and wireless connectivity—are lacking, as are appropriate audio-visual and data facilities. The building's primary and secondary electrical system are original (1967) and do not allow for the equipment associated with today's instruction delivery, particularly Mechanical Engineering and Mechanical Engineering Technology which use specialized computer software which require robust computers dedicated to those programs.

Accessibility Deficiencies: Cheney Hall does not meet current ADA requirements and can be restrictive to students with mobility issues.

Interaction Space Deficiencies: Cheney Hall completely lacks the non-classroom spaces that enable the "high quality co-curriculum designed for development of the intellectual, cultural, personal, and practical aspects of students' lives" envisioned in the university's mission. Spaces for informal student gathering, walk-in computer labs, lounges, collaboration, and study are currently non-existent. There are no spaces for informal and non-instructional interactions.

Building Systems Deficiencies: Cheney Hall's heating, ventilation, and air conditioning systems are of original design and installation. Systems do not meet current energy code and indoor air quality issues are prevalent in the facility. This facility's systems shortcomings have a substantial effect on instruction in the classrooms and laboratory spaces.

Building Conditions

Please see Appendix for the FCS reports for Cheney Hall, Computing and Engineering Building and Cadet Hall.

Cheney Hall: Cheney Hall was originally completed in 1966 to house the Industrial Arts program. The building is 50 years old. There have been some minor renovations of the building in 2006 and 2016. The balance of the shell and space is of original construction and condition. **The Overall Facility Condition Score for the building is 2.6.** Many of the components are in the Fair-Systems Approaching End of Expected Life Cycles with some at critical level of Needs Improvement;

Limited Functionality.

- Substructure : 2.0
- Shell : 2.3
- The substructure and the shell of the building rank in the category of "good." The roof and windows on the facility are original installation and do not meet current state energy code. The exterior walls and roof are not insulated and affect the utility cost of heating and cooling the building.
- Interiors: 2.8
- Most the interior walls, floors and ceiling are "worn" due to age with ceiling ranking 4 or "poor".
- Services: 3.0

The systems of the building are what show the most decline. While the Plumbing and Electrical are in the "fair" range, the HVAC and Fire Protection components are at the level of 4 and 5 "poor" equipment marginal or "unsatisfactory" system non-functioning or seriously deficient. The building HVAC system does not meet current Washington State energy code and there are reported indoor air quality issues that can only be address by a new ventilation system.

The building has many Americans with Disability Act (ADA) deficits due to the age and the original design. In particular, the elevator does not meet ADA requirements for current square foot or

controls location.
Computing and Engineering Building: CEB was completed in 2005 and soon thereafter lacked any expansion space for program growth. The 2016 Facility Condition Assessment ranks the condition of the facility as "good/excellent" with an **overall 1.6 Facility Condition Score**. The challenge with CEB is that the Mechanical Engineering and Technology programs have exceeded the space in CEB that has the mechanical, electrical and plumbing systems suitable for hands-on Mechanical Engineering and Technology teaching laboratories.

2.3 SPACE NEEDS ASSESSMENT

After analyzing existing space proficiencies and deficiencies, right-sizing existing program, and accounting for enrollment growth with additional program, in general, for effective functioning and a optimal teaching and learning environment, the Engineering Department is currently deficient in:

- Instructional laboratory spaces for hands-on experiential learning
- Specialized laboratory spaces for faculty, graduate student and industry research
- Specialized laboratory spaces for student clubs and outreach activities
- Flexible open work space with exterior access for project and class extension
- Break-out laboratory classroom with sufficient space for engineering demonstrations
- Meeting rooms for student-student and student-teacher interactions
- Student study spaces and lounge
- Community space suitable for department and community outreach events

Lobby/Work Area/Demonstration Space
Space to accommodate the fourth (open work space) and final (community space) bullets above are currently lacking and are critical to the success of the Engineering Department. They can share space and are programmed in the subsequent Space Requirements as "Lobby/Work Area/ Demonstration".

Student projects can be physically large, occasionally up to ten feet tall. The department does not currently have space to support these projects which has forced them to be housed in inappropriate locations such as labs, and it has also had the unfortunate effect of limiting students' project choices and solutions. Double height space with direct access to the outdoors, that can be used for both project work and demonstration is required for future student success.

To support so many first generation and transfer students, the department has a tradition of holding capstone events for each of the four degrees and other industry interactive events every quarter. The department's annual STEM-focused career fair is one of the largest in Washington State. No space exists in the current facilities to support these activities at the size of the current department.

An important part of the culture and success of the Engineering Program has been repeated interaction with a wide range of industry partners. The relationships built as part of those interactions generate private support, scholarships, equipment donations, collaborative projects and research opportunities. Space for these interactive events will allow expansion of these relationships. One departmental goal is to be able to serve as a resource to engineering societies in the region to hold events in collaboration with the University.

Frequent events with many people and objects in this space are anticipated. To accommodate these, the scale of the space both horizontally and vertically must relate to the scale of the event and must also not limit the potential of large or non-stationary student capstone projects.

2.4 SPACE REQUIREMENTS

Program Room List

The program for the Engineering Building project is separated into two primary sections:

1. Engineering Building
2. CEB Renovated Spaces

The following tables compile the spaces that are required by the Engineering Building project program as assignable square footages.

ENGINEERING BUILDING						
SPACE ID	SPACE NAME	OCC.	ASF *	NO.	TOTAL ASF	NOTES
TEACHING LABS						
1.01	WOOD SHOP	16	2,904	1	2,904	
1.02	CONSTRUCTION LAB	12	1,815	1	1,815	
1.03	PLASTICS LAB	6	1,089	1	1,089	
1.04	METALLICS & FOUNDRY LAB	22	3,993	1	3,993	
1.05	FLUIDS LAB	6	1,089	1	1,089	
1.06	FLUID POWER LAB	24	1,815	1	1,815	
1.07	CONTROLS & SENSOR TECH LAB	32	2,178	1	2,178	
1.08	HVAC LAB	8	1,452	1	1,452	
1.09	LAB CLASSROOM	24	1,452	1	1,452	
SUBTOTAL TEACHING LABS					17,787	
LAB SUPPORT						
2.01	WORK AREA		900	1	900	
2.02	WORK AREA/DEMONSTRATION SPACE		1,600	1	1,600	
2.03	LAB SUPPORT		200	3	600	
2.04	MATERIALS STORAGE		700	1	700	
SUBTOTAL LAB SUPPORT					3,800	
RESEARCH LABS						
3.01	INDUSTRY SPACE	12	2,178	1	2,178	
3.02	CONTROLLED RESEARCH SPACE	6	1,452	1	1,452	
3.03	ROBOTICS RESEARCH LAB	12	2,178	1	2,178	
SUBTOTAL RESEARCH LABS					5,808	
PROJECTS LABS						
4.01	TECH PROJECTS LAB	12	1,452	1	1,452	
4.02	TECH PROJECT STORAGE	3	1,452	1	1,452	
4.03	ME/MET PROJECTS LAB	12	1,452	1	1,452	
4.04	ME/MET PROJECT STORAGE	3	1,452	1	1,452	
4.05	CLUB LAB	12	1,452	1	1,452	
SUBTOTAL PROJECTS LAB					7,260	
OFFICES & OFFICE SUPPORT						
5.01	LAB SUPERVISION & SUPPORT		725	1	725	
SUBTOTAL OFFICES					725	
STUDENT COLLABORATION						
6.01	LOBBY/DEMONSTRATION SPACE		1,650	1	1,650	
6.02	TEAM ROOMS		185	13	2,405	
6.03	OPEN CONVERSATION PRE/POST CLASS		450	3	1,350	
SUBTOTAL COLLABORATION					5,405	
TOTAL ASF ENGINEERING BUILDING					**40,785**	

CEB RENOVATED SPACES						
SPACE ID	SPACE NAME	OCC.	ASF *	NO.	TOTAL ASF	NOTES
TEACHING LABS						
CEB 002	COMPOSITE LAB	10	1,815	1	1,815	CEB Ground Level
CEB 001	MATERIALS SCIENCE LAB	6	1,089	1	1,089	CEB Ground Level
CEB 024	ADDITIVE MANUFACTURING	12	2,178	1	2,178	CEB Ground Level
CEB 205/7	HEAT TRANSFER / THERMODYNAMICS LAB	6	1,089	1	1,089	CEB Second Floor
SUBTOTAL RENOVATED LABS					6,171	
PROJECTS LABS						
CEB 125	MAKER SPACE	10	1,089	1	1,089	CEB First Floor
SUBTOTAL PROJECT LABS					1,089	
OFFICE & OFFICE SUPPORT						
CEB 319	DEANS OFFICES, MEETING & SUPPORT		2,771	1	2,771	CEB Third Floor
CEB 302	RECEPTION AREA		500	1	500	CEB Third Floor
SUBTOTAL RENOVATED OFFICES					3,271	
STUDENT COLLABORATION						
CEB 024	TEAM ROOMS		156	4	624	CEB Ground Level
CEB 002/D	STUDENT LOUNGE		1,948	1	1,948	CEB Ground Level
CEB 102	STUDENT STUDY		1,038	1	1,038	CEB First Floor
CEB 201	MEETING ROOM		766	1	766	CEB Second Floor
CEB 202	STUDENT COLLABORATION		887	1	887	CEB Second Floor
SUBTOTAL RENOVATED COLLABORATION					5,263	
CLASSROOMS						
CEB 228/7	CLASSROOM	40	1000	1	1,000	CEB Second Floor
CEB 207/9	CLASSROOM	72	1800	1	1,800	CEB Second Floor
SUBTOTAL CLASSROOMS					2,800	
TOTAL ASF CEB RENOVATION					**18,594**	

Room List Summary

The table below summarizes the preceding room lists and adds a net/gross ratio to estimate the total building area.

PROGRAM ELEMENT	AREA (ASF)	
ENGINEERING BUILDING		
Teaching Labs	17,787	
Research Labs	5,808	
Projects Labs	7,260	
Lab Support	3,800	
Offices & Office Support	725	
Collaboration	5,405	
Total Engineering Building (ASF)	**40,785**	
Estimated Net/Gross Ratio	55%	Ratio consistent with
Estimated Engineering Building Area (GSF)	**74,155**	other science building
CEB RENOVATED SPACES		
Teaching Labs	6,171	
Projects Labs	1,089	
Classrooms	2,800	
Offices & Office Support	3,271	
Collaboration	5,263	
Total CEB Renovated Space (ASF)	**18,594**	
Estimated Net/Gross Ratio	79%	
Estimated CEB Renovated Space Area (GSF)	**23,650**	

Program-Related Space Allocation

The following table summarizes the assignable areas of the proposed Engineering Building and calculates the total score, which is a weighted average with a maximum of 6 points possible. Categories and points are per OFM guidelines.

PROGRAM ELEMENT	POINTS	ASSIGNABLE SQUARE FEET	PERCENTAGE OF TOTAL	SCORE = POINTS x PERCENTAGE
Instructional Space (classroom, lab, library)	6	44,015	74%	**4.4**
Student Advising/Counseling Service	4	0	0%	**0.0**
Child Care	1	0	0%	**0.0**
Faculty Offices	4	0	0%	**0.0**
Administrative	3	3,996	7%	**0.2**
Maintenance/Central Stores/Student Center	4	11,368	19%	**0.8**
Totals		59,379	100%	**5.4**

Maximum Capacity

EWU's expectation is that this building under current growth forecasts for students and faculty would reach maximum capacity at about 6 years after opening. The objective will be to occupy and reach capacity as quickly as possible. EWU is continuously reviewing faculty hiring, enrollment data and projections, curriculum requirements, scheduling, class sizes, etc to identify a maximum enrollment capacity.

By the time the engineering programs contained in the new facility have matured to maximum capacity, EWU could be considering adding a Civil Engineering degree offering. If there is a capacity issue in the new Engineering Building, space could be developed in a new Civil Engineering Building. That said, EWU is fairly confident that growth will level out at the 6 year milestone.

Relationships of Functions

The ideal relationships of teaching, project and research labs to each other was explored in multiple work sessions with the faculty, staff and administration. The process revealed that there were certain labs which have many preferred adjacencies and others which have few or no preferred adjacencies.

Preferred Adjacencies

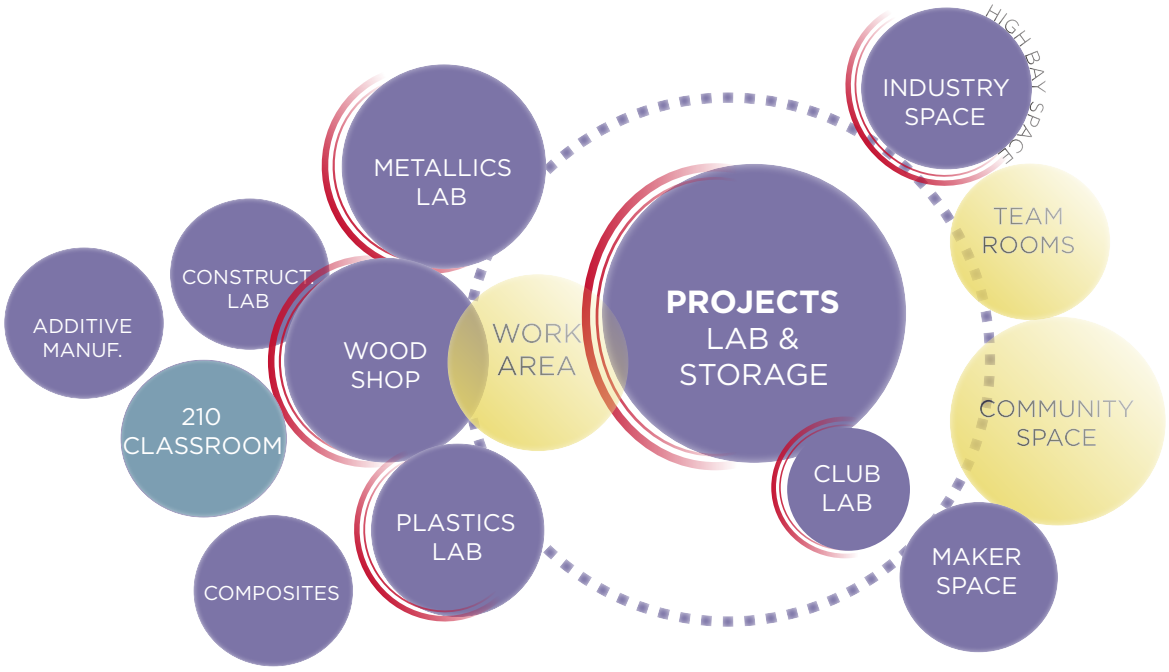
- Wood Shop, Metallics and Plastics are to be adjacent or proximate to each other
- Construction Lab is to be adjacent to Wood Shop
- Additive Manuf and Composites are to be proximate to Wood Shop, Metallics and Plastics
- Classroom Laboratory serves and is to be proximate to Wood Shop, Metallics and Plastics
- Work Area should be adjacent to Wood Shop, Metallics and Project Labs
- Project Labs are to be proximate to Wood Shop, Metallics and Plastics
- Project Labs and Project Storage are to be adjacent or proximate to each other
- Student Meeting Rooms (Team Rooms) are to be proximate to Project Labs, Wood Shop, Metallics and Plastics
- Club Lab should be proximate to Wood Shop, Metallics and Plastics
- Club Lab and Maker Space are to be proximate to the building entrance for outreach use

Other Considerations

- Metallics would prefer a raised loading dock for semi-truck direct access into the lab
- Industry Space and Wood Shop prefer to direct loading into the labs
- Freight elevator shall be easily accessed from Wood Shop, Metallics, Plastics, Project Labs and Work Area

Organizational Concept

Multiple organizational concepts for the Engineering Building were explored with the faculty, staff and administration. The diagram below shows the preferred concept which places students and their projects at its core, surrounded and supported by the labs and spaces that are most vital to enabling students' long term success.



Engineering Building Organizational Concept

2.5 TECHNICAL PROGRAM REQUIREMENTS

Laboratory Room Diagrams and Data Sheets

Detailed preliminary laboratory room diagrams and data sheets are included in the Appendix of this report. These documents provide the detailed program requirements for each type of laboratory space within the Engineering building and help to validate the program size for each.

Building Systems Requirements

Building systems requirements are outlined in the description of major systems included in Section 6.0 Project Budget Analysis.

Circulation

Effective circulation will be an important element in the design of the Engineering Building. Beyond the human occupants of the building, materials will be delivered to the facility including wood, metals, plastics and other supplies, and equipment. In addition to material delivery, the debris and waste generated by laboratory functions must be safely removed on a periodic basis.

Internal building circulation should provide safe pedestrian egress from each individual laboratory and laboratory support space through an uncomplicated path of egress to the building exterior at grade. Features that should be considered in the design of the circulation system include:

- At least one door into each laboratory space should have a minimum 54" wide clear opening. This can be accomplished using openings with one 3'-0" active leaf and one 1'-6" inactive leaf.
- Equipment lists should be carefully reviewed to verify that individual pieces of equipment can be transported and maneuvered between spaces. Future equipment should be anticipated.
- Doorways accessing corridors should open into recessed alcoves serving the corridor. The doors should swing out from laboratories, in the direction of exit.
- Wherever possible, circulation and fume hood locations within laboratory spaces should be coordinated to preclude exiting in front of the fume hoods.
- Clear, unobstructed access to the freight elevator from all labs for movement of materials, equipment and student projects is critical to the functioning of the program.

Interaction

The program should include areas outside of laboratories that provide opportunities for students to study and interact with one another. 80% of EWU students are commuters, so it is vital that new facilities incorporate study spaces and lounge space as well as enhanced technologies to support virtual study.

The building should encourage interaction within each laboratory group, between students, researchers, and faculty, and with the larger campus. This requires that spaces that support interaction be created between laboratories, on each floor, and in public areas of building. Areas for formal and, in particular, informal interaction should be linked to the circulation schemes. Formal interaction spaces should include meeting rooms and lounge areas. Informal interaction spaces should include student study areas, casual meeting spaces for short duration interaction, display/announcement boards, and possibly outdoor gathering spaces.

Meeting rooms (Team Rooms) should be incorporated throughout the building that facilitate groups of 4-6 students or groups of 12 for students plus faculty. These are the typical sizes of capstone project groups and engineering study groups.

Accessibility

The principles of universal design should be entirely incorporated to provide an accessible environment to all of its users throughout both the building and the site. Ramps and grading should allow easy access to the building from campus buildings and parking. All spaces within the building should incorporate the ADA guidelines to allow for an easily accessible environment for all of the building occupants. Early consideration should be given to the following accessibility aspects:

- Accessible work stations and fume hoods should be provided in the laboratories based on code requirements.
- Location of accessible work stations should be as close as possible to eyewashes and safety showers.
- An 18" clearance on the pull side and 12" clearance on the push side of doors opposite the hinged side is required.

Some guidelines for accessible work stations in laboratories include:

- Work surfaces 30"- 34" above floor with wheelchair clearance below. Adjustable work surfaces can provide a range of possible height adjustments.
- Laboratory service controls, equipment, and equipment controls within easy reach for persons with limited mobility. Controls should have single-action levers or blade handles for easy operation.
- Aisle widths and clearances adequate for maneuvers of wheelchair bound individuals. Aisles 5'-0" wide are recommended with turnaround areas.

Vibration Control

Some of the engineering equipment that will be used in the Engineering Building is sensitive to vibration, and some equipment creates excessive vibration. The building structure should be designed to moderate vibration to acceptable levels. Care should be taken to locate vibration creating engineering equipment where it has the least impact on other laboratories. Labs and support spaces will be designed to satisfy floor vibration criteria of VC-A (2,000 micro-in/sec. at 75 steps/min). This vibration criteria is appropriate for optical balances and microscopes up to 400x magnification, which are common in many labs. Classroom and office areas will be designed to meet the standard criteria of 0.5% g (g = force of gravity).

Air handling equipment and ductwork should be designed to minimize vibration. Supply and exhaust air fans, compressors, pumps and other noise and vibration producing equipment should be located in mechanical rooms with protective wall and floor construction. Equipment shall be isolated from supporting structure with resilient mounts. Vibration isolators should be selected based on floor stiffness, span extension, equipment power and operating speed.

Building Management Systems

The Engineering Building should be provided with a micro-processor based direct digital control building automation/energy management system. This system should provide environmental and energy management controls in all spaces and monitoring of the laboratory controls. All data from the energy management system should report into the existing campus energy management control system to allow for reporting of space and system status, reporting of alarms, scheduling of preventative maintenance functions, and trending of data for energy conservation purposes.

Monitoring of critical parameters of the ventilation system will be important for safe operation and effective maintenance and management of the building. Status of HVAC operations for laboratories, fume hoods, and other critical spaces, should be reported and alarmed when outside of established operational criteria.

Besides providing a high level of control and functionality in an integrated building control system, it is also desirable to have the capability of remote data reporting on consumption of water, gas, steam, chilled water, electrical, etc. for use by engineering courses. Trending of these basic systems is now required by Washington State law. As the campus works toward reductions of campus emissions, it would be highly beneficial for electrical energy use to be further separated to allow monitoring of energy by building components- HVAC (fans/pumps), receptacle loads, lighting, and process loads.

Technology Infrastructure

Spaces in the new engineering building should be flexibly designed to support changing technologies and dynamic laboratory environments. Teaching laboratories should feature the latest technological tools to support teaching goals and engineering demonstrations. Technology infrastructure should be designed to meet the current needs of each lab space, while remaining flexible enough to accommodate future potential changes to lab equipment and lab functions. All labs are to have overhead services. Wireless Internet access should be provided throughout the building.

Sustainable Design

Sustainable strategies to reduce and enhance the buildings' impact on the environment and lower its energy demand will ultimately have a beneficial effect on its longevity.

High performance public buildings: Under RCW 39.35D, Washington State requires sizable capital projects to achieve a minimum of Leadership in Energy and Environmental Design (LEED®) Silver. Several projects at EWU have achieved LEED® Gold.

Efficiency and environmental performance: Under Executive Order 18-01, all newly constructed state-owned (including lease-purchase) buildings shall be designed to be zero energy or zero energy-capable, and include consideration of net-embodied carbon. In unique situations where a cost effective zero-energy building is not yet technically feasible, buildings shall be designed to exceed the current state building code for energy efficiency to the greatest extent possible.

Toward making the EWU-EB a Living Laboratory, the use of heat pump technology for energy efficiency could be part of the curriculum and a showcased experience within the building. Washington State Energy Code are on a path toward 70% energy use reduction and elimination of fossil fuels from buildings by 2031. The Engineering Building will be a part of this change as new HVAC technologies are adopted and popularized, especially heat pump technology.

Reducing greenhouse gas emissions: EWU is updating its Climate Action Plan (CAP), which will address how the University can achieve carbon neutrality over the next 30 years. While the CAP may not be complete in the short term, design teams should consider strategies to align with the goals of carbon neutrality in the next 30 years. The electricity grid in Washington will be carbon neutral beginning in 2030, meaning a high-performance, all-electric building will meet that goal.

Washington State requires capital projects to engage in Energy Life Cycle Cost Analysis (ELCCA) per the Department of Enterprise Services (DES) Assessment as well as a Life Cycle Cost Analysis (LCCA) per the Office of Financial Management (OFM). The design team and University should use these requirements as an opportunity to study high-performance design to reduce energy use and cost in detail and make informed decisions about energy-saving strategies, in line with Washington State's greenhouse reduction goals for new buildings. Meeting these requirements requires a robust energy modeling effort including elements from ASHRAE Standard 209.

The 2019 Clean Buildings law requires retrofits of existing buildings that do not meet an Energy

Use Intensity (EUI, energy use per square foot) threshold. This building should be designed so that it meets current and expected EUI goals and does not require an energy retrofit in the coming years.

Water: Low-maintenance Xeriscape, plantings that do not need watering after establishment, is being installed at EWU as part of the Interdisciplinary Science Center project as a water-saving feature and can be explored as part of the site design of the new Engineering Building.

2.6 FUTURE REQUIREMENTS

Design to Adapt to Changes

Planning a building that can adapt to change is particularly important and challenging when designing engineering buildings because they both need to keep up with technological advancement in the field and are laden with significant scientific and safety equipment. The design of a science facility also commences so far in advance of actual construction that the design team must emphasize flexibility in all aspects of the project. Measures to accommodate change may include:

- Planning the structural layout such that partitions can easily be deconstructed or relocated to create larger or smaller spaces as needed.
- Providing adequate floor to floor heights to accommodate future increases in ventilation requirements due to future unforeseen equipment needs.
- Avoiding the use of systems that are difficult to modify or work with.
- Selection of building systems that require little and easy maintenance and are easily accessible and adaptable.
- Selection of moveable furniture and equipment that can be easily stored.

2.7 CODES/REGULATIONS

Applicable Codes

EWU engineering building is expected to comply with the following codes:

Building	International Building Code, latest edition with Washington State amendments, WAC 51-50
Fire	International Fire Code, latest edition with Washington State amendments, WAC 51-54 NFPA 13 Standard for the Installation of Sprinkler Systems
Mechanical	International Mechanical Code, latest edition with Washington State amendments, WAC 51-52
Plumbing	Uniform Plumbing Code, current Washington State-required edition with amendments, WAC 51-56 & 57
Electrical	National Electric Code, current Washington State-required edition, WAC 296-46B
Energy	Washington State Non-Residential Energy Code, latest edition, WAC 51-11
Accessibility	Accessible and Usable Buildings and Facilities, ICC/ANSI 117.1, current Washington State-required edition
Air Quality	Washington State Ventilation and Indoor Air Quality Code, WAC 51-13
Elevators	American Society of Mechanical Engineers (ASME) A17.1, current Washington State-required edition
Sustainability	High-performance public buildings (Chapter 39.35D RCW). State efficiency and environmental performance, if applicable (Executive Order 18-01). Greenhouse gas emissions reduction policy (RCW 70.235.070).

Seismic	American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures ASCE 7-16

EWU Engineering building is expected to comply with the following standards:

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
ASHRAE Standard 62.1 – Ventilation for Acceptable Indoor Air Quality
ASHRAE Standard 55 – Thermal Comfort
Sheet Metal Contractors Association of North America (SMACNA)
American Society of Plumbing Engineers (ASPE)
Eastern Washington University, Design and Construction Guidelines

Preliminary Building Code Analysis
The following code analysis identifies critical issues in the 2018 International Building Code that must be addressed during the design process; however, it is not intended as a complete investigation of relevant code requirements.

Use and Occupancy Classification (Chapter 3): The building occupancy will be classified as Group B, with Group S-2 spaces for low-hazard general storage and possibly Group H-2 spaces for hazardous storage.

Construction Type (Chapter 5): Type II-A, fully sprinklered construction is assumed for this report.

Building Height and Area (Chapter 5): Predesign concept plans have determined that the Engineering building will be 3 stories in height, with total size of about 75,000 gross square feet. The largest single floor will be approximately 26,000 square feet. Type II-A fully sprinklered buildings with Group B occupancies are allowed to be up to 112,500 square feet per story, up to 85 feet in height, and a maximum of 6 stories tall. H-2 occupancies are allowed on any floor up to two stories above grade.

Fire Resistive Construction (Chapter 6 & 7): Per IBC 602.2, all building elements are to be of noncombustible construction.

Building Element	Required Rating
Structural Frame	1-hour
Exterior Bearing Walls	1-hour
Interior Bearing Walls	1-hour
Exterior Non-bearing Walls	Unrated with greater than 30-foot separation
Int. Non-bearing Partitions	Unrated unless providing required separation
Floors	1-hour
Roofs	1-hour
Shaft Enclosures	1-hour
Exterior Openings	Unprotected with no limit if over 20-foot separation

Note: The provision of an automatic fire sprinkler system through the building may eliminate the requirement for 1-hour fire resistive construction in some building elements.

Occupant Load (Table 1004.1.1):

Area	Occupant Load Factor
Classrooms	20 sf/ occupant
Laboratories	50 sf/ occupant
Offices	150 sf/ occupant

Storage	300 sf/ occupant
Mechanical Rooms	300 sf/ occupant

Egress Requirements (Chapter 10):

Egress Element	Requirement
Exit Width	Stairs: 0.3”/ occupant, minimum 44” wide for occ. load > 50
Door Width	0.2”/ occupant, minimum 32” wide clear opening
Exit Corridors	Minimum 44” wide
Number of Exits	2 when occupant load > 50, 3 when occ. load > 500
Exit Location	Exits shall be located at a distance apart equal to not less than one third of the length of the maximum diagonal dimension of the building or area served, where building is equipped with automatic sprinkler systems.
Travel Distance	Travel distance shall not exceed 300’ in a sprinklered. Group B occupancy. H-2 occupancies are limited to shorter allowable travel distances, 100’.

3.0 ANALYSIS OF ALTERNATIVES

3.1 DESCRIPTIONS OF ALTERNATIVES

3.2 SUMMARY OF ALTERNATIVES

3.3 LIFE CYCLE COST OF ALTERNATIVES

3.4 PREFERRED ALTERNATIVE: BUILDING CONFIGURATION AND SQUARE FOOTAGE

3.1 DESCRIPTIONS OF ALTERNATIVES

Alternative I: Preferred Alternate - New Engineering Building on the Existing Campus
Satisfaction of the program requirements can readily be achieved through construction of a new building on the Cheney campus that will facilitate continued Mechanical Engineering & Technology program growth and degree production, improve the quality and safety of laboratories, increase faculty and industry research opportunities, support community outreach activities particularly rural and underserved populations, and encourage student engagement with each other, the Engineering Department and the regional engineering industry.

The new structure will be designed to provide desired health, safety and functionality without compromise. The new building will connect to CEB, taking advantage of CEB's strengths, creating efficiencies such as shared departmental and instructional resources, direct access to faculty and administrative offices, and shared student amenities. The building will be a student centered environment that provides a high quality engineering teaching and research environment that is responsive to the needs of engineering education and the engineering industry.

Alternative II: Renovation of Existing Engineering Facilities
An alternative for addressing the deficiencies of the existing facilities would entail a major renovation of CEB and Cheney Hall. The alternative falls short in serious ways: it not only generates significant additional expense, it results in substandard teaching and research laboratories and continued operational and systems inefficiencies, and it eliminates eight good quality, general use classrooms and two computer labs. Additional costs would be incurred to relocate the entire Engineering Department and others from both buildings during construction.

CEB was completed in 2005, is currently in good condition for its primary purpose as a classroom, computer lab and office building. However, the existing structure and systems of CEB are not compatible with the needs of engineering education. The ventilation demands and laboratory support systems in a engineering facility require above-average floor-to-floor heights that allow clear ceiling space for large duct work and laboratory plumbing and electrical systems. The existing CEB mechanical, engineering and plumbing systems are suited only for office, classroom and computer lab space. They are not adequate for engineering and cannot be made so without substantial demolition and reconstruction of the superstructure. Resulting labs would still be substandard in size and quality due to restricted dimensions and existing low ceiling heights.

Cheney Hall was completed in 1966 and many of the components are approaching end of expected life cycles. It currently houses a portion of the athletics department. Both buildings would need to be brought up to current ADA, structural and energy codes.

Alternative III: No Action
The consequences of taking no action would have a negative impact on EWU students, the Engineering Department, the University, the region, and the State of Washington. EWU would not be able to support the current and forecasted demand for engineering enrollment. Student success in EWU's undergraduate engineering programs could not be ensured. The result would be that EWU would produce fewer graduates in high demand engineering professions and this would undermine the policies of the Washington Student Achievement Council and the Office of Financial Management.

Additionally, the current Engineering Building would continue to have significant deficiencies in building systems, technology, student spaces and general quality. The current facilities would also continue to experience high maintenance and repair costs, which if deferred will result in facilities that are not capable of supporting even the current student load.

3.2 SUMMARY OF ALTERNATIVES

The following table compares the alternatives:

	Alternative I: ***Preferred Alternate*** New Engineering Building on the Existing Campus	**Alternative II:** Renovation of Existing Engineering Facilities	**Alternative III:** No Action
Description	Design and construction of a new engineering building to support growth and new desired program requirements.	Major renovation to existing facilities both CEB and Cheney Hall.	No action taken.
Advantages	- Provides sufficient high quality teaching laboratories to meet forecasted enrollment and degree production. - Provides state-of-the-art engineering research facilities for faculty and industry collaboration - Direct connection to CEB takes advantage of CEB's strengths, creating efficiencies such as shared instructional resources, direct access to faculty and administrative offices, and shared student amenities.	- Reuses some of the existing infrastructure. - Cheney Hall is due for some systems and finishes upgrades. - No demolition of Cadet Hall or relocation of its program elsewhere on campus.	- No demolition of Cadet Hall or relocation of its program elsewhere on campus.
Disadvantages	- Demolition of Cadet Hall and relocation of its program elsewhere on campus.	- Majority of facilities are in good condition for their intended use as classrooms and offices. - Upgrading mechanical systems for lab use requires substantial demolition and reconstruction. - 8 good quality general use classrooms and 2 good quality computer labs would be eliminated. - Resulting labs would still be substandard in size and quality due to restricted dimensions and existing low ceiling heights. - Additional costs will be incurred to relocate Engineering Department during construction.	- EWU would not be able to support the current and forecasted demand for engineering enrollment. - Student success in EWU's undergraduate engineering programs could not be ensured. - EWU would produce fewer graduates in high demand engineering professions undermining the policies of the Washington Student Achievement Council and the Office of Financial Management.
Project Costs	$69,748,366	$72,689,944	$0
Construction Schedule	Start: July 2023 Mid-point: April 2024 Completion: July 2025	Start: July 2023 Mid-point: April 2024 Completion: July 2025	No Construction

3.3 LIFE CYCLE COST OF ALTERNATIVES

Life Cycle Cost Analysis - Project Summary

Agency	Eastern Washington University
Project Title	Engineering Building

Existing Description	None

Lease Option 1 Description	N/A

Lease Option 2 Description	N/A

Ownership Option 1 Description	Alternative I: (Preferred Option) - New Engineering Buidling on the Existing Campus. Includes a 74,515 gsf new addition and 23,650 renovation of an existing facility.

Ownership Option 2 Description	Alternative II: Renovation of Existing Engineering Facilities

Ownership Option 3 Description	Alternative III: No Action

Lease Options Information	**Existing Lease**	**Lease Option 1**	**Lease Option 2**
Total Rentable Square Feet	-	-	-
Annual Lease Cost (Initial Term of Lease)	$ -	$ -	$ -
Full Service Cost/SF (Initial Term of Lease)	$ -	$ -	$ -
Occupancy Date	n/a		
Project Initial Costs	n/a	$ -	$ -
Persons Relocating	-	-	-
RSF/Person Calculated			

Ownership Information	**Ownership 1**	**Ownership 2**	**Ownership 3**
Total Gross Square Feet	97,805	91,000	-
Total Rentable Square Feet	-	-	-
Occupancy Date	4/1/2025	4/1/2025	
Initial Project Costs	$ -	$ -	$ -
Est Construction TPC ($/GSF)	$ 762	$ 853	$ -
RSF/Person Calculated	-	-	-

Financial Analysis of Options

	Display Option?	Yes	Yes	Yes	No	No	Yes	No
	Financial Comparisons	**Existing Lease**	**Lease 1**	**Lease 2**	**Ownership 1**			
Years	**Financing Means**	**Current**	**Current**	**Current**	**GO Bond**	**COP**	**COP Deferred ***	**63-20**
0	0 Year Cumulative Cash	$ -	$ -	$ -			$ -	
	0 Year Net Present Value	$ -	$ -	$ -			$ -	
	Lowest Cost Option (Analysis Period)							

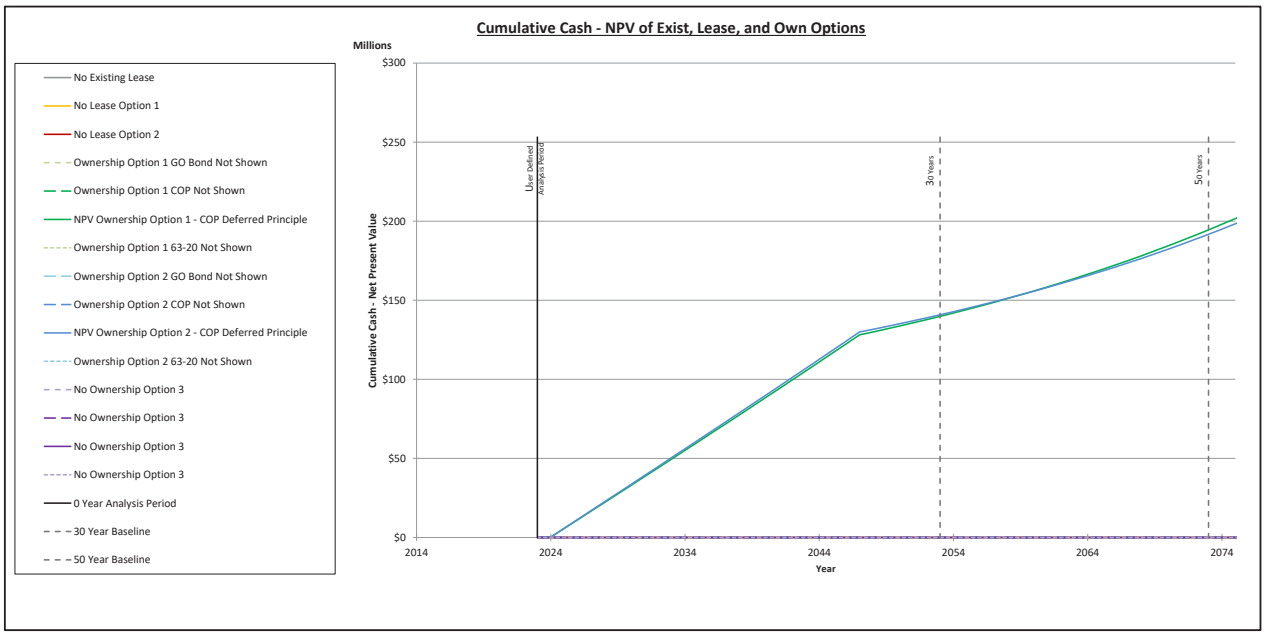
	Financial Comparisons	**Existing Lease**	**Lease 1**	**Lease 2**	**Ownership 1**			
Years	**Financing Means**	**Current**	**Current**	**Current**	**GO Bond**	**COP**	**COP Deferred ***	**63-20**
30	30 Year Cumulative Cash	$ -	$ -	$ -			$ 148,721,959	
	30 Year Net Present Value	$ -	$ -	$ -			$ 137,588,583	
	Lowest Cost Option (30 Years)						1	

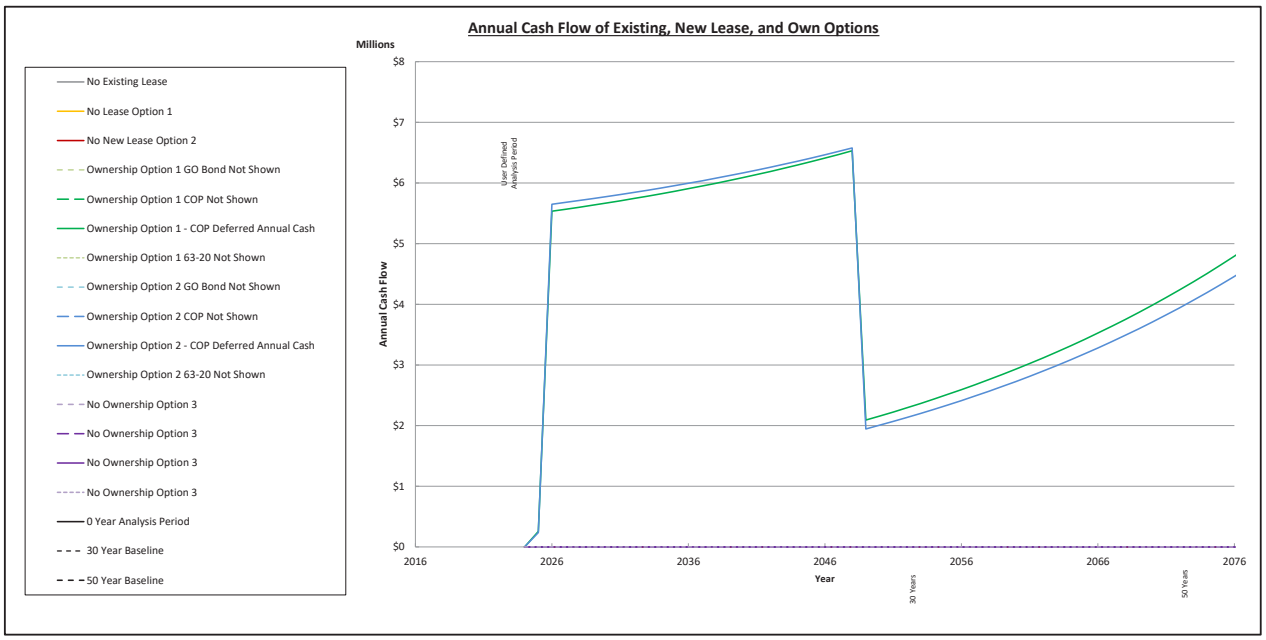
	Financial Comparisons	**Existing Lease**	**Lease 1**	**Lease 2**	**Ownership 1**			
Years	**Financing Means**	**Current**	**Current**	**Current**	**GO Bond**	**COP**	**COP Deferred ***	**63-20**
50	50 Year Cumulative Cash	$ -	$ -	$ -			$ 214,877,218	
	50 Year Net Present Value	$ -	$ -	$ -			$ 190,811,952	
	Lowest Cost Option (50 Years)						2	

	Display Option?	No	No	Yes	No	No	No	Yes	No
	Financial Comparisons	**Ownership 2**				**Ownership 3**			
Years	**Financing Means**	**GO Bond**	**COP**	**COP Deferred**	**63-20**	**GO Bond**	**COP**	**COP Deferred**	**63-20**
0	0 Year Cumulative Cash			$ -				$ -	
	0 Year Net Present Value			$ -				$ -	
	Lowest Cost Option (Analysis Period)								

	Financial Comparisons	**Ownership 2**				**Ownership 3**			
Years	**Financing Means**	**GO Bond**	**COP**	**COP Deferred**	**63-20**	**GO Bond**	**COP**	**COP Deferred**	**63-20**
30	30 Year Cumulative Cash			$ 149,884,511				$ -	
	30 Year Net Present Value			$ 138,739,605				$ -	
	Lowest Cost Option (30 Years)			2					

	Financial Comparisons	**Ownership 2**				**Ownership 3**			
Years	**Financing Means**	**GO Bond**	**COP**	**COP Deferred**	**63-20**	**GO Bond**	**COP**	**COP Deferred**	**63-20**
50	50 Year Cumulative Cash			$ 211,436,871				$ -	
	50 Year Net Present Value			$ 188,259,840				$ -	
	Lowest Cost Option (50 Years)			1					


Cumulative Cash - NPV of Exist, Lease, and Own Options
Millions
No Existing Lease
No Lease Option 1
No Lease Option 2
Ownership Option 1 GO Bond Not Shown
Ownership Option 1 COP Not Shown
NPV Ownership Option 1 - COP Deferred Principle
Ownership Option 1 63-20 Not Shown
Ownership Option 2 GO Bond Not Shown
Ownership Option 2 COP Not Shown
NPV Ownership Option 2 - COP Deferred Principle
Ownership Option 2 63-20 Not Shown
No Ownership Option 3
No Ownership Option 3
No Ownership Option 3
No Ownership Option 3
0 Year Analysis Period
30 Year Baseline
50 Year Baseline
$300
$250
$200
$150
$100
$50
$0
Cumulative Cash - Net Present Value
User Defined Analysis Period
30 Years
50 Years
2014
2024
2034
2044
2054
2064
2074
Year


Annual Cash Flow of Existing, New Lease, and Own Options
Millions
No Existing Lease
No Lease Option 1
No New Lease Option 2
Ownership Option 1 GO Bond Not Shown
Ownership Option 1 COP Not Shown
Ownership Option 1 - COP Deferred Annual Cash
Ownership Option 1 63-20 Not Shown
Ownership Option 2 GO Bond Not Shown
Ownership Option 2 COP Not Shown
Ownership Option 2 - COP Deferred Annual Cash
Ownership Option 2 63-20 Not Shown
No Ownership Option 3
No Ownership Option 3
No Ownership Option 3
No Ownership Option 3
0 Year Analysis Period
30 Year Baseline
50 Year Baseline
$8
$7
$6
$5
$4
$3
$2
$1
$0
Annual Cash Flow
User Defined Analysis Period
2016
2026
2036
2046
2056
2066
2076
Year
30 Years
50 Years

Financial Assumptions

Date of Life Cycle Cost Analysis:	6/26/2020
Analysis Period Start Date	4/2/2023
User Input Years of Analysis	0

All assumptions subject to change to reflect updated costs and conditions.

	Lease Options		
	Existing Lease	**Lease Option 1**	**Lease Option 2**
Inflation / Interest Rate	3.120%	3.120%	3.120%
Discount Rate	0.533%	0.533%	0.533%
Length of Financing	N/A	N/A	N/A

Ownership Option 1			Ownership Option 2			Ownership Option 3		
GO Bond	**COP**	**63-20**	**GO Bond**	**COP**	**63-20**	**GO Bond**	**COP**	**63-20**
3.540%	3.670%	3.670%	3.540%	3.670%	3.670%	3.540%	3.720%	3.720%
0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%	0.533%
25	25	25	25	25	25	25	25	25

See Financial Assumptions tab for more detailed information

COP Deferred and 63-20 Financing defer the payment on principle until construction completion.

New Lease Assumptions

Real Estate Transaction fees are 2.5% of the lease for the first 5 years and 1.25% for each year thereafter in the initial term of the lease.

Tenant Improvements are typically estimated at $15 per rentable square foot.

IT infrastructure is typically estimated at $350 per person.

Furniture costs are typically estimated at $500 per person and do not include new workstations.

Moving Vendor and Supplies are typically estimated at $205 per person.

Default Ownership Options Assumptions

Assumes a 2 month lease to move-in overlap period for outfitting building and relocation.

Assumes surface parking.

The floor plate of the construction option office building is 25,000 gross square feet.

The estimated total project cost for construction is $420.00 per square foot.

See the Capital Construction Defaults tab for more construction assumptions.

Ownership Option 1 Information Sheet

*	***Requires a user input***	*Green Cell*	*= Value can be entered by user.*	*Yellow Cell*

*	**Project Description**	Alternative I: (Preferred Option) - New Engineering Buidling on the Existing Campus. Includes a 74,515 gsf new addition and 23,650 renovation of an existing facility.
*	**Construction or Purchase/Remodel**	Construction
*	**Project Location**	Cheney — Market Area = Spokane County

	Statistics	
*	Gross Sq Ft	97,805
*	Usable Sq Ft	
	Space Efficiency	
	Estimated Acres Needed	4.00
	MACC Cost per Sq Ft	$460.46
	Estimated Total Project Costs per Sq Ft	$653.56
	Escalated MACC Cost per Sq Ft	$536.92
	Escalated Total Project Costs per Sq Ft	$762.08

*	**Move In Date**	4/1/2025

Interim Lease Information	**Start Date**
Lease Start Date	
Length of Lease (in months)	
Square Feet (holdover/temp lease)	
Lease Rate- Full Serviced ($/SF/Year)	
One Time Costs (if double move)	

	Construction Cost Estimates (See Capital Budget System For Detail)			
		Known Costs	Estimated Costs	Cost to Use
	Acquisition Costs Total	$ 0	$ 1,000,000	$ 0
A & E	**Consultant Services**			
	A & E Fee Percentage (if services not specified)		6.1% Std	6.10%
	Pre-Schematic Design services	$ 295,214		
	Construction Documents	$ 2,390,408		
	Extra Services	$ 1,490,797		
	Other Services	$ 1,161,059		
	Design Services Contingency	$ 266,874		
	Consultant Services Total	$ 5,604,352	$ 3,658,749	$ 5,604,352
MACC	**Construction Contracts**			
	Site Work	$ 3,664,163		
	Related Project Costs			
	Facility Construction	$ 41,371,410		
	MACC SubTotal	$ 45,035,573	$ 29,341,500	$ 45,035,573
	Construction Contingency (5% default)	$ 2,551,779	$ 2,251,779	$ 2,551,779
	Non Taxable Items			$ -
	Sales Tax	$ 4,140,100		$ 4,140,100
	Construction Additional Items Total	$ 6,691,879	$ 2,251,779	$ 6,691,879
	Equipment			
	Equipment	$ 3,377,668		
	Non Taxable Items			
	Sales Tax	$ 293,857		
	Equipment Total	$ 3,671,525		$ 3,671,525
	Art Work Total	$ 347,007	$ 225,178	$ 347,007
	Other Costs			
	Abatement, Permits, Etc...	$ 800,000		
	Other Costs Total	$ 800,000		$ 800,000
	Project Management Total	$ 1,770,928		$ 1,770,928
	Grand Total Project Cost	**$ 63,921,264**	**$ 36,477,205**	**$ 63,921,264**

Construction One Time Project Costs			
One Time Costs	**Estimate**	**Calculated**	
Moving Vendor and Supplies		$ -	*$205 / Person in FY09*
Other (not covered in construction)			
Total	$ -	$ -	

	Ongoing Building Costs				
Added Services	New Building Operating Costs	Known Cost /GSF/ 2025	Estimated Cost /GSF/ 2025	Total Cost / Year	Cost / Month
☑	Energy (Electricity. Natural Gas)	$ -	$ 1.39	$ 136,311	$ 11,359
☑	Janitorial Services	$ -	$ 1.47	$ 143,814	$ 11,985
☑	Utilities (Water, Sewer, & Garbage)	$ -	$ 0.41	$ 40,018	$ 3,335
☑	Grounds	$ -	$ 0.01	$ 500	$ 42
☑	Pest Control	$ -	$ 0.13	$ 12,506	$ 1,042
☑	Security	$ -	$ 0.10	$ 10,004	$ 834
☑	Maintenance and Repair	$ -	$ 6.19	$ 605,271	$ 50,439
☑	Management	$ -	$ 0.56	$ 55,025	$ 4,585
☑	Road Clearance	$ -	$ 0.18	$ 17,508	$ 1,459
☑	Telecom	$ -	$ -	$ -	$ -
	Additional Parking	$ -	$ -	$ -	$ -
	Other	$ -	$ -	$ -	$ -
	Total Operating Costs	**$ -**	**$ 10.44**	**$ 1,020,957**	**$ 85,080**

Ownership Option 2 Information Sheet

*	***Requires a user input***	*Green Cell*	*= Value can be entered by user.*	*Yellow Cell*

*	**Project Description**	Alternative II: Renovation of Existing Engineering Facilities
*	**Construction or Purchase/Remodel**	
*	**Project Location**	Cheney — Market Area = Spokane County

	Statistics	
*	Gross Sq Ft	91,000
*	Usable Sq Ft	
	Space Efficiency	
	Estimated Acres Needed	4.00
	MACC Cost per Sq Ft	$484.72
	Estimated Total Project Costs per Sq Ft	$731.62
	Escalated MACC Cost per Sq Ft	$565.21
	Escalated Total Project Costs per Sq Ft	$853.10

*	**Move In Date**	4/1/2025

Interim Lease Information	**Start Date**
Lease Start Date	
Length of Lease (in months)	
Square Feet (holdover/temp lease)	
Lease Rate- Full Serviced ($/SF/Year)	
One Time Costs (if double move)	

	Construction Cost Estimates (See Capital Budget System For Detail)			
		Known Costs	Estimated Costs	Cost to Use
	Acquisition Costs Total	$ 0	$ 1,000,000	$ 0
A & E	**Consultant Services**			
	A & E Fee Percentage (if services not specified)		8.12% Std	8.12%
	Pre-Schematic Design services	$ 295,214		
	Construction Documents	$ 3,105,880		
	Extra Services	$ 1,365,082		
	Other Services	$ 1,482,503		
	Design Services Contingency	$ 624,868		
	Consultant Services Total	$ 6,873,547	$ 3,583,537	$ 6,873,547
MACC	**Construction Contracts**			
	Site Work	$ 584,220		
	Related Project Costs			
	Facility Construction	$ 43,525,573		
	MACC SubTotal	$ 44,109,793	$ 27,300,000	$ 44,109,793
	Construction Contingency (5% default)	$ 4,710,979	$ 4,710,979	$ 4,710,979
	Non Taxable Items			$ -
	Sales Tax	$ 4,247,407		$ 4,247,407
	Construction Additional Items Total	$ 8,958,386	$ 8,958,386	$ 8,958,386
	Equipment			
	Equipment	$ 3,308,235		
	Non Taxable Items			
	Sales Tax	$ 287,816		
	Equipment Total	$ 3,596,051		$ 3,596,051
	Art Work Total	$ 361,637	$ 220,549	$ 361,637
	Other Costs			
	Abatement, Permits, Etc..	$ 1,410,000		
	Other Costs Total	$ 1,410,000		$ 1,410,000
	Project Management Total	$ 1,267,716		$ 1,267,716
	Grand Total Project Cost		**$ 41,062,472**	**$ 66,577,130**

Construction One Time Project Costs			
One Time Costs	**Estimate**	**Calculated**	
Moving Vendor and Supplies		$ -	*$205 / Person in FY09*
Other (not covered in construction)			
Total	$ -	$ -	

	Ongoing Building Costs				
Added Services	New Building Operating Costs	Known Cost /GSF/ 2025	Estimated Cost /GSF/ 2025	Total Cost / Year	Cost / Month
☑	**Energy (Electricity. Natural Gas)**	$ -	$ 1.39	$ 126,827	$ 10,569
☑	**Janitorial Services**	$ -	$ 1.47	$ 133,808	$ 11,151
☑	**Utilities (Water, Sewer, & Garbage)**	$ -	$ 0.41	$ 37,234	$ 3,103
☑	**Grounds**	$ -	$ 0.01	$ 465	$ 39
☑	**Pest Control**	$ -	$ 0.13	$ 11,635	$ 970
☑	**Security**	$ -	$ 0.10	$ 9,308	$ 776
☑	**Maintenance and Repair**	$ -	$ 6.19	$ 563,158	$ 46,930
☑	**Management**	$ -	$ 0.56	$ 51,196	$ 4,266
☑	**Road Clearance**	$ -	$ 0.18	$ 16,290	$ 1,357
☑	**Telecom**	$ -	$ -	$ -	$ -
	Additional Parking	$ -	$ -	$ -	$ -
	Other	$ -	$ -	$ -	$ -
	Total Operating Costs	**$ -**	**$ 10.44**	**$ 949,921**	**$ 79,160**

Ownership Option 3 Information Sheet

*	***Requires a user input***	*Green Cell*	*= Value can be entered by user.*	*Yellow Cell*

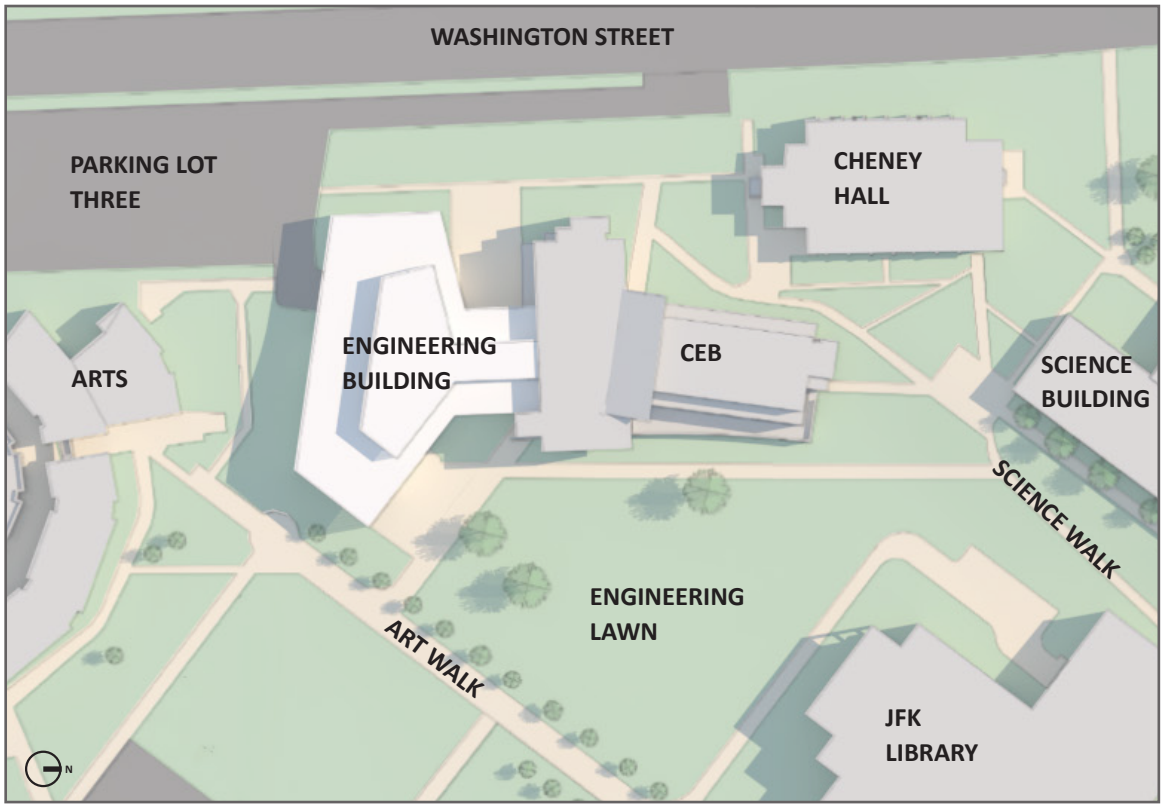
*	**Project Description**	Alternative III: No Action	
*	**Construction or Purchase/Remodel**		
*	**Project Location**		Market Area =

	Statistics	
*	Gross Sq Ft	-
*	Usable Sq Ft	
	Space Efficiency	
	Estimated Acres Needed	-
	MACC Cost per Sq Ft	$0.00
	Estimated Total Project Costs per Sq Ft	$0.00
	Escalated MACC Cost per Sq Ft	$0.00
	Escalated Total Project Costs per Sq Ft	$0.00

*	**Move In Date**	

Interim Lease Information	**Start Date**
Lease Start Date	
Length of Lease (in months)	
Square Feet (holdover/temp lease)	
Lease Rate- Full Serviced ($/SF/Year)	
One Time Costs (if double move)	

3.4 PREFERRED ALTERNATIVE: BUILDING CONFIGURATION AND SQUARE FOOTAGE



Scope of Preferred Alternative

The preferred alternative will construct a new three story, 74,155 gross square foot facility on the EWU campus in Cheney, Washington that will house engineering teaching laboratories, research laboratories, lab support facilities, work areas, and student collaboration and study areas and which will be integrally connected to the adjacent existing Computing and Engineering Building (CEB). The direct adjacency with CEB takes advantage of CEB's strengths and offers many efficiencies such as shared departmental and instructional resources, direct access to faculty and administrative offices, shared student amenities, and reduced building envelope.

Originally designed as primarily a classroom and office building, CEB will require partial light modification of 23,650 GSF to create connections between the buildings and to complete the project program. Square footage in the new facility is reduced by taking advantage of spaces in CEB that require only light modification to become suitable to the project program.

The demolition of Cadet Hall is also included in the project scope. See Section 4.0 Site Analysis for more detailed discussion of Cadet Hall and relocation of its current program.

Anticipated Results

The preferred alternative ensures continued Engineering program growth and degree production, improves the quality and safety of laboratories, increases faculty and industry research opportunities, supports community outreach activities particularly rural and underserved populations, and encourages student engagement with each other, the Engineering Department and the regional engineering industry.

4.0 SITE ANALYSIS

4.1 SITE OPTIONS

4.2 CAMPUS RELATIONS

4.3 SITE EVALUATION - PHYSICAL ISSUES

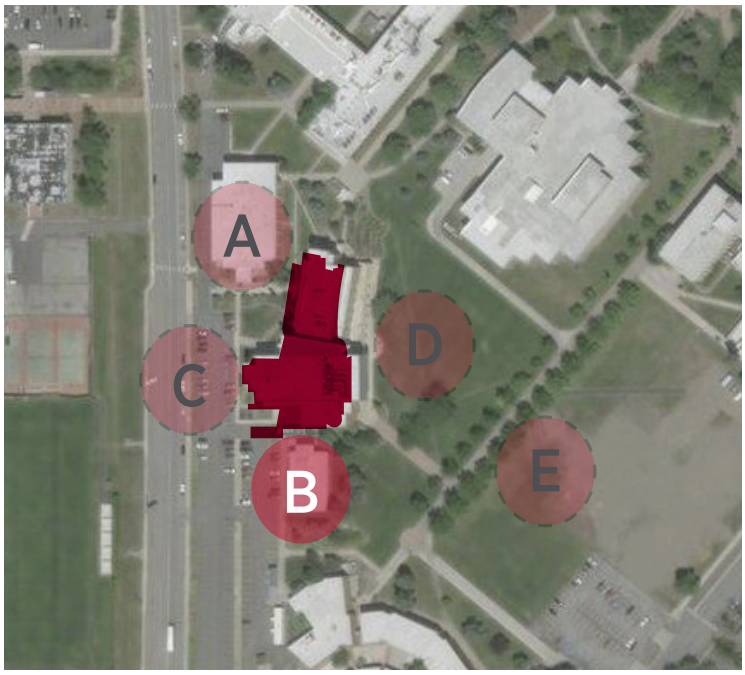
4.4 SITE EVALUATION - REGULATORY ISSUES

4.5 SITE EVALUATION - ACCESS ISSUES

4.6 SITE SELECTION

4.1 SITE OPTIONS

Five candidate sites on the Cheney campus were initially identified to determine a preferred site for the Engineering Building. The predesign process highlighted that locating the Engineering Building immediately adjacent to CEB for the purposes of sharing resources and encouraging interaction between engineering disciplines was very important. This intention remained intact through studies of several options for the location of the Engineering Building. Ultimately, three sites adjacent to CEB were selected as alternatives worth studying for the Engineering Building.



- Site A: Cheney Hall
- Site B: Cadet Hall
- Site C: Parking Lot 3
- Site D: Engineering Hall
- Site E: Reid Hall

Evaluation of the sites included consideration of numerous issues and those are illustrated in the table on the next page. Key factors in the site selection were appropriate area available, proximity and possible connections to the existing CEB, increasing proximity to Washington Street for greater visibility to industry and community, connections to campus pedestrian and ADA circulation, and disruption to existing buildings and landscape. Topography, solar orientation, access to utilities, service access, disruption to existing parking and future campus expansion were also considered.

Based on the matrix of criteria, three sites were chosen to be studied in greater detail, see 3.6 in this section. Site A: Cheney Hall and Site C: Parking Lot 3 were studied because of their favorable campus locations and high criteria score. These sites were not chosen because their potential connections to CEB were less favorable. Cheney Hall would be challenging to demolish as it would interrupt other University programs which also share space in the building and because of already planned future uses, such as swing space for other University facilities projects.

The predesign study concluded that Site B: Cadet Hall, which is located immediately south of the existing CEB and east of Washington Street, is the most appropriate site for the new engineering building. It best meets the criteria and responds to EWU's 2014 Master Plan Goals of connecting to the larger community and enhancing open space. It has the most favorable adjacency to CEB and its location allows for new "front doors" for Engineering on Washington Street and the Engineering Lawn. This site is located within the boundaries of the Eastern Washington University's Cheney campus and is owned by the State of Washington. The site contains adequate available area that a building on the site will comply with all easement and setback requirements set forth by the University.

Rating:
'3' = Significant Advantage
'0' = Significant Disadvantage
Weighing Factor:
'5' = Most Important
'1' = Least important

		Site Options									
		A		B		C		D		E	
		Cheney Hall		Cadet Hall		Parking Lot 3		Engineering Lawn		Reid Hall	
Evaluation Criteria	Weight Factor	Rating	Weight Value	Rating	Weight Value	Rating	Weight Value	Rating	Weight Value	Rating	Weight Value
Appropriate available area	5	2	10	2	10	3	15	3	15	3	15
Proximity to CEB	5	3	15	3	15	3	15	3	15	0	0
Increase engineering presence, new 'front door'	5	3	15	3	15	2	10	1	5	0	0
Increase visibility with industry and community	5	3	15	3	15	3	15	0	0	0	0
Connection to campus circulation	5	3	15	2	10	2	10	3	15	1	5
Ease of service access	4	2	8	3	12	3	12	1	4	2	8
Favorable site topography	3	3	9	3	9	3	9	1	3	3	9
Favorable solar orientation	3	1	3	1	3	3	9	2	6	3	9
Located within academic core	3	3	9	3	9	2	6	3	9	1	3
Connection to future development	2	3	6	3	6	1	2	3	6	2	4
Impact of disruption to existing building(s)	2	0	0	2	4	3	6	3	6	3	6
Utilities availability/rerouting	2	3	6	3	6	3	6	2	4	2	4
Allows future engineering growth	2	0	0	2	4	1	2	1	2	3	6
Disruption to existing parking	1	2	2	0	0	0	0	3	3	3	3
Total			88		93		87		63		57

Please note that the scores under “Impact of Disruption to Existing Buildings” represents the relative disruption at a University level: disruption of Site A Cheney Hall will have far more impact at a University level than disruption of Sites B-E.

Cheney Hall (~30,000gsf) currently contains program for multiple departments, making the functions more difficult to replace. In the short and long term it is also considered good swing space, especially for the sciences given its existing lab amenities. Cadet Hall (~10,000gsf) currently contains non-technical program that could be housed in a variety of spaces on campus. See 4.3 in this section for further description of Cadet Hall.

4.2 CAMPUS RELATIONS

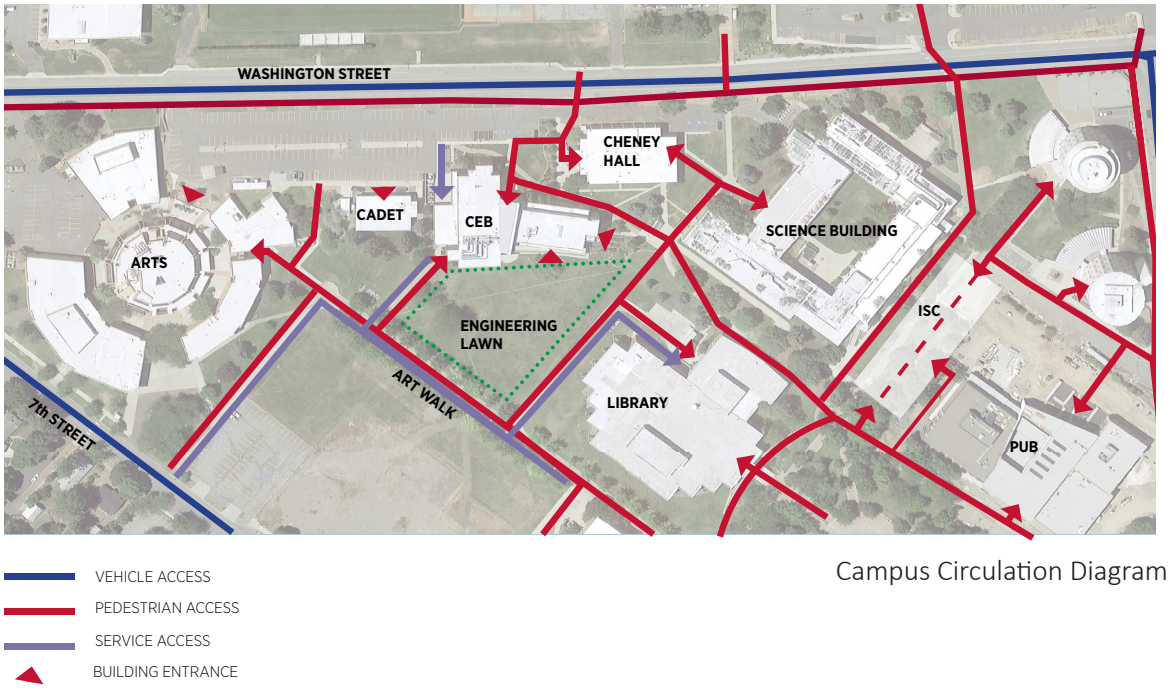
Campus Organization

EWU's Cheney campus is currently organized around two major pedestrian circulation routes, the "Art Walk" and the "Campus Mall", and 2 major open spaces, the Campus Quad and the Engineering Lawn. The site options B, D and E are located adjacent to the main circulation route "Art Walk". The informal open lawn area adjacent to the Art Walk has been identified as the "Engineering Lawn".

Campus Circulation and Open space

The major open spaces on campus each have a unique character that is beneficial for a diversity of uses. The Engineering Lawn area represents the largest open lawn area on the campus and is used by students for informal activities such as playing frisbee, however, the space lacks definition at the edges and is not fully integrated into campus life because of the lack of destinations around it. The major open spaces are supplemented by a large number of smaller open spaces, giving the campus a park-like feel.

The major campus circulation routes are supplemented by minor routes that link into the surrounding city grid. Building entries are generally grouped around open spaces and major pedestrian routes. There are essentially no main building entries currently fronting on the Engineering Lawn open space. Secondary entrances to CEB front the engineering lawn or the Science Building and are often used by students more than the main CEB entrance which faces Washington Street.

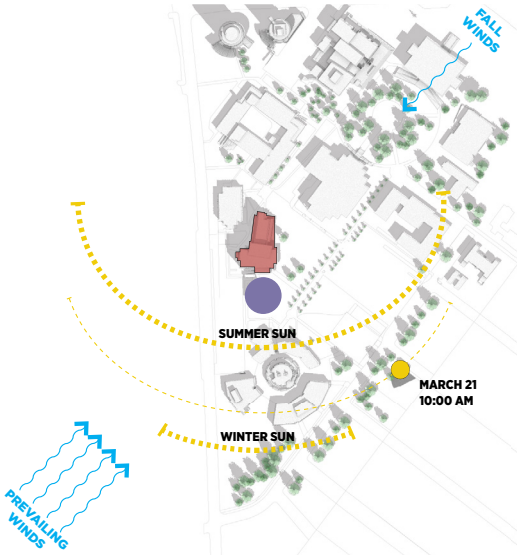


Campus Circulation Diagram

4.3 SITE EVALUATION - PHYSICAL ISSUES

Climate/ Solar Orientation

The preferred site for the Engineering Building site will require access to daylight. To optimize solar exposure and reduce unwanted glare and heat-gain, the ideal site orientation for a building in this climate will require the building to be oriented in an east-west manner. The building will be designed to allow daylight to penetrate into the building for access to the public spaces and



Preferred Engineering Building Site Solar and Wind Orientation

common areas, while the light in the labs will be controlled. Building fenestration will be designed with consideration to the overall site and building orientation. Any future nearby development should be kept to three stories to maintain solar access for the Engineering Building**.**

Stormwater Requirements

The University's stormwater system drains to the City of Cheney's street storm system, and this new engineering building will conform to the City's development manual which specifies stormwater design standards. Stormwater that runs off the vehicular service drives will be treated by a biofiltration swale system adjacent to the drive that will feed into a detention system.

Geotechnical and Environmental Conditions

Historical geotechnical reports for CEB and the JFK Library were reviewed in order to gain a preliminary understanding of subsurface conditions in the area of campus near the candidate sites. Those geotechnical reports show that subgrade soils are generally comprised of soft to medium stiff clayey soils underlain by basalt bedrock. Pilings or geopiers supported on the basalt bedrock are generally recommended for foundations. Perched groundwater is found at various depths, sometimes near the surface, and will likely require a building to be equipped with sub-floor and perimeter drainage with collected water pumped to a disposal system or to a cistern for reuse in landscape irrigation. Since a preliminary geotechnical report on the site is beyond the reach of this predesign study, it is not possible to conclude that any of the alternatives would provide superior foundation and/or drainage conditions.

There are no known environmentally sensitive conditions. Wetlands, shorelines, flood zones, endangered species, and contaminated soils are not present at the site. The site has no known or suspected archaeological significance.

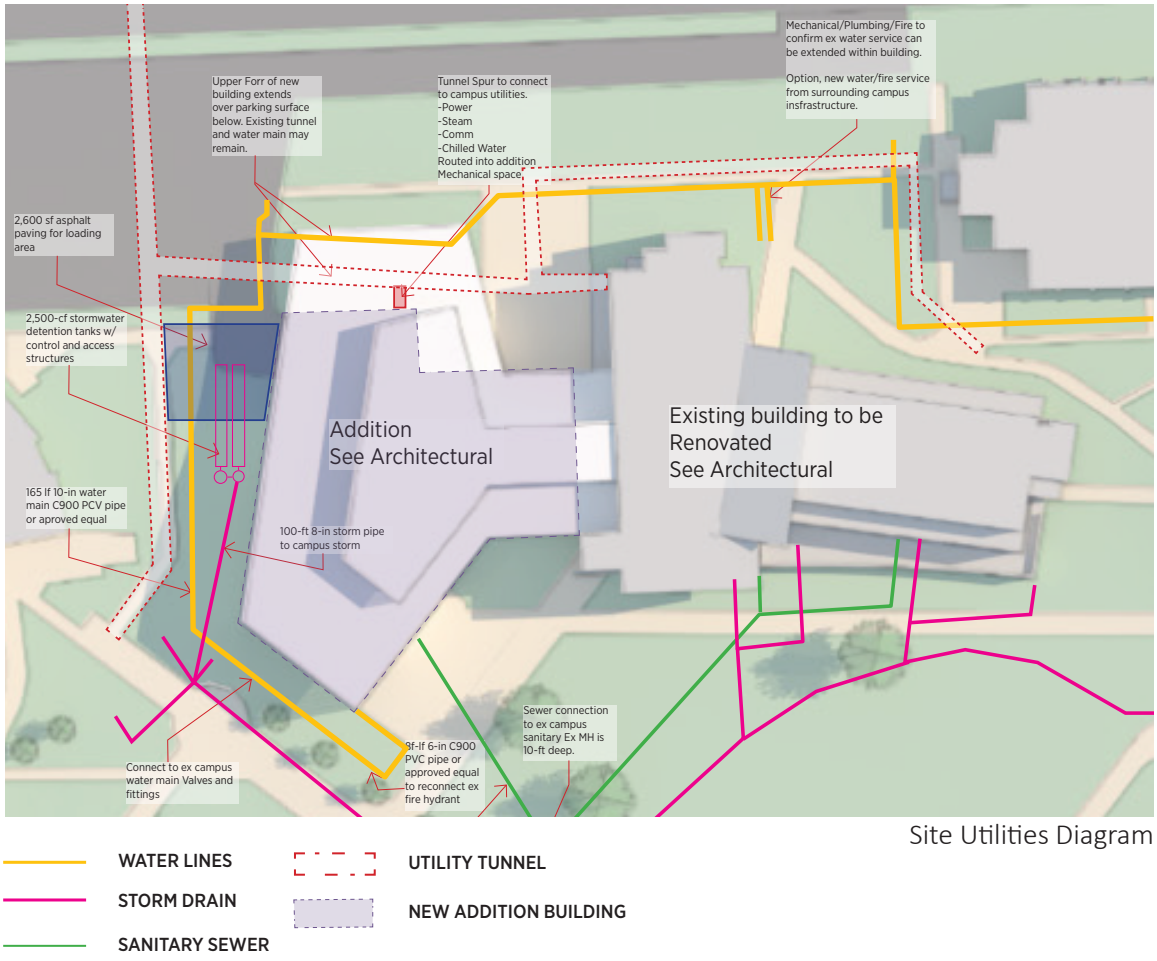
Utilities

The campus tunnel system runs beneath the preferred site and provides direct access to steam, chilled water, telecommunications and electricity to the project. Water, sanitary sewer, storm drainage, and natural gas are separate, direct-buried utilities and are accessible to all sites.

Energy Conservation

Factors that may affect energy conservation in any of the site alternatives are:

- Solar orientation, both for daylighting of interior spaces and laboratories



Site Utilities Diagram

- Adjacency to the campus tunnel system, which would allow the use of centrally generated steam and chilled water
- Consolidation of energy intensive lab/shop spaces into the new addition, whose processes require large amounts of fresh air and exhaust, will allow for sustainable energy efficient solutions that cannot be accommodated within the existing facilities due to practical spatial restraints

Hazardous Materials Inventory

Cadet Hall will be evaluated for hazardous materials and all abatement completed prior to the start of any demolition work.

Buildings Affected by Work

The demolition of Cadet Hall (~10,000gsf) and related site work is also included in the project scope. Built in 1955, Cadet Hall has major infrastructure issues and a major upgrade to this building infrastructure is on the horizon. The building is one of the smaller buildings on campus and the building's size and current organization does not allow for other University uses in the long term. The Cadet Hall site is an excellent location on campus for campus growth.EWU's Facilities and Planning feels that it is better to move the ROTC program to a new location and keep the Engineering Building in close proximity to CEB. EWU Administration has been advised that the Cadet Hall site is a high priority location and relocation of the ROTC program has not currently been a concern given that there are adequate or better spaces to house them on campus. Relocation of the existing ROTC program will be carefully managed by the university.

The functions of Cadet Hall could relocate to Cheney Hall in either the short or the long term.

Cheney Hall will have immediate vacancies due to the Computer Science Department's relocation to EWU's Spokane campus. In the long term, Cheney Hall will have additional vacancies when the Engineering Department relocates to the new facilities. **If an appropriate relocation solution cannot be achieved a site will be selected that does not involve the demolition of Cadet.**

4.4 SITE EVALUATION - REGULATORY ISSUES

Local Jurisdiction

Buildings on EWU's campus are subject to the governing codes of the City of Cheney. It is anticipated that during the design process, the university and design team will meet periodically with officials of the City to ascertain that building plans are in conformance to the City's requirements.

Zoning and Local Requirements

Zoning and local land use regulations are not expected to significantly affect the preferred site. The City of Cheney designates the campus of Eastern Washington University as a unique zone called "P" (Public). The Cheney Zoning Code has no specific restrictions on the use of property within a P zone. EWU maintains a good working relationship with the City of Cheney and discusses each project with the City prior to implementation.

Environmental Regulations

All sites are compatible with SEPA and LEED® requirements.

Building Code Requirements

The International Building Code as amended by the State of Washington has been adopted by the City of Cheney and will govern the design and construction of the Engineering Building. Section 2.7 of this report contains a preliminary building code analysis. Building code requirements are not expected to rule out or have a profound impact on the use of any proposed alternatives.

4.5 SITE EVALUATION - ACCESS ISSUES

Pedestrian Access

Pedestrian circulation should be concentrated around the Engineering Lawn and on the Art Walk to stay within and complement existing campus organization. Pedestrian access between CEB and the Engineering Building will be at the Engineering lawn as well as a connected internal corridor.

Service Access

Service access to the site can be provided via the west of the building via Washington Street for Option A. Service access can be provided via the Art Walk for Option C and Option D. Service access to the site can be provided via both Washington Street and The Art Walk for the preferred alternative. Both routes are currently used to service other buildings on the campus. If access is provided via the Art Walk, the conflict between pedestrian circulation and service vehicles will be increased.

ADA Access

Primary circulation routes around the Art Walk and Engineering Lawn are generally accessible due to the relatively flat topography. The primary exception to this occurs along the area to either side of CEB and around Cadet Hall. All the schemes bridge this section of topography and provide public entries at both an upper level and a ground floor level which facilitates wheelchair access to either elevation.

Parking

Parking at EWU is provided on a campus wide basis, with assigned surface parking lots and on-street parking. Parking is not specifically provided for individual buildings. The Parking Lot 3 area adjacent to CEB will be effected by all options and the loss of parking stalls will be replaced with an increase of parking in the lot just off 7th Street. Accessible parking will need to be added adjacent to the building in all site options.

Other Issues

- No potential issues with the surrounding neighborhood during construction or ongoing are expected or have been identified.
- No potential impact on surroundings and existing development with construction lay-down areas and construction phasing is expected or has been identified.
- Beyond what has been noted in this report, no specific problem areas have been identified that need further study for risk or cost.
- No future phases or other facilities are yet known to affect this project.

4.6 SITE SELECTION

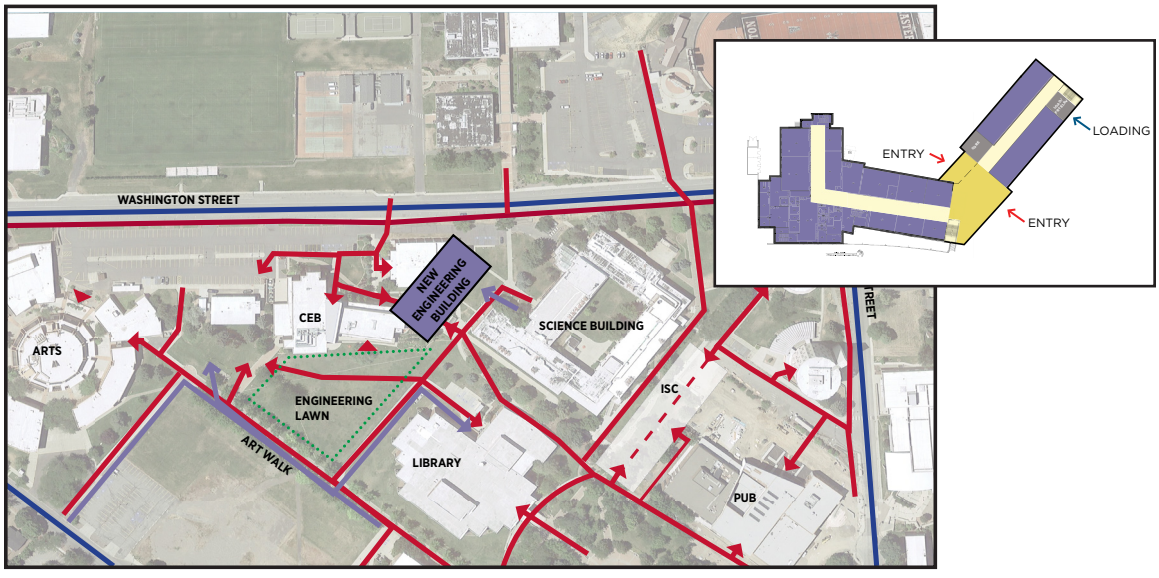
Potential site alternatives were studied for the location and layout of the Engineering Building. Based on the site selection criteria Site A, B and C were selected to study in further detail. Each option evaluated the relationships of the building to the campus and to CEB.

Key site relationships studied include:

- Proximity to CEB for pedestrian access and shared resources
- Proximity to Washington Street for greater visibility to industry and community
- Activation of the Engineering Lawn through proximity to CEB and the JFK Library
- Convenient service access for loading
- Future campus expansion
- Solar Orientation

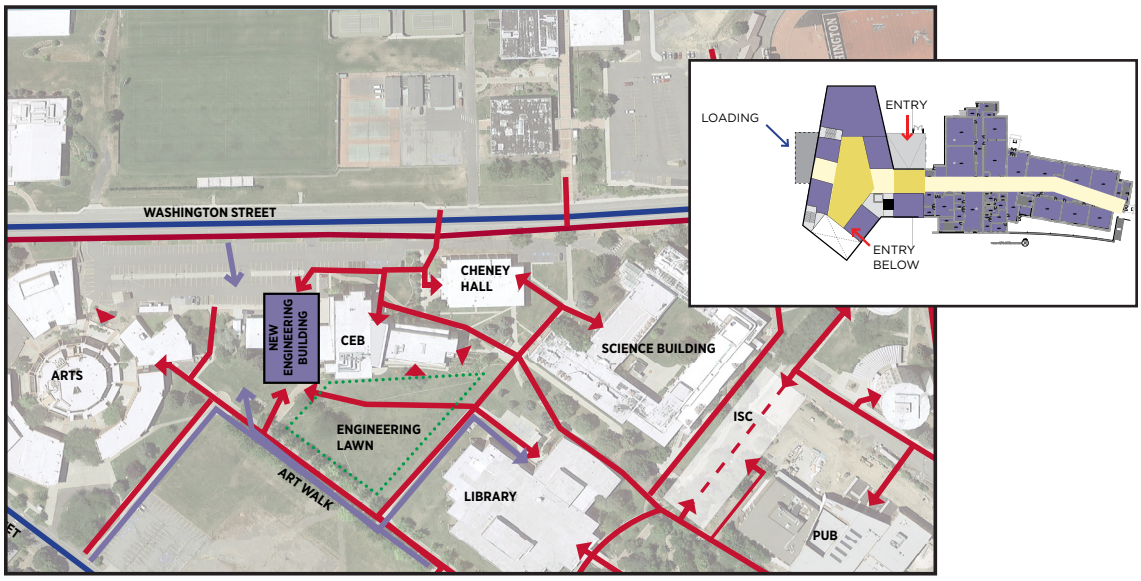
Site A: Cheney Hall Replacement

This alternative provides a direct connection to CEB along the northern stair tower and ties into the existing circulation pattern on campus. The north entrance of CEB, although not designed as the main entrance, is often used by students entering the building. This scheme would create a more successful entrance to CEB and combine it with the new entrance of the new building. It allows for loading to be shared with the Science Building. The basement of CEB could be utilized for mechanical space to limit the amount of square footage required in the new building.



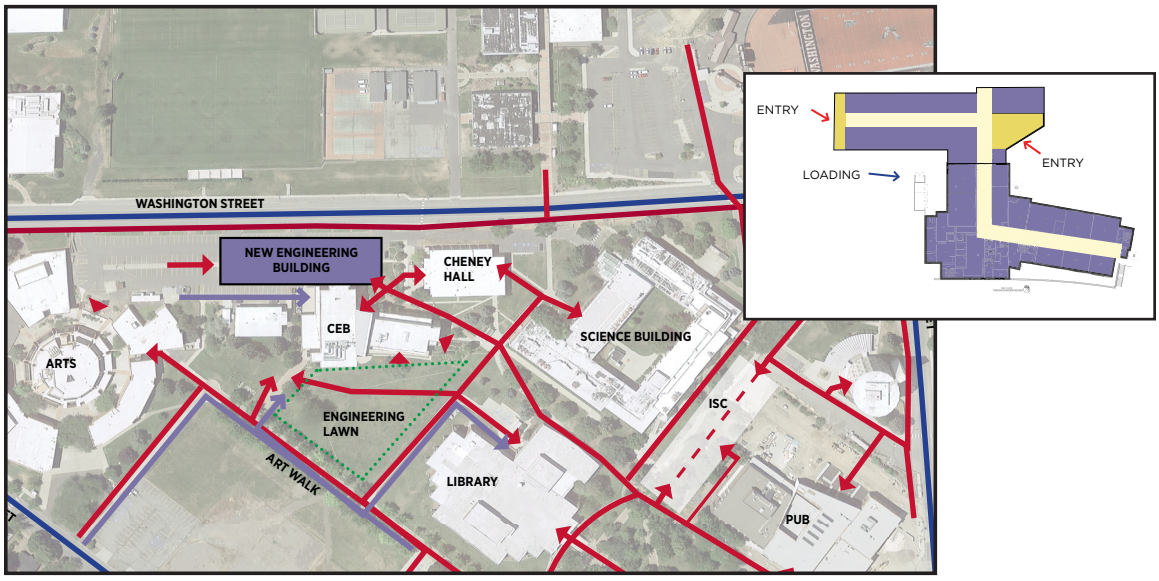
Site B: Cadet Hall Replacement - Preferred Alternative

This scheme has both loading and entrances located towards campus at the ground level and towards Washington Street at level one. It creates two front doors and a presence to Washington street and to campus and the Art Walk. It is connected to CEB via the north/south corridor . The student entrance is facing the Art Walk and engineering lawn. This schemes east/west orientation allows for an optimal solar orientation.



Site C: Parking Lot 3 Construction

This alternatives provides a direct connection to CEB along the west stair tower and corridor. It creates a strong front door presence on Washington Street with the front facade elongated along Washington. It has a direct connection to CEB for shared resources and connection. It lacks a connection to the engineering lawn and the student entrance would be located adjacent to the CEB main entrance and Cheney Hall entrance.



5.0 PROJECT SCHEDULE

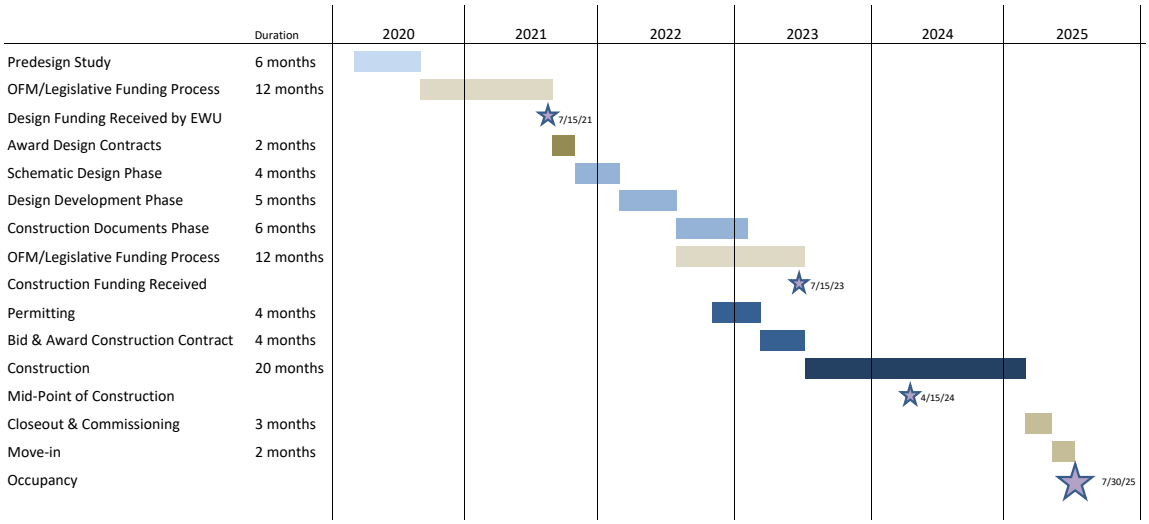
5.1 MILESTONE SCHEDULE

5.2 IMPLEMENTATION AND MANAGEMENT

5.3 REGULATORY ISSUES

5.1 MILESTONE SCHEDULE

A summary schedule is as follows:



5.2 IMPLEMENTATION AND MANAGEMENT

Management Organization

The University's Construction and Planning office will manage the design and construction of this project. The Associate Vice President for Facilities and Planning is responsible for overall organization management. Construction and Planning provides oversight of programming; predesign; cost estimating; design and construction services for building alterations, new construction, and grounds improvements for the Cheney campus.

Project managers organize and administer the work of outside design consultants and public works contractors. They follow projects all the way through construction and work closely with clients, project architects, designers and consultants to ensure projects are on time and within budget.

The following individuals in the Construction and Planning office will oversee the Engineering project:

Shawn King	Associate Vice President
Troy Bester	Senior Project Manager

The cost for the University's management of the design and construction is included in the Project Budget Analysis section of this report.

Method of Delivery

Eastern Washington University proposes to use the Design/Bid/Build method to accomplish this project. This has proven to be the most cost effective given the region and EWU's construction resources.

Value Engineering and Constructibility

Value-engineering analysis and constructibility review will be integrated throughout the design and building process, and the time has been factored into the schedule above.

Project Commissioning

Building commissioning will be integrated into the process of the project to ensure through documented verification that all building systems perform interactively and according to the design intent.

Project Delays
No known factors that will delay the project.
No known local government ordinances or neighborhood issues that will affect the project schedule.

5.3 REGULATORY ISSUES

Local Jurisdiction
Buildings on EWU's campus are subject to the governing codes of the City of Cheney. It is anticipated that during the design process, the university and design team will meet periodically with officials of the City to ascertain that building plans are in conformance to the City's requirements.

Zoning and Local Requirements
Zoning and local land use regulations are not expected to significantly affect the preferred site. The City of Cheney designates the campus of Eastern Washington University as a unique zone called "P" (Public). The Cheney Zoning Code has no specific restrictions on the use of property within a P zone. EWU maintains a good working relationship with the City of Cheney and discusses each project with the City prior to implementation.

Local Jurisdiction & Community Engagement
The local jurisdiction 9JHA) will be notified during the design phase. Meetings with local engineering industry partners are planned as part of the process. Community stakeholder meetings are not currently anticipated.

Consistency with applicable long-term plans
The project is consistent with applicable long-term plans as required by RCW 43.88.110 through EWU's 2014 Comprehensive Master Plan.

Planning Compliance
The Engineering Building complies with planning under Chapter 36.70A RCW, as required by RCW 43.88.0301.

Information required by RCW 43.88.0301(1)

RCW 43.88.0301(1)(a)(i):	No
RCW 43.88.0301 (1)(a)(ii)(A):	No, not within the urban growth area. Yes, part of planned employment growth.
RCW 43.88.0301 (1)(a)(ii)(B):	Yes. EWU growth provides growth in Cheney and graduates with skills used by local industry.
RCW 43.88.0301 (1)(b)(i):	Yes
RCW 43.88.0301 (1)(b)(ii):	No
RCW 43.88.0301 (1)(b)(iii):	Yes

Environmental Regulations
All sites are compatible with SEPA and LEED requirements.

Building Code Requirements
The International Building Code as amended by the State of Washington has been adopted by the City of Cheney and will govern the design and construction of the engineering building Section 2.7 of this report contains a preliminary building code analysis. Building code requirements are not expected to rule out or have a profound impact on the use of any of the proposed alternatives.

6.0 PROJECT BUDGET ANALYSIS

6.1 BUDGET ASSUMPTIONS

6.2 OUTLINE SPECIFICATIONS

6.3 CONSTRUCTION COST ESTIMATE

6.4 PROPOSED PROJECT COST

6.5 PROPOSED FUNDING

6.6 FACILITY OPERATIONS AND MAINTENANCE REQUIREMENTS

6.1 BUDGET ASSUMPTIONS

The following assumptions have been made as the basis for the Engineering Building project budget:

- The building will be constructed as a single phase.
- The construction start date will be July 2023.
- The construction period will be 20 months.
- Design/Bid/Build delivery method will be utilized.
- The building will be designed to achieve a minimum LEED silver rating.
- The building will be designed to comply with the codes and standards sited in Section 2.0 of this report.
- New mechanical, plumbing and electrical services will be provided complying with local building codes and campus standards.
- A utility tunnel connection will bring campus steam, electrical and telecommunications to the building.
- The building will be sprinklered throughout.
- Approximately 24 of the existing parking stalls will be removed and/or relocated as part of this project. A new loading zone from Washington Street via Parking Lot Three will be constructed.
- Subgrade soil conditions are expected to be similar to those at nearby buildings. A geotechnical investigation for the site has not been completed. Soils reports from the adjacent JFK Library and the nearby CEB indicate that site soils consist of a thin stratum of topsoil over medium stiff clayey silt or clay (Palouse formation) over stiffer Saprolite clays over basalt bedrock.
    - ❖ At CEB the clays extend down to as deep as 40 feet with groundwater encountered at 10 to 15 feet deep, and foundations consist of spread footings over rock bearing pads, which are located in stiffer Saprolite clays below the Palouse formation layer.
    - ❖ At JFK the site is clay silt over basalt bedrock at depths ranging from 12-17.5 feet below grade with ground water present, and the foundations are taken to bedrock utilizing concrete piers, and there is a foundation dewatering system.
    - ❖ The adjacent campus utility tunnel has dewatering sumps that pump to the stormwater system.
    - ❖ The presence of groundwater is expected on the project site, necessitating the inclusion of a permanent dewatering system for the utility tunnel connection and basement area.

6.2 OUTLINE SPECIFICATIONS

The following outline specifications form the basis for the Engineering Building construction costs:

A Substructure

A10 Foundations

A prior geotechnical report for this project was prepared by AMEC Earth and Environmental Inc. dated October 8, 2001. The geotechnical report recommends shallow foundation system for new Engineering Building. Existing soft clay soils will be over-excavated approximately 2 to 4 feet below bottom of footings and replaced with compacted structural fill to accommodate for the shallow foundation. Compacted fill will likely need to be imported as existing site soil is not considered appropriate due to its long term compressibility. Perched ground water was encountered at depth of 6 to 10 feet below ground surface during the soil exploration.

New column foundation at the vicinity of an existing utility tunnel traversing at the west of the building site will be designed to minimize the surcharge load to the tunnel.

A20 Basement

Basement wall will consist of 12" thick concrete wall with continuous wall footing and slab on grade can be 5" thick reinforced concrete slab underlain by properly prepared subgrade.
A soil report addendum will be required to provide updated design information per the current building code.

B Shell

B10 Substructure

Floor to Floor Height: A height of 18'-0" floor to floor at the ground level and level two is established to accommodate the robust mechanical and electrical equipment serving the 'shop' like laboratories. A height of 16'-0" floor to floor will be used at levels one to align with the floor to floor of CEB for ease of connecting into the existing building.

Codes:

The governing building code will be the International Building Code, latest edition with Washington State amendments, WAC 51-50. Other referenced design codes are anticipated to include the AISC Manual of Steel Construction (LRFD), Second Edition, ACI Building Code, Commentary, ACI 318 14, ASCE 7-16 and AWS Structural Welding Code (AWS D 1.1 10).

Design Load

- Live Loads:

Classrooms, Offices and Interior Spaces	81 psf, reducible
Lobby, Exterior and Exit Areas	100 psf, reducible
Light Storage	125 psf, non-reducible
Laboratory and Laboratory Support Area	100 psf, reducible
Roof	20 psf, reducible

- Dead Loads:

  General: Estimated weight of construction material.

  Partitions: 10 psf included in seismic mass per building code requirement; 15 psf minimum for gravity design.

  Typical ceiling and finishes: 5 psf.

  Mechanical Equipment: 100 psf or actual weight of mechanical equipment.

- Lateral Loads:

  Seismic design criteria will be based on ASCE 7-16.

Seismic Design Parameters:

Risk Category	III
Seismic Design Category	D
Design Spectral Response Coefficient	SDS = 0.312
Design Spectral Response Coefficient	SD1 = 0.177
Importance Factor	I= 1.25
Structural Response Modification	R= 8 (Steel Buckling-Restrained Brace Frame)
Deflection Amplification Factor	Cd = 5
Drift Limit	2.0%
Seismic Design Category	E

Wind Design Parameters:

Wind Basic Wind Speed	115 miles per hour
Wind Exposure	B
Wind Importance Factor	I = 1.0

Materials

Concrete

f'c = 5,000 psi (NWC); All columns
f'c = 5,000 psi (NWC); All beams and slab
f'c = 5,000 psi (NWC); Basement Walls
f'c = 4,000 psi (NWC); Column Footings
f'c = 4,000 psi (NWC); Basement Wall Footings
f'c = 4,000 psi (NWC); Slab on grade
f'c = 3,000 psi (LWC); Concrete on Metal Deck

Reinforcing steel

ASTM A615 Grade Steel 60 ksi or 75 ksi except as noted on the drawings.

Structural Steel

ASTM 992 for all structural shapes except as noted otherwise
ASTM A500, Grade B for all structural tubes
A490 Anchor bolts
A325 High strength bolts, except as noted otherwise

Gravity-Load Resisting System

- Steel construction with concrete filled metal decks supported on steel beams is proposed. The elevated floors and roof diaphragms will consist of 3 ¼" light-weight concrete over 3" metal deck on steel beams and girders, supported by steel columns.

Lateral-Load Resisting System:

Braced Frame above Level 1 and concrete shear walls below are used to provide seismic bracing for the Engineering Building. Buckling Restraint Braced Frames (BRBF) will be used in both directions at the upper floors and evenly distributed throughout the building and strategically located within the stair and shaft walls. BRBF's will transition to concrete shear walls at the Ground Level.

BRBF/Concrete shear wall scheme was selected over others because it offered added values and opportunities that significantly enhanced the project. Benefits of the proposed structural scheme include:

- Provides a much more sustainable, lighter and a very high-performing structure.
- BRBF/Concrete shear wall are ideal for drift control due to their inherent stiffness. Strategic placement of the braced frames and shear walls adjacent to stair and restroom walls or partition allows total flexibility for space planning.
- The building, as designed, is very stiff and will have significantly less inter-story drift than what the code permits.
- The smaller story drift will limit the building damage in an earthquake event and allow restoration of building functionality and occupancy much more expeditiously than would be possible with other more flexible lateral force resisting systems.
- This is no vertical discontinuity in the braced frames. This not only simplifies the construction but also yields a structure which is much more robust.
- The proposed structural system is very cost-effective and also minimizes the construction time.

- Long-span roof structure over the Metallic Lab can be achieved economically with steel beams.

Penthouse Construction: Construction will be structural steel columns and bracing, and steel roof framing.

B20 Exterior Enclosure

Exterior Walls:

- The brick wall system will include; an air cavity, rigid insulation, air barrier, sheathing, steel framing, batt insulation, a vapor barrier, and interior drywall.
- Steel framing will support curtain walls and window systems, and metal panel and louvered penthouse enclosure walls.

Exterior Windows, Doors and Louvers:

- Punched aluminum frame windows at laboratories within brick wall system, curtain walls at building entries and laboratory facades parallel to Washington Street and the Art Walk as well as glazed entrance doors will all be aluminum with anodized finish. All glazing will be insulated low-E performance glass.
- Operable vertical panel doors at laboratories to exterior.
- Hollow metal exterior doors and interior doors at mechanical spaces.
- Painted hollow metal doors and frames at mechanical spaces, service entrances, and emergency exits.
- Louvers will be painted aluminum, fixed and drainable.

B30 Roofing

Roofing materials will include the following: thermoplastic membrane roofing over tapered rigid insulation, roof walkway pads, painted sheet metal coping at parapets, and roof stanchion tie-offs.

C Interiors

C10 Interiors Construction

Partitions: Typical interior partitions will be metal studs with 5/8" type 'x' gypsum wallboard, impact resistant gypsum wallboard on all corridor walls, and acoustic insulation where required. All demising walls will be built to underside of structure. Fire and smoke stopping will be provided at all rated wall and floor penetrations.

Doors: Interior doors will be of formaldehyde free solid core particle board, or mineral cores at labeled doors, with stained hardwood veneer faces. Doors will have satin stainless steel finish hardware with required accessories. Interior door and relight frames will be of hardwood or painted hollow metal, with fire rated glass where required.

C20 Stairs

The two egress stairs will also serve as the communicating stairs and are located adjacent to the building entries and will have steel structure with architectural detailing including precast concrete treads and perforated metal risers.

C30 Interior Finishes

Floor Finishes: Interior floor finishes will include polished concrete in circulation areas and lobby/ work area/ event space paralleling Washington Street, resilient tile in controlled research and Sensor Tech Lab and sealed concrete in all other teaching, project and research laboratories. Additional floor finishes include low VOC carpet tile at collaboration spaces and classrooms, ceramic tile at restrooms, sealed concrete at Tech Offices, support and back of house spaces and a durable traffic coating at the penthouse.

Wall Finishes: Interior wall finishes will include painted gypsum wallboard, ceramic tile at restrooms, acoustic wall panels in classrooms and at circulation, hardwood architectural detailing in the open student study lounge/work area, and corner guards as required. Sections of storefront glazing provide visibility into the teaching, project and research laboratories.

Ceiling Finishes: Interior ceiling finishes include exposed structure, painted gypsum wallboard, suspended acoustical ceiling systems, and wood slat ceiling clouds in public circulation area and collaboration areas.

Interior specialties: See E2015 Non-Laboratory Casework and Other Specialties.

D Services

D10 Conveying Systems

One 3 stop MRL passenger and one 4 stop MRL freight elevator with roof access will be provided, with ladders to the elevator pits.

D20 Plumbing

D2010 Plumbing Fixtures:

Restroom wall hung water closets, urinals and lavatories will be constructed of commercial grade vitreous china. Lavatory traps and supplies will be insulated per accessibility requirements.

Hands free sensor operated electric faucets with integral thermostatic mixing controls will be provided on toilet room lavatories. Sensor operated electric flush valves will be used for water closets and urinals.

Lab sinks will either be epoxy as part of the casework or stainless steel for chemical resistance or durability. Custodial sinks will be provided with wall faucet and lever handles.

Emergency showers and eyewash stations within the labs/shops, as provided under E10, will be serviced from a new centralized tempered water system that delivers potable tepid water between 60 and 95 degrees to the safety stations.

Laboratory fume hoods, as provided under E10, will be pre-piped with utility connections at the top and rear of hood.

Water Conservation- The following items will be reviewed by the design team and Eastern Washington University for Water Conservation and Long Term Campus Standardization / Maintenance considerations; dual flush (1.6/1.0 GPF) water closets, ultra-low flow water closets (1.28 GPF), pint flow urinals, and lavatory faucets to deliver 0.5 GPM.

D2020 Domestic Water Distribution:

Domestic cold water and 120°F hot water distribution systems will be provided throughout the building. The existing water heaters will be modified to service both the new addition and existing building.

A hot water recirculation system controlled through the campus energy management system (EMS) will be provided and distributed at low velocities, using “in-line” all-bronze circulating pumps.

Water heaters will be instantaneous steam-to-hot water, utilizing campus steam and heat exchangers. The existing water heating system in the basement of the existing building will be

modified for expanded program demands.

Valves will be provided at all branch take-offs to individual fixture groups, and zone valves will also be provided. Balancing valves will be placed in return loops at connections of the hot water piping.

Materials:
Water Piping: Copper type L

D2030 Sanitary Waste System
A gravity sanitary drainage system will be provided to serve all plumbing fixtures and equipment (see also Lab Waste and Vent System under Section D2090).

Floor drains will be provided at safety showers in keeping with campus standards with the exception of metal shops that have the possibility of introducing oil into the sanitary sewer. Oil water separators are not anticipated at this time.

Materials:
Drain, Waste, Vent Piping (above grade) : Cast Iron
Waste Piping (below grade): PVC, ABS, or cast Iron

D2040 Rainwater Drainage
Gravity primary and overflow storm drainage systems will be provided to serve the roof levels with each system piped separately outside of the building. Rain leaders will be located within the heated portion of the building to prevent freezing of the pipe and will be insulated to prevent condensation from developing on the pipe. Overflow drains will terminate at grade level on splash blocks.

Materials:
Storm Drain Piping (above grade): Cast Iron
Storm Drain Piping (below grade): PVC, ABS, Cast Iron

D2090 Other Plumbing Systems
Compressed Air System: The existing air compressors are having issues with breakdowns due to age and wear. A new central compressed air system with duplex compressors, air drier and receiver storing 125 psig air will be provided for shop uses. Compressed air will be delivered at 100 psig and be piped throughout the laboratory/shop spaces. Isolated areas that require clean/dry air will have point of use driers and filters and air pressure regulators. The compressors will be located in the new addition to allow space for expanded water heaters in the existing mechanical room.

Lab Vacuum System: The existing vacuum pumps are obsolete and do not have available parts. A new vacuum pump and receiver will be provided in the new mechanical room to make room for expanded water utilities in the existing mechanical room. High vacuum needs will be provided from owner furnished, owner installed local pumps.

Natural Gas System: Natural gas from the existing building will be extended to the foundry for use in the kilns. Extensive use of natural gas is not anticipated.

Lab Specialty Gas Systems: Central house system for nitrogen and specialty gases are not anticipated. If required, these will be Owner provided at the point of use.

Welding Gas Systems: Central welding gas systems are not anticipated. Welding gases will be Owner provided from movable welding carts on wheels.

Industrial Water Systems: Cold and 120°F hot non-potable water distribution systems will be provided throughout the new addition to selected equipment and lab faucets. The systems will be isolated from the domestic water system with a reduced pressure backflow preventer assembly. Hot water heaters and storage tanks will be the same as described in Section D2020 and will be located within the existing mechanical room.

Industrial Hot Water Recirculation System: A recirculation system will be provided and distributed at low velocities to ensure fixtures and equipment requiring hot water will have hot water readily available through the use of "in-line" all-bronze circulating pumps.

Tempered Water System: Potable cold water will be tempered by mixing domestic cold water and domestic hot water at a new master mixing valve located in the existing mechanical room to deliver tempered water to the emergency showers and eyewash stations throughout the building.

Lab Waste and Lab Vent System: Laboratory sinks in casework, chemical fume hood cup sinks and floor drains in chemical use areas will be piped in a dedicated waste system that will allow for future monitoring by regulatory authorities for possible discharges. Outside the building, after the monitoring point, the lab waste system will combine with the building sanitary sewer. Waste and vent piping will be chemical resistant.

Snow Melt System: A hydronic snowmelt system will be provided for exterior walkways at main entrances and site stairs that are difficult to access with mechanical snow removal equipment. Hydronic heat for the snowmelt system will be generated from a water-to-water heat exchanger connected to the new additions hot water heating system.

Materials:
Compressed Air Piping: Copper
Lab Air Piping: Copper
Lab Vacuum Piping: Copper
Lab Natural Gas Piping: Black steel
Industrial Hot/Cold Water/Tempered Water Piping: Copper
Lab Waste Piping: Polypropylene
Snowmelt Piping (buried in slab): Polypropylene

<u>D30 HVAC Systems- General</u>
Campus Chilled Water Plant: The campus has a central chilled water plant that distributes chilled water to the buildings on campus through an underground tunnel system. The new addition basement mechanical room is in close proximity to the campus tunnel and the tunnel will be extended to connect to the basement mechanical room with a 6" service for the new addition.

Campus Steam Plant: The campus has a central steam plant that distributes steam and condensate to the buildings on campus through an underground tunnel system. The new addition basement mechanical room is in close proximity to the campus tunnel and the tunnel will be extended to connect to the basement mechanical room with a 6" high pressure steam service for the new addition.

Heating System: Primary heating will be provided from campus steam through high pressure vertical flooded steam to hot water heat exchangers to negate the need for a steam PRV station and condensate receivers. This system will save 5-7% building heating energy by the elimination

of flash steam. Glycol hot water solution will be piped to the air handlers, hydronic heating systems, and snow melt heat exchangers. Since the nature of the new addition is primarily heating and cooled with 100% outside air ventilation systems, radiant heating should be provided for off-hour heating requirements.

Ventilation Requirements: It is anticipated that the lab/shop spaces in the new addition will be 100% outside air systems with heat recovery where air quality is suitable for passing through filters and equipment. Six (6) labs with fume hoods should be located in close proximity to be zoned from the same air handling unit if practical, so that they can be efficiently ventilated 24 hours a day (minimum 6 air changes per hour in the occupied mode and 4 air changes per hour in the unoccupied mode).

Acoustic Considerations: Vibration isolation of pumps and compressors will be provided. Additional acoustic considerations will include limiting duct velocities through ductwork, terminal units and air inlets/outlets to achieve space NC, use of sound attenuators in the duct systems, and vibration isolation of mechanical equipment with spring isolators and flexible connections will also be employed.

Outdoor Design Conditions: Heating Systems will be sized for the ASHRAE median of extremes for Cheney, Washington which is-9°F. Cooling systems will be sized for the ASHRAE 0.1% design condition temperature for Cheney, Washington which is 99°F dry bulb and 69°F wet bulb.

Indoor Design Conditions:
When occupied, office and lab spaces will be maintained between 68 and 75°F.
Telecommunication rooms will control to 68-75°F 24 hours per day, 7 days per week. Mechanical and electrical spaces will control to 55-85°F.

D3010 Energy Supply
Electrical service to the EWU Campus primary distribution system is provided by the City of Cheney.

Campus high pressure steam and chilled water from the central heating plant natural gas fired boilers and central cooling plant energy efficient water-cooled chillers will be delivered to the building addition via the campus utility tunnel distribution network.

D3040 HVAC Distribution
New Addition Supply: The new addition lab/shop areas will be serviced from 100% outside air systems with heat recovery and perimeter heat (estimated at 80-85,000 cfm). Units will have supply fans, hot water heating coils, chilled water coils and filters with VAV controls and multiple fans installed in an array for redundancy. Each zone will have its own air terminal unit for regulation of airflow based upon occupied/unoccupied airflows and temperature requirements. The non-lab core spaces will be serviced from high efficiency VAV systems (estimated at 32,000 cfm) although alternative systems such as DOAS system with chilled beam terminal units should be evaluated in the design phase.

New Addition Exhaust: Exhaust will be ducted to exhaust fans with heat recovery at the roof level. Fans will be manifolded for partial redundancy and spaces will have pressure independent exhaust terminal units. Specialty exhaust for products of combustion such as foundry furnaces/ kilns will be ducted separately out the building without heat recovery. Air will be filtered at grilles prior to entering the exhaust air terminal units of each space. Exhaust systems are anticipated to be 70-75,000 cfm.

Renovation:
Ground Floor:
Due to reconfiguration of this zone, all mechanical upgrades in this area should be considered Heavy Renovation

Additive manufacturing (2450 sqft): This zone is serviced by a 22,000 cfm AHU which has 100% outside air and 100% exhaust capabilities, has too much air volume and is too energy intensive for the new proposed use. This scope should replace or rebuild existing AHU-5 and associated relief/ exhaust fan to provide capacity in the 5-7,500 cfm range. Due to the industrial use of former metallics lab all ductwork in this zone should be removed and replaced with new.

Teams room and storage and student lounge (5000 sqft): Remove existing ductwork and exhaust fans including wood working exhaust systems. Provide new hot and cold duct VAV mains from existing AHU-1 in the north ground floor mechanical room and new dual duct VAV terminal units for these spaces.

Material Science Lab, Composites lab and Lab Storage (4373 sqft): AHU-4 (10,000 cfm with 100% osa capability) and a VFD controlled relief fan currently feeds the wood shop. Extend AHU-4 ductwork to service this zone. Provide supply and exhaust terminal units for each zone with hot water reheat from the new addition. Provide VAV controls on the supply fan. Retrofit or provide new exhaust fan for increased exhaust duct static pressure.

The existing dust collectors will not be required for the new scope and should be removed as they have had several breakdowns and should not be considered reliable for continued long term use for the expanded woodworking/construction shop areas.

Second Floor
This floor should be considered light tenant improvement work for HVAC systems and moderate plumbing renovations in the expanded thermodynamics lab which is nearly doubling in size.

Approximately 5600 square feet is being renovated on this floor. This floor is serviced by dual duct VAV air handling systems. Provide new VAV terminal units and new branch ductwork to accommodate new zoning. Modify plumbing as required for new use.
Third Floor
This floor should be considered light tenant improvement work for HVAC and plumbing systems.

Approximately 3150 square feet is being renovated on this floor. This floor is serviced by dual duct VAV air handling systems. Provide new VAV terminal units and new branch ductwork to accommodate new zoning. Modify plumbing as required for new use. Potential scope in this zone could include relocation or removal of a sink in the existing kitchen area and potential relocation of vent pipes in walls.

Dust Collector: A dust collection system will be provided for the wood shop. The dust collector will be located on the south side of the new addition outside the shop area with access for dustbin service. Air will be filtered with final filters and recirculated back to the space for energy conservation.

Process Exhaust: Provide exhaust for point source particulates. Consider filtration units for welding that clean the air prior to recirculating back to the space.

Supply/return and non fume hood exhaust ductwork: Galvanized steel
Chemical fume hood exhaust ductwork: Stainless steel although galvanized will be considered for

manifolded systems diluted with general exhaust.

D3050 Terminal and Packaged Units
Areas that have 24-hour process cooling loads such as the main telecommunication rooms will be serviced from dedicated standalone cooling units.

D3060 HVAC Instrumentation and Controls

Direct Digital Control (DDC): The project will utilize a Direct Digital Control (DDC) for the control of the HVAC systems, providing for heating and cooling control, peak load demand limiting and start/stop optimization. Damper and valve actuators will be electronic. Room thermostats will be an electronic adjustable type with override switch for occupant activation to occupied mode during unoccupied periods.

Energy Management System (EMS): The EMS controls will be compatible with EWU's campus BACnet system and existing computing and engineering facility controls manufactured by Alerton. Controls will interface and communicate with this network and front-end operator's terminal for the purpose of remote operation and maintenance. The EMS will include display and report real-time building systems performance data. The EMC controls will provide energy metering interface for the new and existing water, chilled water, steam and electric utilities servicing the existing building and new addition to a Skyspark control system.

Within the existing facility, the scope will include an upgrade of the Global Building Controller for compatibility with the new facility software. Existing supply and exhaust VAV will also be considered for controls upgrade due to cleaning issues associated with airflow measurement and improved airflow accuracy with new controllers for building pressurization.

Chemical Fume Hood Controls: Variable air volume controls shall be considered for the hoods for acoustics and energy conservation.

D3070 Testing, Adjusting and Balancing
Air systems (supply, return, and exhaust), hydronic, and domestic hot water recirculation systems will be completely balanced in accordance with Associated Air Balance Council or National Environmental Balancing Bureau.

D40 Fire Protection
General System: The existing system will be extended from the existing building to the new addition and the addition will be sprinklered in accordance with the City of Cheney requirements.

Sprinklers: The building light hazard areas (office, lecture rooms, circulation spaces) will be sprinkled to light hazard requirements. Electrical, mechanical and non-chemical use labs will be sprinklered to ordinary hazard group 1 requirements. Labs, shops, and other higher hazard areas will be sprinklered to ordinary hazard group 2 requirements. The fire system will be divided into multiple zones by floor for identification and annunciation at the central fire alarm panel.

Standpipe: A fire protection standpipe will be required and provided at each exit stairwell if the highest occupied level of the building exceeds 30 feet above grade.

D50 Electrical Systems General
The building electrical systems will be designed in accordance with the latest revised edition of the following codes:

National Electrical Code
- International Building Code (IBC)
- International Fire Code (IFC)
- Regulations of the State Fire Marshal
- Electrical Safety Order of the Washington State Department of Labor and Industries
- Washington Administrative Code
- Americans with Disabilities Act (ADA)
- Washington State Non Residential Energy Code
- Requirements of Washington State Industrial Safety & Health Administration (WISHA)

The building electrical systems will be designed in accordance with the following standards:
- Illuminating Engineers Society of North America (IESNA)
- Eastern Washington University Construction Standards

D5010 Service and Distribution

Site Electrical: The existing building receives power from the existing campus 13.2KV primary electrical distribution system via existing 13.2KV Switch #1. As part of the proposed building addition, a new building service will be established at the new back of house service area. The existing service will be removed and refed from the new service to allow for a new building main entry from the West. The existing 13.2KV Switch #1 is loop fed from the campus primary electrical distribution system and is suitable for new service work.

Temporary Site Electrical: The existing building service transformers, generator and propane tank will require temporary relocation prior to the start of building excavation. It is proposed that this equipment be relocated North and adjacent to the existing parking lot to be outside of the excavation for the new building ground floor. This relocation will allow the existing building to remain in service during the construction of the new building. Once the new building permanent services are established, the existing building temporary services will be replaced with new services from the new construction. The existing building telecom services from the existing tunnel are not expected to be impacted by the construction of the new building.

Building Normal Electrical Service: (3) new three-phase four-wire electrical services will be provided for the new building. These new electrical services will be derived from (1) new 480/277V outdoor pad mount transformer and (2) new 208/120V outdoor pad mount transformers, which will be connected to the EWU campus 13.2KV primary electrical distribution system. (2) new main switchboards will be located in a dedicated main electrical room located on the ground level. The dedicated main electrical room will be located as closely as possible to the new outdoor pad mount transformers to limit the secondary service cable length. The existing building 480V & 208V main switchboards will be refed from the new services. The new 480V main switchboard will refeed the existing building 480V switchboard. The existing and new 208V main switchboards will each be served by a dedicated 208V service transformer.

NEC Article 700 Emergency Electrical Distribution System: The emergency electrical distribution system will consist of (1) 150KW, 480/277V engine driven propane fueled generator. The emergency electrical distribution system will be provided with an automatic transfer switch in order to automatically switch loads between the normal EWU campus power and generator backed power. The emergency electrical distribution system will supply power to all life safety systems within the building such as egress lighting, exit lighting and the fire alarm system.

NEC Article 702 Optional Standby Electrical Distribution System: The standby electrical distribution system will consist of (1) existing 125KW, 480/277V engine driven propane fueled generator, which will be relocated from the existing building service yard. The standby electrical distribution

system will be provided with an automatic transfer switch in order to automatically switch loads between the normal EWU campus power and generator backed power. The primary intent of the standby power system is to provide generator backed power to non-life safety loads within the new building, such as fume hoods, department computer servers, telecommunications rooms (and associated cooling) and important lab equipment which is deemed critical by EWU staff.

Building Distribution: The building electrical distribution will originate from a main electrical room on the ground floor and feed smaller stacked electrical rooms located on each floor above. The building electrical distribution will be designed to provide separation of lighting, mechanical and computer equipment loads. Lab and special equipment power distribution will be separate from general building power panels. Because the building is being provided with separate 480/277 and 208/120V electrical services, it will not be necessary to distribute dry type step down transformers throughout the building. Multi- stage surge suppression shall be provided by installing transient voltage surge suppressors at the main switchboard, distribution switchboards and appropriate panelboard locations.

Switchboards: Switchboards shall be free-standing dead-front style. Main devices shall be equipped with ground fault protection. Distribution devices shall be factory-installed, group-mounted circuit breakers. Each main switchboard will have owner metering per EWU campus standards and integral TVSS protection. Switchboard shall be mounted on a 2" concrete housekeeping curb. All bus bars shall be copper.

Panelboards: Circuit breaker panelboards shall be provided throughout the building as required to adequately serve the associated building loads. Lab spaces will typically receive dedicated power panels located within each lab room. Panelboards shall be dead-front circuit breaker type with proper interrupting capacity. All panelboards shall be provided with 42 available circuits and door in door construction. All bus bars shall be copper. Where appropriate, panelboards will be provided with integrally mounted TVSS units.

Mechanical Equipment: Refer to mechanical narrative for proposed mechanical systems and possible equipment. Motor loads ½ HP and larger will be 480V three phase. Motor starters and disconnects will typically be located in close proximity to each associated piece of mechanical equipment. Variable frequency drives will be provided by the mechanical contractor and installed by electrical contractor for various pieces of mechanical equipment.

Shop/Lab Equipment: Refer to the lab narrative for proposed electrical systems to be provided for each unique space. The electrical systems will be designed to provide ultimate flexibility to accommodate the ever-changing program needs for engineering studies.

Disconnect Switches: Safety switches shall be heavy duty type with interlocking door and spring-loaded contacts. Safety switches used as motor disconnects shall be fused. Outdoor safety switches shall be NEMA 3R.

Engine/Generator: Emergency and standby power generation shall be provided by means of an engine driven propane or natural gas fueled generator set. Each generator set shall be sized to supply the emergency and standby loads served. Emergency power will not be provided for elevator operation. Generator sets shall include a weatherproof sound attenuating enclosure for outdoor installation. Operation of the generators will be monitored on a multi function system designed to report most normal failures such as low cooling fluid temperature, low starting batteries, overcrank, overload, high water temperature, etc. The generators shall be mounted on a 6" curb to allow for maintenance access to oil drain low point.

Automatic Transfer Switch: The automatic transfer switches shall be 4-pole, switched neutral, open transition type.

Medium Voltage Pad Mount Transformers: Transformers shall contain a dead front loop feed primary compartment. Provide transformers with integral secondary disconnect switch located within the transformer secondary compartment. Provide external oil sampling valve system extended to lockable box on exterior of each transformer.

Medium Voltage Cabling: 15KV medium voltage cables shall be shielded, copper MV-90 single conductors. 15KV cables shall be sized in accordance with EWU campus standards and the National Electric Code and shall be installed with a 600V insulated equipment grounding conductor. 15KV cables shall be installed in continuous runs without splices.

Medium Voltage Elbows: 15KV medium voltage cables shall be terminated at transformers by 200 amp rated load-break elbows manufactured by Cooper.

Grounding: Grounding materials shall be copper, except ground rods shall be copper-clad steel. Grounding electrode shall be provided per code requirements. Equipment grounding conductors shall be run with all feeders and branch circuits. Separate grounding conductors shall be provided for isolated ground branch circuits. Equipment ground bars shall be provided within all electrical rooms and telecommunications rooms.

D5020 Lighting and Branch Wiring

General Interior Lighting: Lighting throughout the interior building spaces will respond to the primary use of each space while maintaining a level of flexibility to react to future use of each space. Uniform ambient lighting will establish a basic minimum lighting level throughout each individual space with task, display and accent lighting used to establish contrast and interest. Specific attention will be given to the lighting for areas with computer workstations in order to minimize glare. Lighting within the building will be LED. Lighting system design foot candle levels will be in accordance with IES standards and EWU standards. In general, areas within the building will be illuminated to the following light levels:

Building Area	Foot-Candles
General Classrooms	30-50
Labs	60-75
Offices	30-50
Conference Rooms	30-50
Restrooms	10-15
Corridors	10-15
MEP Utility	10-20
Storage Rooms	10-20

Egress & Exit Lighting: Exit lighting will be LED type. Emergency egress lighting will be provided throughout the path of egress and will be supplied with power from the emergency generator system in the event of a failure on the normal power system.

General Lighting Controls: Within normally occupied spaces, multi-level switching or dimming will be provided in conjunction with occupancy sensors and will utilize two or more manual wall switches. Manually dimmable lighting controls shall be utilized within appropriate areas, such as conference rooms and labs. Automatic dimming controls shall be considered for the purpose of daylight harvesting within areas where adequate natural daylight is present within the building.

A programmable low voltage lighting control system shall be provided for automatic control of lighting in corridors / common areas and exterior site lighting. The low voltage lighting control system shall also be interfaced to the campus energy management system (EMS) to all EMS control of the exterior lighting.

Programmable Low Voltage Lighting Control System: Provide a distributed low voltage lighting control system with building management system interface. The low voltage lighting control system shall be manufactured by nLight (acuity brands) in accordance with EWU campus standards.

Occupancy Sensors: Occupancy sensors will be utilized to automatically shut off the lighting within offices, conference rooms, restrooms, labs and classrooms when these spaces are unoccupied. Occupancy sensors shall be dual technology type and capable of vacancy mode. Either ceiling mounted or wall mounted occupancy sensors will be utilized depending on the physical size and specific geometry of the room being controlled.

Sustainable Design Considerations: All sustainable design measures considered will be evaluated completely with regards to their associated sustainable and economic aspects. Many opportunities are currently available to construct a building that is a model of sustainable design. The following is a brief list of items related to the building lighting and lighting control systems which are being considered for this project:

Energy efficient LED lighting will be utilized as the primary light source within the building in order to reduce the energy consumption associated with the lighting system.

Occupancy sensors will be utilized to automatically shut off the lighting withing interior spaces when they are unoccupied. This will allow the interior lighting within these areas to be automatically turned off during unoccupied times, thereby increasing the available energy savings associated with the interior lighting system.

Within normally occupied spaces, multi-level switching or manual dimming will be provided in conjunction with occupancy sensors and will utilize two or more manual wall switches. The utilization of manual controls within these spaces will allow the user to reduce the light levels within their spaces if desired, further increasing the available energy savings associated with the interior lighting system.

Automatic dimming lighting controls will be considered for the purpose of daylight harvesting within areas where adequate natural daylight is present within the building. The utilization of automatic dimming and daylight harvesting will allow EWU to take advantage of the natural available daylight to the fullest extent possible. This will result in additional available energy savings associated with the interior lighting system.

A programmable low voltage lighting control system shall be used to control both the exterior and interior lighting systems. This will allow both the interior and exterior lighting systems to be automatically turned on/off at pre-programmed times, thereby increasing the available energy savings associated with the interior and exterior lighting systems.

General Exterior Lighting: Exterior lighting will be LED type selected to match the architectural building exterior and EWU campus standards. Exterior entry lighting which illuminates the path of egress will be supplied with power from the emergency generator system in the event of a failure on the normal power system. Exterior lighting will utilize full cut off light fixtures in order to avoid light trespass and meet associated dark sky lighting requirements. In general, exterior areas will

be illuminated to the following light levels:

Exterior Area	Foot-Candles
Exterior Entry	5
Exterior Walkways	2
Parking Areas	1

Exterior Lighting Controls: A programmable low voltage lighting control system shall be used to control the exterior lighting. This will allow the exterior lighting to be automatically turned on and off at pre-programmed times, automatically controlled via outdoor photocell and automatically controlled by the campus EMS system.

General Branch Wiring: Provide complete raceway and wiring systems in conformance with code requirements and campus standards.

Conduit: Galvanized steel metal conduit shall be used inside building. Non-metallic conduit shall be used underground, except at transitions. Metal conduit shall be rigid metal conduit, intermediate metal conduit, electrical metallic tubing, or flexible metal conduit. Non-metallic conduit shall be schedule 40 PVC. Conduit shall be concealed wherever possible. Minimum conduit size is 3/4" unless otherwise noted. Conduits installed within utility tunnels shall be rigid metal conduit.

Building Wire: All wiring shall be copper, minimum size #12 AWG. All feeder conductors shall be installed in conduit. Aluminum conductors are not allowed on the EWU campus, unless approved by the project manager. All 480/277V and 208/120V building wire shall be color coded in accordance with EWU campus standards.

Wiring Devices: Switches and receptacles outlets shall be specification grade. GFI type outlets shall be provided where outlets are mounted within 6 feet of a sink. Trim plates shall be color coordinated with architect.

Renovation: (refer to architectural narrative for areas of work)

- Ground Floor – Heavy electrical work is anticipated at the ground floor of the existing building to accommodate the new programs. This would include modified electrical distribution, branch circuits, lighting, telecom, fire alarm and security.
- First Floor – Moderate to light electrical work is anticipated on the first floor of the existing building to accommodate the new program. This would include modified branch circuits, lighting, telecom, fire alarm and security.
- Second Floor – Moderate to light electrical work is anticipated on the first floor of the existing building to accommodate the new program. This would include modified branch circuits, lighting, telecom, fire alarm and security.
- Third Floor – Moderate to light electrical work is anticipated on the first floor of the existing building to accommodate the new program. This would include modified branch circuits, lighting, telecom, fire alarm and security.

D5030 Communication and Security

Telecommunications Building Distribution: A complete telecommunications distribution pathway and cabling system will be provided by the contractor in accordance with the EWU construction standards. Pathways, cabling, outlets and passive equipment will be provided by the contractor. Active equipment will be provided by EWU. Telecommunications rooms will be located throughout the facility in accordance with EIA/TIA 568 and 569. The main telecom room will be

located on the ground floor of the building, in a centralized location. Secondary communication rooms are to be located on each floor and stacked above the main telecommunication room. Horizontal station cable pathways will be provided and routed to the telecommunications rooms located on each floor. Each telecommunications room shall be provided with a dedicated 120/208V standby power panelboard and an equipment ground bar. Selected areas will be equipped with cabling provisions for owner furnished wireless local area networking. Telecommunications riser cabling and pathways will be provided from the entrance location to the telecommunications room on each floor. Cable trays will be installed down corridors with conduits provided at hard (inaccessible) ceilings and were wall and floor penetrations are required.

Telecommunication Outlet Distribution: Telecommunications devices will typically be located at instructor's podiums, ceiling mounted projector locations, computer workstations and required student locations. Offices shall typically be provided with two telecommunication outlet locations per room.

WiFi Systems: WiFi system pathways, cabling and outlets will be provided by the contractor. Required locations for WiFi network routers will be closely coordinated with EWU. All WiFi network routers will be provided and installed by EWU.

Closed Circuit Television (CCTV) System: New CCTV System pathways and network drops will be provided by the contractor. Required locations for CCTV devices will be closely coordinated with EWU. All CCTV cameras, power supplies, cabling and active electronic equipment will be provided and installed by EWU through a separate vendor.

Access Control System: A new access control system will be provided for the new building. Required locations for miscellaneous access control devices will be closely coordinated with EWU. Typical spaces which will include access controls are classrooms, labs, office suites and utility rooms.

D5090 Other Electrical Systems

Audio / Video Systems: Complete AV systems will be provided by the contractor. Required locations for AV devices and equipment will be closely coordinated with EWU, but will typically include classrooms, teaching labs and meeting spaces. Video projectors, sound reinforcement systems, cabling and all active/passive electronic AV equipment will be furnished and installed by the contractor.

Fire Alarm: A complete battery backed addressable fire alarm system with manual pull stations, automatic detection and ADA compliant horn/strobes will be provided throughout the facility. Smoke detector and heat detectors will be installed as required by the governing codes, and in accordance with EWU campus standards. The building fire sprinkler system will be monitored by the fire alarm system for system flow and shutoff valve tampering. Central reporting capabilities will be provided with the fire alarm system and shall be compatible with the existing campus fire alarm monitoring system. The new fire alarm system shall be manufactured by Edwards System Technology (EST) in accordance with EWU campus standards.

Clock System: Clock System pathways, cabling and outlets will be provided by the contractor. Required locations for clocks will be closely coordinated with EWU. All clocks and clock equipment will be provided and installed by EWU.

Room Scheduling: Room Scheduling System pathways, cabling, outlets and passive equipment will be provided by the contractor. Required locations for room scheduling will be closely coordinated with EWU. All room scheduling displays, and active equipment will be provided/installed by EWU.

Community Antenna Television (CATV) System: CATV system pathways, cabling and outlets will be provided by the contractor. Required locations for CATV will be closely coordinated with EWU. All CATV distribution equipment will be provided and installed by EWU.

E Equipment and Furnishings

E10 Equipment

E1010 Laboratory Fume Hoods and Other Air Containment Units

Bench-Mounted Chemical Fume Hoods: Restricted bypass type / variable air volume (VAV) extraction hoods at 100 fpm (0.51 m/s) face velocity with a vertical rising sash will be provided. Exhaust air volume will be based on 18" open sash position. Fume hood work surface will be dished epoxy resin.

Fume Extractor Arms (Snorkels): Snorkels will be 3 inch (75 mm) diameter, hinged, self-supporting air extractor arm assembly with 14" diameter clear acrylic hood.

Low Slot Exhaust: These will be custom fabricated stainless steel.

Biological Safety Cabinets: Cabinets will be Class II, Type A2, and designed to operate with an intake air velocity of 100 fpm (0.5 m/s), re-circulating the air through the supply HEPA filter into the work area.

Laminar Flow Hoods: Laminar Flow Hoods shall be equipped with supply HEPA filter and reusable prefilter to maintain Class 100 standard at work area.

Canopy Hood: Canopy Hood shall be an exhausted stainless steel canopy enclosure with all hangers and miscellaneous hardware, including damp location light fixture.

E1020 Laboratory Service Fittings and Fixtures

Service Fittings: Service fittings shall be chromium plated with an acid- and solvent-resistant, clear epoxy coat finish specifically designed for laboratory use. All service fittings shall be of the tapered body design with four arm handles, except for ADA accessible fittings which shall have lever handles as described below.

Fittings and fixtures: These are designated to be accessible to persons with disabilities (ADA) with operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N), maximum.

Safety Stations: Safety station shall be barrier-free with emergency shower actuation valve in stainless steel cabinet for recess mounting and wall-mounted eyewash with stainless steel skirt.

Hand held eye wash: These shall be dual-purpose eye wash/drench hose, deck mounted.

Cup Sinks: Cup sinks will be epoxy and set flush with work surface, except for any cup sinks at fume hoods which will have ¼" raised rim.
Laboratory Sinks: Laboratory sinks will be epoxy for drop-in installation in work surfaces.
Stainless steel sinks: Stainless steel sinks will be Integral one piece construction with stainless steel work surface. 18 gauge (1.3 mm thick) steel unless otherwise noted.

Scrub-up sink: These shall be wall mounted 14 gauge (2.0 mm thick) Type 304 stainless steel sink with knee action control and HWCW mixing valve.

E1030 Laboratory Sterilizers And Washers

Laboratory Glassware Washers (as required): These shall be tall, floor mounted, front loading single door units programmable for multiple wash cycle and drying cycle duration, with purified water rinse capability. Unit shall have mounting hardware and finish pieces for mounting through architectural wall.

Laboratory Medium Steam Sterilizers: These shall be prevacuum/gravity models with interior chamber dimensions of 20: x 36" x 48". Steam source should be provided to operate all sterilizers and Cage/Bottle Washer. Freestanding single door unit shall be cabinet enclosed. Recessed single door unit shall have mounting hardware and finish pieces for mounting though architectural wall. Pass-through double door unit shall have mounting hardware and finish pieces for mounting one end through an architectural wall.

Instruments, Controls Major Electrical Components: These shall be located in surface mount control console. Provide LCD color touchscreen microprocessor based temperature and humidity (where applicable) controller with real-time and archive trending. Each room shall be provided with reset type personnel emergency alarm with electrically powered audible and visual alarm system.

Environmental conditioning system consisting of blower(s), evaporator coil(s), heaters, humidifier (as required), refrigeration piping system and drain pans, shall be housed in modular enclosure(s) suspended from the room ceiling and shall be factory prewired to the control cabinet.

Refrigerant: Utilize non-ozone depleting refrigerants R-134a, R-404A, or approved equal; CFC type refrigerant shall not be acceptable.

Operation: Each system shall be designed and furnished in such a manner as to allow the motor compressor to operate continuously with a modulating bypass system to maintain specified temperature ranges.

Defrost: System shall incorporate an automatic defrost system.

Refrigerant Piping: All refrigeration piping required shall be furnished and installed by the controlled temperature room contractor. Provide ACR type, hard drawn, cleaned and capped Type L copper tubing with silver brazed joints.

Ventilation: provide make-up air from the laboratory space at the rate of 0.25 CFM per square foot (4.57 m^3/h per square meter) unless otherwise indicated on the drawings. No ventilation air provisions shall be made for freezer rooms operating at or below 0°C.

E20 Furnishings

E2010 Laboratory Casework and Other Furnishings

Wood Casework: Wood casework shall comply with all requirements of AWI Section 400 Custom Grade architectural cabinets. Lumber shall be plain sawn oak; veneer shall be plain sliced oak. Wood casework shall be flush overlay design.

Metal Casework: Metal casework shall be of modern design and shall be constructed in accordance with the recommended practices of the Scientific Equipment and Furniture Association. All units shall be of flush overlay construction. Door and drawer heads shall be of welded, double walled steel construction, 3/4" (18 mm) thick, filled with sound deadening material.

Corrosive Storage Cabinets:Cabinets shall be vented with corrosion resistant liner designed and labeled specifically for the storage of acids and other corrosive substances, to meet code requirements

Flammable Liquid/Solvent Storage Cabinets:Cabinets shall be metal designed and labeled specifically for the storage of flammable liquids and other volatile substances, to meet code requirements.

Ventilated Storage Cabinets shall have perforated metal adjustable shelving, vent louvers inset on the lower portion of the door, and a 2" diameter PVC connection to the building exhaust system.

Laboratory work surfaces: These shall be 1" thick chemically resistant modified epoxy resin.

Stainless steel work surfaces: These shall be 16 gauge (1.6 mm thick), type 304, #4 finish with heavy mastic coating underside and perimeter timber fixing frame.

Adjustable reagent shelves: These shall be ¾ inch thick, 7-ply shop sanded exterior grade veneer plywood shelving with K+ face veneers with chemical resistant plastic laminate on all surfaces on book-end brackets mounted on double-slotted 2 inch x 2 inch fully welded square steel tube support frame. All shelves shall have 1-1/2" high safety edging.

Adjustable wall shelves: These shall be ¾ inch thick, 7-ply shop sanded exterior grade veneer plywood shelving with K+ face veneers with chemical resistant plastic laminate on all surfaces on book-end brackets mounted on double-slotted standards. All shelves shall have 1-1/2" high safety edging.

Heavy-duty shelving: These shall be 1 inch thick, 7-ply hardwood plywood with chemical resistant plastic laminate on all surfaces and edges on heavy-duty shelf standards and brackets. All shelves shall have 1-1/2" high safety edging.

Stainless steel shelving: These shall be Super Erecta stainless steel shelf system, post supported, floor mounted or wall mounted, and floor mounted high density configuration, and shall include all accessories required for function.

Open industrial metal shelf units: These shall be premium grade 20 gauge steel shelf units comprised of 5 shelves adjustable on 1" increments, 85" high 14 gauge angle post supports, and side and rear cross-bracing.

Cylinder Restraints: These shall be fabricated with Unistrut, Powerstrut or equal.

Overhead service carriers: These shall be fabricated with unistrut channels supported from structure above at 48" on center maximum and include a 14 gauge metal channel at bottom for mounting of piped services and electrical raceways.

Suspended metal channel grid: Purpose designed to support 200 lb. (0.89 kN) point load at any position and 50 lb./ft. (0.73 kN/m) uniformly distributed load. All brackets, channels, etc. (galvanized metal).

Pipe drop enclosures: These shall be an 18 gauge galvanized steel sheet enclosure with removable cover panels and epoxy paint finish.

Drying racks: These shall have a stainless steel body with white polypropylene pegs and integral

drain trough with welded stainless steel trough ends.

E2015 Non-Laboratory Casework and Other Specialties
Casework: Typical casework provided in the student lounge and tech offices will consist of plastic laminate millwork cabinets, countertops and shelving. Fixed plastic laminate tables will be provided at the Large and Medium Classrooms.

Visual Display Boards: Tack boards and glass marker boards will be provided in classrooms and collaboration spaces.

Toilet Compartments: Provide solid phenolic core partitions that are floor-to-ceiling mount.

Window Blinds: Roller blind window coverings will be provided throughout the building, with blackout shades at labs and classrooms having video projection.

Projections Screens: Provide roll down projection screens.

Signage: Interior way-finding and room identification signage, and exterior building signage will be provided.

Bicycle Racks: Stainless steel bicycle racks will be provided.

Fire Extinguisher Cabinets: Provide recessed stainless steel fire extinguisher cabinets.

Toilet Accessories: Provide stainless steel toilet accessories.

F Other building construction
No requirements.

G Site work

G10 Site Preparation
Site Preparation and Excavation
Existing Cadet Hall will be demolished for the construction of the new Engineering Building addition. Cadet Hall has an approximately 5,000-sf footprint and is two floors. Demolition will include removal of all building and foundations, capping of utility services and disposal of all materials to appropriate and legal locations.

Site preparation for the Engineering Building Addition will include removal of the existing paving and miscellaneous site features in the work area.

The topsoil and vegetative material will be removed, screened and saved for re-use in revised landscaped areas. The subgrade will be prepared prior to placing structural fill or building foundations, per future geotechnical recommendations. Structural fill will be approved imported material. Native silty or clayey material is not be acceptable for use as structural fill and will be hauled of site.

Temporary Sediment and Erosion Control
During construction, all temporary erosion and sedimentation control systems will be designed and constructed in accordance with the Eastern Washington Regional Stormwater Manual Best Management Practices (BMP's), to protect of site properties as well as minimize the quantity of sediment-laden water from entering the City of Cheney's public storm system. The site will be

graded to drain to sediment control ponds or temporary tanks on the lower site, near the Art Walk, off 7th Street.

Temporary catch basin protection should be installed and maintained on existing and new catch basins to filter sediment-laden water entering the existing storm conveyance system during construction.

Temporary Construction Features
The project will require temporary construction access from the upper west parking lot, and likely also from the lower lot area to the southeast. This access and other contractor laydown and trailer space will need to be coordinated with ongoing campus activities and circulation needs. Quarry spall work pads on disturbed soils, and silt fencing placed around the downhill portion of the site will further control soils and limit erosion. Soil stockpiles will need to be erosion protected, with plastic sheeting or other approved measures to prevent sediment migration from the site.

Construction Debris: The contractor will implement BMP's to prevent demolition and construction debris, waste, material, fuel, oil, lubricants, and other fluids from entering the public right of way and the existing storm conveyance system. All waste materials shall be disposed of in appropriate, legal locations. Recycling or reuse of demolished or excess material when appropriate is encouraged.

Foundation Subdrainage: A footing and slab drainage system will be incorporated, and discharge into a stormwater detention system described under G30 or directly into the campus stormwater system in under then Engineering lawn. This system discharges to the City system in 7th Street. . Slab drainage will be a layer of washed, free draining aggregate underlain by a filter fabric. Perforated drain pipes in the free-draining layer will gravity drain to the existing campus storm system.

G20 Site Improvements
Site Development: The building will be accessed from the parking lot on the west side off Washington Street, and from the lower site off the southeast at the Engineering Lawn. Delivery access can be made from either side.

Landscaping: A combination of xeriscape planting, grass lawns, biofiltration swales (described under G30), and trees will be provided.

Irrigation: An irrigation system will be provided, and will be supplemented by water collected in the stormwater detention system described under G30.

Site Paving
Site paving will consist of asphalt and concrete per University standards. Paving will be for new/ replaced walks and drives around the new building and to patch utility trenches., in-kind matching existing surfaces.

Asphalt for restored parking areas and new loading/utility yard off west parking , assume 6-in of ½-in HMA over 6-in crushed base.

Concrete walks and plazas around the buildings, 6-in w/ reinforcing. Where needed for fire lane, 8-in thick pavement.

At University direction, some areas of new/replaced paving will have snow melt tubing and

connection to campus or building boilers for heat.

Fire Truck Access

Fire truck access can be provided off the parking lot on the west side, at Washington Street and from 7th Street, via the Art Walk. There are three existing fire hydrants within a 300-foot radius of the proposed building. One off the Northwest corner of Cadet Hall appears to be in the footprint of the new addition, and should be moved (replaced) west into the parking lot.

Water Supply

Water mains: Existing Campus water mains are to the west, under the parking lot, and south between this site and the Art Buildings. Part of the campus main under the parking lot will need to be relocated further west to avoid the new addition west wing.

A single combined fire and domestic water service will be provided to the building from the University system water line under the west parking lot, and between the addition site and the Art Building. Alternately, the addition may be served from the existing 6-in service that enters the existing CEB from the west parking lot. Analysis from the plumbing and fire design will be required to confirm adequate flow from this 6-in connection.

Water Meter: An in-building water meter will be provided to measure the domestic water use in the new building for the purpose of; reporting trends in building systems consumption required by WA State law, reporting of meeting LEED criteria, and real-time display of building systems performance data for use by engineering courses at EWU.

Sanitary Sewer

All floors of the addition should be able to discharge waste by gravity to the campus sanitary sewer system located off the southeast of the site, under the engineering lawn. A new 6-in connection to this system is anticipated, approximately 150-ft of 6-in sewer pipe needed to make a new connection.

Stormwater Treatment and Disposal

The University's stormwater system drains to the City of Cheney's street storm system. Development of this addition will conform to the City's current surface water development manual which specifies stormwater design standards. The City has adopted the Spokane Regional Stormwater Manual, April 2008, which also governs stormwater design for Spokane County, the City of Spokane, and the City of Spokane Valley. Storm water collected off new roof areas will not need to be treated for water quality but can be directed to the new storm water flow control system (detention tank). If new and replaced vehicular use pavements exceed 5,000-sf within this project, then water quality treatment facilities will need to be provided for water collected off these surfaces. For small areas this is usually best done before detention. Cartridge filter systems or grass swales may be possible based on available space and locations.

Stormwater Detention System: The soils on the EWU campus are typically fine-grained and usually not suitable for infiltration as the sole source of stormwater disposal. Stormwater runoff, from the roof and from adjacent new and replaced pavements, will be routed to a detention system, approximately 2,500-CF in an underground tank or vault beneath the south, upper side of the site. This detention system will discharge to the storm system at the lower site level, below the Art building and near Media Lane. Approximately 60-ft of 8-in pipe will connect it to existing systems.

Foundation Subdrainage: A footing and slab drainage system will be incorporated, and discharge directly into the campus stormwater system. Below slab drainage will be a layer of washed, free draining aggregate underlain by a filter fabric. Perforated drain pipes in the free-draining layer will

gravity drain to the existing campus storm system.

The existing campus storm system runs southeast in Media Lane and connects to City systems at 7th Street.

Connection to Campus Utility Tunnel

West of the site, under the asphalt parking lot, a branch of the campus utility tunnel provides access to many campus utilities, including power, communications, steam, and chilled water. Below grade, the new building will not directly affect the tunnel, the basement level will stop short of the tunnel walls. A short new spur off the tunnel will run into basement mechanical spaces allowing the new building to access campus utilities in the tunnel. Above grade the new addition will span over the tunnel, without bearing on it.

Gas Distribution

Natural gas service is provided to the existing CEB by Avista Utilities, from a service under the west parking lot. It may be possible for this service to provide for the new addition, or a new separate service to the addition provided. Gas loads from the mechanical design will determine the required path for this.

G4010 Electrical Distribution

The EWU Campus currently receives electrical utility power via two separate 13.2KV electrical service feeders from the City of Cheney. These two 13.2KV electrical service feeders are terminated within the EWU Rozell Substation at Campus Switchgear Bus #1 and Campus Switchgear Bus #2. Four separate 13.2KV campus feeders are routed from the Campus Switchgear to a system of 13.2KV switches located throughout the EWU campus in order to provide increased redundancy and flexibility to the campus electrical distribution system.

G4020 Site Lighting

Site lighting will be selected in conformance with EWU campus standards and will utilize full cut off LED light fixtures in order to avoid light trespass and meet associated dark sky lighting requirements. Site lighting which illuminates the path of egress will be supplied with power from the emergency generator system in the event of a failure on the normal power system. Site lighting will be controlled via a programmable low voltage lighting control system which will allow the site lighting to be automatically turned on and off at pre-programmed times.

G4030 Site Communication/Data

Data/Communication service is provided to the existing building from the EWU owned data/com distribution system. Fiber optic cabling is typically routed throughout the EWU Campus via a system of cable tray that is located within the existing campus utility tunnel system. New telecommunications building service pathways will be provided and installed by the contractor. New building service pathways will be routed from the existing campus utility tunnel system into the main telecom room or be extended from the existing ground floor MDF in the existing building. Telecommunications building service cabling will be provided and installed by the contractor.

G4090 Other Site Electrical Utilities

New CATV System service pathways will be provided by the contractor to the main telecommunications room. New CATV System pathways shall also be installed by the contractor from the main telecommunications room to all other telecommunications rooms.

6.3 CONSTRUCTION COST ESTIMATE

A detailed construction cost estimate for a new Engineering Building was prepared by a professional cost estimator in order to accurately determine the predicated costs for the project. The detailed estimate is included in the Appendix to this report. The estimated construction cost for the new building, existing building work and site improvements is summarized as:

New Building Construction:

A10	Foundations	$860,402
A20	Basement Construction	$525,396
B10	Superstructure	$3,781,193
B20	Exterior Closure	$3,212,588
B30	Roofing	$696,214
C10	Interior Construction	$1,868,883
C20	Stairs	$200,000
C30	Interior Finishes	$1,700,873
D10	Conveying	$320,000
D20	Plumbing Systems	$1,853,875
D30	HVAC Systems	$4,782,998
D40	Fire Protection Systems	$315,159
D50	Electrical Systems	$4,449,300
E10	Equipment (built in)	$1,618,980
E20	Casework & Furnishings (built in)	$560,295
	Subtotal New Building Construction	$26,746,154
	Design Contingency/ Contractor Overhead	$6,865,738
	Total New Building Construction Cost	**$33,611,892**

Existing Building Construction:

C10	Interior Construction	$231,575
C30	Interior Finishes	$462,540
D20	Plumbing Systems	$214,269
D30	HVAC Systems	$808,931
D40	Fire Protection Systems	$59,125
D50	Electrical Systems	$567,600
E10	Equipment (built in)	$286,770
E20	Casework & Furnishings (built in)	$198,773
F20	Selective Demolition	$191,440
Subtotal Existing Building Construction		$3,021,023
	Design Contingency/ Contractor Overhead	$775,496
	Total Existing Building Construction Cost	**$3,796,519**

Site Construction:

G10	Site Preparation	$1,333,366
G20	Site Improvements	$704,336
G30	Site Civil / Mechanical Utilities	$258,000
G40	Site Electrical Utilities	$620,000

Design Contingency/ Contractor Overhead	$748,460
Total Sitework Construction Cost	**$3,664,163**
General Conditions & Support Services	$1,800,000
Unescalated Maximum Allowable Construction Cost (MACC)	$42,872,574
Escalated Maximum Allowable Construction Cost (MACC)	**$49,303,460**

6.4 PROPOSED PROJECT COST

Escalated project costs for the Engineering Building are summarized as follows:

Acquisition Costs	$0
Consultant Services	$5,939,232
Construction Contracts	$56,634,316
Equipment	$4,025,828
Art Work	$347,007
Other Costs	$860,160
Project Management	$1,941,823
Total Project Request	**$69,748,366**

Detailed project costs have been submitted to OFM through the online Capital Budgeting System. The C100 and detailed preliminary construction cost estimate are included in the Appendix.

6.5 PROPOSED FUNDING

The Engineering Building will be a State funded project.

6.6 FACILITY OPERATIONS AND MAINTENANCE REQUIREMENTS

Assumptions

The following estimates of operations and maintenance costs for the Engineering Building are based on the "EWU's Annual Cost per Gross Square Foot" for FY20. Costs are escalated at an inflation rate of 3.0 % per year.

Operations and Maintenance Cost

Current campus operations and maintenance costs for FY20 are shown in Table 1. For the Engineering Building the projected operations and maintenance costs for the first full year of occupancy and 2027 and 2029 are shown in Table 2.

Table 1: Operations and Maintenance - Current Campus

Operations	Operating cost GSF/YR
Component :	FY20
091-Utilities	$2.42
092 - Bldg & Utilities Maintenance	$2.64
093 - Custodial & Grounds Service	$3.20
094 - Ops & Maintenance Support	$3.98
Total Annual Per GSF	$12.24

Table 2: Operations and Maintenance - Projected Engineering Building

Operations	Operating cost GSF/YR	GSF	Cost 2025	Cost 2027	Cost 2029
Component :	FY25				
091-Utilities	$2.81				
092 - Bldg. & Utilities Maintenance	$3.06				
093 - Custodial & Grounds Service	$3.71				
094 - Ops & Maintenance Support	$4.61				
Total Annual Per GSF	$14.19	74,155	$1,052,223	$1,116,304	$1,184,287

Staffing Plan

The Engineering Building project will result in an increase to operations and maintenance costs for the campus. The new building will require an increase in the custodial staff, maintenance staff, goods and services, and utility costs.

7.0 PROJECT DRAWINGS

7.1 PROJECT RESPONSE

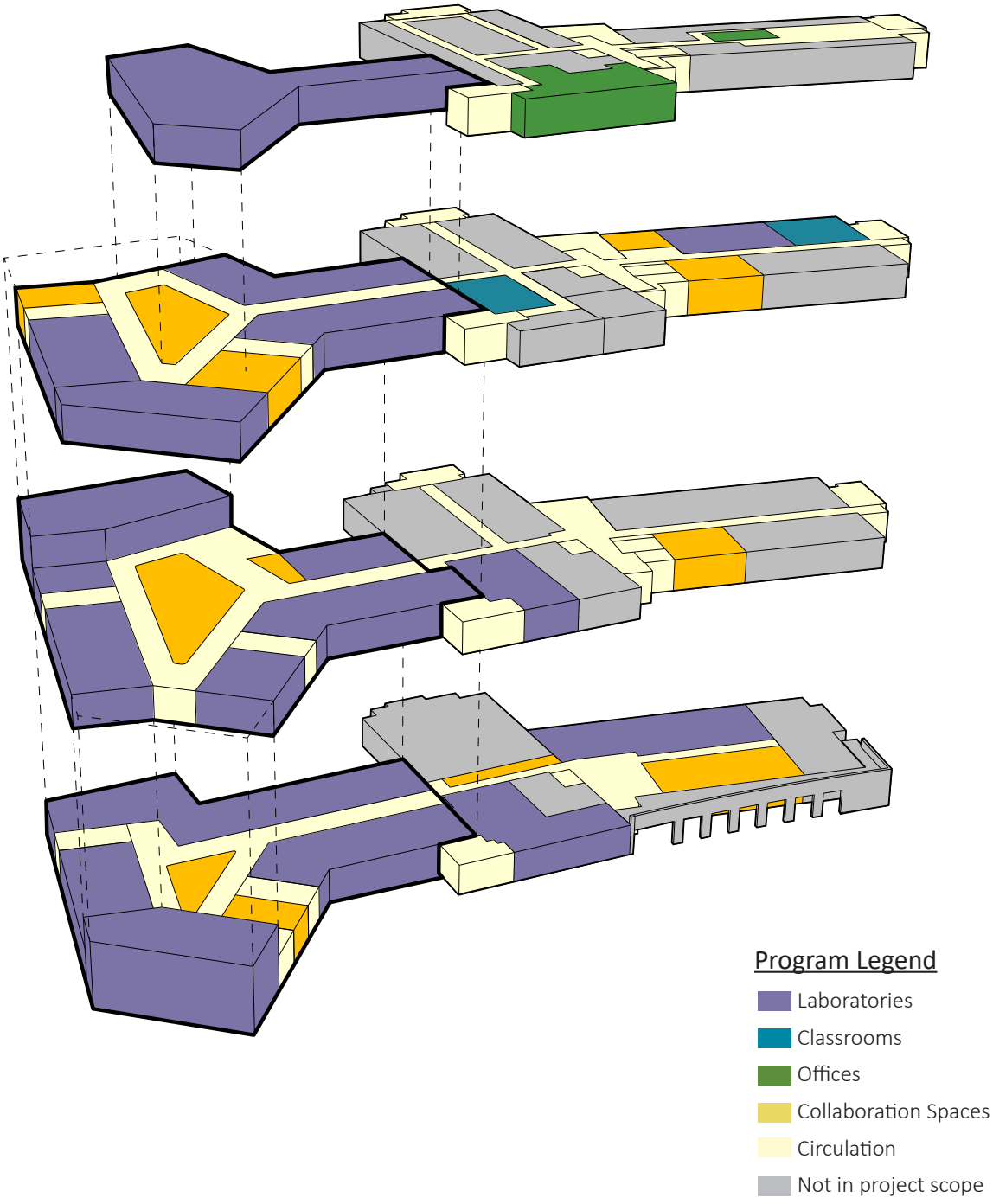
7.2 SITE PLAN

7.3 BUILDING PLANS

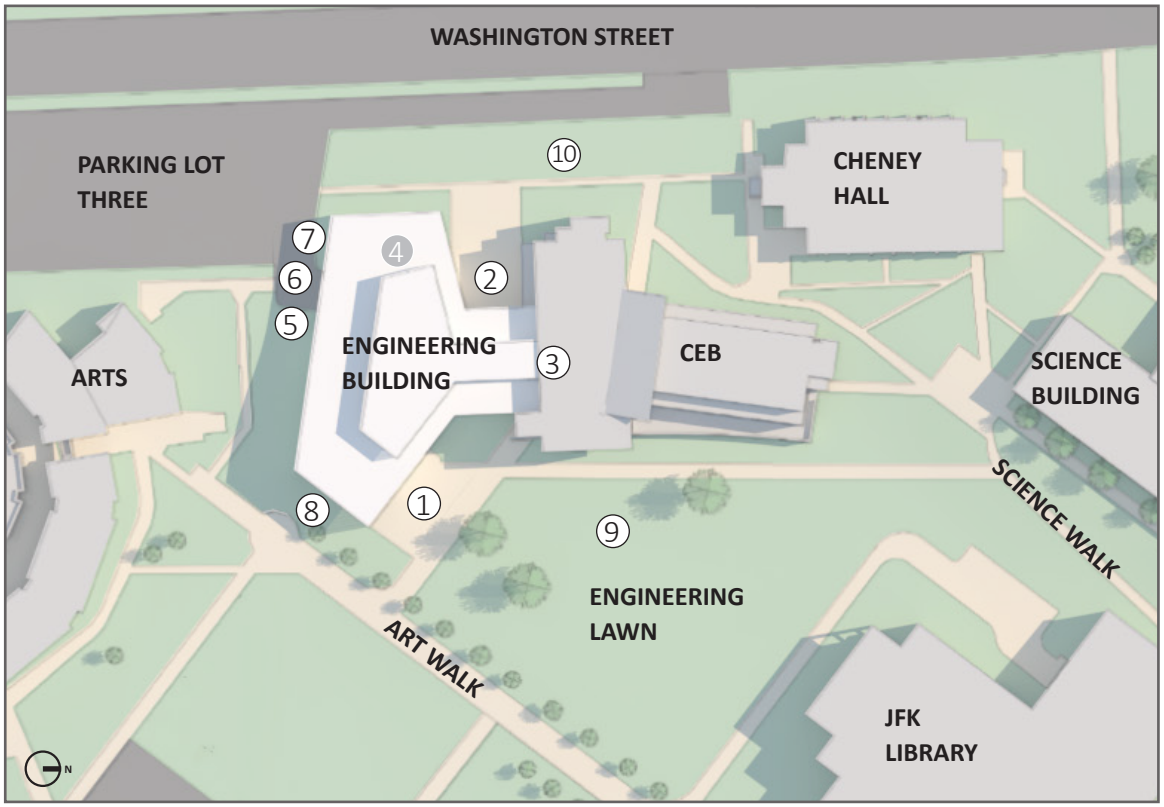
7.4 AERIAL AND CONCEPTUAL MASSING VIEWS

7.1 PROJECT RESPONSE

The below axonometric drawing illustrates the general scope of work and program in the design response for the Engineering Building project. The project primarily consists of a new facility with teaching laboratories, research laboratories, and collaborative working spaces with an integral connection to the existing Computing and Engineering Building (CEB). This response reduces square footage in the new facility by taking advantage of spaces in CEB that require only light modification to become suitable to the project program.



7.2 SITE PLAN



Site Features

1) Northwest Entrance Plaza- One of two primary building entries is located off the Art Walk and faces the Engineering Lawn.

2) Washington Entrance- One of two primary building entries provides access from Washington Street, off of Parking Lot Three.

3) Connection to CEB- Continuation of CEB's north-south circulation corridor into the building on Ground, First and Second Floors.

4) Utility Tunnel- A branch utility tunnel connects a partial mechanical basement with the existing campus utility tunnel that runs under the building.

5) Service Yard- Located adjacent to the parking lot, includes electrical equipment such as transformers, and trash/recycle;

6) Loading Dock- Access from Washington Street through Parking Lot Three;

7) Raised Direct Loading Doc- From Parking Lot Three into Metallics;

8) Direct Loading- From Art Walk into ground level Industry Space and Northwest Entrance.

9) Engineering Lawn- A new path from Science Walk past CEB to the building. Enlarged hardscape work area to the east of both buildings.

10) Bio Infiltration Swale- A vegetative system will hold stormwater and treat stormwater from the vehicular drive

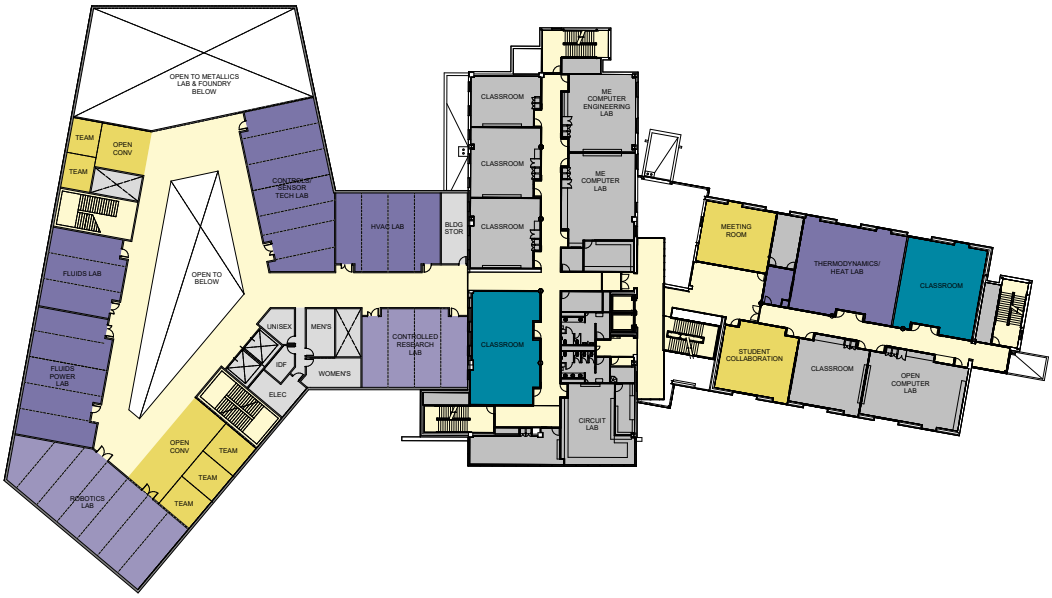
7.3 BUILDING PLANS

GROUND LEVEL

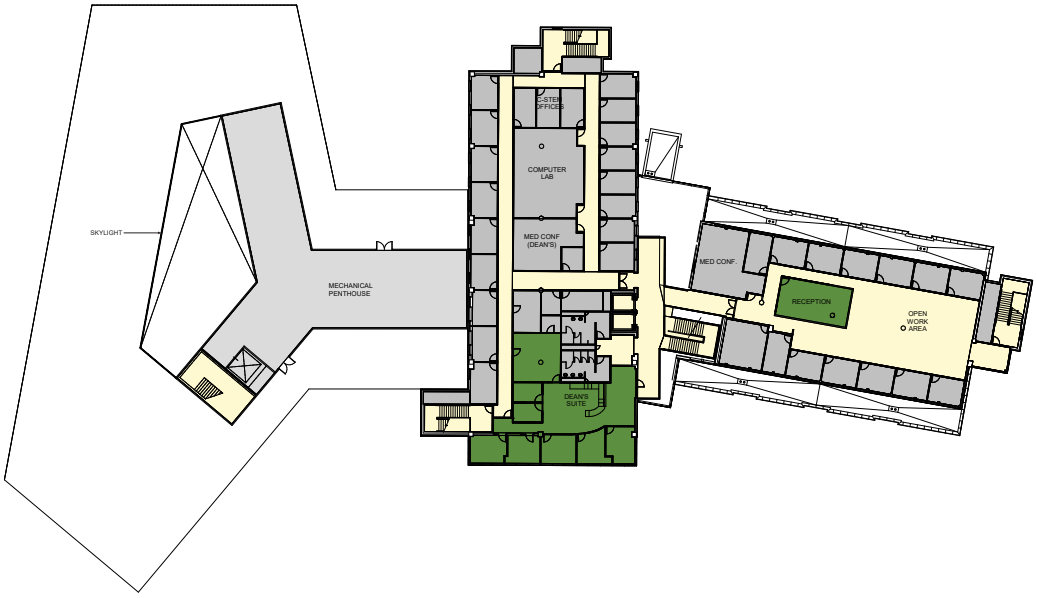
LEVEL ONE

Engineering Program Legend

- Teaching Laboratories
- Research Laboratories
- Project Laboratories
- Classrooms
- Offices
- Collaboration Spaces
- Circulation
- Building Support
- Not in project scope



LEVEL TWO



PENTHOUSE / LEVEL THREE

7.4 AERIAL AND CONCEPTUAL MASSING VIEWS

VIEW LOOKING EAST

VIEW LOOKING WEST

VIEW TOWARDS WASHINGTON STREET ENTRY

VIEW TOWARD ART WALK ENTRY

8.0 APPENDIX

8.1 PREDESIGN CHECKLIST

8.2 PREDESIGN STUDY PROCESS PARTICIPANTS

8.3 SUSTAINABLE DESIGN

8.4 SPACE DIAGRAMS/DETAILED REQUIREMENTS

8.5 PRELIMINARY CONSTRUCTION COST ESTIMATE

8.6 LETTER FROM DAHP

8.7 C100

8.8 CHENEY HALL, CEB & CADET HALL FCS REPORTS

Appendix 1: Predesign checklist and outline

A predesign should include the content detailed here. OFM will approve limited scope predesigns on a case-by-case basis.

- ❖ **Executive summary**
- ❖ **Problem statement, opportunity or program requirement**
  - ☐ Identify the problem, opportunity or program requirement that the project addresses and how it will be accomplished.
  - ☐ Identify and explain the statutory or other requirements that drive the project's operational programs and how these affect the need for space, location or physical accommodations. Include anticipated caseload projections (growth or decline) and assumptions, if applicable.
  - ☐ Explain the connection between the agency's mission, goals and objectives; statutory requirements; and the problem, opportunity or program requirements.
  - ☐ Describe in general terms what is needed to solve the problem.
  - ☐ Include any relevant history of the project, including previous predesigns or budget funding requests that did not go forward to design or construction.
- ❖ **Analysis of alternatives (including the preferred alternative)**
  - ☐ Describe all alternatives that were considered, including the preferred alternative. Include:
    - ☐ A no action alternative.
    - ☐ Advantages and disadvantages of each alternative. Please include a high-level summary table with your analysis that compares the alternatives, including the anticipated cost for each alternative.
    - ☐ Cost estimates for each alternative:
      - ☐ Provide enough information so decision makers have a general understanding of the costs.
      - ☐ Complete OFM's Life Cycle Cost Model (RCW 39.35B.050).
    - ☐ Schedule estimates for each alternative. Estimate the start, midpoint and completion dates.
- ❖ **Detailed analysis of preferred alternative**
  - ☐ Nature of space – how much of the proposed space will be used for what purpose (i.e., office, lab, conference, classroom, etc.)
  - ☐ Occupancy numbers.
  - ☐ Basic configuration of the building, including square footage and the number of floors.
  - ☐ Space needs assessment. Identify the guidelines used.
  - ☐ Site analysis:
    - ☐ Identify site studies that are completed or under way.
    - ☐ Location.

- ☐ Building footprint and its relationship to adjacent facilities and site features. Provide aerial view, sketches of the building site and basic floorplans.
- ☐ Stormwater requirements.
- ☐ Ownership of the site and any acquisition issues.
- ☐ Easements and setback requirements.
- ☐ Potential issues with the surrounding neighborhood, during construction and ongoing.
- ☐ Utility extension or relocation issues.
- ☐ Potential environmental impacts.
- ☐ Parking and access issues, including improvements required by local ordinances, local road impacts and parking demand.
- ☐ Impact on surroundings and existing development with construction lay-down areas and construction phasing.

☐ Consistency with applicable long-term plans (such as the Thurston County and Capitol campus master plans and agency or area master plans) as required by RCW 43.88.110.

☐ Consistency with other laws and regulations:

- ☐ High-performance public buildings (Chapter 39.35D RCW).
- ☐ State efficiency and environmental performance, if applicable (Executive Order 18-01).
- ☐ Greenhouse gas emissions reduction policy (RCW 70.235.070).
- ☐ Archeological and cultural resources (Executive Order 05-05 and Section 106 of the National Historic Preservation Act of 1966).
- ☐ Americans with Disabilities Act (ADA) implementation (Executive Order 96-04).
- ☐ Compliance with planning under Chapter 36.70A RCW, as required by RCW 43.88.0301.
- ☐ Information required by RCW 43.88.0301(1).
- ☐ Other codes or regulations.

☐ Identify problems that require further study. Evaluate identified problems to establish probable costs and risk.

☐ Identify significant or distinguishable components, including major equipment and ADA requirements in excess of existing code.

☐ Identify planned technology infrastructure and other related IT investments that affect the building plans.

☐ Describe planned commissioning to ensure systems function as designed.

☐ Describe any future phases or other facilities that will affect this project.

☐ Identify and justify the proposed project delivery method. For GC/CM, link to the requirements in RCW 39.10.340.

☐ Describe how the project will be managed within the agency.

☐ Schedule.

- ☐ Provide a high-level milestone schedule for the project, including key dates for budget approval, design, bid, acquisition, construction, equipment installation, testing, occupancy and full operation.
- ☐ Incorporate value-engineering analysis and constructability review into the project schedule, as required by RCW 43.88.110(5)(c).

- ☐ Describe factors that may delay the project schedule.
- ☐ Describe the permitting or local government ordinances or neighborhood issues (such as location or parking compatibility) that could affect the schedule.
- ☐ Identify when the local jurisdiction will be contacted and whether community stakeholder meetings are a part of the process.

❖ **Project budget analysis for the preferred alternative**

- ☐ Cost estimate.
  - ☐ Major assumptions used in preparing the cost estimate.
  - ☐ Summary table of Uniformat Level II cost estimates.
  - ☐ The C-100.
- ☐ Proposed funding.
  - ☐ Identify the fund sources and expected receipt of the funds.
  - ☐ If alternatively financed, such as through a COP, provide the projected debt service and fund source. Include the assumptions used for calculating finance terms and interest rates.
- ☐ Facility operations and maintenance requirements.
  - ☐ Define the anticipated impact of the proposed project on the operating budget for the agency or institution. Include maintenance and operating assumptions (including FTEs).
  - ☐ Show five biennia of capital and operating costs from the time of occupancy, including an estimate of building repair, replacement and maintenance.
- ☐ Clarify whether furniture, fixtures and equipment are included in the project budget. If not included, explain why.

❖ **Predesign appendices**

- ☐ Completed Life Cycle Cost Model.
- ☐ A letter from DAHP.

8.2 PREDESIGN STUDY PROCESS PARTICIPANTS

EASTERN WASHINGTON UNIVERSITY

EWU ENGINEERING DEPARTMENT
Dr. David Bowman, Dean of STEM
Dr. Martin Weiser, Department Chair & Associate Professor, ME & MET
Terence Geyer, Senior Lecturer, Applied Technology, Technology/Manufacturing
Rusty Hallin, Lecturer, Applied Technology, Technology/Manufacturing
James S. McCuistion, Lecturer, Distance Education & Technology
Donald Richter, Professor, ME, MET & Technology/Manufacturing
Gary Weber, Lecturer, ME & MET

EWU FACILITIES AND PLANNING
Shawn King, Assoc Vice Pres, Facilities & Planning
Troy Bester, Senior Project Manager
Erik Budsberg, Sustainability Director

DESIGN TEAM
LMN Architects (Architect)
Stephen Van Dyck
Jennifer Milliron
Jennifer DuHamel
Heather Bing
Choua Vang
Kjell Anderson

Research Facilities Design (Laboratory Planner)
Richard Heinz
Terry D. Brown
Jeff R. Schulien

Saiful Bouquet (Structural Engineer)
Saiful Islam
YK Low

Coughlin Porter Lundeen (Civil Engineer)
Tim Brockway
Ken Wiersema

MW Consulting Engineers (Mech/Elec Engineer)
Kjersten Khuta
Joel Enevold

Roen Associates (Cost Estimator)
Roger Roen
Jeff Weaver
Matt Wiggins

8.3 SUSTAINABLE DESIGN

LEED

Washington State requires sizable capital projects to achieve a minimum of LEED Silver. Several projects at EWU have achieved LEED Gold.

LEED v4/v4.1 for BD+C: New Construction and Major Renov

Project Checklist

Y	?	N			
1			Credit	Integrative Process	1
7	**9**	**16**	**Location and Transportation**		**16**
		16	Credit	LEED for Neighborhood Development Location	16
	1		Credit	Sensitive Land Protection	1
	2		Credit	High Priority Site	2
3	2		Credit	Surrounding Density and Diverse Uses	5
3	2		Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
	1		Credit	Green Vehicles	1
5	**5**	**0**	**Sustainable Sites**		**10**
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
1	1		Credit	Site Development - Protect or Restore Habitat	2
	1		Credit	Open Space	1
1	2		Credit	Rainwater Management	3
1	1		Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1
6	**5**	**0**	**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	2
4	2		Credit	Indoor Water Use Reduction	6
	2		Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1
15	**18**	**0**	**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
3	3		Credit	Enhanced Commissioning	6
10	8		Credit	Optimize Energy Performance	18
1			Credit	Advanced Energy Metering	1
	2		Credit	Demand Response	2
	3		Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

7	**6**	**0**	**Materials and Resources**		**13**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
3	2		Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1	1		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
1	1		Credit	Construction and Demolition Waste Management	2

8	**8**	**0**	**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	2
3			Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1	1		Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
1	1		Credit	Interior Lighting	2
	3		Credit	Daylight	3
	1		Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

4	**2**	**0**	**Innovation**		**6**
3	2		Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

3	**1**	**0**	**Regional Priority**		**4**
1			Credit	Regional Priority: Water Use Reduction (40%)	1
1			Credit	Regional Priority: Construction IAQ Plan	1
1			Credit	Regional Priority: BPDO - EPD	1
	1		Credit	Regional Priority: Specific Credit	1

56	**54**	**16**	**TOTALS**	Possible Points:	**110**

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

ENERGY AND CARBON GOALS

- EWU is updating their Climate Action Plan (CAP), which will address how the University can achieve carbon neutrality over the next 30 years. While the CAP may not be complete in the short term, design teams should consider strategies to align with the goals of carbon neutrality in the next 30 years. The electricity grid in Washington will be carbon neutral beginning in 2030, meaning a high-performance, all-electric building will meet that goal.

- Washington State requires capital projects to engage in Energy Life Cycle Cost Analysis (ELCCA) per the Department of Enterprise Services (DES) Assessment as well as a Life Cycle Cost Analysis (LCCA) per the Office of Financial Management (OFM). The design team and University should use these requirements as an opportunity to study high-performance design to reduce energy use and cost in detail and make informed decisions about energy-saving strategies, in line with Washington State's greenhouse reduction goals for new buildings. Meeting these requirements requires a robust energy modeling effort including elements from ASHRAE Standard 209.

- The 2019 Clean Buildings law requires retrofits of existing buildings that do not meet an Energy Use Intensity (EUI, energy use per square foot) threshold. This building should be designed so that it meets current and expected EUI goals and does not require an energy retrofit in the coming years.

- Washington State Energy Codes are on a path towards 70% energy use reduction and the elimination of fossil fuel from buildings by 2031. The new Engineering Building will be a part of this change as new HVAC technologies are adopted and popularized, especially heat pump technology. This building can be a Living Laboratory by using heat pump technology and having it be part of the curriculum and a showcased experience of the building.

- Water:Low-maintenance Xeriscape, plantings that do not need watering after establishment, is being installed at EWU as part of the Interdisciplinary Science Center project as a water-saving feature and can be explored as part of the site design of the new Engineering Building.

- Consolidation of energy intensive lab/shop spaces into the new addition, whose processes require large amounts of fresh air and exhaust, will allow for sustainable energy efficient solutions that cannot be accommodated within the existing building due to practical spatial restraints. Energy efficient solutions include capture of waste energy from the exhaust air to pre-heat and pre-cool the ventilation air, variable flow demand-based ventilation systems, filtering and recycling air from sawdust collection systems.

DETAILED SPACE REQUIREMENTS

Laboratory & Support

LMN / RFD

Eastern Washington University

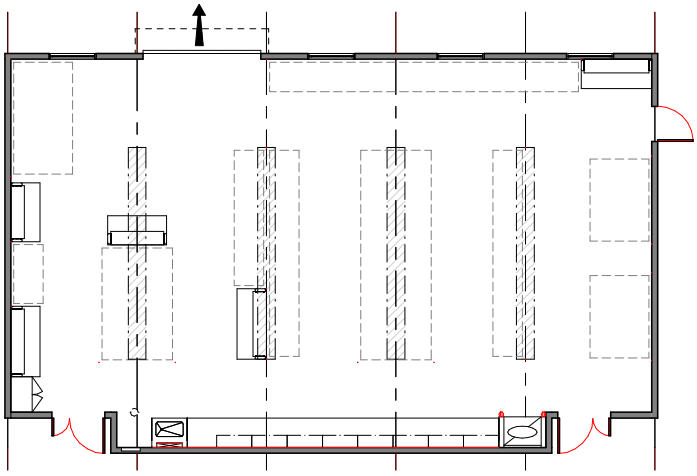
DEPARTMENT: ME

SPACE ID NO: CEB 002

SPACE NAME: COMPOSITE LAB

AREA NSF: 1,815

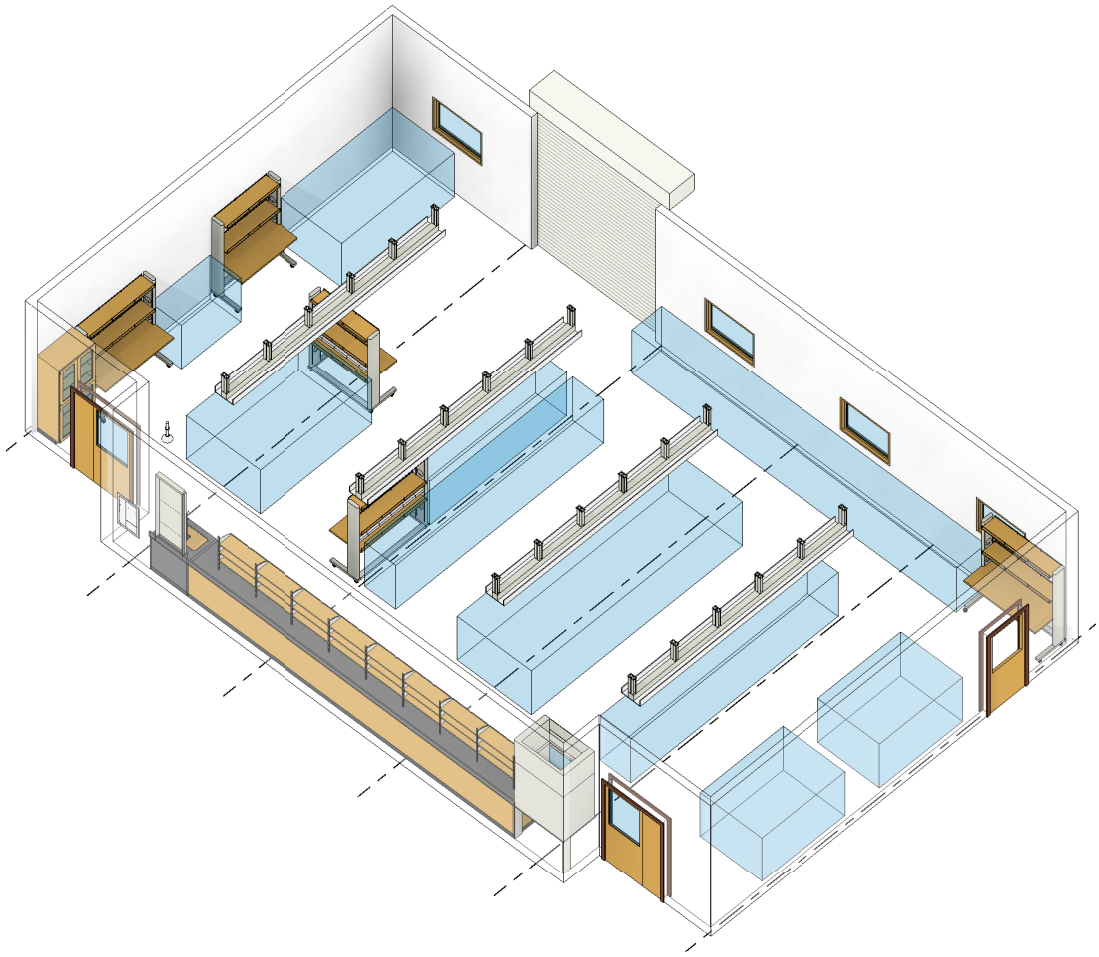
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: COMPOSITE LAB

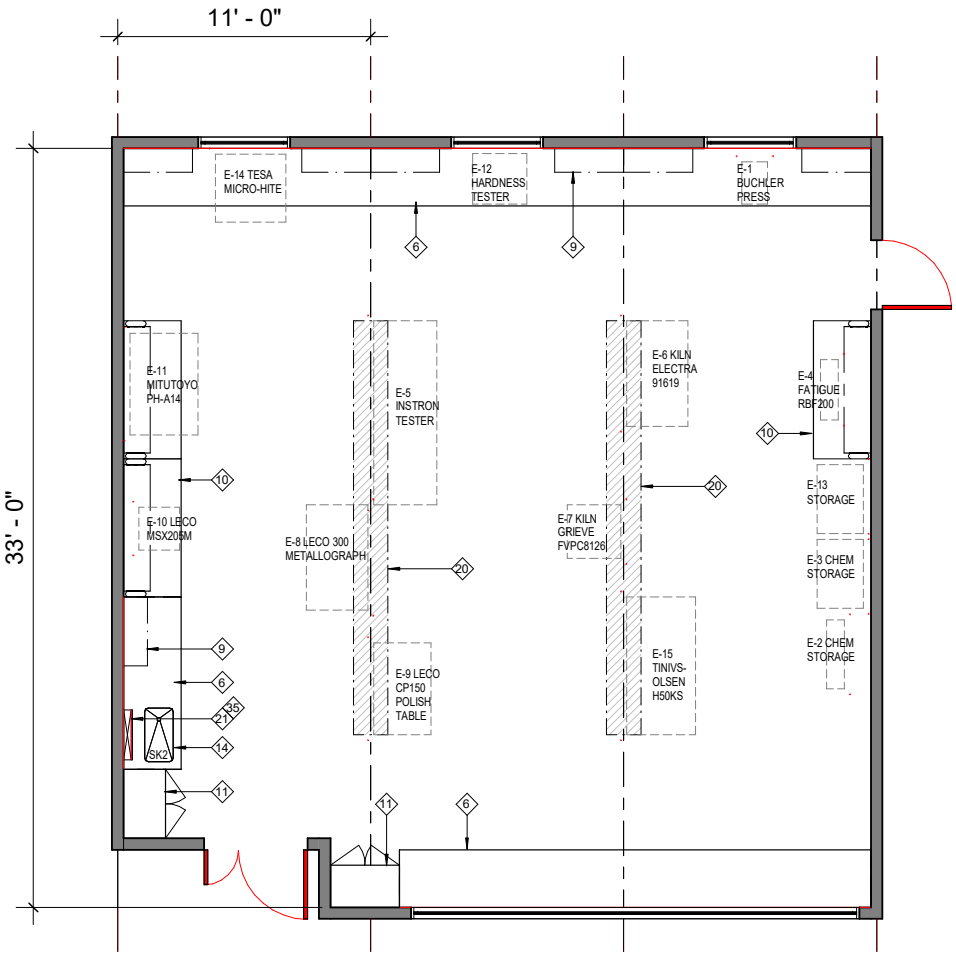
SPACE ID NO: CEB 002
AREA NSF: 1,815

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: CEB 001**
SPACE NAME: MATERIAL SCIENCE **AREA NSF: 1,089**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



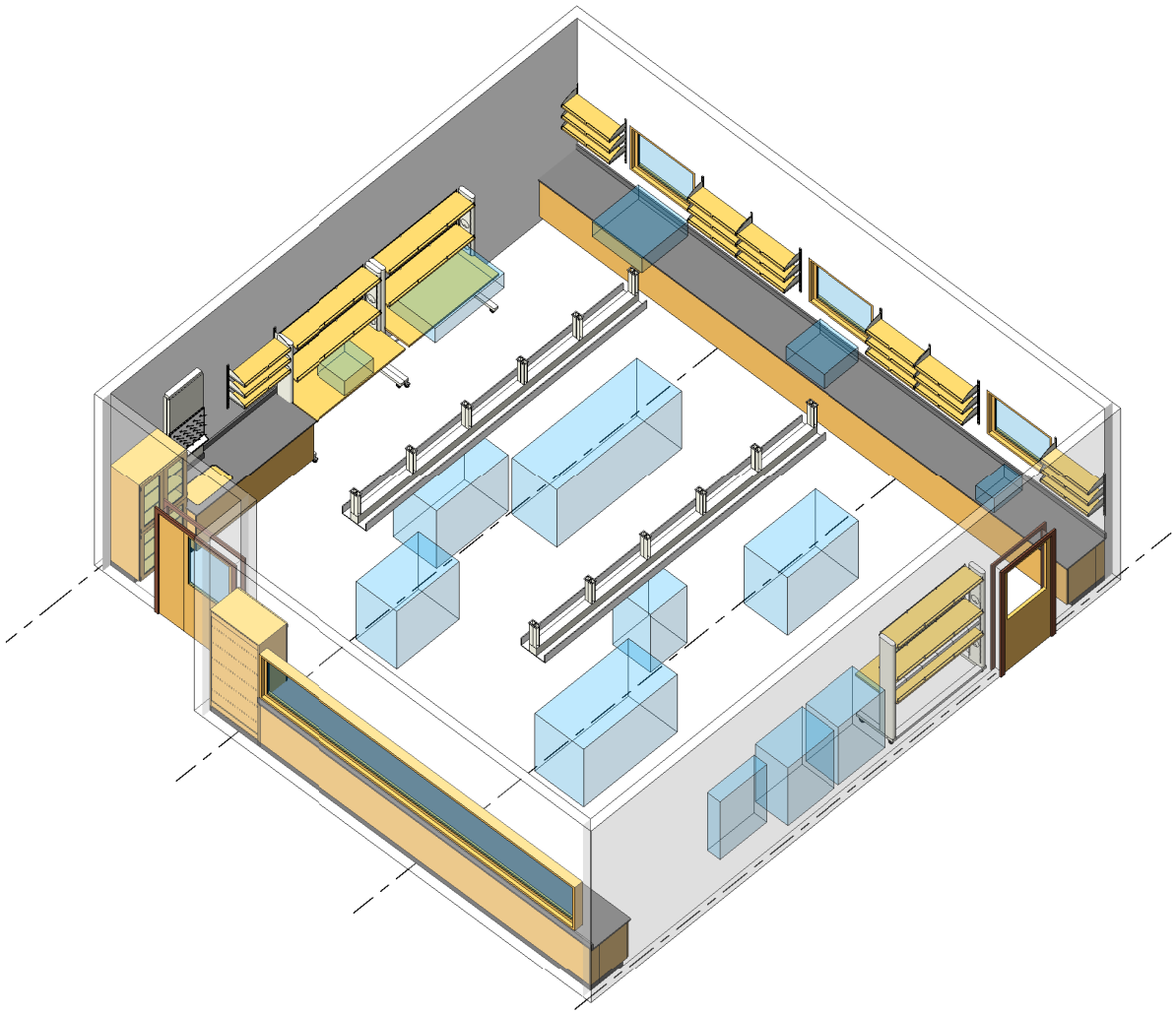
FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
10. Mobile Workstation
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Coat/ Bookbag Storage
17. Laser Curtain
18. Canopy Hood
19. Safety Shower/Eyewash
20. Overhead Cable Tray
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. White Markerboard
26. Movable Laboratory Table
27. Metro Shelving
28. Tall Corrosive Storage Cabinet
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: MATERIAL SCIENCE

SPACE ID NO: CEB 001
AREA NSF: 1,089

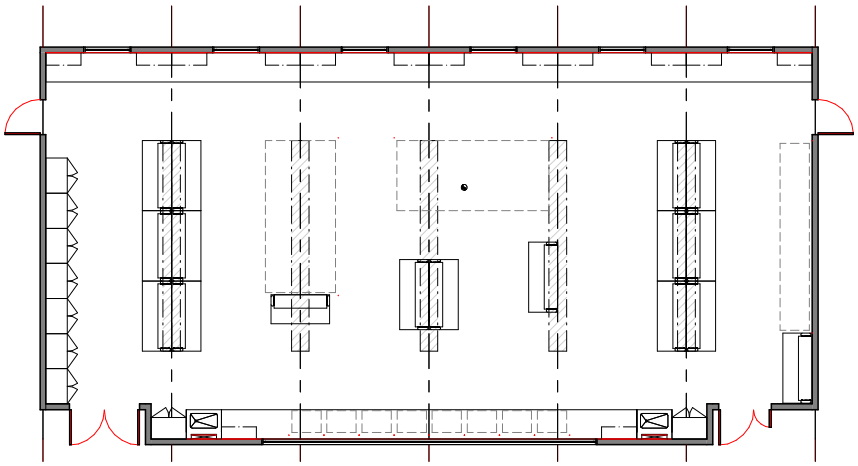
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: ADDITIVE MANUFACTURING

SPACE ID NO: **CEB 024**
AREA NSF: **2,178**

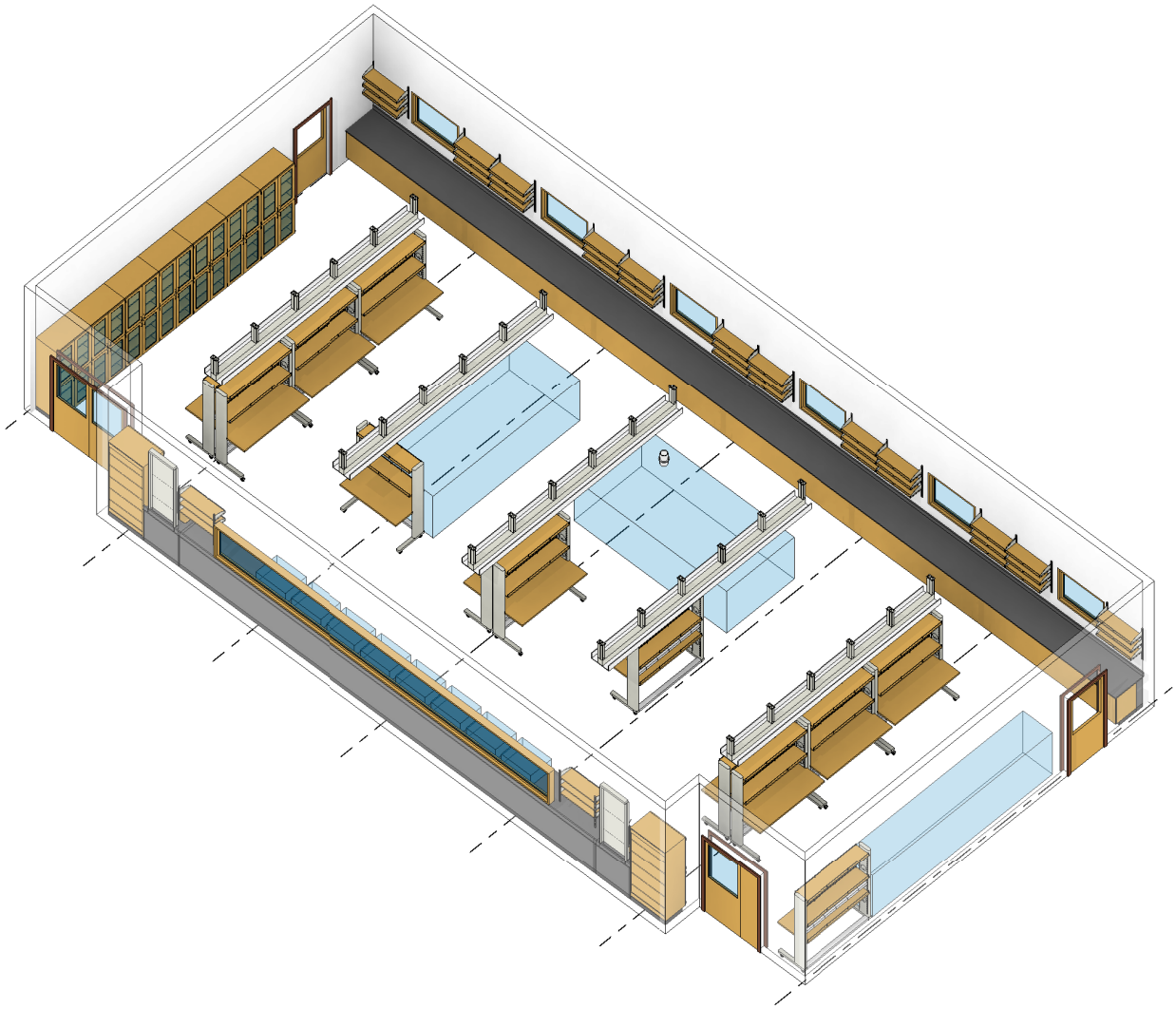
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: ADDITIVE MANUFACTURING

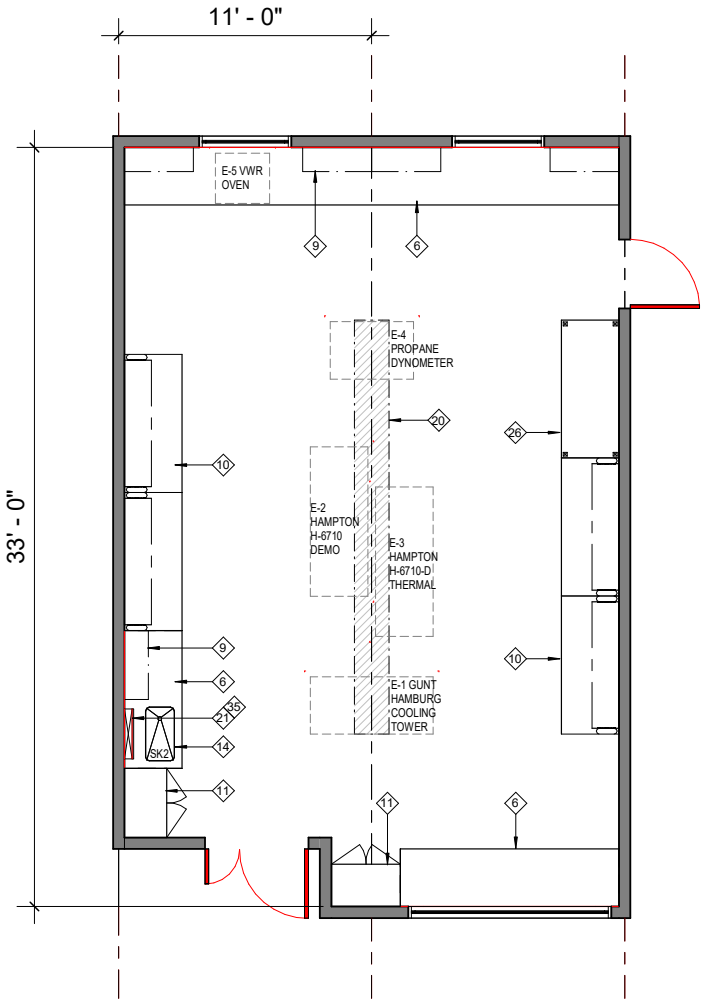
SPACE ID NO: CEB 024
AREA NSF: 2,178

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: CEB 205/7**
SPACE NAME: THERMALDYNAMICS / HEAT TRANSFER **AREA NSF:**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



FURNISHINGS

01. Chemical Fume Hood
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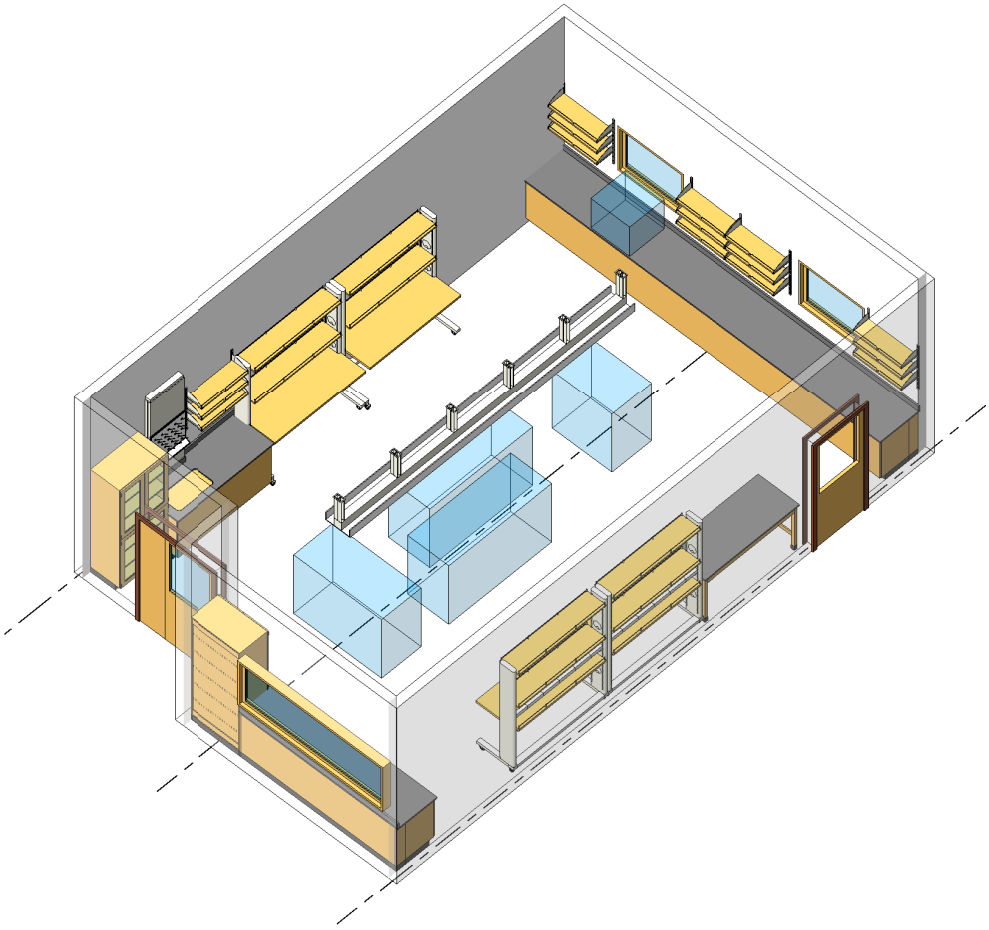
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: THERMALDYNAMICS / HEAT TRANSFER

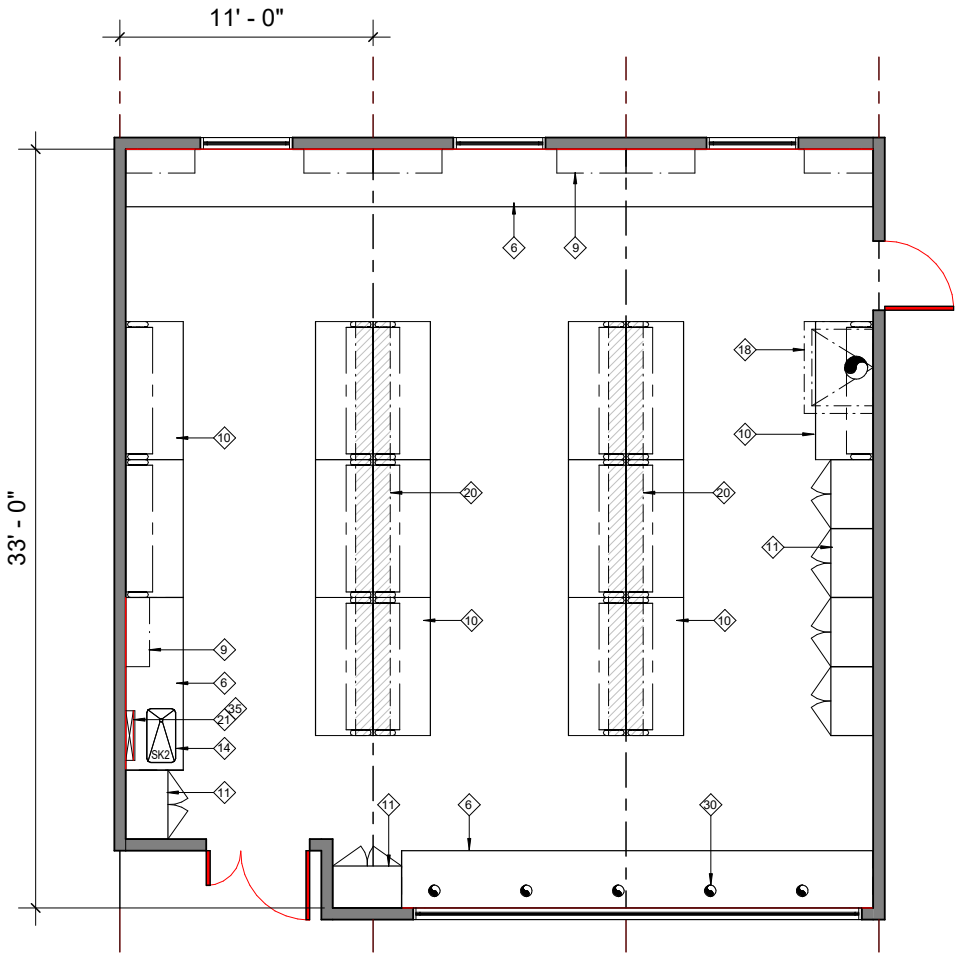
SPACE ID NO: CEB 205/7
AREA NSF:

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: CEB 125**
SPACE NAME: MAKER SPACE **AREA NSF: 1,089**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



0' 2' 4' 8'
1/8" = 1'-0"

FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
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34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: MAKER SPACE

SPACE ID NO: CEB 125
AREA NSF: 1,089

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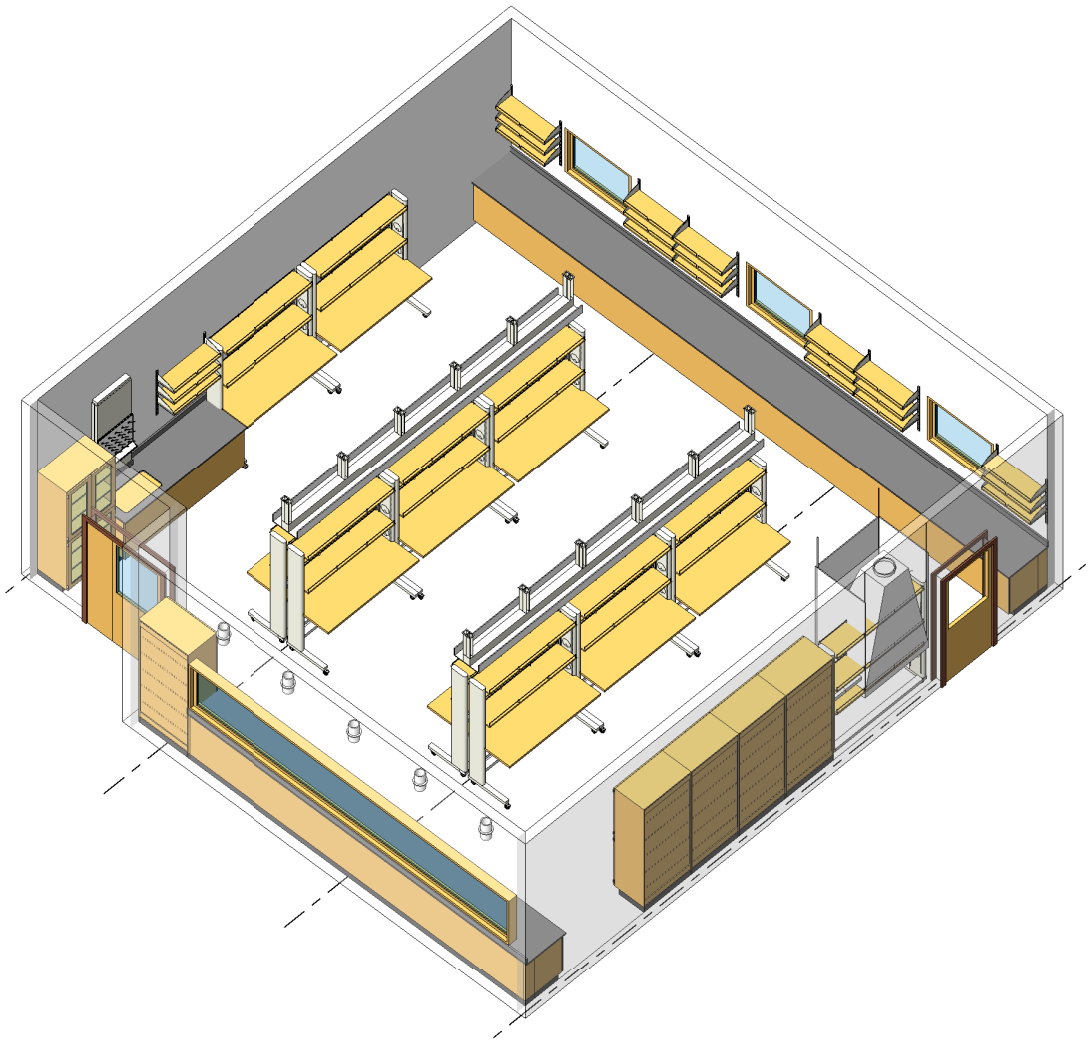
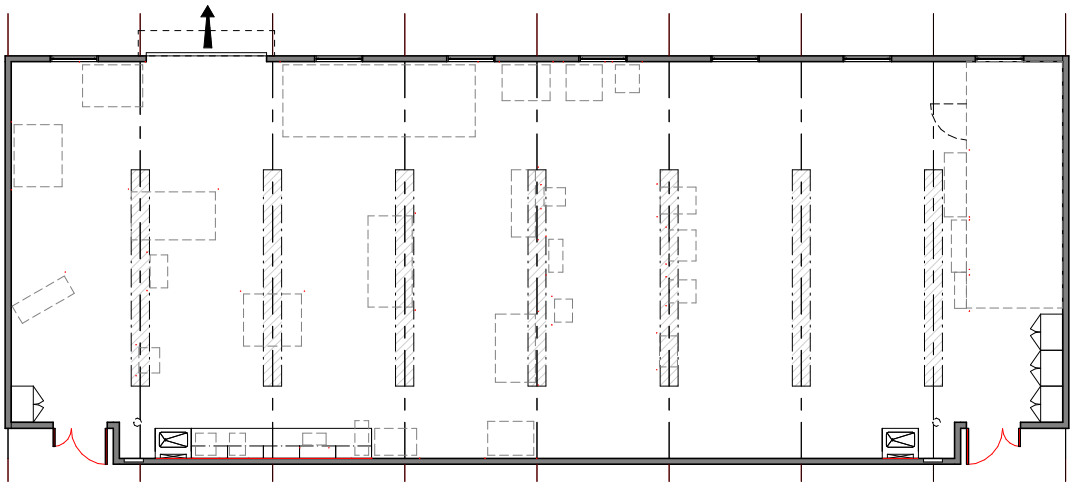


DEPARTMENT: ME
SPACE NAME: WOOD SHOP

SPACE ID NO: 1.01
AREA NSF: 2,904

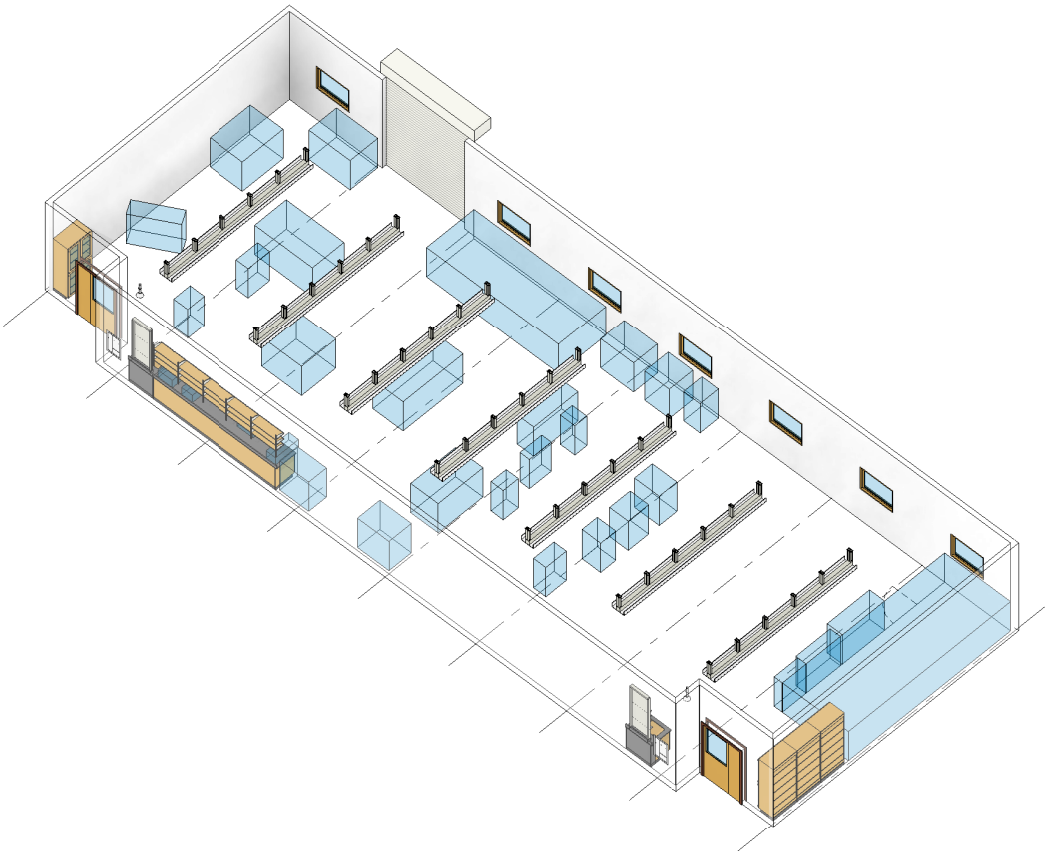
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: WOOD SHOP

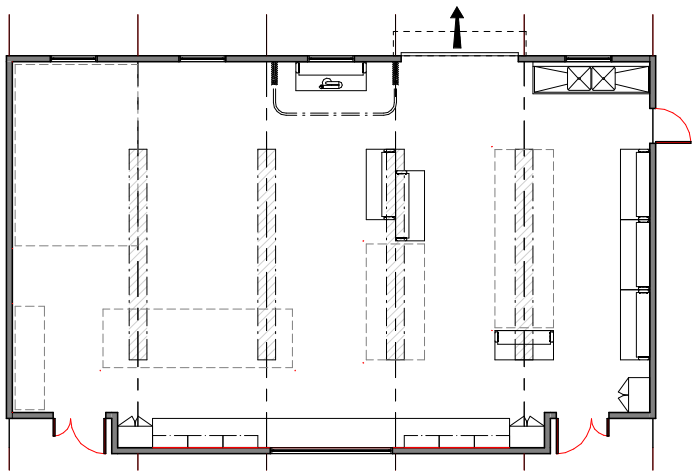
SPACE ID NO: 1.01
AREA NSF: 2,904

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 1.02**
SPACE NAME: CONSTRUCTION LAB **AREA NSF: 1,815**

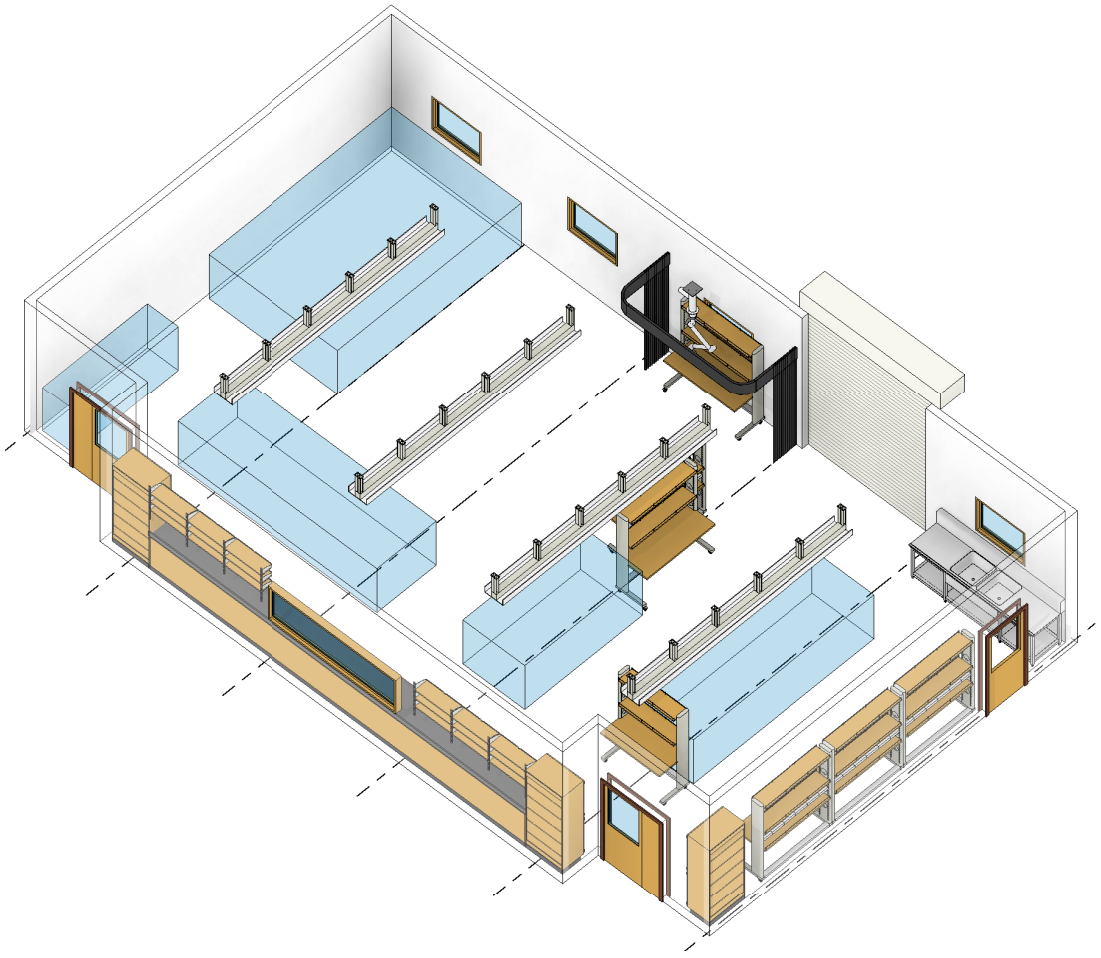
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: CONSTRUCTION LAB

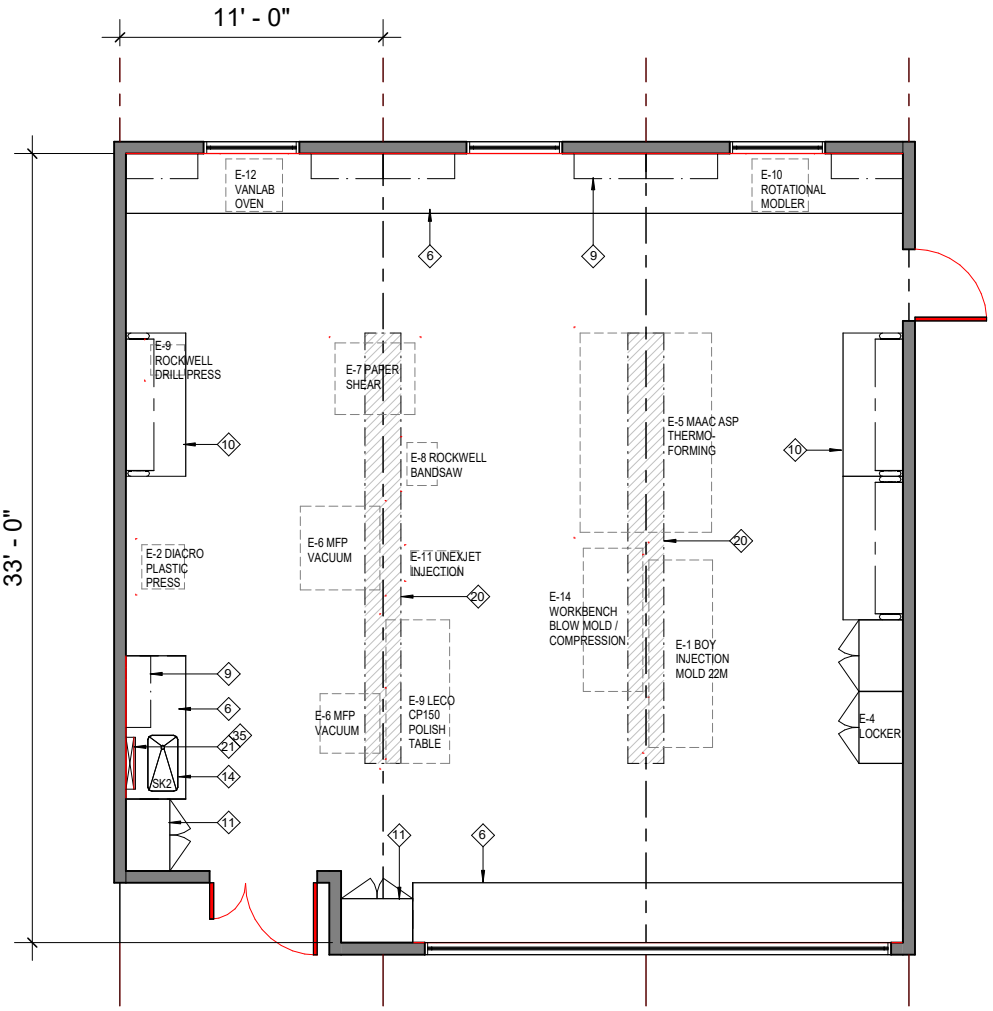
SPACE ID NO: 1.02
AREA NSF: 1,815

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 1.03**
SPACE NAME: PLASTICS LAB **AREA NSF: 1,089**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



0' 2' 4' 8'
1/8" = 1'-0"

FURNISHINGS

01. Chemical Fume Hood
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31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: PLASTICS LAB

SPACE ID NO: 1.03
AREA NSF: 1,089

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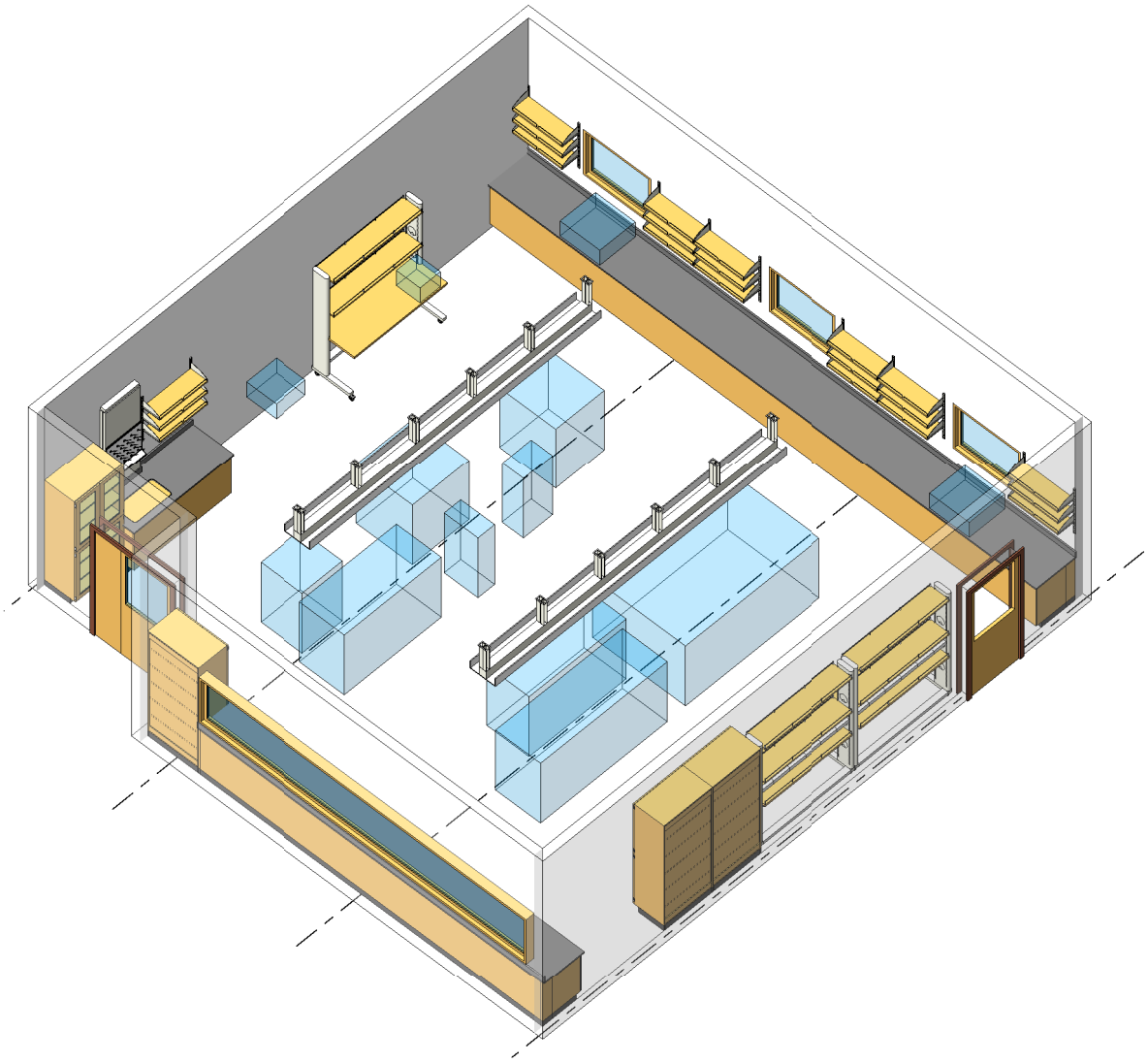
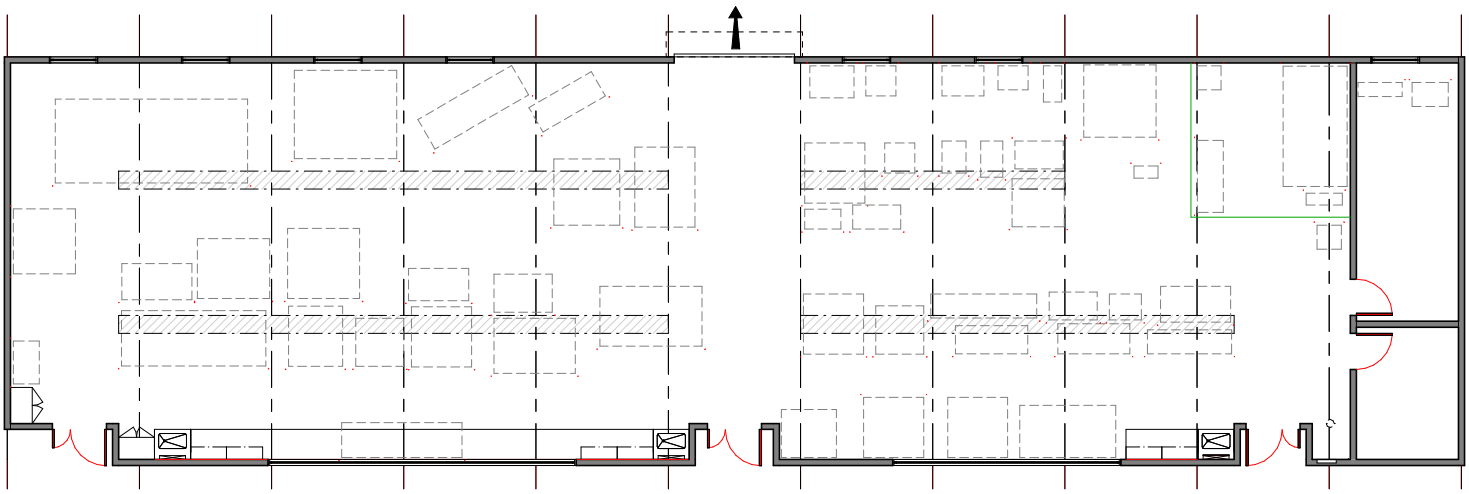


DEPARTMENT: ME
SPACE NAME: METALLICS LAB

SPACE ID NO: 1.04
AREA NSF: 3,993

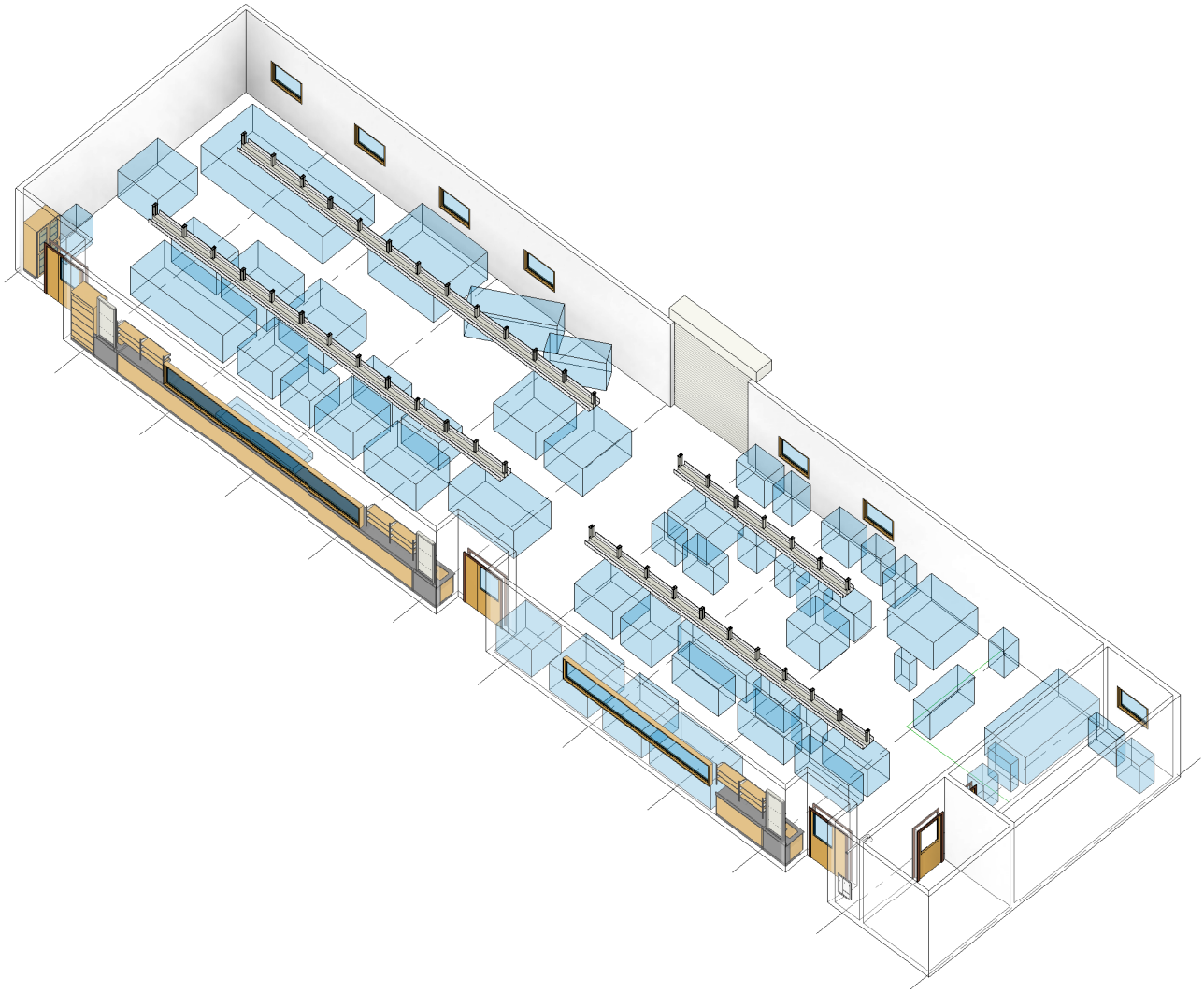
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: METALLICS LAB

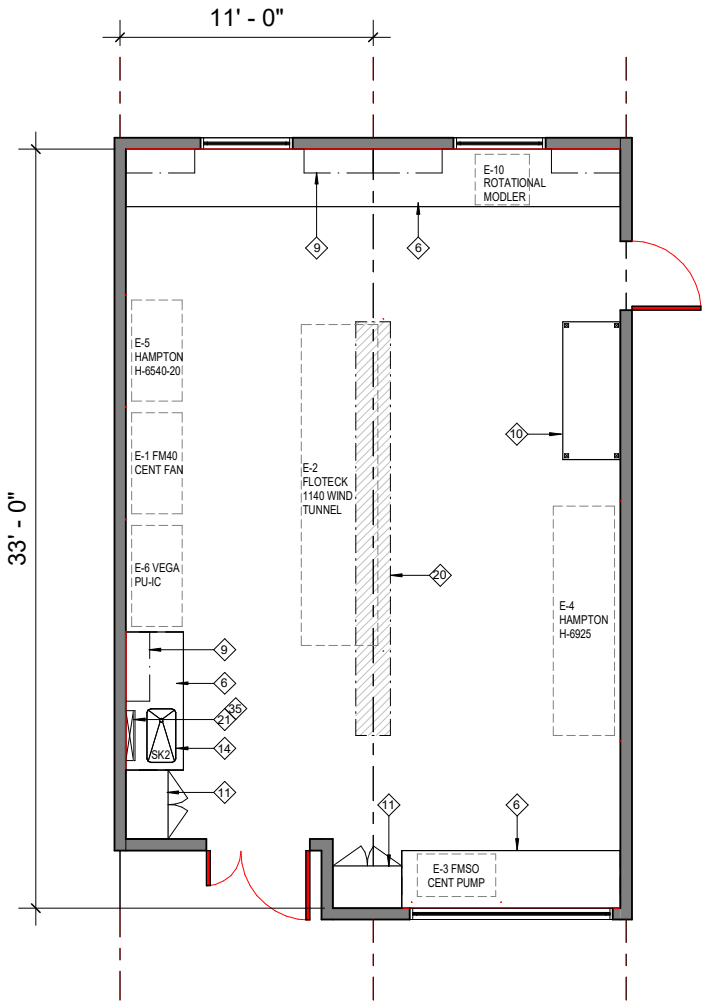
SPACE ID NO: 1.04
AREA NSF: 3,993

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 1.05**
SPACE NAME: FLUIDS LAB **AREA NSF: 1,089**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



0' 2' 4' 8'
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FURNISHINGS

01. Chemical Fume Hood
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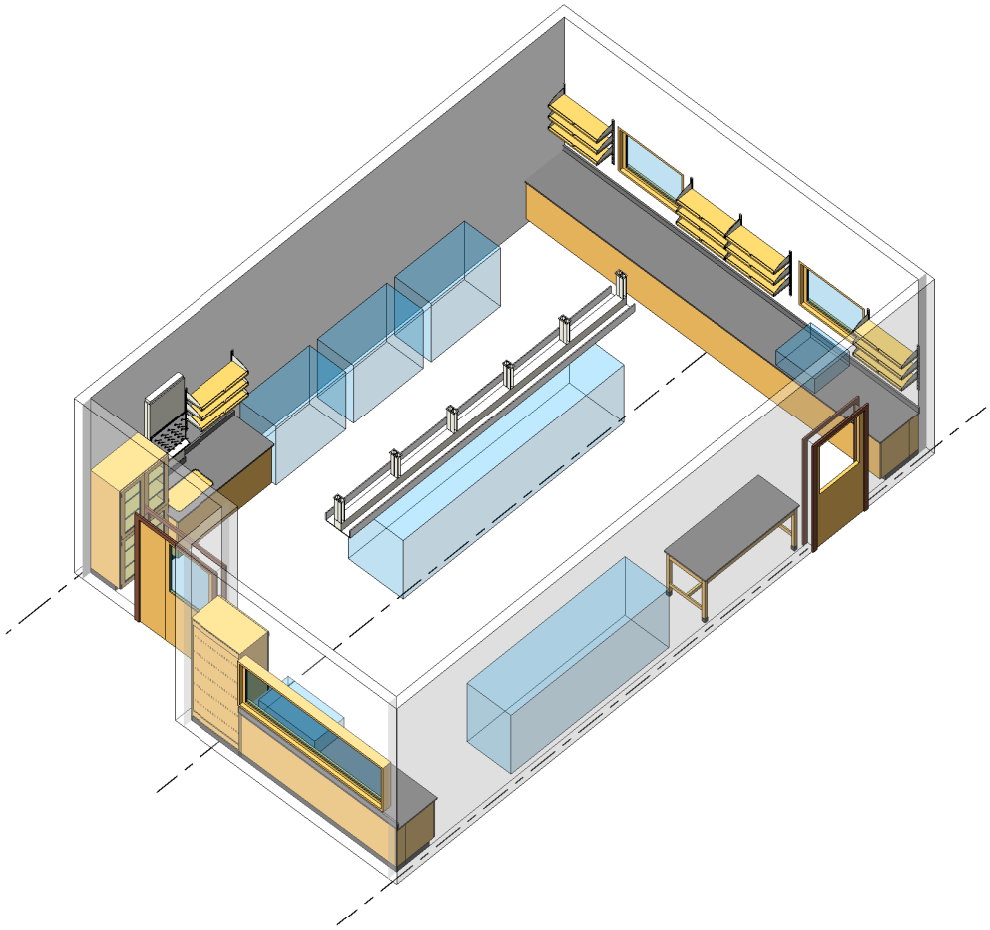
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: FLUIDS LAB

SPACE ID NO: 1.05
AREA NSF: 1,089

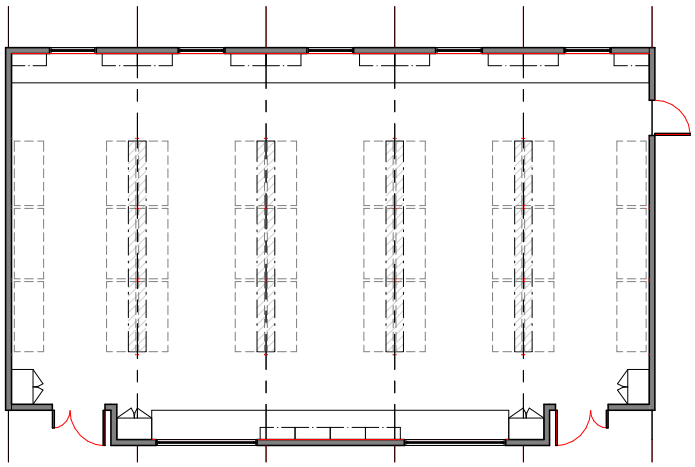
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: FLUID POWER LAB

SPACE ID NO: 1.06
AREA NSF: 1,815

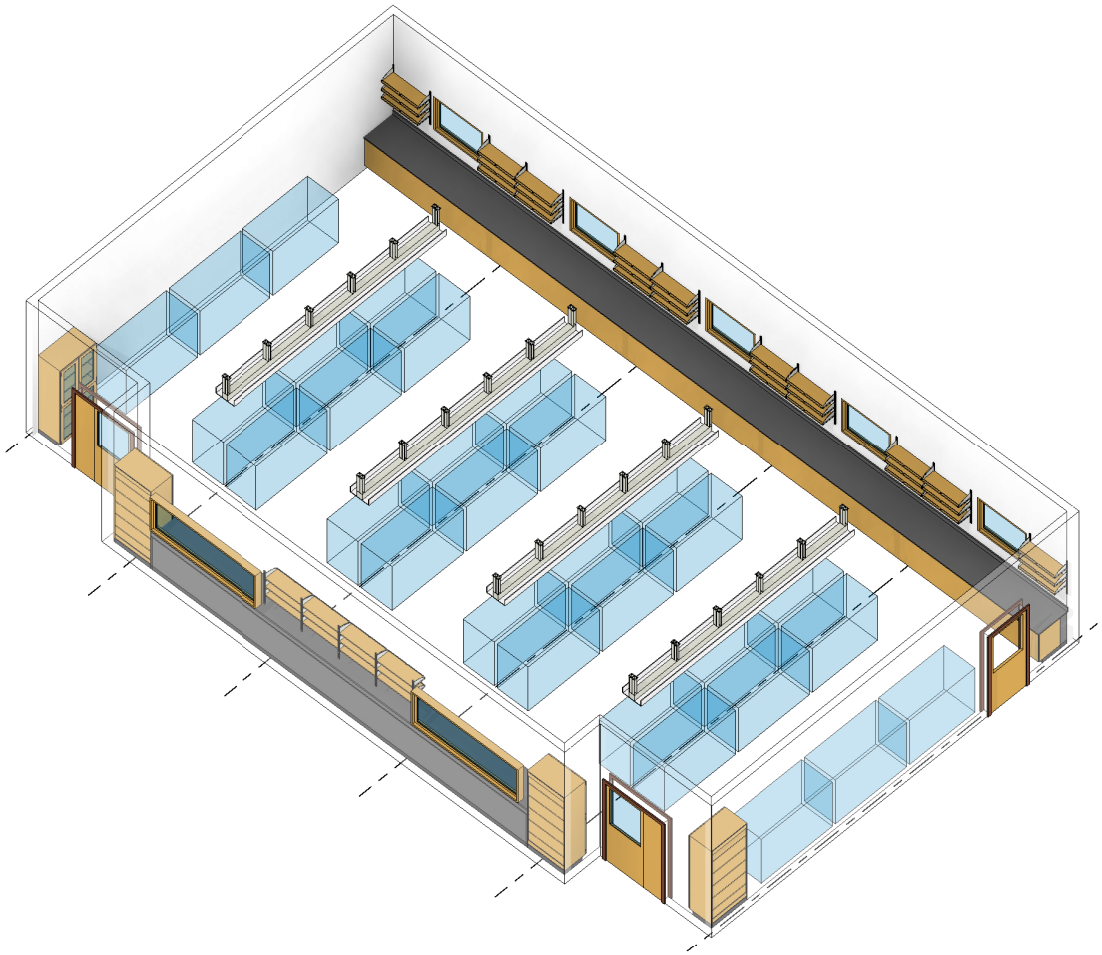
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: FLUID POWER LAB

SPACE ID NO: 1.06
AREA NSF: 1,815

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.

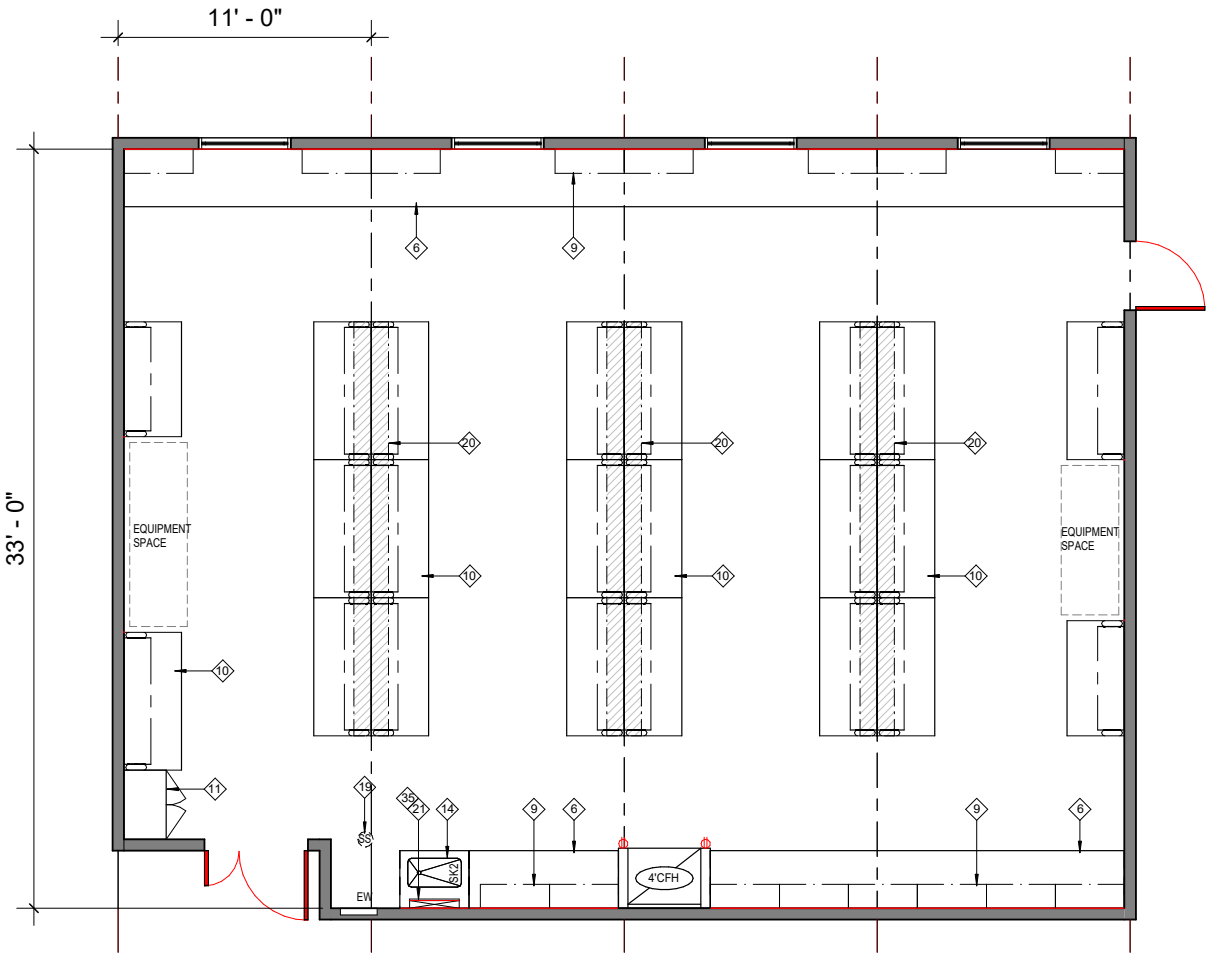


DEPARTMENT: ME
SPACE NAME: SENSOR TECH LAB

SPACE ID NO: 1.07
AREA NSF: 1,452

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.

COMBINED W/CONTROLS LAB



FURNISHINGS

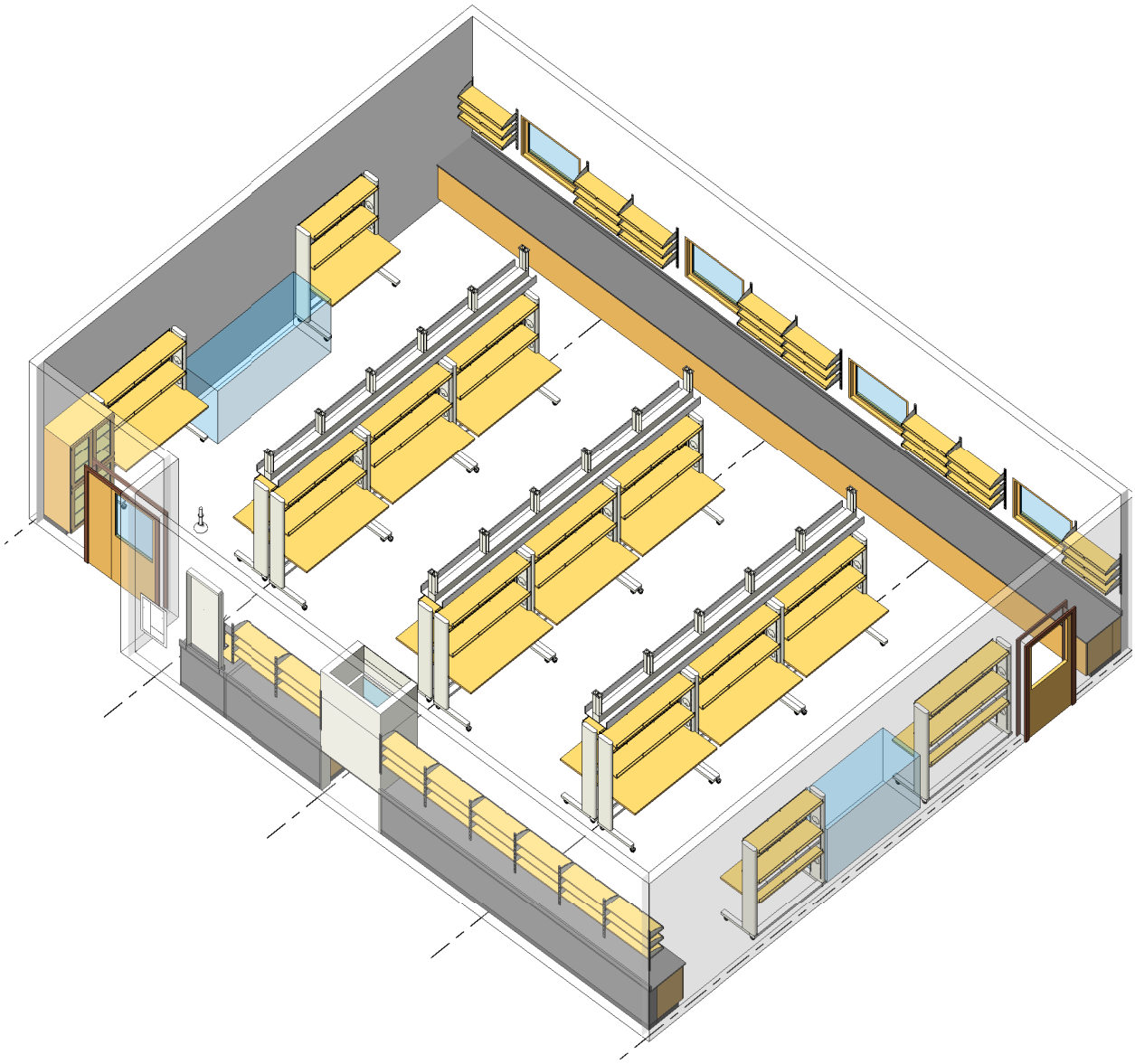
01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
10. Mobile Workstation
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Coat/ Bookbag Storage
17. Laser Curtain
18. Canopy Hood
19. Safety Shower/Eyewash
20. Overhead Cable Tray
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. White Markerboard
26. Movable Laboratory Table
27. Metro Shelving
28. Tall Corrosive Storage Cabinet
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: SENSOR TECH LAB

SPACE ID NO: 1.07
AREA NSF: 1,452

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.

COMBINED W/ CONTROLS LAB

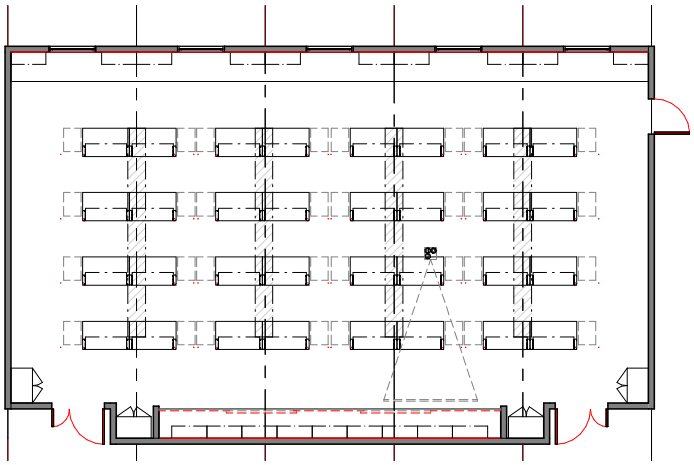


DEPARTMENT: ME
SPACE NAME: ME/MET CONTROLS LAB

SPACE ID NO: **1.07**
AREA NSF: **1,815**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.

COMBINED W/ SENSOR TECH

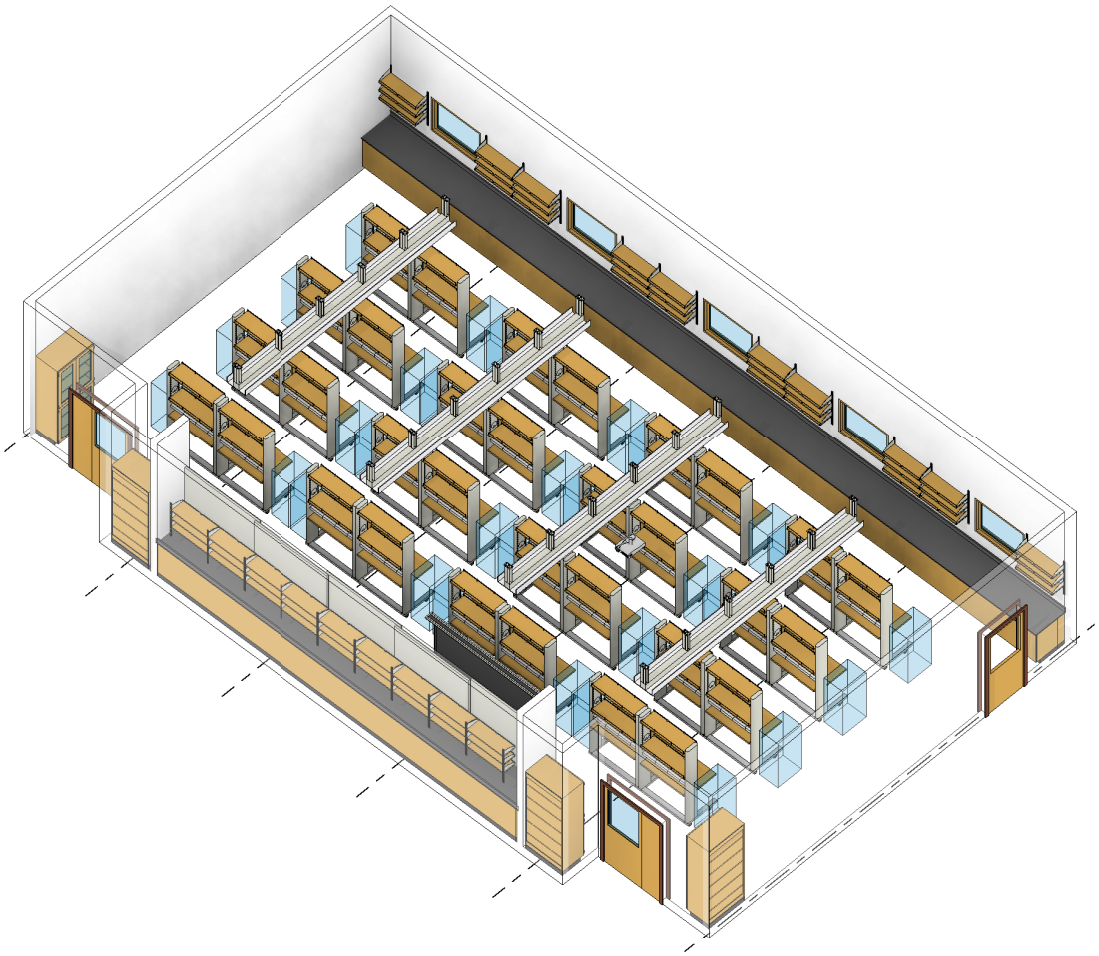


DEPARTMENT: ME
SPACE NAME: ME/MET CONTROLS LAB

SPACE ID NO: 1.07
AREA NSF: 1,815

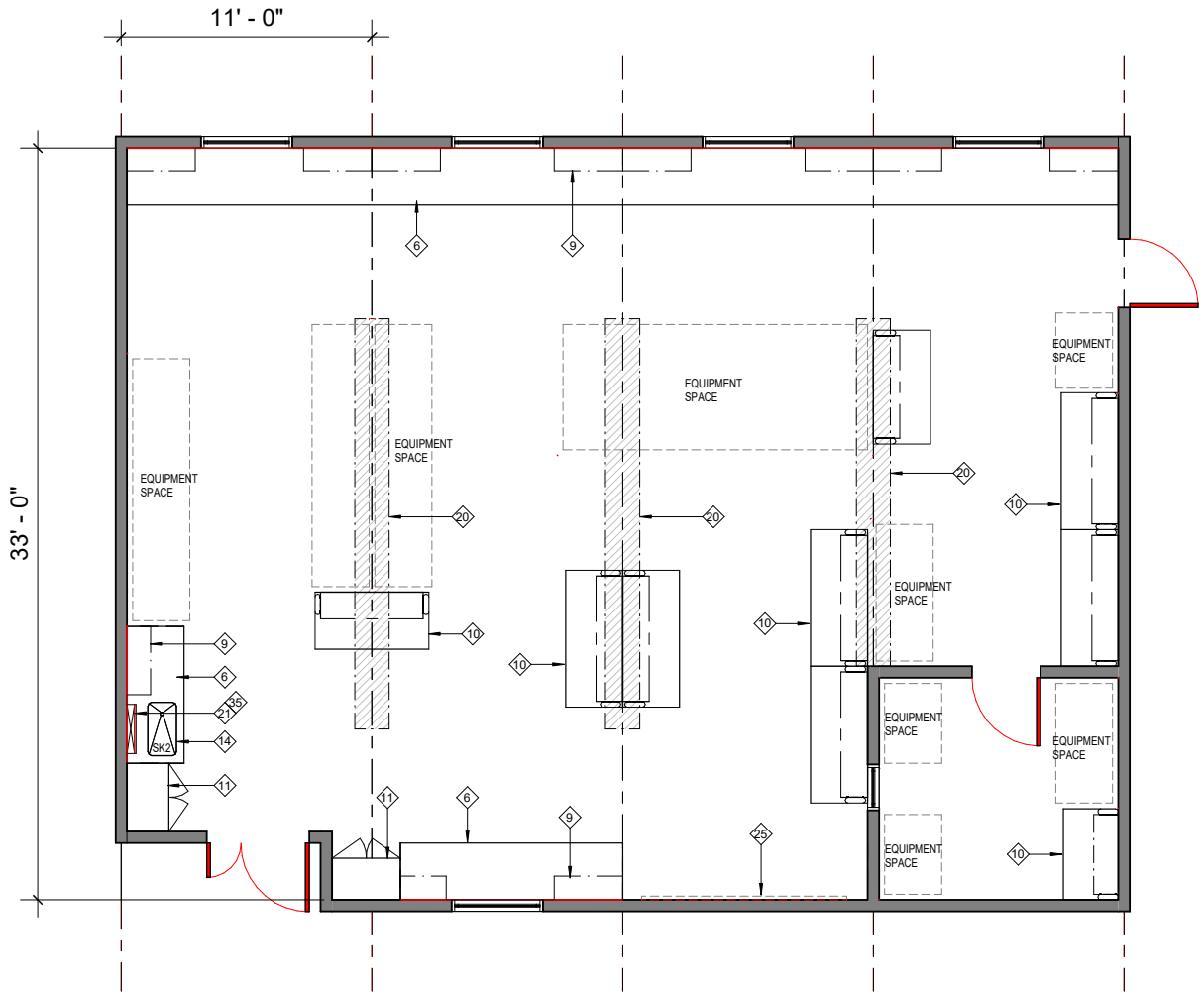
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.

COMBINED W/ SENSOR TECH



DEPARTMENT: ME **SPACE ID NO: 1.08**
SPACE NAME: HVAC TEACHING LAB **AREA NSF: 1,452**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



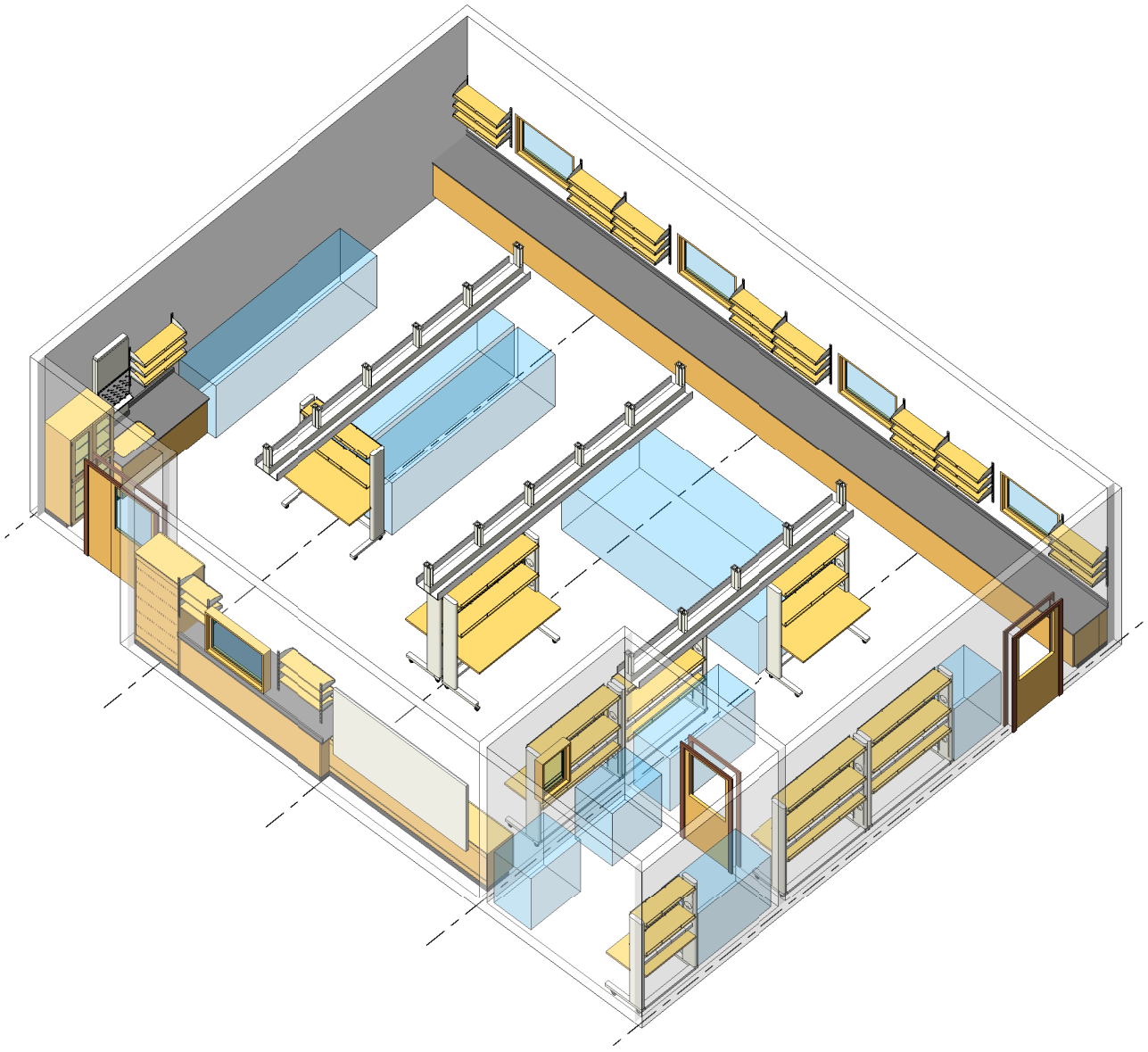
FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
10. Mobile Workstation
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Coat/ Bookbag Storage
17. Laser Curtain
18. Canopy Hood
19. Safety Shower/Eyewash
20. Overhead Cable Tray
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. White Markerboard
26. Movable Laboratory Table
27. Metro Shelving
28. Tall Corrosive Storage Cabinet
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: HVAC TEACHING LAB

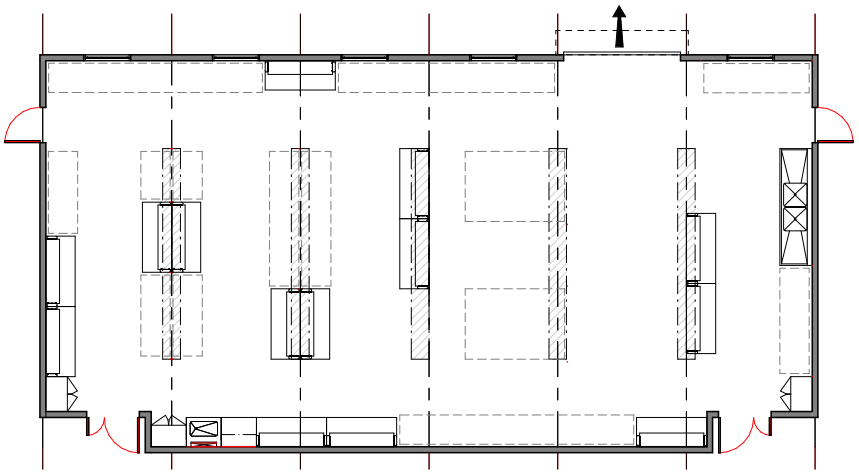
SPACE ID NO: 1.08
AREA NSF: 1,452

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 3.01**
SPACE NAME: INDUSTRY SPACE **AREA NSF: 2,178**

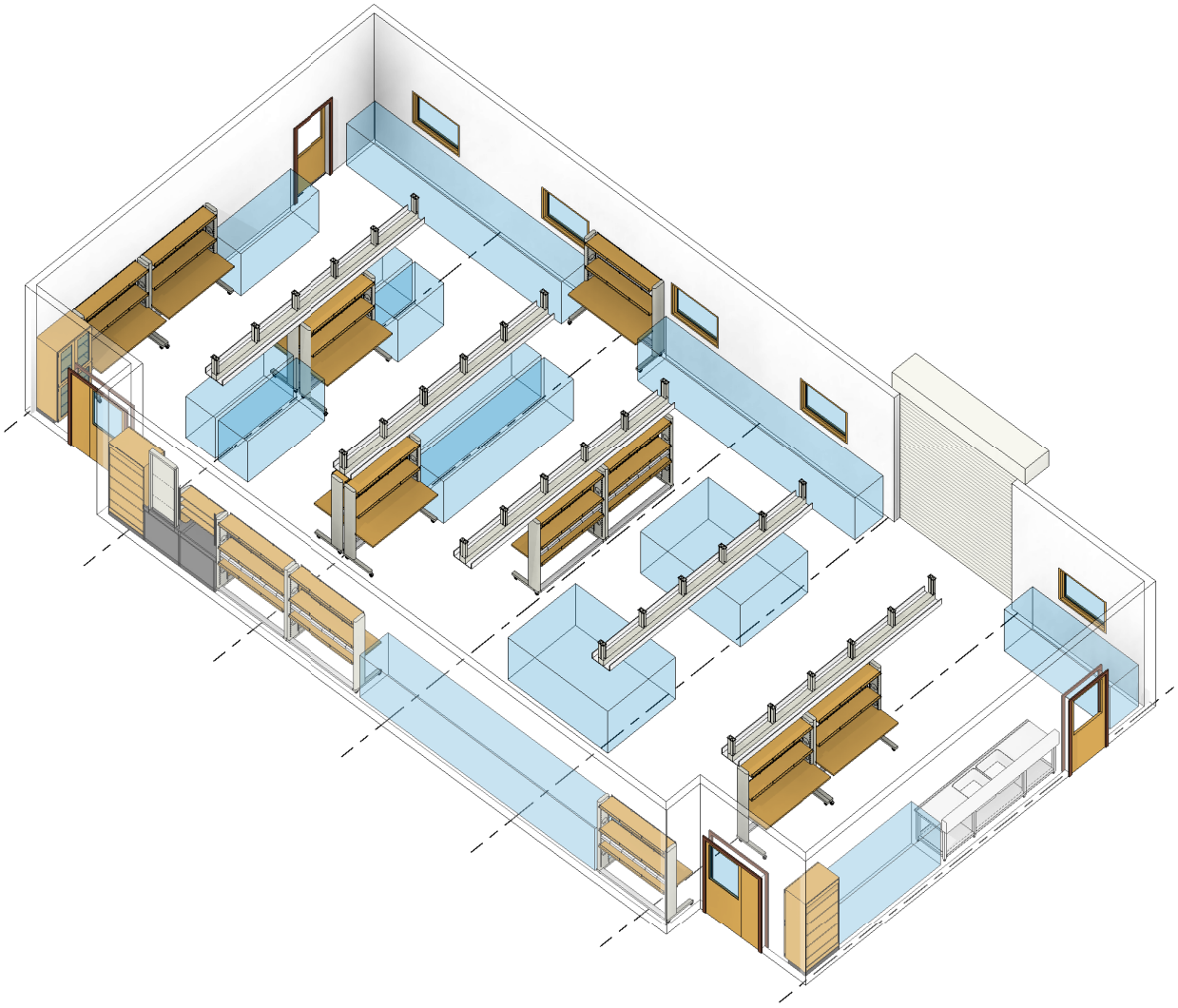
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: INDUSTRY SPACE

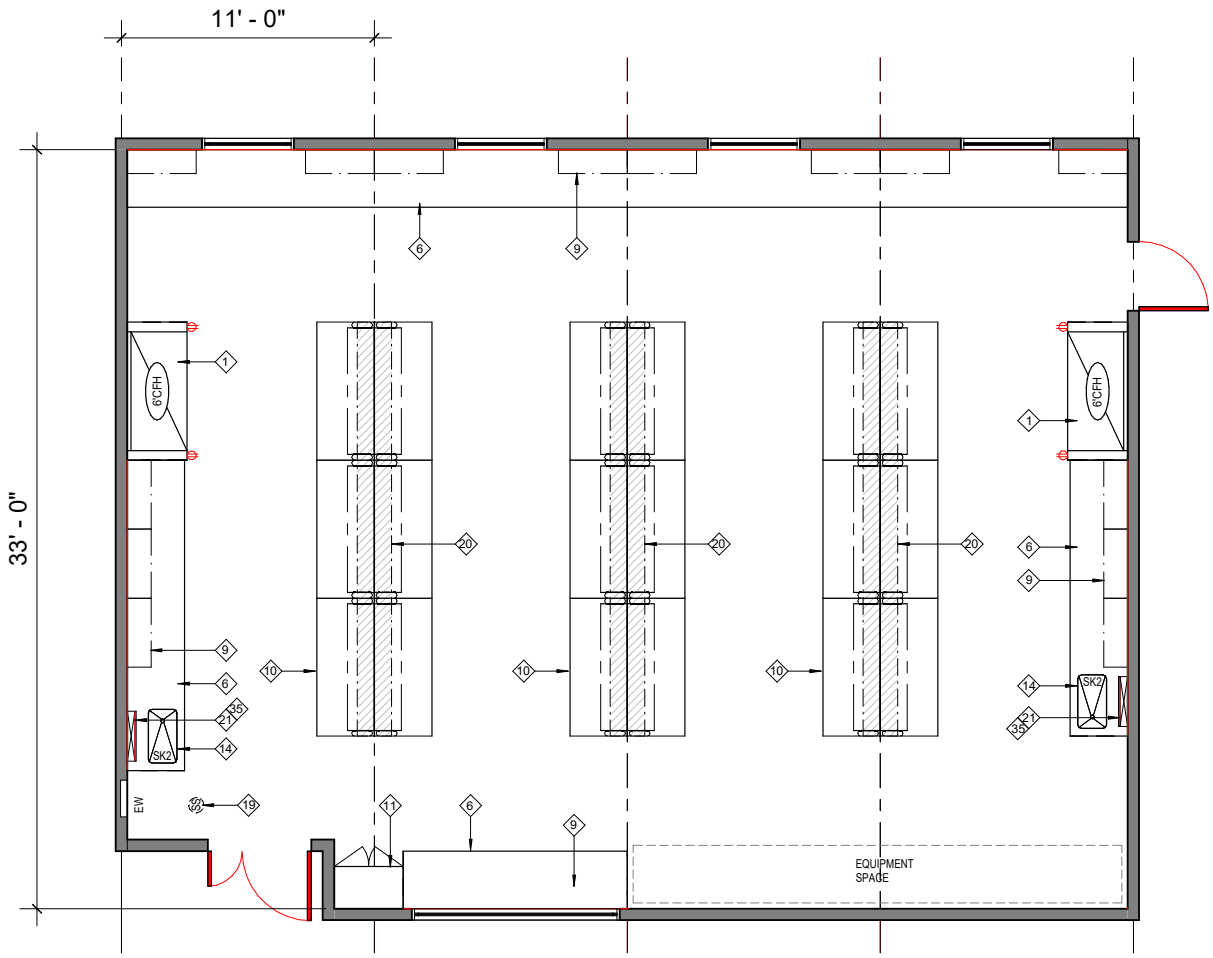
SPACE ID NO: 3.01
AREA NSF: 2,178

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 3.02**
SPACE NAME: CONTROLLED RESEARCH SPACE **AREA NSF: 1,452**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



0' 2' 4' 8'
1/8" = 1'-0"

FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
10. Mobile Workstation
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
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16. Coat/ Bookbag Storage
17. Laser Curtain
18. Canopy Hood
19. Safety Shower/Eyewash
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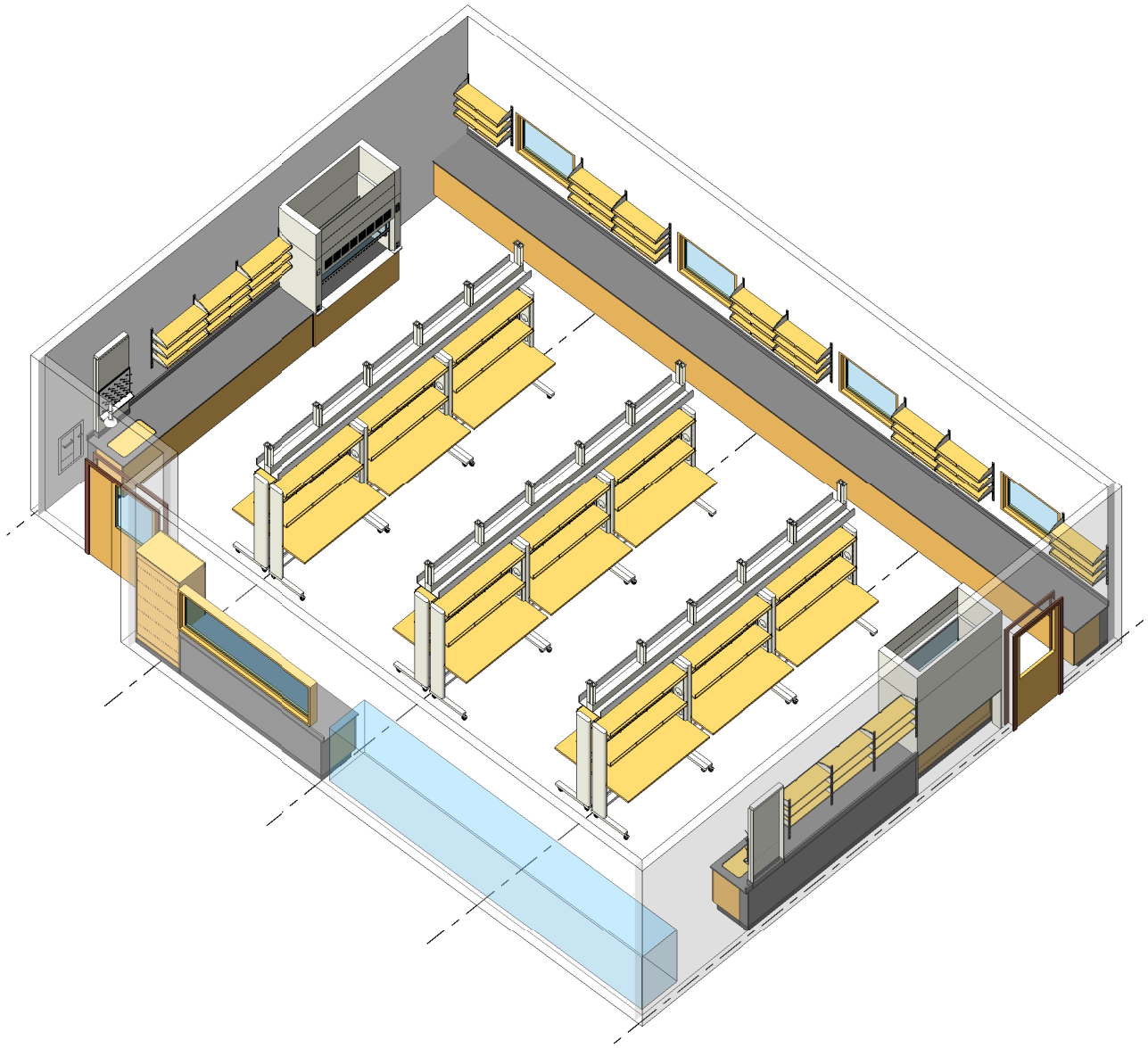
22. Movable Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. White Markerboard
26. Movable Laboratory Table
27. Metro Shelving
28. Tall Corrosive Storage Cabinet
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: CONTROLLED RESEARCH SPACE

SPACE ID NO: 3.02
AREA NSF: 1,452

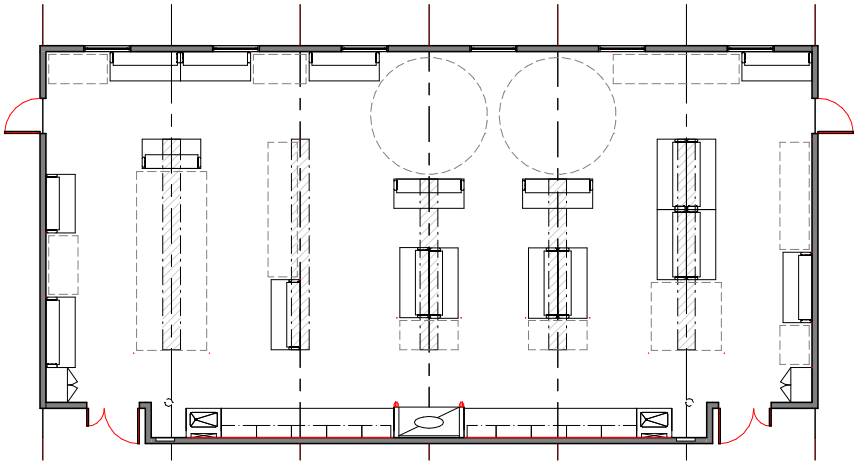
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: ROBOTICS RESEARCH LAB

SPACE ID NO: 3.03
AREA NSF: 2,178

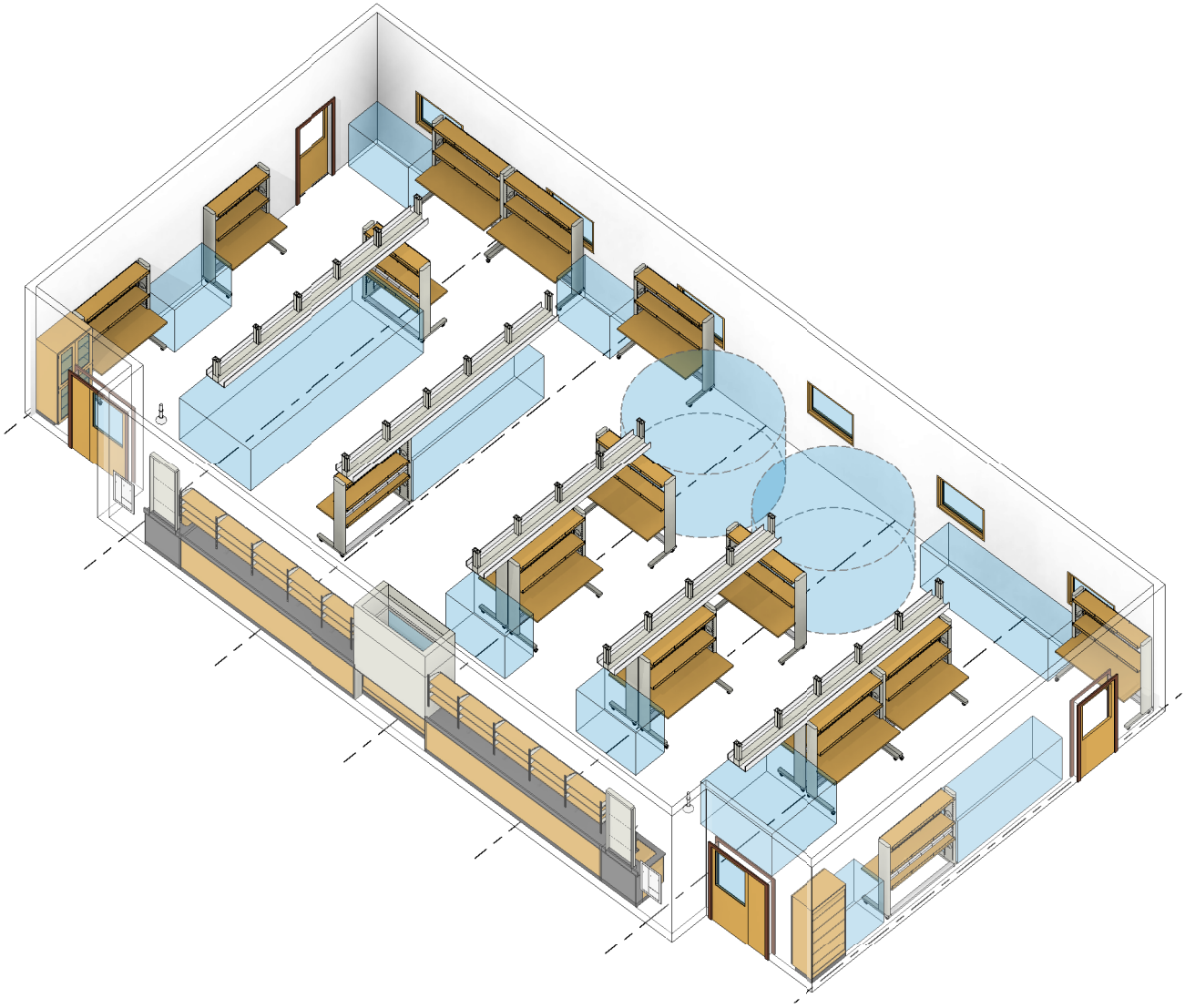
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: ROBOTICS RESEARCH LAB

SPACE ID NO: 3.03
AREA NSF: 2,178

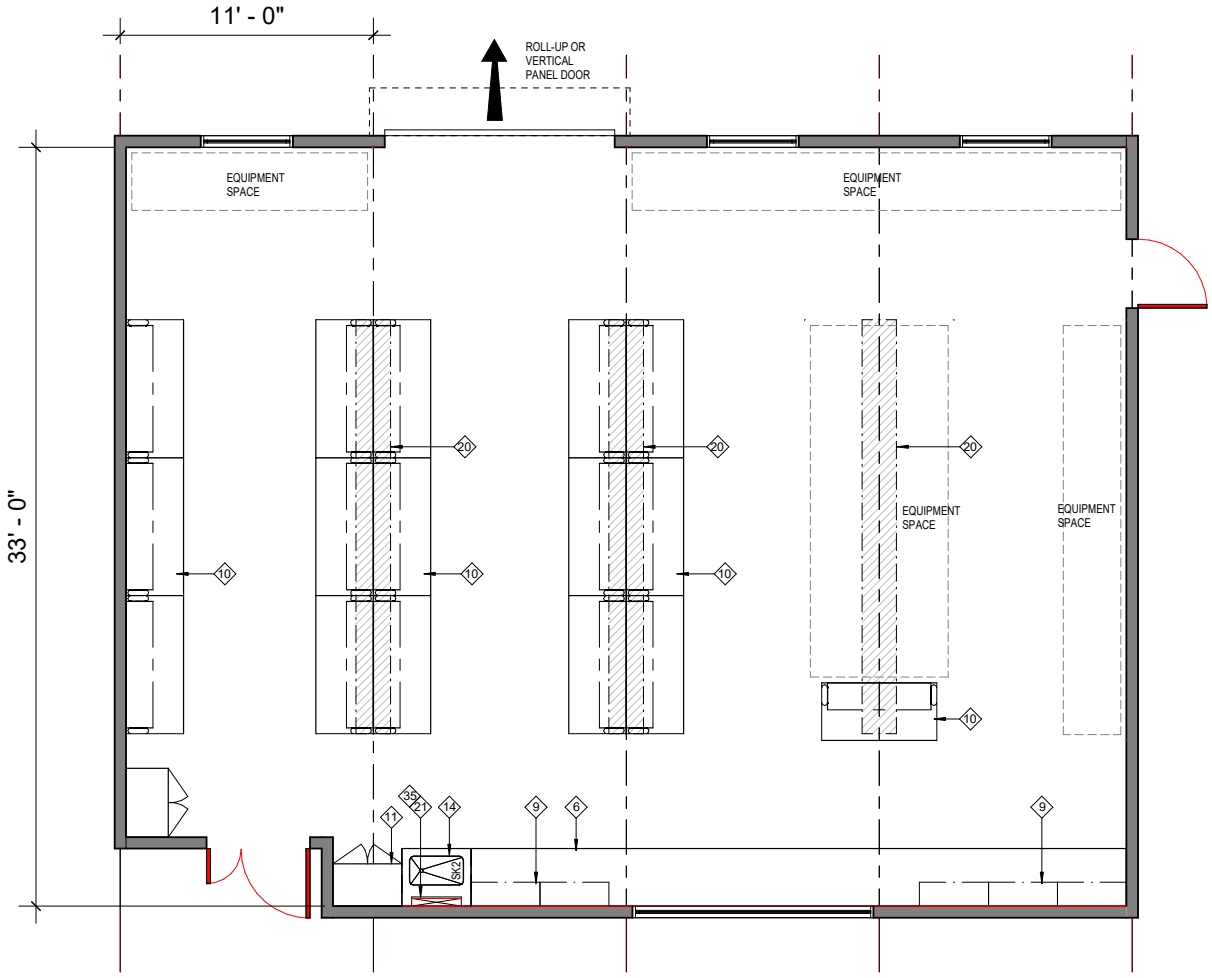
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME
SPACE NAME: TECH PROJECTS LAB

SPACE ID NO: 4.01
AREA NSF: 1,452

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



0' 2' 4' 8'
1/8" = 1'-0"

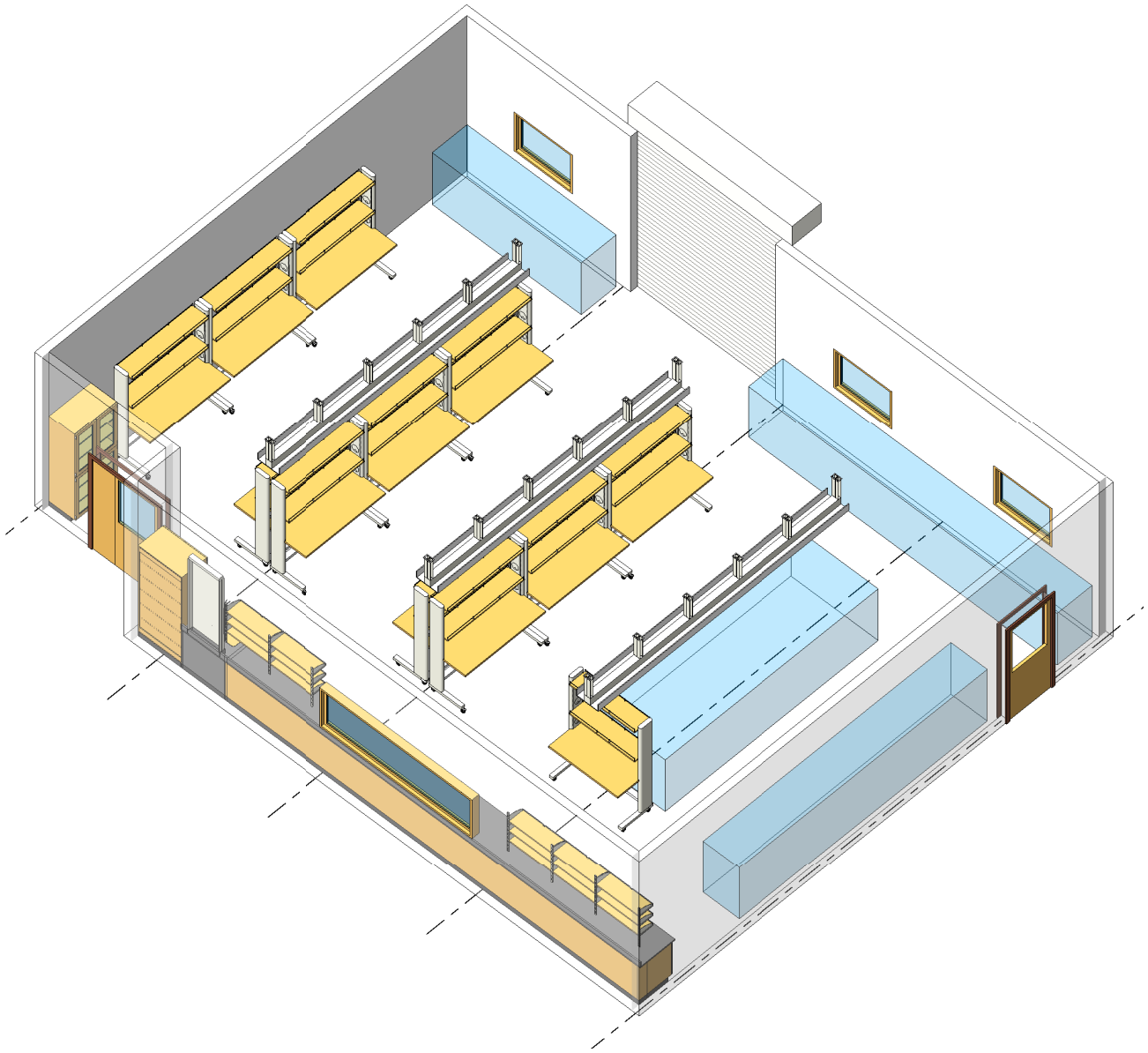
FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
10. Mobile Workstation
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Coat/ Bookbag Storage
17. Laser Curtain
18. Canopy Hood
19. Safety Shower/Eyewash
20. Overhead Cable Tray
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. White Markerboard
26. Movable Laboratory Table
27. Metro Shelving
28. Tall Corrosive Storage Cabinet
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: TECH PROJECTS LAB

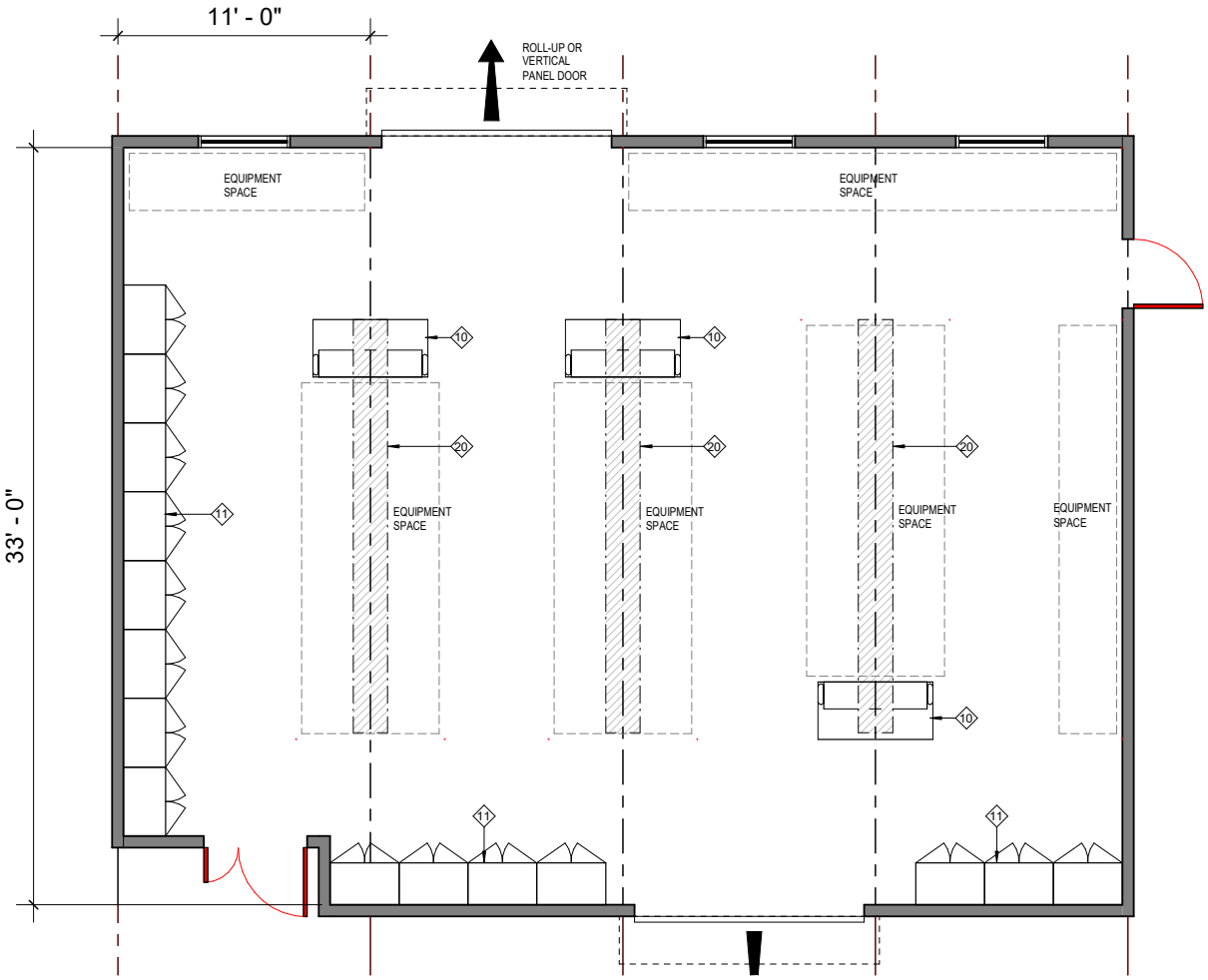
SPACE ID NO: 4.01
AREA NSF: 1,452

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 4.02**
SPACE NAME: TECH PROJECT STORAGE **AREA NSF: 1,452**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
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29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: TECH PROJECT STORAGE

SPACE ID NO: 4.02
AREA NSF: 1,452

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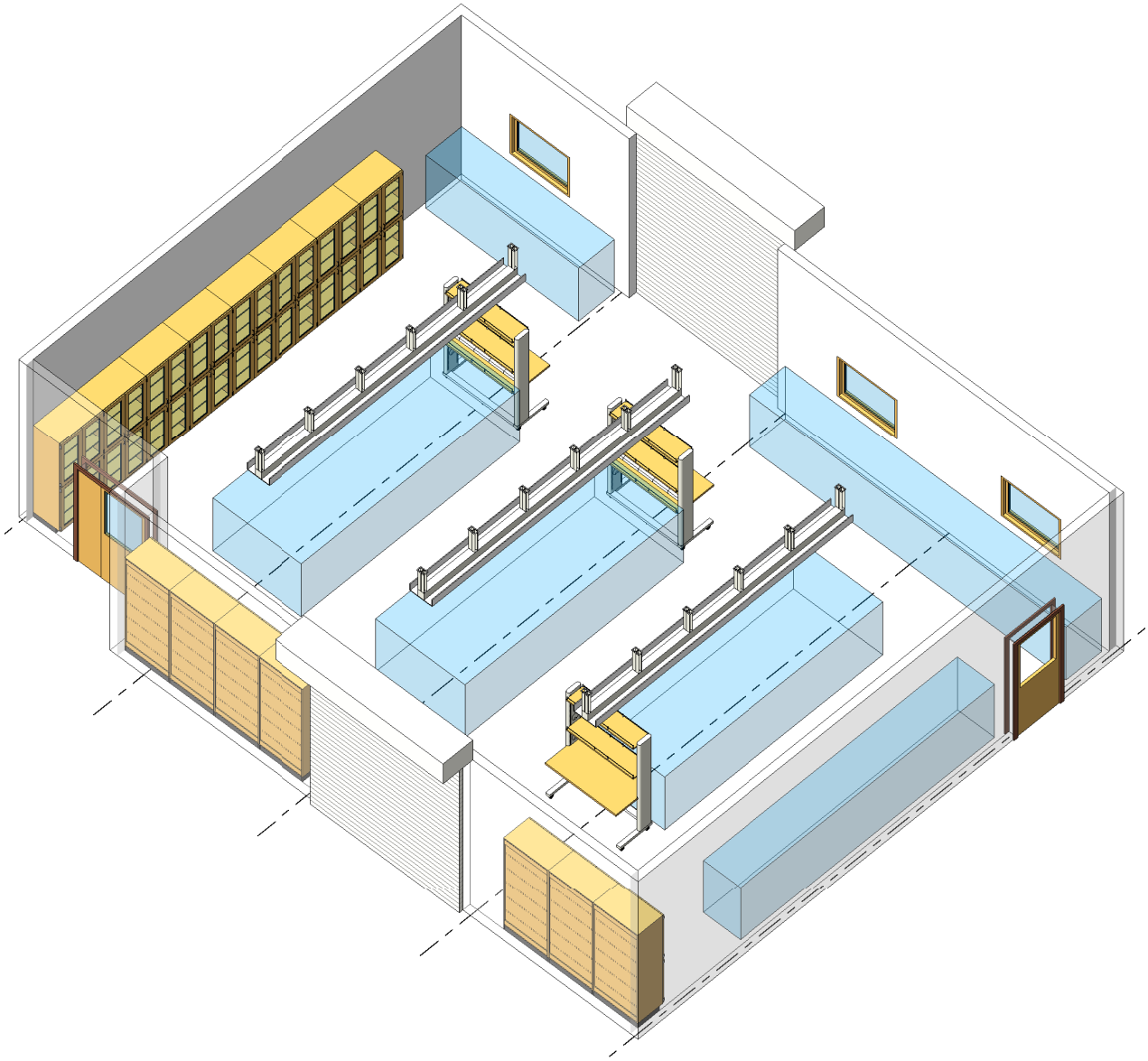

DEPARTMENT: ME **SPACE ID NO: 4.03**
SPACE NAME: ME/MET PROJECTS LAB **AREA NSF: 1,452**

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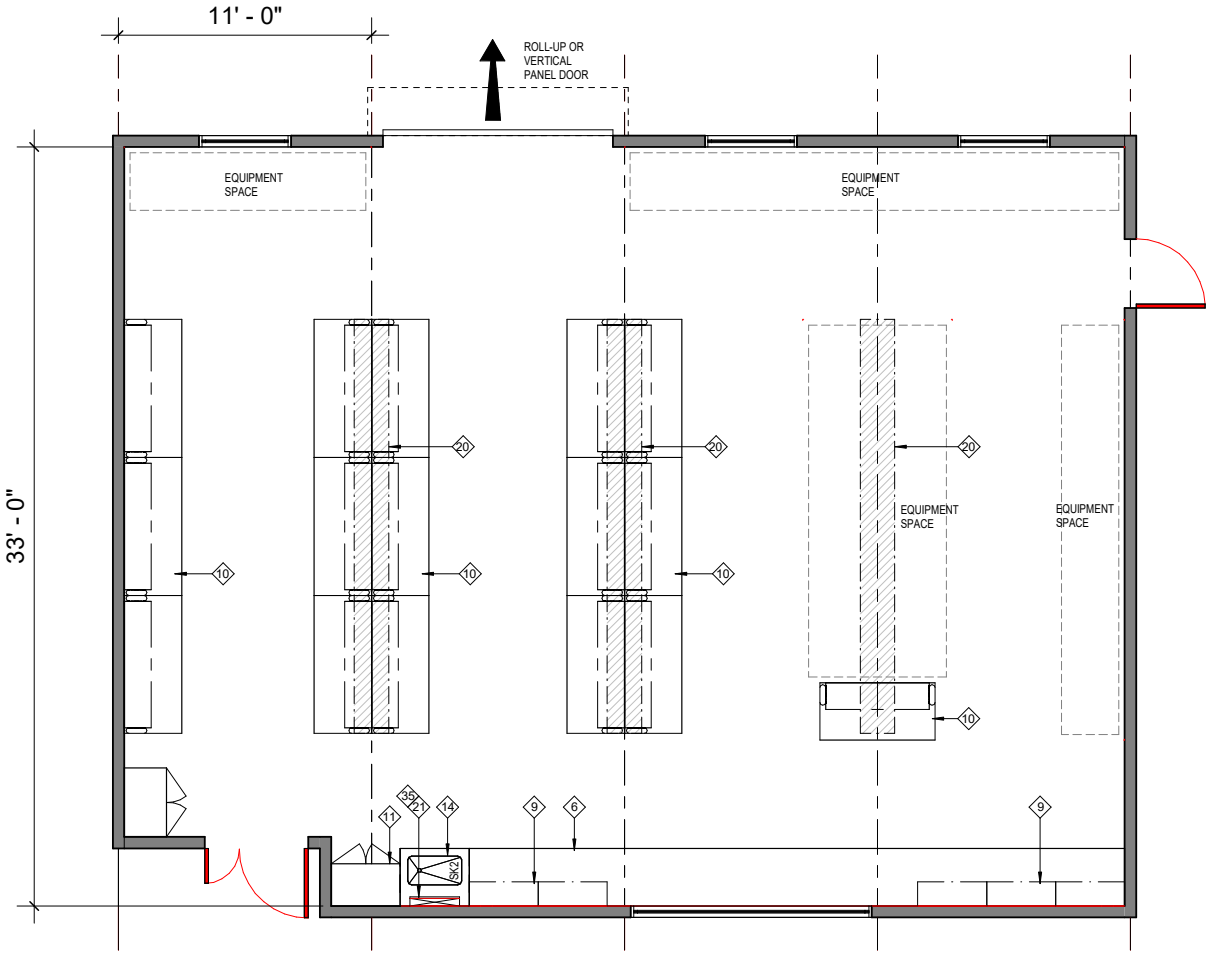

0' 2' 4' 8'
1/8" = 1'-0"

FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
10. Mobile Workstation
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13. Equipment Space
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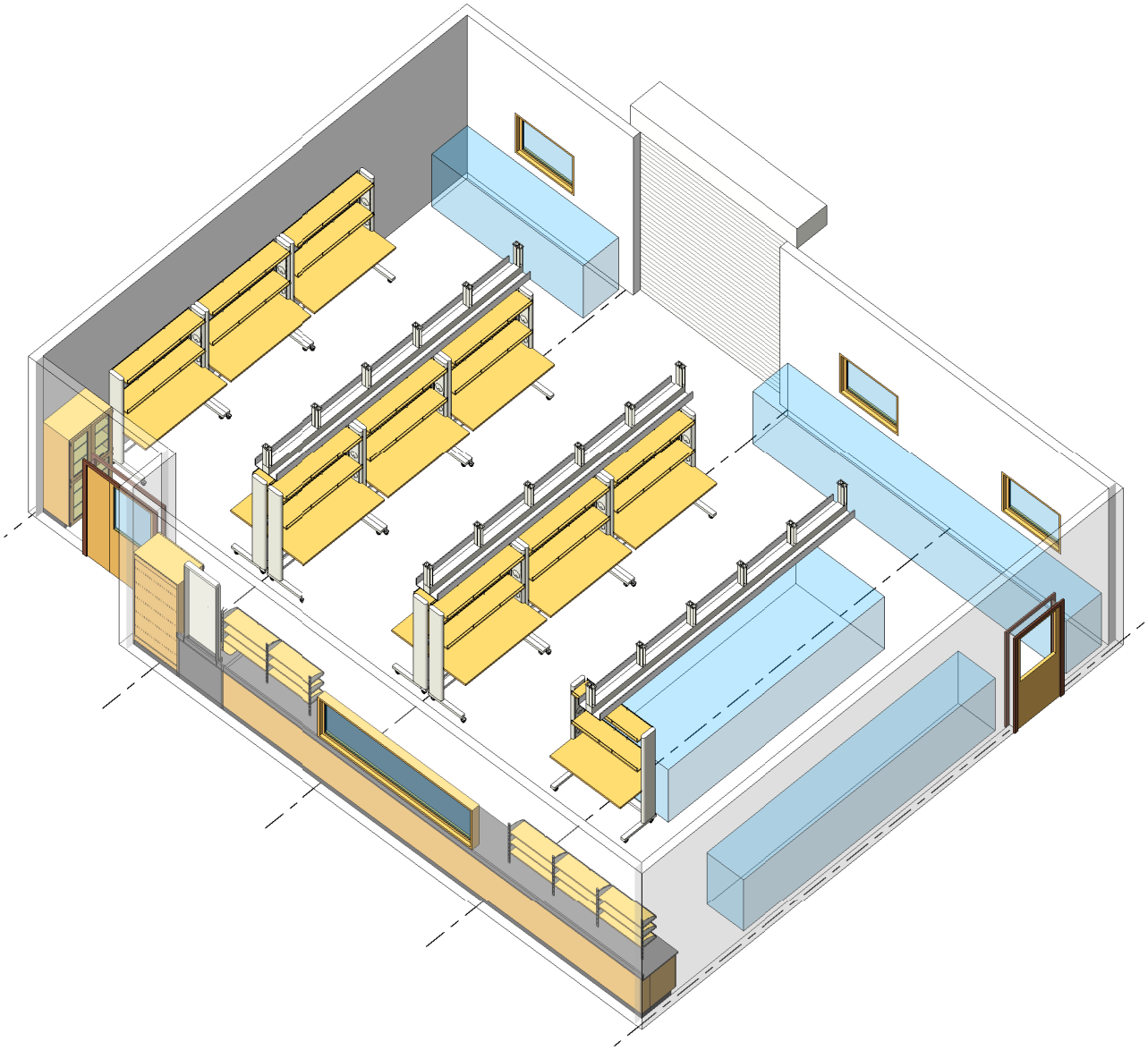
15. Cupsink
16. Coat/ Bookbag Storage
17. Laser Curtain
18. Canopy Hood
19. Safety Shower/Eyewash
20. Overhead Cable Tray
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Glassware Dryer
25. White Markerboard
26. Movable Laboratory Table
27. Metro Shelving
28. Tall Corrosive Storage Cabinet
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: ME/MET PROJECTS LAB

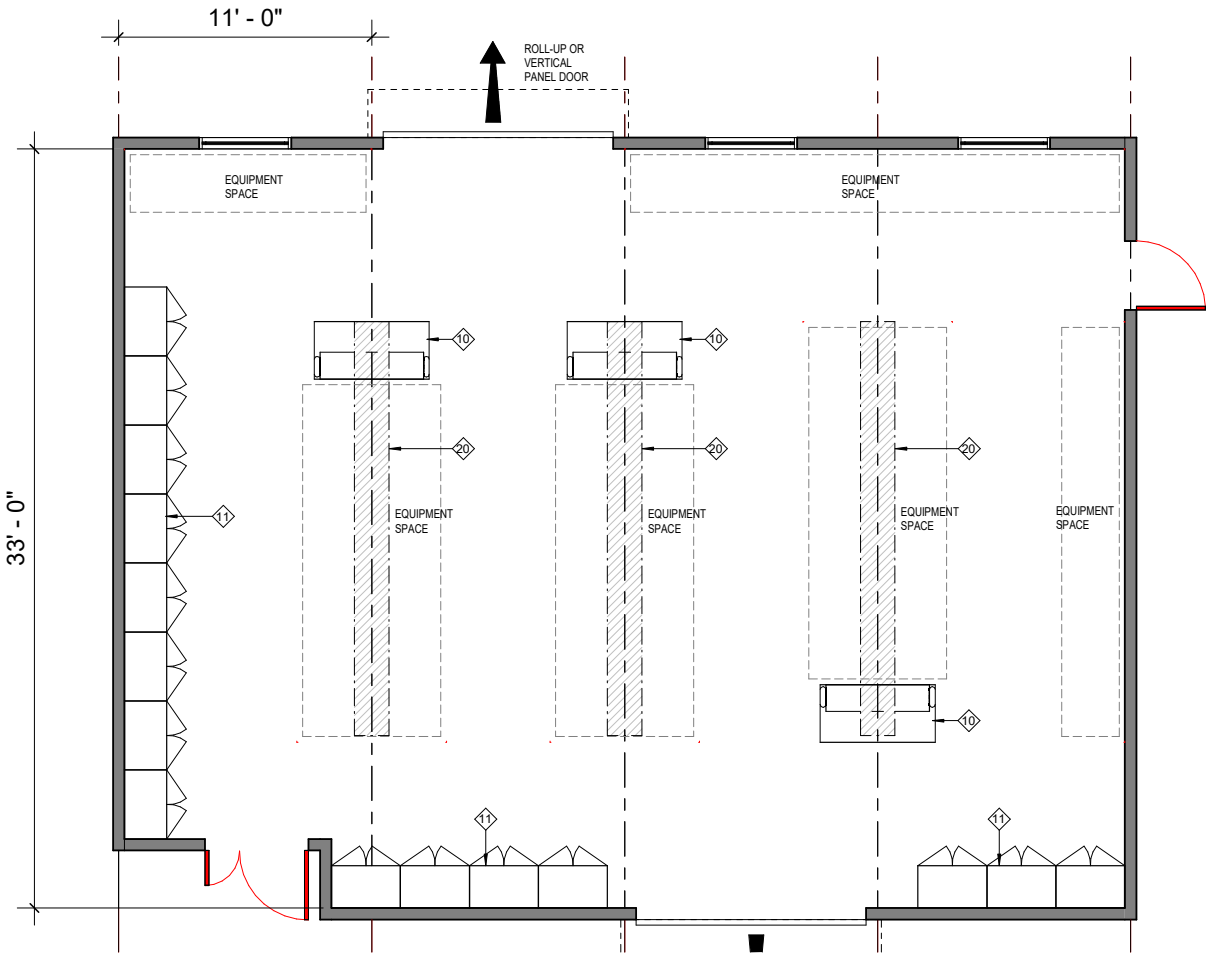
SPACE ID NO: 4.03
AREA NSF: 1,452

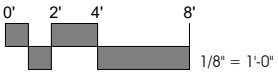
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 4.04**
SPACE NAME: ME/METS PROJECT STORAGE **AREA NSF: 1,452**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.





FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
10. Mobile Workstation
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
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14. Laboratory Sink
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16. Coat/ Bookbag Storage
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25. White Markerboard
26. Movable Laboratory Table
27. Metro Shelving
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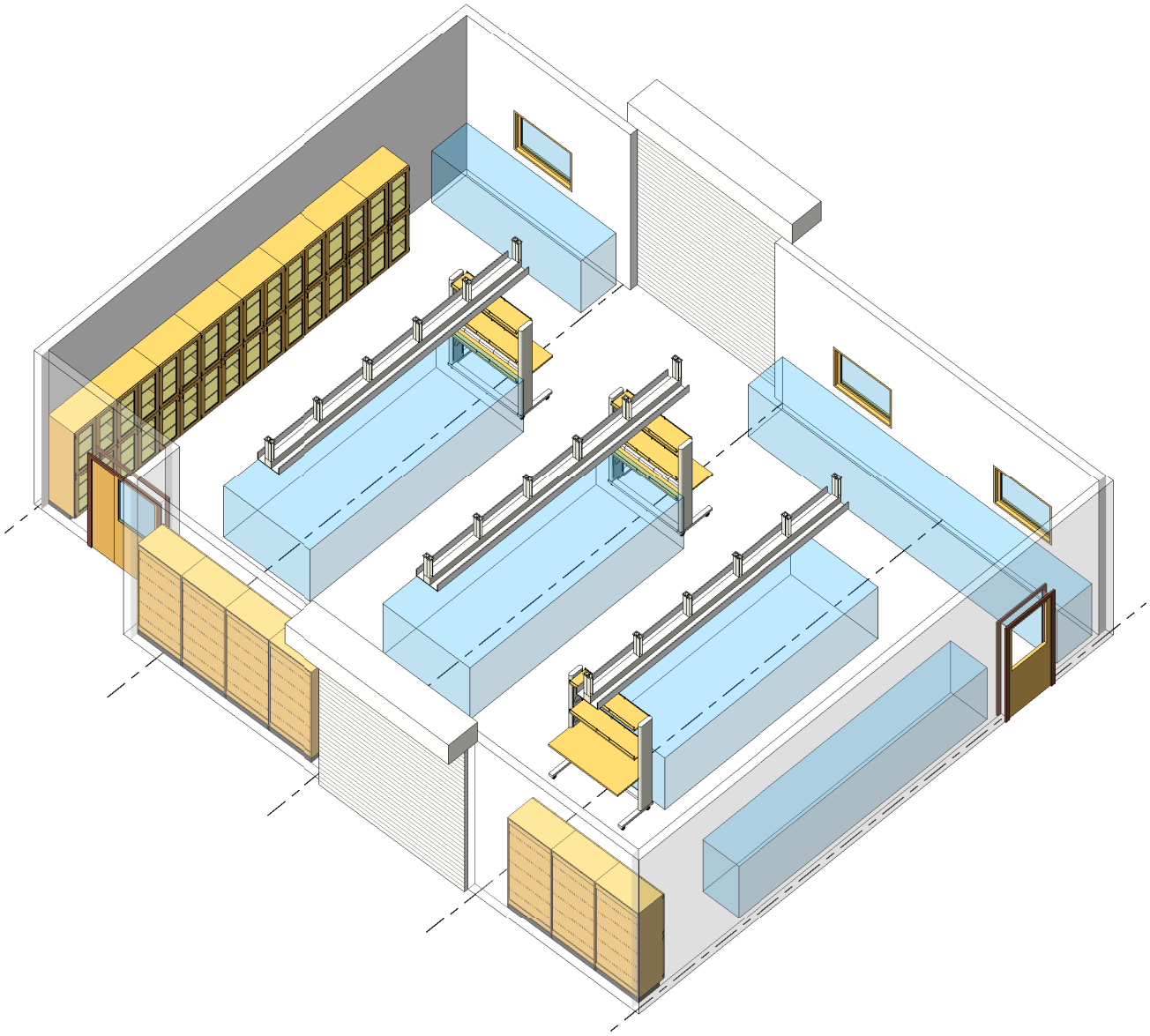
29. Ice Machine
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: ME/METS PROJECT STORAGE

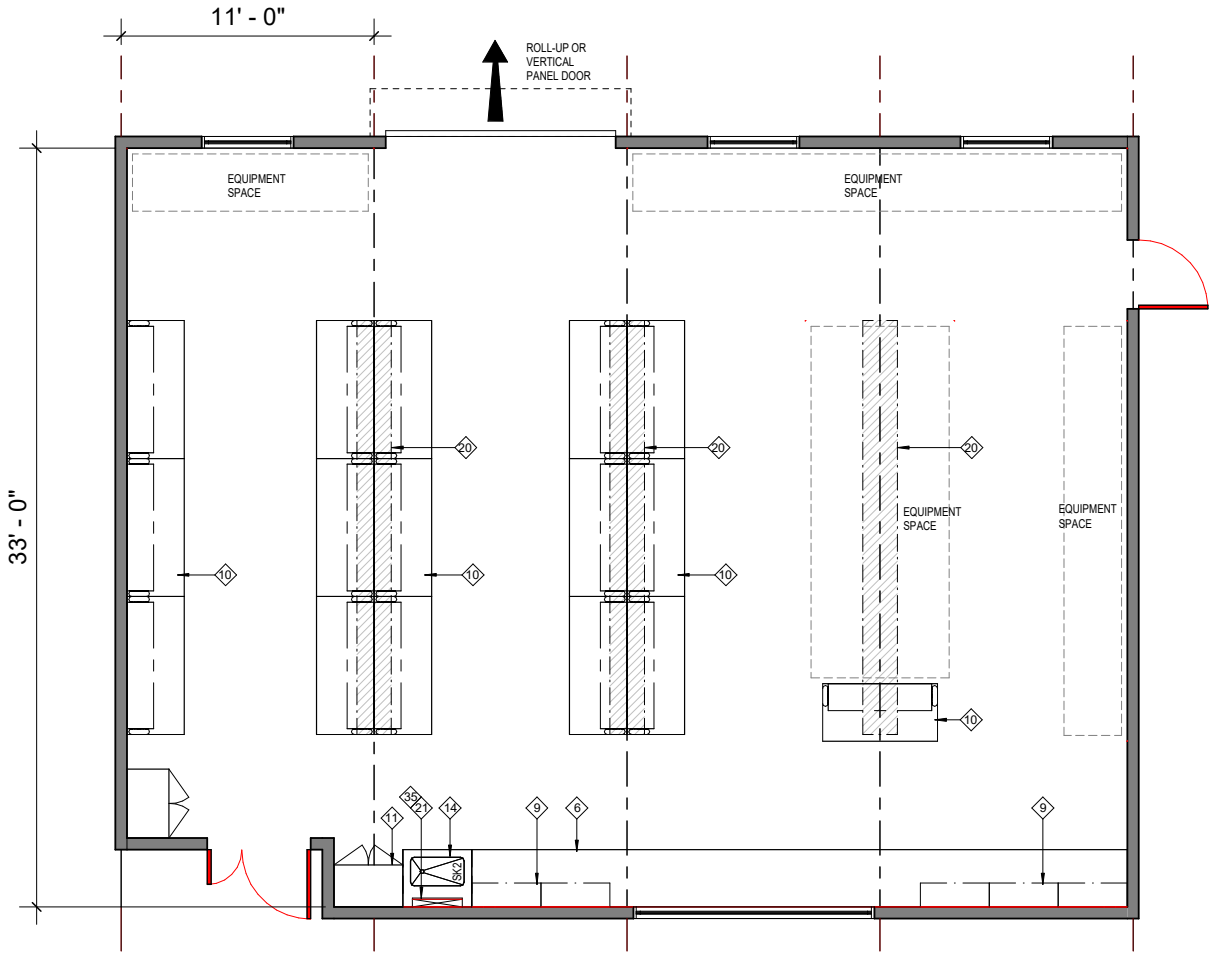
SPACE ID NO: 4.04
AREA NSF: 1,452

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



DEPARTMENT: ME **SPACE ID NO: 4.05**
SPACE NAME: CLUB ROOM LAB **AREA NSF: 1,452**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



FURNISHINGS

01. Chemical Fume Hood
02. Biological Safety Cabinet
03. Laminar Flow Hood
04. Cylinder Restraint
05. Snorkel Exhaust
06. Laboratory Bench, Standing Height
07. Laboratory Bench, Sitting Height
08. Wall Cabinet
09. Adjustable Wall Shelves
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27. Metro Shelving
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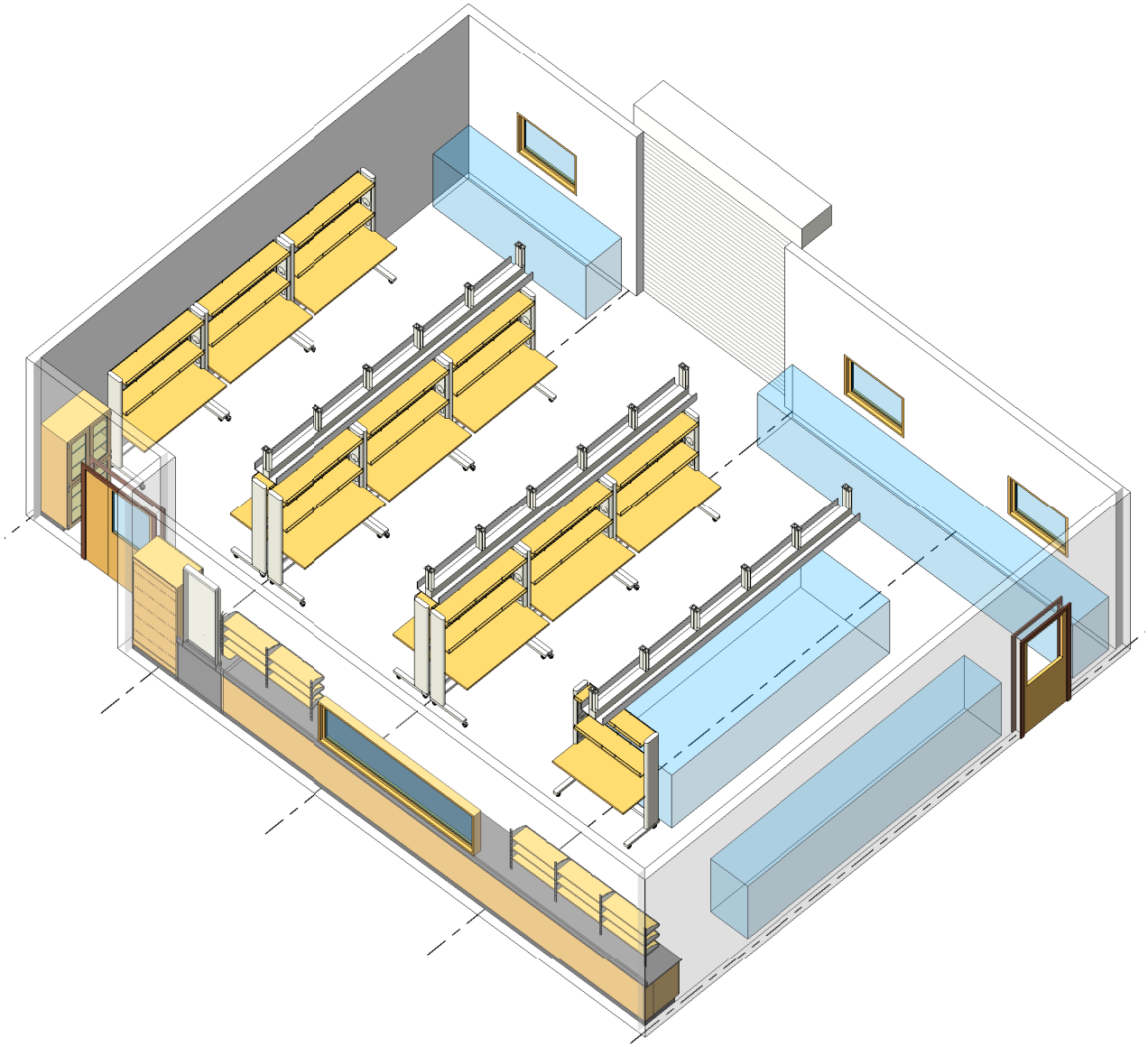
30. Equipment Exhaust
31. Full-View Hood
32. Multi-media Projector & Screen
33. Metro Shelving High Density
34. Scullery Sink
35. Drying Rack

DEPARTMENT: ME
SPACE NAME: CLUB ROOM LAB

SPACE ID NO: 4.05
AREA NSF: 1,452

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



Room Data Summary

Eastern Washington University - Engineering Building

Date: 6-24-20

LMN + Research Facilites Design

	Room Name	Equipment List Available	Vibration Criteria	Room Air: Recirc Air	Room Air: 100% Exhasted - min. make-up	Room Air: 100% Exhasted with AC Rates	Room Air: AC Rate Occupied (Minimum)	Room Air: AC Rate Unoccupied (Minimum)	Services: Safety Shower (Tempered) Potable	Services: Eye Wash (Tempered) Potable	Services: Hot & Cold (H/C) or Cold (C)	Services: Purified Water (Type II) RO/DI	Services: Process Cooling Water (CHWS&R)	Services: Natural Gas (LG)	Services: House or Local Vacuum (LV)	Services: Local High Vacuum (Cabinet for OFOI Pump)	Services: Shop Compressed Air (125psi with Regulator) (SA)	Services: Clean Dry Compressed Air (125psi with Regulator) (CA)	Services: Compressed Air (15 - 30 PSI) (LA)
1.03	Plastic Lab	●				●	6	4		●	●						●		
1.08	HVAC Teaching Lab				●					●	●						●		
4.03	ME/MET Projects Lab				●					●	●						●		
4.04	ME/MET Projects Storage				●												●		
4.01	Tech Projects Lab				●					●	●						●		
4.02	Tech Projects Storage				●												●		
3.02	Controlled Research Lab					●	6	4	●	●	●				●	●		●	●
1.07	Sensor Tech Lab					●	6	4	●	●	●				●	●		●	●
CEB 125	Maker Space Light				●					●	●				●	●		●	●
4.05	Club Room				●					●	●						●		
CEB 001	Material Science	●			●					●	●						●		
1.04	Metallics Lab	●			●				●	●	●						●		
1.01	Wood Shop	●			●				●	●	●						●		
	ME/MET Controls Lab			●															
CEB 024	Additive Manufacturing				●												●		
CEB 002	Composite Lab					●	6	4	●	●	●						●		
3.03	Robotics Research Lab	●				●	6	4	●	●	●						●		
1.06	Fluid Power Lab			●															
1.02	Construction Lab				●					●	●						●		
3.01	Industry Space				●					●	●						●		
1.05	Fluids Lab	●			●					●	●						●		

Room Data Summary

Eastern Washington University - Engineering Building

Date: 6-24-20

LMN + Research Facilites Design

		Power						Communications							
	Room Name	120v	120v, Standby	208v, 1ph	208v, 1ph, Standby	208v, 3ph	480v	Video/Cable	Data Connection	Audio System	Projection or Monitors	Required 365/24/7 HVAC	Exhaust Point of use	Temp. - Winter	Temp. - Summer
4.03	Plastic Lab	●		●					●				●	68°F Min	75°F Max
4.04	HVAC Teaching Lab	●		●					●					68°F Min	75°F Max
4.01	ME/MET Projects Lab	●		●					●					68°F Min	75°F Max
4.02	ME/MET Projects Storage	●							●					68°F Min	75°F Max
3.02	Tech Projects Lab	●		●					●					68°F Min	75°F Max
1.07	Tech Projects Storage	●							●					68°F Min	75°F Max
CEB 125	Controlled Research Lab	●	●	●	●				●				●	68°F Min	75°F Max
4.05	Sensor Tech Lab	●	●	●	●				●				●	68°F Min	75°F Max
CEB 001	Maker Space Light	●							●				●	68°F Min	75°F Max
1.04	Club Room	●		●					●					68°F Min	75°F Max
1.01	Material Science	●		●					●					68°F Min	75°F Max
	Metallics Lab	●		●		●	●		●				●	68°F Min	75°F Max
CEB 024	Wood Shop	●		●		●			●				●	68°F Min	75°F Max
CEB 002	ME/MET Controls Lab	●							●		●			68°F Min	75°F Max
3.03	Additive Manufacturing	●		●		●			●				●	68°F Min	75°F Max
1.06	Composite Lab	●		●		●	●		●				●	68°F Min	75°F Max
1.02	Robotics Research Lab	●		●		●	●		●				●	68°F Min	75°F Max
3.01	Fluid Power Lab	●		●		●	●		●					68°F Min	75°F Max
1.05	Construction Lab	●		●		●			●				●	68°F Min	75°F Max
CEB 205	Industry Space	●		●		●	●		●				●	68°F Min	75°F Max
	Fluids Lab	●		●		●	●		●				●	68°F Min	75°F Max
	Thermals Lab	●		●		●	●		●				●	68°F Min	75°F Max

Room Data Summary

Eastern Washington University - Engineering Building

Date: 6-24-20

		Utilization			Floor					Base		Partitions			Ceiling			
ID #	Room Name	8 hours / day	14 hours / day	24 hours / day	Sealed Concrete	Resilient Tile	Resilient Welded Sheet Mat'l	Epoxy	Static Dissapative Resilient Tile	4" Topset	Integral with Floor	Gyp Bd, Epoxy Paint	Gyp Borad, Paint	Other	Open	Acoustic Tile	Gyp Bd, Epoxy Paint	Minimum Height
1.03	Plastic Lab		●		●					●			●			●		9'6"
1.08	HVAC Teaching Lab		●		●					●			●		●			
4.03	ME/MET Projects Lab		●		●					●			●		●			
4.04	ME/MET Projects Storage		●		●					●			●		●			
4.01	Tech Projects Lab		●		●					●			●		●			
4.02	Tech Projects Storage		●		●					●			●		●			
3.02	Controlled Research Lab		●			●				●			●			●		9'6"
1.07	Sensor Tech Lab		●			●				●			●			●		9'6"
CEB 125	Maker Space Light		●		●					●			●			●		9'6"
4.05	Club Room		●		●					●			●		●			
CEB 001	Material Science		●		●					●			●			●		9'6"
1.04	Metallics Lab		●		●					●			●		●			
1.01	Wood Shop		●		●					●			●		●			
	ME/MET Controls Lab		●		●					●			●			●		9'6"
CEB 024	Additive Manufacturing		●		●					●			●			●		9'6"
CEB 002	Composite Lab		●		●					●			●		●			
3.03	Robotics Research Lab		●		●					●			●		●			
1.06	Fluid Power Lab		●		●					●			●			●		9'6"
1.02	Construction Lab		●		●					●			●		●			
3.01	Industry Space		●		●					●			●		●			
1.05	Fluids Lab		●		●					●			●		●			
CEB 205	Thermals Lab		●		●					●			●		●			

Room Data Summary

Eastern Washington University - Engineering Building

Date: 6-24-20

LMN + Research Facilites Design

		Doors					Lighting							Casework					Benchtops			
ID #	Room Name	Single Leaf 3'-0"	3'-0" + 1'-6"	Pair 3'-0" + 3'-0""	Overhead	Card Key Security	Bench or +36" aff: 50 -75 fc	Task Lighting	Dark Room Red Light	In - Use Warning Light	Black-out Capability	Zoned Lighting	Other	Wood Cabinets	Metal Cabinets	Wood Over Metal	Plastic Laminate	Stainless Steel	Epoxy Benchtop	Wood Benchtop	Stainless Steel	Plastic Laminate - Satic Dissapative
1.03	Plastic Lab	●	●				●							●						●		
1.08	HVAC Teaching Lab	●	●				●							●						●		
4.03	ME/MET Projects Lab	●	●		11x14		●							●	●					●		
4.04	ME/MET Projects Storage	●	●		11x14		●							●						●		
4.01	Tech Projects Lab	●	●		11x14		●							●	●					●		
4.02	Tech Projects Storage	●	●		11x14		●							●						●		
3.02	Controlled Research Lab	●	●				●	●						●					●			
1.07	Sensor Tech Lab	●	●				●	●						●					●			
CEB 125	Maker Space Light	●	●				●							●	●					●		
4.05	Club Room	●	●		11x14		●							●						●		
CEB 001	Material Science	●	●				●	●						●						●		
1.04	Metallics Lab	●	●		11x14		●							●	●					●		
1.01	Wood Shop		●		11x14		●							●	●					●		
	ME/MET Controls Lab	●	●				●							●	●					●		
CEB 024	Additive Manufacturing	●	●	●			●							●	●					●		
CEB 002	Composite Lab	●	●		11x14		●							●	●				●	●		
3.03	Robotics Research Lab	●	●				●							●	●					●		
1.06	Fluid Power Lab	●	●				●							●	●				●	●		
1.02	Construction Lab	●	●		11x14		●							●	●					●		
3.01	Industry Space	●	●		11x14		●							●	●					●		
1.05	Fluids Lab	●	●				●							●	●					●		
CEB 205	Thermals Lab	●	●				●							●	●					●		

8.5 PRELIMINARY CONSTRUCTION COST ESTIMATE

Construction Cost Summary

ROEN ASSOCIATES

Owner: **Eastern Washington University**

Project: **Engineering Building**

June 26, 2020

ESTIMATED COSTS SUMMARY

Phase	Description	QTY	UOM	$ / UOM	Cost
1	Engineering Building	74,155	BGSF	$453.27	$33,611,892
2	Existing Building Work	23,650	GSF	$160.53	$3,796,519
3	Sitework	114,000	GSF	$32.14	$3,664,163
4	General Conditions & Support Services	20	MO	$90,000	$1,800,000
Total Estimated Construction Cost		**74,155**	**BGSF**	**$578.15**	**$42,872,574**
5	Escalation to Midpoint (Q2, 2024 @ 4% / Yr)	15.0%	on	$42,872,574	$6,430,886
Total Escalated Construction Cost		**74,155**	**BGSF**	**664.87**	**$49,303,460**

COMMENTS:

Design, Bid, Build delivery method is assumed

Assumes a Q3, 2023 start and a 20 month schedule

No Site Frontage Improvements are included or anticipated

Roen Associates
121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - New Addition
Pre-Design Budget Estimate

Project Owner:	**Eastern Washington University**	Architect:	LMN Architects
Project Name:	**Engineering Building**	Project Duration:	20 MO
Project Location:	Cheney, WA	Building GSF:	74,155
Project Start Date:	Q3, 2023	Site GSF:	114,000 74,155 (including PH)
Estimate Date:	June 26, 2020		

ESTIMATE SUMMARY					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
A10	Foundations	74,155	BGSF	$11.60	$860,402
A20	Basement Construction	74,155	BGSF	$7.09	$525,396
B10	Superstructure	74,155	BGSF	$50.99	$3,781,193
B20	Exterior Enclosure	74,155	BGSF	$43.32	$3,212,588
B30	Roofing	74,155	BGSF	$9.39	$696,214
C10	Interior Construction	74,155	BGSF	$25.20	$1,868,883
C20	Stairs	74,155	BGSF	$2.70	$200,000
C30	Interior Finishes	74,155	BGSF	$22.94	$1,700,873
D10	Conveying Systems	74,155	BGSF	$4.32	$320,000
D20	Plumbing	74,155	BGSF	$25.00	$1,853,875
D30	HVAC	74,155	BGSF	$64.50	$4,782,998
D40	Fire Protection	74,155	BGSF	$4.25	$315,159
D50	Electrical	74,155	BGSF	$60.00	$4,449,300
E10	Equipment	74,155	BGSF	$21.83	$1,618,980
E20	Casework & Furnishings	74,155	BGSF	$7.56	$560,295
F10	Special Construction	74,155	BGSF	$0.00	$0
F20	Selective Demolition	74,155	BGSF	$0.00	$0
Building Construction Subtotal					**$26,746,154**
	Design Contingency			18.00%	$4,814,308
	Subtotal				$31,560,462
	Contractor Mark Up (Overhead, Profit, Insurance, P&P Bond & Sub Bonds)			6.50%	$2,051,430
	Subtotal				$33,611,892
	Escalation to Mid-Point (See Summary)				$0
BUILDING GRAND TOTAL		74,155	BGSF	$453.27	**$33,611,892**

Estimate excludes soft costs such as design fees, permits, testing / inspections, construction change order contingencies, loose fixtures / furnishings and sales tax.

Roen Associates
121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - New Addition
Pre-Design Budget Estimate

ROEN ASSOCIATES

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
A10	**FOUNDATIONS**				
	Foundation Earthwork				
	Footing Excavation and Backfill	1,371	cy	$ 25.00	$34,278
	Footing Drains with Gravel		See Site		
	Foundations				
	Spread Footings (includes reinforcing)	104	cy	$ 780.00	$81,120
	Continuous Footings (includes reinforcing)	232	cy	$ 720.00	$167,067
	Perimeter Stem Wall (includes reinforcing)	31	cy	$ 2,440.00	$75,911
	Concrete Columns and Plinths				
	Square	89	cy	$ 2,190.00	$194,667
	Existing Building Foundation Tie-in	1	ls	$ 15,000.00	$15,000
	Slab-on-Grade				
	Slab on Grade (includes reinforcing, base course and vapor barrier)	27,900	sf	$ 8.00	$223,200
	Misc. Concrete				
	Housekeeping Pads - Allowance	600	sf	$ 20.00	$12,000
	Elevator Pits (includes ladder, hoist beam, sump and waterproofing)	2	ea	$ 9,500.00	$19,000
	Set Column Anchor Bolts	30	set	$ 75.00	$2,250
	Grout Baseplates	30	ea	$ 50.00	$1,500
	Architectural Precast - Allowance	1	ls	$ 30,000.00	$30,000
	Perimeter Insulation / Waterproofing				
	2" Rigid Polystyrene	735	sf	$ 4.00	$2,940
	Stem Wall Dampproofing	735	sf	$ 2.00	$1,470
	SUBTOTAL FOUNDATIONS	**74,155**	**BGSF**	**$11.60**	**$860,402**
A20	**BASEMENT CONSTRUCTION**				
	Basement Excavation				
	See Site				
	Basement Walls				
	Perimeter 14" Basement Wall (Includes Reinforcing)	8,728	sf	$ 45.00	$392,738
	Waterproofing				
	2" Rigid Polystyrene	8,728	sf	$ 4.00	$34,910
	Stem Wall Damp Proofing	8,728	sf	$ 2.00	$17,455
	Waterproofing Membrane	8,728	sf	$ 8.00	$69,820
	1/4" Protection Board	8,728	sf	$ 1.20	$10,473
	SUBTOTAL BASEMENT CONSTRUCTION	**74,155**	**BGSF**	**$7.09**	**$525,396**
B10	**SUPERSTRUCTURE**				
	Structural CMU and Masonry				
	8" CMU (Elevator)	4,620	sf	$ 32.00	$147,840
	Structural Steel				
	Vertical Structure				
	HSS Tube Steel Columns	74,851	lbs	$ 2.50	$187,128

No.	DETAILED ESTIMATE Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Horizontal Structure				
	Structural Framing (12 psf Allowance for First Floor)	243,900	lbs	$ 2.50	$609,750
	Structural Framing (12 psf Allowance for Second Floor)	255,000	lbs	$ 2.50	$637,500
	Structural Framing (12 psf Allowance for Penthouse Floor)	46,800	lbs	$ 2.50	$117,000
	Structural Framing (9 psf Allowance for Roof)	216,900	lbs	$ 2.50	$542,250
	Structural Framing (9 psf Allowance for Penthouse Roof)	45,000	lbs	$ 2.50	$112,500
	Moment and Brace Frames				
	Brace Framing - Allowance	20,000	lbs	$ 2.50	$50,000
	Metal Decking				
	Floor Decking - 3"	42,075	sf	$ 6.50	$273,488
	Roof Decking	25,400	sf	$ 4.00	$101,600
	Miscellaneous				
	Structural Support for Vent Stacks - Allowance	1	ls	$ 50,000.00	$50,000
	Miscellaneous Metals - Allowance	114,000	gsf	$ 3.00	$342,000
	Elevator Pit Ladder and Hoist Beam	2	ea	$ 2,000.00	$4,000
	Concrete Topping Slabs				
	6" Slab over Metal Floor Deck with Reinforcing	42,075	sf	$ 10.00	$420,750
	Fireproofing				
	Structural Steel Fireproofing				
	Sprayed Cementitious Fireproofing	74,155	gsf	$ 2.50	$185,388
	Firestopping - See Interior Partitions				
	SUBTOTAL SUPERSTRUCTURE	**74,155**	**BGSF**	**$50.99**	**$3,781,193**
B20	**EXTERIOR ENCLOSURE**				
	Exterior Wall Construction				
	Exterior Wall Assembly (GWB - Finish 1 Side, vapor barrier, metal studs, R-19 batt insulation, sheathing, 2" rigid insulation, WRB)	21,980	sf	$ 20.00	$439,600
	Exterior Wall Finish				
	Masonry Veneer				
	Brick Veneer (at 50% of the Exterior)	15,700	sf	$ 45.00	$706,500
	Galvanized Steel Lintels - Allowance	200	lf	$ 40.00	$8,000
	Sill Flashing - Allowance	200	lf	$ 12.50	$2,500
	Metal Panels				
	Composite Metal Panel (at 20% of the Exterior - Penthouse)	6,280	sf	$ 60.00	$376,800
	Composite Metal Panel (Penthouse)	6,400	sf	$ 70.00	$448,000
	Exterior Feature Elements - Allowance	1	ls	100,000.00	$100,000
	Exterior Soffits				
	Finish to Soffits (Entry and/or Overhangs)	None Shown			
	Exterior Windows				
	Storefront/Curtain Walls (at 30% of the Exterior)	9,420	sf	$ 90.00	$847,800
	Premium - Glazing (Allowance)	1,200	sf	$ 25.00	$30,000
	Expansion/Seismic Joints				
	Roof Joints	75	lf	225.00	$16,875

No.	DETAILED ESTIMATE Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Exterior Wall Joints	40	lf	220.00	$8,800
	Exterior Doors				
	Storefront Entry Doors, Hardware, per leaf	8	ea	$ 3,500.00	$28,000
	Push Button ADA Auto Operators	2	ea	$ 4,000.00	$8,000
	Standard Grade HM Dr, HM Frame, Hardware, per leaf	5	ea	$ 2,500.00	$12,500
	Exit Devices	8	ea	$ 800.00	$6,400
	Overhead Doors (Allowance)	5	ea	$ 12,500.00	$62,500
	Exterior Paint & Sealants				
	Masonry Water Repellants	15,700	sf	$ 2.00	$31,400
	Anti-Graffiti Coating (up to 8')	5,320	sf	$ 3.00	$15,960
	Paint to HM Doors and Frames	5	ea	$ 175.00	$875
	Exterior - Control Joints, Caulking and Joint Sealants	74,155	gsf	$ 0.50	$37,078
	Building Graphics				
	Allowance for Building Signage	1	ls	$ 25,000.00	$25,000
	SUBTOTAL EXTERIOR ENCLOSURE	**74,155**	**BGSF**	**$43.32**	**$3,212,588**
B30	**ROOFING**				
	Roof Coverings				
	Membrane Roofing System with Rigid Insulation	25,400	sf	$ 18.00	$457,200
	Membrane Roofing Lapping up Backside of Parapets	4,140	sf	$ 6.00	$24,840
	Flashing and Sheet Metal				
	Parapet Caps and Copings	1,035	lf	22.00	$22,770
	Miscellaneous Roof Flashing and Blocking	10%	on	$482,040	$48,204
	Skylights				
	Aluminum Skylights - Allowance	1,500	sf	$ 80.00	$120,000
	Roof Accessories				
	Walk Pads - Allowance	500	sf	$ 7.00	$3,500
	Fall Protection Anchors	20	ea	$ 750.00	$15,000
	Access Ladders	1	ea	$ 3,500.00	$3,500
	Roof Hatches	1	ea	$ 1,200.00	$1,200
	SUBTOTAL ROOFING	**74,155**	**BGSF**	**$9.39**	**$696,214**
C10	**INTERIOR CONSTRUCTION**				
	Partitions				
	GWB Partition (GWB - Finish 2 Sides, metal studs, sound batts)	46,540	sf	$ 10.00	$465,400
	STC Rated Walls - Allowance	46,540	sf	$ 6.00	$279,240
	Fire Caulking at Penetrations	74,155	gsf	$ 0.35	$25,954
	Interior - Caulking and Joint Sealants	74,155	gsf	$ 0.30	$22,247
	Miscellaneous Carpentry - Allowance	74,155	gsf	$ 1.50	$111,233
	Patchwork at Existing Building - Allowance	1	ls	$ 15,000.00	$15,000
	CMU Walls - See B10 Superstructure Above				
	Interior Glazing				

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Interior Storefront with 1/4" tempered glazing - Allowance	3,350	sf	$ 60.00	$201,000
	HM Sidelights/Relites with 1/4" tempered glazing (Allowance)	140	sf	$ 35.00	$4,900
	Interior Doors, Frames, Hardware				
	HM / SCW Dr, HM Frame, Hardware, Complete - per leaf	48	ea	$ 2,100.00	$100,800
	Won-Doors, Frame and Hardware	6	sets	$ 20,000.00	$120,000
	Storefront Doors, Hardware, Complete - per leaf	12	ea	$ 3,000.00	$36,000
	Interior Railings				
	Balcony Rails	245	lf	250.00	$61,250
	Sloping Stair Rails and Grabs - Included with Stairs Below				
	Fittings / Specialties				
	Visual Displays	74,155	gsf	$ 0.50	$37,078
	MG-1 Marker Glass (Allowance)	480	sf	$ 85.00	$40,800
101400	Signage (Code and Wayfinding)	74,155	gsf	$ 0.75	$55,616
102113	Toilet Compartments (Phenolic)				
	ADA Stalls	12	stalls	$ 1,800.00	$21,600
	Standard Stalls	18	stalls	$ 1,450.00	$26,100
	Urinal Screens	6	ea	$ 550.00	$3,300
	Operable Partitions				
102233	Folding Panel Partitions - Allowance	1,650	sf	$ 85.00	$140,250
	Header Support	100	lf	$ 125.00	$12,500
102800	Toilet Accessories				
	Restrooms	6	ea	$ 5,000.00	$30,000
	Janitorial	3	ea	$ 1,000.00	$3,000
	Misc. Specialties Allowance (FECs, Corner Guards, etc...)	74,155	gsf	$ 0.75	$55,616
	SUBTOTAL INTERIOR CONSTRUCTION	**74,155**	**BGSF**	**$25.20**	**$1,868,883**
C20	**STAIRS**				
	Stair Construction (includes concrete, finishes and guard/hand rails)				
Stair 1	Pre-Engineered Metal Stair, per floor to floor flight w/ landing	2	flights	$ 40,000.00	$80,000
Stair 2	Pre-Engineered Metal Stair, per floor to floor flight w/ landing	3	flights	$ 40,000.00	$120,000
	SUBTOTAL STAIRS	**74,155**	**BGSF**	**$2.70**	**$200,000**
C30	**INTERIOR FINISHES**				
	Wall Finishes				
	Paint to Walls, Doors, Frames and Miscellaneous	74,155	gsf	$ 3.00	$222,465
	Restroom Wall Tile	3,850	sf	$ 20.00	$77,000
	Wainscot - Allowance	10,000	sf	$ 25.00	$250,000
	Miscellaneous Finish Carpentry Allowance	74,155	gsf	$ 0.50	$37,078
	Acoustical Wall Treatment - Allowance	74,155	gsf	$ 3.00	$222,465
	Bases				
	Rubber Base	3,800	lf	$ 2.00	$7,600
	Tile Base	550	lf	$ 20.00	$11,000

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Wood Base (Corridors)	3,200	lf	$ 20.00	$64,000
	Floor Finishes				
	Carpet	3,940	sf	$ 6.00	$23,640
	Ceramic/Quarry Tile	2,300	sf	$ 15.00	$34,500
	Polished or Honed Concrete	26,400	sf	$ 7.00	$184,800
	Rubber Tile Flooring	3,000	sf	$ 9.00	$27,000
	Sealed Concrete	35,400	sf	$ 2.00	$70,800
	Walk-Off Mat	450	sf	$ 35.00	$15,750
	Floor Prep / Moisture Vapor Reducer	71,040	sf	$ 1.00	$71,040
	Ceiling Finishes				
	ACT Ceiling (2x2) - Standard (Tech Office)	740	sf	$ 5.25	$3,885
	Vestibule Ceiling - Allowance	860	sf	$ 35.00	$30,100
	Collab/Circulation Ceiling - Allowance	4,000	sf	$ 45.00	$180,000
	GWB Ceiling, Painted (Restrooms)	2,300	sf	$ 8.00	$18,400
	GWB Vertical Soffits	2,220	sf	$ 15.00	$33,300
	Grid System - Allowance	1	ls	$ 25,000.00	$25,000
	Exposed Ceiling, Painted (Classrooms/Remaining Spaces except Penthouse)	60,700	sf	$ 1.50	$91,050
	SUBTOTAL INTERIOR FINISHES	**74,155**	**BGSF**	**$22.94**	**$1,700,873**
D10	**CONVEYING SYSTEMS**				
	Elevators & Lifts				
	Machine Room Less, Hydraulic Elevator (3) Stops	1	ea	$ 135,000.00	$135,000
	Machine Room Less, Hydraulic Elevator (4) Stops - Freight	1	ea	$ 185,000.00	$185,000
	SUBTOTAL CONVEYING SYSTEMS	**74,155**	**BGSF**	**$4.32**	**$320,000**
D20	**PLUMBING**				
	Plumbing				
	Per MW budget estimate dated 6-22-20	74,155	gsf	$ 25.00	$1,853,875
	SUBTOTAL PLUMBING	**74,155**	**BGSF**	**$25.00**	**$1,853,875**
D30	**HVAC**				
	HVAC				
	Per MW budget estimate dated 6-22-20				
	HVAC Dry	74,155	gsf	$ 36.00	$2,669,580
	HVAC Wet	74,155	gsf	$ 20.00	$1,483,100
	Controls	74,155	gsf	$ 8.50	$630,318
	SUBTOTAL HVAC	**74,155**	**BGSF**	**$64.50**	**$4,782,998**
D40	**FIRE PROTECTION**				

Roen Associates
121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - New Addition
Pre-Design Budget Estimate

ROEN ASSOCIATES

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Fire Protection				
	Per MW budget estimate dated 6-22-20	74,155	gsf	$ 4.25	$315,159
	SUBTOTAL FIRE PROTECTION	**74,155**	**BGSF**	**$4.25**	**$315,159**
D50	**ELECTRICAL**				
	Electrical				
	Per MW budget estimate dated 6-22-20	74,155	gsf	$ 60.00	$4,449,300
	SUBTOTAL ELECTRICAL	**74,155**	**BGSF**	**$60.00**	**$4,449,300**
E10	**EQUIPMENT**				
115300	**Laboratory Equipment**				
	Laboratory Equipment - Per RFD	1	ls	$ 1,618,980	$1,618,980
	SUBTOTAL EQUIPMENT	**74,155**	**BGSF**	**$21.83**	**$1,618,980**
E20	**CASEWORK & FURNISHINGS**				
	Fixed Casework				
	Classroom Casework Allowance	74,155	sf	$ 5.00	$370,775
	Window Treatment				
	Mini Blinds - Sidelites/Relites	140	sf	$ 8.00	$1,120
	Roller Shades	9,420	sf	$ 20.00	$188,400
	Moveable Furnishings				
	EXCLUDED			$ -	$0
	SUBTOTAL FURNISHINGS	**74,155**	**BGSF**	**$7.56**	**$560,295**
F10	**SPECIAL CONSTRUCTION**				
	None				
	SUBTOTAL SPECIAL CONSTRUCTION	**74,155**	**BGSF**	**$0.00**	**$0**
F20	**SELECTIVE BUILDING DEMOLITION**				
	Building Demolition	See Site Section G10			
	Hazardous Components Abatement				
	None				
	SUBTOTAL SELECTIVE BUILDING DEMOLITION	**74,155**	**BGSF**	**$0.00**	**$0**

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Eastern Washington University
Engineering Building - Existing Renovation
Pre-Design Budget Estimate

ROEN ASSOCIATES

Project Owner:	**Eastern Washington University**	Architect:	LMN Architects
Project Name:	**Engineering Building**	Project Duration:	20 MO
Project Location:	Cheney, WA	Building GSF:	23,650
Project Start Date:	Q3, 2023	Site GSF:	0
Estimate Date:	June 26, 2020		

ESTIMATE SUMMARY					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
A10	Foundations	23,650	BGSF	$0.00	$0
A20	Basement Construction	23,650	BGSF	$0.00	$0
B10	Superstructure	23,650	BGSF	$0.00	$0
B20	Exterior Enclosure	23,650	BGSF	$0.00	$0
B30	Roofing	23,650	BGSF	$0.00	$0
C10	Interior Construction	23,650	BGSF	$9.79	$231,575
C20	Stairs	23,650	BGSF	$0.00	$0
C30	Interior Finishes	23,650	BGSF	$19.56	$462,540
D10	Conveying Systems	23,650	BGSF	$0.00	$0
D20	Plumbing	23,650	BGSF	$9.06	$214,269
D30	HVAC	23,650	BGSF	$34.20	$808,931
D40	Fire Protection	23,650	BGSF	$2.50	$59,125
D50	Electrical	23,650	BGSF	$24.00	$567,600
E10	Equipment	23,650	BGSF	$12.13	$286,770
E20	Casework & Furnishings	23,650	BGSF	$8.40	$198,773
F10	Special Construction	23,650	BGSF	$0.00	$0
F20	Selective Demolition	23,650	BGSF	$8.09	$191,440
Building Construction Subtotal					**$3,021,023**
	Design Contingency			18.00%	$543,784
	Subtotal				$3,564,807
	Contractor Mark Up (Overhead, Profit, Insurance, P&P Bond & Sub Bonds)			6.50%	$231,712
	Subtotal				$3,796,519
	Escalation to Mid-Point (See Summary)				$0
BUILDING GRAND TOTAL		23,650	BGSF	$160.53	**$3,796,519**

Estimate excludes soft costs such as design fees, permits, testing / inspections, construction change order contingencies, loose fixtures / furnishings and sales tax.

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121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - Existing Renovation
Pre-Design Budget Estimate

ROEN ASSOCIATES

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
A10	**FOUNDATIONS**				
	None				
	SUBTOTAL FOUNDATIONS	**23,650**	**BGSF**	**$0.00**	**$0**
A20	**BASEMENT CONSTRUCTION**				
	None				
	SUBTOTAL BASEMENT CONSTRUCTION	**23,650**	**BGSF**	**$0.00**	**$0**
B10	**SUPERSTRUCTURE**				
	None				
	SUBTOTAL SUPERSTRUCTURE	**23,650**	**BGSF**	**$0.00**	**$0**
B20	**EXTERIOR ENCLOSURE**				
	None				
	SUBTOTAL EXTERIOR ENCLOSURE	**23,650**	**BGSF**	**$0.00**	**$0**
B30	**ROOFING**				
	None				
	SUBTOTAL ROOFING	**23,650**	**BGSF**	**$0.00**	**$0**
C10	**INTERIOR CONSTRUCTION**				
	Partitions				
	GWB Partition (GWB - Finish 2 Sides, metal studs, sound batts)	6,350	sf	$ 12.00	$76,200
	STC Rated Walls - Allowance	3,810	sf	$ 6.00	$22,860
	Fire Caulking at Penetrations	23,650	gsf	$ 0.35	$8,278
	Interior - Caulking and Joint Sealants	23,650	gsf	$ 0.30	$7,095
	Miscellaneous Carpentry - Allowance	23,650	gsf	$ 1.00	$23,650
	Interior Glazing				
	HM Sidelights/Relites with 1/4" tempered glazing (Allowance)	56	sf	$ 35.00	$1,960
	Interior Doors, Frames, Hardware				
	HM / SCW Dr, HM Frame, Hardware, Complete - per leaf	10	ea	$ 2,200.00	$22,000
	Fittings / Specialties				
	Visual Displays	23,650	gsf	$ 0.75	$17,738
	MG-1 Marker Glass (Allowance)	192	sf	$ 85.00	$16,320
101400	Signage (Code and Wayfinding)	23,650	gsf	$ 0.75	$17,738
	Misc. Specialties Allowance (FECs, Corner Guards, etc...)	23,650	gsf	$ 0.75	$17,738
	SUBTOTAL INTERIOR CONSTRUCTION	**23,650**	**BGSF**	**$9.79**	**$231,575**

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121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - Existing Renovation
Pre-Design Budget Estimate

ROEN ASSOCIATES

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
C20	**STAIRS**				
	None				
	SUBTOTAL STAIRS	**23,650**	**BGSF**	**$0.00**	**$0**
C30	**INTERIOR FINISHES**				
	Wall Finishes				
	Paint to Walls, Doors, Frames and Miscellaneous	23,650	gsf	$ 3.00	$70,950
	Wainscot - Allowance	2,000	sf	$ 25.00	$50,000
	Miscellaneous Finish Carpentry Allowance	23,650	gsf	$ 0.50	$11,825
	Acoustical Wall Treatment - Allowance	23,650	gsf	$ 3.00	$70,950
	Bases				
	Rubber Base	2,845	lf	$ 2.00	$5,690
	Wood Base (Corridor - Ground Floor)	240	lf	$ 20.00	$4,800
	Floor Finishes				
	Polished Concrete	23,650	sf	$ 7.00	$165,550
	Floor Prep / Moisture Vapor Reducer	23,650	sf	$ 1.00	$23,650
	Ceiling Finishes				
	Exposed Ceiling, Painted (Classrooms/Remaining Spaces)	23,650	sf	$ 2.50	$59,125
	SUBTOTAL INTERIOR FINISHES	**23,650**	**BGSF**	**$19.56**	**$462,540**
D10	**CONVEYING SYSTEMS**				
	None				
	SUBTOTAL CONVEYING SYSTEMS	**23,650**	**BGSF**	**$0.00**	**$0**
D20	**PLUMBING**				
	Plumbing				
	Per MW budget estimate dated 6-22-20	23,650	gsf	$ 9.06	$214,269
	SUBTOTAL PLUMBING	**23,650**	**BGSF**	**$9.06**	**$214,269**
D30	**HVAC**				
	HVAC				
	Per MW budget estimate dated 6-22-20				
	HVAC Dry	23,650	gsf	$ 21.80	$515,570
	HVAC Wet	23,650	gsf	$ 1.57	$37,131
	Controls Upgrade	23,650	gsf	$ 10.83	$256,230
	SUBTOTAL HVAC	**23,650**	**BGSF**	**$34.20**	**$808,931**
D40	**FIRE PROTECTION**				
	Fire Protection				

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Per MW budget estimate dated 6-22-20	23,650	gsf	$ 2.50	$59,125
	SUBTOTAL FIRE PROTECTION	**23,650**	**BGSF**	**$2.50**	**$59,125**
D50	**ELECTRICAL**				
	Electrical				
	Per MW budget estimate dated 6-23-20	23,650	gsf	$ 24.00	$567,600
	SUBTOTAL ELECTRICAL	**23,650**	**BGSF**	**$24.00**	**$567,600**
E10	**EQUIPMENT**				
115300	**Laboratory Equipment**				
	Laboratory Equipment - Per RFD	1	ls	$ 286,770	$286,770
	SUBTOTAL EQUIPMENT	**23,650**	**BGSF**	**$12.13**	**$286,770**
E20	**CASEWORK & FURNISHINGS**				
	Fixed Casework				
	Classroom Casework Allowance	23,650	sf	$ 6.50	$153,725
	Window Treatment				
	Mini Blinds - Sidelites/Relites	56	sf	$ 8.00	$448
	Roller Shades	2,230	sf	$ 20.00	$44,600
	Moveable Furnishings				
	EXCLUDED			$ -	$0
	SUBTOTAL FURNISHINGS	**23,650**	**BGSF**	**$8.40**	**$198,773**
F10	**SPECIAL CONSTRUCTION**				
	None				
	SUBTOTAL SPECIAL CONSTRUCTION	**23,650**	**BGSF**	**$0.00**	**$0**
F20	**SELECTIVE BUILDING DEMOLITION**				
	Building Structural Demolition				
	Slab on grade removal and replace - Allowance	1	ls	$ 25,000.00	$25,000
	Building Interior Demolition				
	Partitions	340	lf	$ 15.00	$5,100
	Door, Frame & HW	20	ea	$ 120.00	$2,400
	Flooring	23,650	sf	$ 1.50	$35,475
	Rubber Base	2,845	lf	$ 1.00	$2,845
	Ceilings	23,650	sf	$ 1.50	$35,475
	Casework	635	lf	$ 20.00	$12,700
	Miscellaneous Demolition	120	hrs	$ 60.00	$7,200
	Temporary Partitions / Dust Control - Allowance	400	sf	$ 25.00	$10,000

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121 South Wall Street
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Eastern Washington University
Engineering Building - Existing Renovation
Pre-Design Budget Estimate

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Phasing - Allowance	2	ea	$ 2,500.00	$5,000
	Supervision, Hauling & Dump Fees	15%	on	$334,968	$50,245
	Mechanical, Electrical and Plumbing	In MEP Numbers Above			
	SUBTOTAL SELECTIVE BUILDING DEMOLITION	**23,650**	**BGSF**	**$8.09**	**$191,440**
Z10	**GENERAL REQUIREMENTS**				
	General Conditions				
	See Summary				
	SUBTOTAL GENERAL REQUIREMENTS	**23,650**	**BGSF**	**$0.00**	**$0**

Roen Associates
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Eastern Washington University
Engineering Building - Sitework
Pre-Design Budget Estimate

Project Owner:	**Eastern Washington University**	Architect:	LMN Architects
Project Name:	**Engineering Building**	Project Duration:	20 MO
Project Location:	Cheney, WA	Building GSF:	74,155
Start Date:	Q3, 2023	Site GSF:	114,000
Estimate Date:	June 26, 2020		

ESTIMATE SUMMARY					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
G10	Site Preparation	114,000	gsf	$11.70	$1,333,366
G20	Site Improvements	114,000	gsf	$6.18	$704,336
G30	Site Civil / Mech Utilities	114,000	gsf	$2.26	$258,000
G40	Site Electrical Utilities	114,000	gsf	$5.44	$620,000
G50	Other Site Construction	114,000	gsf	$0.00	$0
Sitework Subtotal					**$2,915,702**
	Design Contingency			18.00%	$524,826
	Subtotal				$3,440,528
	Contractor Mark Up (Overhead, Profit, Insurance, P&P Bond & Sub Bonds)			6.50%	$223,634
	Subtotal				$3,664,163
	Escalation to Mid-Point (See Summary)			0.00%	$0
SITE GRAND TOTAL		114,000	BGSF	$32.14	**$3,664,163**

Estimate excludes soft costs such as design fees, permits, testing / inspections, construction change order contingencies, loose fixtures / furnishings and sales tax.

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121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - Sitework
Pre-Design Budget Estimate

ROEN ASSOCIATES

DETAILED ESTIMATE					
No.	Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
G10	**SITE PREPARATON**				
	Mobilization	1	ls	20,000.00	$20,000
	Site Demolition & Relocation				
	Building Demolition (Cadet Hall)	6,600	sf	12.00	$79,200
	Building Demolition includes temporary enclosure (at Existing Building	1,500	sf	25.00	$37,500
	Sawcut Existing Asphalt Paving Lines	600	lf	2.00	$1,200
	Remove Wheel Stops	10	ea	75.00	$750
	Remove Trees	5	ea	200.00	$1,000
	Remove Asphalt Paving	37,300	sf	1.50	$55,950
	Remove Concrete Walks	9,800	sf	2.50	$24,500
	Remove Dumpster/Mechanical Enclosure	800	sf	10.00	$8,000
	Demo Utilities	160	lf	30.00	$4,800
	Misc. Site Clearing	1	ls	7,500.00	$7,500
	Site Earthwork				
	TESC Erosion Control				
	Filter Fabric Fence	650	lf	8.00	$5,200
	Catch Basin Inlet Protection	10	ea	150.00	$1,500
	Stabilized Construction Entry	2,800	sf	3.50	$9,800
	Tree Protection Fencing	300	lf	20.00	$6,000
	Clear and Grub	42,000	sf	0.30	$12,600
	Excavation				
	Strip Topsoil (to stockpile)	1,556	cy	6.00	$9,336
	Export Unsuitable - Allowance	138	cy	35.00	$4,830
	Imported Fill - Allowance	1,158	cy	45.00	$52,110
	Rock Excavation - Allowance	2,056	cy	70.00	$143,920
	Shoring - Allowance	1	ls	25,000.00	$25,000
	Basement Excavation and Export	13,704	cy	30.00	$411,120
	Pilings (includes mobilization)	52	ea	5,800.00	$301,600
	Finish Grading	96,500	sf	0.30	$28,950
	Hazardous Waste Remediation				
	Allowance	8,100	sf	10.00	$81,000
	SUBTOTAL SITE PREPARATON	**114,000**	**SGA**	**$11.70**	**$1,333,366**
G20	**SITE IMPROVEMENTS**				
	Asphalt Paving (Base Courses Included)				
	Medium Duty (3" HMA over 4" Crushed Rock)	24,000	sf	3.50	$84,000
	Concrete Site Work (Base Courses Included)				
	Curbs - Standard	880	lf	20.00	$17,600
	Hardscape - Concrete	18,200	sf	8.00	$145,600
	8" Concrete Paving	3,400	sf	10.00	$34,000
	Brick Pavers - Allowance	1	ls	30,000.00	$30,000
	Retaining Wall - Allowance	1	ls	75,000.00	$75,000

Roen Associates
121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - Sitework
Pre-Design Budget Estimate

ROEN ASSOCIATES

No.	DETAILED ESTIMATE Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Pavement Markings/Site Signage				
	Striping - ADA Stalls with Signage	2	ea	1,000.00	$2,000
	Striping - Standard Stalls	50	ea	30.00	$1,500
	Stop Signs	2	ea	800.00	$1,600
	Tactile Warning Strips	40	sf	30.00	$1,200
	Site Development				
	Site Furnishings (Allowance)	1	ls	30,000.00	$30,000
	Site Improvements not shown (Allowance)	1	ls	100,000.00	$100,000
	New Electrical/Trash Enclosure - Allowance	1	ls	50,000.00	$50,000
	Landscaping/Irrigation				
	Landscaping/Irrigation (Allowance)	35,000	sf	3.50	$122,500
	Place Topsoil (from stockpile)	1,556	cy	6.00	$9,336
	SUBTOTAL SITE IMPROVEMENTS	**114,000**	**SGA**	**$6.18**	**$704,336**
G30	**SITE CIVIL / MECHANICAL UTILITIES**				
	Water Service				
	Tie-in at Existing (includes gate valve)	1	ea	$ 3,000.00	$3,000
	Water/Fire Line, 8" Ductile Iron (includes trench, bedding and backfill)	150	lf	$ 70.00	$10,500
	Water/Fire Line, 6" Ductile Iron (includes trench, bedding and backfill)	100	lf	$ 55.00	$5,500
	Water Meter	1	ea	$ 5,000.00	$5,000
	Irrigation Meter	1	ea	1,500.00	$1,500
	Irrigation Line, 1" PVC (includes trench, bedding and backfill)	30	lf	$ 30.00	$900
	Double Check Valve (in vault)	1	ea	$ 12,000.00	$12,000
	Pressure Reducing Valve (Domestic)	1	ea	$ 3,700.00	$3,700
	Domestic Water, 2" Ductile Iron (includes trench, bedding and backfill)	100	lf	$ 45.00	$4,500
	Fire Line - Dry (4" Ductile Iron)	100	lf	55.00	$5,500
	FDC - Fire Department Connection	1	ea	$ 1,800.00	$1,800
	PIV - Post Indicator Valve	1	ea	$ 2,500.00	$2,500
	Hydrant Assembly	1	ea	$ 4,500.00	$4,500
	Sanitary Sewer Systems				
	Tie-in at Existing	1	ea	$ 500.00	$500
	Side Sewer, 6" PVC (includes trench, bedding and backfill)	130	lf	$ 50.00	$6,500
	Cleanouts	1	ea	$ 650.00	$650
	Storm Drainage				
	Drain Line, 8" PVC (includes trench, bedding and backfill)	100	lf	$ 35.00	$3,500
	Roof Drain Line, 4"/6" PVC (includes trench, bedding and backfill)	500	lf	$ 30.00	$15,000
	Underslab Pipe (Allowance)	1,000	lf	$ 35.00	$35,000
	Footing Drainpipe (Allowance)	500	lf	$ 35.00	$17,500
	Storm Drainage in Parking Lot (Allowance)	1	ls	$ 20,000.00	$20,000
	Cleanouts	3	ea	$ 550.00	$1,650
	Detention Tanks	2	ea	30,000.00	$60,000
	Control and Access Structures	2	ea	14,000.00	$28,000
	Gas:				

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121 South Wall Street
Spokane, WA 99201

Eastern Washington University
Engineering Building - Sitework
Pre-Design Budget Estimate

No.	DETAILED ESTIMATE Description	Quantity	Unit of Measure	Unit Cost	Total Estimated Cost
	Natural Gas Trench and Backfill (Gas Line by Utility Purveyor)	200	lf	24.00	$4,800
	Existing Street Surface Repair/Traffic Control	200	sf	20.00	$4,000
	SUBTOTAL SITE CIVIL / MECHANICAL UTILITIES	**114,000**	**SGA**	**$2.26**	**$258,000**
G40	**SITE ELECTRICAL UTILITIES**				
	Electrical and Telecom Utilities				
	Relocation of Existing Electrical Services for new Main Entry	1	ls	$ 500,000	$500,000
	Exterior Lighting - Allowance	1	ls	$ 120,000	$120,000
	SUBTOTAL SITE ELECTRICAL UTILITIES	**114,000**	**SGA**	**$5.44**	**$620,000**
G50	**OTHER SITE CONSTRUCTION**				
	None				
	SUBTOTAL OTHER SITE CONSTRUCTION	**114,000**	**SGA**	**$0.00**	**$0**
Z10	**GENERAL REQUIREMENTS**				
	General Conditions				
	See Summary				
	SUBTOTAL GENERAL REQUIREMENTS	**114,000**	**SGA**	**$0.00**	**$0**

8.6 LETTER FROM DAHP

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

June 22, 2020

Troy Bester
Senior Project Manager
EWU Construction and Planning Services
101 Rozell
Cheney, WA 99004

In future correspondence please refer to:
Project Tracking Code: 2020-06-04168
Re: EWU Engineering Building

Dear Troy Bester:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHP). The above referenced project has been reviewed on behalf of the State Historic Preservation Officer (SHPO) under provisions of Governor's Executive Order 05-05. Our review is based upon documentation contained in your communication.

We understand the current project to be in the pre-design phase, and it is therefore exempt from further review under Governor's Executive Order 05-05. Should the construction phase of the project become obligated with Washington State Capital Funding, we look forward to continuing consultation. In order to initiate this consultation, we will request the following items:

- EZ-1 form prepared for all ground disturbing activities
- EZ-2 forms for any buildings or structures 45 years in age or more that are proposed for alteration or demolition; please note, due to the lack of information requested in an EZ-2, DAHP may request the preparation of a Historic Property Inventory Form during consultation. This HPIF must be completed by a cultural resource professional, and would provide the University and DAHP the most information possible to make our decisions.

Thank you for the opportunity to review and comment. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. If you have any questions, please feel free to contact me.

Sincerely,

Holly Borth
Project Compliance Reviewer
(360) 586-3533
holly.borth@dahp.wa.gov

State of Washington • **Department of Archaeology & Historic Preservation**
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

8.7 C100

STATE OF WASHINGTON

AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2020

Agency	Eastern Washington University
Project Name	Engineering Building
OFM Project Number	30000556

Contact Information	
Name	Shawn King
Phone Number	509-359-6878
Email	sking@ewu.edu

Statistics			
Gross Square Feet	97,805	MACC per Square Foot	$460
Usable Square Feet	53,792	Escalated MACC per Square Foot	$504
Space Efficiency	55.0%	A/E Fee Class	A
Construction Type	Other Sch. A Projects	A/E Fee Percentage	7.28%
Remodel	No	Projected Life of Asset (Years)	30
Additional Project Details			
Alternative Public Works Project		Art Requirement Applies	Yes
Inflation Rate	2.38%	Higher Ed Institution	Yes
Sales Tax Rate %	8.70%	Location Used for Tax Rate	Cheney, WA
Contingency Rate	5%		
Base Month	June-20	OFM UFI# (from FPMT, if available)	
Project Administered By	Agency		

Schedule			
Predesign Start	February-20	Predesign End	June-20
Design Start	November-21	Design End	January-23
Construction Start	July-23	Construction End	March-25
Construction Duration	20 Months		

Green cells must be filled in by user

Project Cost Estimate

Total Project	**$63,921,263**	Total Project Escalated	**$69,748,366**
		Rounded Escalated Total	**$69,748,000**

STATE OF WASHINGTON

AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2020

Agency	Eastern Washington University
Project Name	Engineering Building
OFM Project Number	30000556

Cost Estimate Summary

Acquisition			
Acquisition Subtotal	**$0**	**Acquisition Subtotal Escalated**	**$0**

Consultant Services			
Predesign Services	$295,214		
A/E Basic Design Services	$2,390,408		
Extra Services	$1,490,797		
Other Services	$1,161,059		
Design Services Contingency	$266,874		
Consultant Services Subtotal	**$5,604,352**	**Consultant Services Subtotal Escalated**	**$5,939,232**

Construction			
Construction Contingencies	$2,551,779	Construction Contingencies Escalated	$2,798,026
Maximum Allowable Construction Cost (MACC)	$45,035,573	Maximum Allowable Construction Cost (MACC) Escalated	$49,303,460
Sales Tax	$4,140,100	Sales Tax Escalated	$4,532,830
Construction Subtotal	**$51,727,451**	**Construction Subtotal Escalated**	**$56,634,316**

Equipment			
Equipment	$3,377,668		
Sales Tax	$293,857		
Non-Taxable Items	$0		
Equipment Subtotal	**$3,671,525**	**Equipment Subtotal Escalated**	**$4,025,828**

Artwork			
Artwork Subtotal	**$347,007**	**Artwork Subtotal Escalated**	**$347,007**

Agency Project Administration			
Agency Project Administration Subtotal	$1,770,928		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$1,770,928**	**Project Administation Subtotal Escalated**	**$1,941,823**

Other Costs			
Other Costs Subtotal	**$800,000**	**Other Costs Subtotal Escalated**	**$860,160**

Project Cost Estimate			
Total Project	**$63,921,263**	Total Project Escalated	**$69,748,366**
		Rounded Escalated Total	**$69,748,000**

Cost Estimate Details

Acquisition Costs					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Purchase/Lease					
Appraisal and Closing					
Right of Way					
Demolition					
Pre-Site Development					
Other					
Insert Row Here					
ACQUISITION TOTAL	**$0**		**NA**	**$0**	

Cost Estimate Details

Consultant Services				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Pre-Schematic Design Services				
Programming/Site Analysis				
Environmental Analysis				
Predesign Study	$295,214			
Other				
Insert Row Here				
Sub TOTAL	**$295,214**	**1.0339**	**$305,222**	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	$2,390,408			69% of A/E Basic Services
Other				
Insert Row Here				
Sub TOTAL	**$2,390,408**	**1.0482**	**$2,505,626**	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)	$95,965			
Geotechnical Investigation	$29,750			
Commissioning	(see "Other Serv.")			
Site Survey	$25,500			
Testing	(see "Other Serv.")			
LEED Services	$88,035			
Voice/Data Consultant	$53,849			
Value Engineering	$35,080			
Constructability Review	$28,033			
Environmental Mitigation (EIS)	(see "Other Serv.")			
Landscape Consultant	$142,719			
Electronic Security Consultant	$17,876			
Audiovisual Consultant	$39,572			
Lighting Consultant	$51,710			
Laboratory Consultant	$254,220			
Acoustical Consultant	$30,396			
Interior Design	$58,310			
Elevator Consultant	$18,976			
Hardware Consultant	$7,922			
Code Consultant				
Building Envelope Consultant	$91,503			
Value Engineering Support	$35,080			
Constructability Participation	$28,033			
Energy Life Cycle Cost Analysis	$30,804			
Life Cycle Cost Analysis	$90,066			
Renovation Design at CEB	$31,480			
Energy Modeling	$58,582			
Models & Renderings	$14,450			
Full Fire Protection Design	$12,886			
Reimbursable Expenses	$120,000			
Sub TOTAL	**$1,490,797**	**1.0482**	**$1,562,654**	Escalated to Mid-Design
4) Other Services				
Bid/Construction/Closeout	$1,073,951			31% of A/E Basic Services
HVAC Balancing	$17,000			
Staffing				
Commissioning Support	$29,862			
Record Drawings	$40,246			
Sub TOTAL	**$1,161,059**	**1.0965**	**$1,273,102**	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	$266,874			
Other				
Insert Row Here				
Sub TOTAL	**$266,874**	**1.0965**	**$292,628**	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	**$5,604,352**		**$5,939,232**	

Cost Estimate Details

Construction Contracts				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Site Work				
G10 - Site Preparation	$1,675,641			
G20 - Site Improvements	$885,139			
G30 - Site Mechanical Utilities	$324,229			
G40 - Site Electrical Utilities	$779,154			
G60 - Other Site Construction	$0			
Other				
Insert Row Here				
Sub TOTAL	**$3,664,163**	**1.0752**	**$3,939,708**	
2) Related Project Costs				
Offsite Improvements				
City Utilities Relocation				
Parking Mitigation				
Stormwater Retention/Detention				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0752**	**$0**	
3) Facility Construction				
A10 - Foundations	$1,081,267			
A20 - Basement Construction	$660,265			
B10 - Superstructure	$4,751,825			
B20 - Exterior Closure	$4,037,259			
B30 - Roofing	$874,932			
C10 - Interior Construction	$2,639,646			
C20 - Stairs	$251,340			
C30 - Interior Finishes	$2,718,760			
D10 - Conveying	$402,144			
D20 - Plumbing Systems	$2,599,037			
D30 - HVAC Systems	$7,027,376			
D40 - Fire Protection Systems	$470,362			
D50 - Electrical Systems	$6,304,738			
F10 - Special Construction				
F20 - Selective Demolition	$240,583			
General Conditions	$1,800,000			
CFCI Equipment	$2,394,956			
CFCI Casework and Furnishings	$953,921			
Escalation Adjustment	$2,162,999			
Sub TOTAL	**$41,371,410**	**1.0965**	**$45,363,752**	
4) Maximum Allowable Construction Cost				
MACC Sub TOTAL	**$45,035,573**		**$49,303,460**	
This Section is Intentionally Left Blank				
7) Construction Contingency				
Allowance for Change Orders	$2,251,779			
Additional Allowance for Renovation Portion of Project	$300,000			
Insert Row Here				
Sub TOTAL	**$2,551,779**	**1.0965**	**$2,798,026**	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0965**	**$0**	
Sales Tax				
Sub TOTAL	**$4,140,100**		**$4,532,830**	
CONSTRUCTION CONTRACTS TOTAL	**$51,727,451**		**$56,634,316**	

Cost Estimate Details

Equipment					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
E10 - Equipment	$2,251,779				
E20 - Furnishings	$1,125,889				
F10 - Special Construction					
Other					
Insert Row Here					
Sub TOTAL	**$3,377,668**		**1.0965**	**$3,703,613**	
1) Non Taxable Items					
Other					
Insert Row Here					
Sub TOTAL	**$0**		**1.0965**	**$0**	
Sales Tax					
Sub TOTAL	**$293,857**			**$322,215**	
EQUIPMENT TOTAL	**$3,671,525**			**$4,025,828**	

Cost Estimate Details

Artwork					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Project Artwork	$0				0.5% of total project cost for new construction
Higher Ed Artwork	$347,007				0.5% of total project cost for new and renewal construction
Other					
Insert Row Here					
ARTWORK TOTAL	**$347,007**		**NA**	**$347,007**	

Cost Estimate Details

Project Management					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Agency Project Management	$1,770,928				
Additional Services					
Other					
Insert Row Here					
PROJECT MANAGEMENT TOTAL	**$1,770,928**		**1.0965**	**$1,941,823**	

Cost Estimate Details

Other Costs					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Mitigation Costs					
Hazardous Material Remediation/Removal	$300,000				
Historic and Archeological Mitigation					
Permits, Etc...	$500,000				
OTHER COSTS TOTAL	**$800,000**		**1.0752**	**$860,160**	

8.8 CHENEY HALL, CEB & CADET HALL FCS REPORTS

Eastern Washington University	**Institution ID**	370
Eastern Washington University	**Site ID**	OFMSID00002
Cheney Hall	**Facility ID**	1163

Facility Size - Gross	31,018	**Facility Size- Assignable**	21,295
Original Year Of Construction	1966	**Year Of Last Renovation**	2005
Facility Use Type	Teaching Labs		
Construction Type	Medium		

Survey Date	12/01/15	**Survey Done By**	SEK

Facility Condition Summary

Overall Facility Condition Score **2.6**

Facility Components

Uniformat II Components	Component Scores	Component Comments
A Substructure:	**2.0**	
Foundations		
Standard Foundations	2	
Slab on Grade	2	
B Shell:	**2.3**	
Superstructure		
Floor Construction	2	
Roof Construction	2	
Exterior Closure		paint shop score - 3 fab shop score - 5, internal stairwell rails not to code
Exterior Walls	2	
Exterior Windows	4	
Exterior Doors	3	
Roofing		
Roof Coverings	3	
Roof Opening	3	
Projections	2	
C Interiors:	**2.8**	
Interior Construction		
Fixed and Moveable Partitions	3	
Interior Doors	3	
Specialties	3	
Staircases		
Stair Construction	2	
Stair Finishes	2	

Eastern Washington University	**Institution ID**	370
Eastern Washington University	**Site ID**	OFMSID00002
Cheney Hall	**Facility ID**	1163

Interior Finishes		
Wall Finishes	3	
Floor Finishes	2	
Ceiling Finishes	4	
D Services:	**3.0**	
Vertical Transportation		life cycle met - good wokring condition though (C. Opsal)
Elevators and Lifts	3	
Plumbing		1st floor - 1, 2nd floor - 4 (J. Butler)
Plumbing Fixtures	4	
Domestic Water Distribution	3	
Sanitary Waste	3	
Rain Water Drainage	3	
Special Plumbing Systems	3	
HVAC		score - 2 (J. Butler)
Energy Supply	3	
Heat Generating Systems	3	
Cooling Generating Systems		
Distribution Systems	3	
Terminal and Package Units	4	
Controls and Instrumentation	4	
Special HVAC Systems and Eq	4	
Fire Protection		
Fire Protection Sprinkler Syste	5	
Stand-Pipe and Hose Systems		
Fire Protection Specialties	3	
Special Fire Protection System		
Electrical		
Electrical Service and Distributi	2	
Lighting and Branch Wiring	2	
Communication and Security S	4	
Special Electrical Systems		
E Equipment and Furnishings:	**1.3**	
Equipment and Furnishings		
Fixed Furnishings and Equipm	1	
Moveable Furnishings (Capital	2	
E Special Construction:		
Special Construction		
Integrated Constr. & Special Co		
Special Controls and Instrume		

Facility Survey Summary

Eastern Washington University	**Institution ID**	370
Eastern Washington University	**Site ID**	OFMSID00002
Computing and Engineering Sc	**Facility ID**	1160

Facility Size - Gross	98,383	**Facility Size- Assignable**	54,910
Original Year Of Construction	2005	**Year Of Last Renovation**	
Facility Use Type	Teaching Labs		
Construction Type	Medium		

Survey Date	12/01/15	**Survey Done By**	SEK

Facility Condition Summary

Overall Facility Condition Score 1.6

Facility Components

Uniformat II Components	Component Scores	Component Comments
A Substructure:	**2.2**	
Foundations		
Standard Foundations	1	
Slab on Grade	4	
B Shell:	**1.0**	
Superstructure		
Floor Construction	1	
Roof Construction	1	
Exterior Closure		fab shop score - 1
Exterior Walls	1	
Exterior Windows	1	
Exterior Doors	1	
Roofing		
Roof Coverings	1	
Roof Opening	1	
Projections	1	
C Interiors:	**1.4**	
Interior Construction		
Fixed and Moveable Partitions	1	
Interior Doors	1	
Specialties	1	
Staircases		
Stair Construction	1	
Stair Finishes	2	

Print Date: 07/25/16

Eastern Washington University	Institution ID	370
Eastern Washington University	Site ID	OFMSID00002
Computing and Engineering Sc	Facility ID	1160

Interior Finishes	
Wall Finishes	2
Floor Finishes	2
Ceiling Finishes	1
D Services:	**2.1**
Vertical Transportation	
Elevators and Lifts	2
Plumbing	
Plumbing Fixtures	2
Domestic Water Distribution	2
Sanitary Waste	2
Rain Water Drainage	2
Special Plumbing Systems	2
HVAC	
Energy Supply	2
Heat Generating Systems	2
Cooling Generating Systems	
Distribution Systems	3
Terminal and Package Units	2
Controls and Instrumentation	2
Special HVAC Systems and Eq	3
Fire Protection	
Fire Protection Sprinkler Syste	2
Stand-Pipe and Hose Systems	
Fire Protection Specialties	2
Special Fire Protection System	
Electrical	
Electrical Service and Distributi	2
Lighting and Branch Wiring	2
Communication and Security S	1
Special Electrical Systems	
E Equipment and Furnishings:	**2.4**
Equipment and Furnishings	
Fixed Furnishings and Equipm	3
Moveable Furnishings (Capital	1
E Special Construction:	
Special Construction	
Integrated Constr. & Special Co	
Special Controls and Instrumen	

Print Date: 07/25/16

Eastern Washington University	**Institution ID**	370	
Eastern Washington University	**Site ID**	OFMSID00002	
Cadet Hall	**Facility ID**	1157	

Facility Size - Gross	10,187	**Facility Size- Assignable**	7,760
Original Year Of Construction	1956	**Year Of Last Renovation**	1978
Facility Use Type	General Classroom		
Construction Type	Heavy		

Survey Date	12/01/15	**Survey Done By**	SEK

Facility Condition Summary

Overall Facility Condition Score **2.7**

Facility Components

Uniformat II Components	Component Scores	Component Comments
A Substructure:	**3.0**	
Foundations		
Standard Foundations	3	
Slab on Grade	3	
B Shell:	**2.9**	
Superstructure		
Floor Construction	3	
Roof Construction	3	
Exterior Closure		fab shop score - 5, inside staircase rail & 2nd floor fire escape not to code
Exterior Walls	3	
Exterior Windows	3	
Exterior Doors	3	
Roofing		
Roof Coverings	2	
Roof Opening	2	
Projections	2	
C Interiors:	**3.0**	
Interior Construction		
Fixed and Moveable Partitions	3	
Interior Doors	3	
Specialties	3	
Staircases		
Stair Construction	3	
Stair Finishes	3	

Interior Finishes		
Wall Finishes	3	
Floor Finishes	3	
Ceiling Finishes	3	
D Services:	**3.8**	
Vertical Transportation		NA
Elevators and Lifts		
Plumbing		
Plumbing Fixtures	4	
Domestic Water Distribution	3	
Sanitary Waste	3	
Rain Water Drainage	3	
Special Plumbing Systems		
HVAC		score - 3 (J. Butler)
Energy Supply	4	
Heat Generating Systems		
Cooling Generating Systems	3	
Distribution Systems	4	
Terminal and Package Units	4	
Controls and Instrumentation	5	
Special HVAC Systems and Eq		
Fire Protection		Detection/Reporting in place of suppression
Fire Protection Sprinkler Syste	5	
Stand-Pipe and Hose Systems		
Fire Protection Specialties	4	
Special Fire Protection System		
Electrical		life cycle met (C. Opsal)
Electrical Service and Distributi	4	
Lighting and Branch Wiring	4	
Communication and Security S	3	
Special Electrical Systems		
E Equipment and Furnishings:	**3.0**	
Equipment and Furnishings		
Fixed Furnishings and Equipm	3	
Moveable Furnishings (Capital	3	
E Special Construction:		
Special Construction		
Integrated Constr. & Special Co		
Special Controls and Instrume		