SOUTHERN UTAH UNIVERSITY

LEARNING LIVES FOREVER

Architectural Program

Science Center Addition

Cedar City, Utah

January 25, 2008

APPROVALS – SIGNATURE PAGE
Project: Programming for Science Center Addition
DFCM Project No. 07297730/Contract No. 087233

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Executive Summary

In the United States and Utah specifically, to maintain and increase a competitive edge in the Sciences we must continuously endeavor to improve the quality of education at every level.

SUU is renowned for high quality undergraduate education. The proposed construction of an addition to the Science Center will enable the Sciences to improve the quality of our Undergraduate Science programs. This, in turn, contributes toward increasing the competitive edge in higher education in Utah and the Nation.

With the addition of these updated and expanded teaching spaces, SUU's undergraduate Science programs will better prepare our 1500 majors to enter America's workforce and graduate or professional schools in critical fields such as Teaching, Medicine, Nursing, Pharmacy, and the basic sciences of Biology, Chemistry, Geology, and Physics.

The additional teaching labs will also relieve bottlenecks in science courses required for General Education of all SUU students.

Space Summary

Space Requirement for the new Science Center Addition are:

Department of Physical Science	
Chemistry	2,700 s.f.
Department of Nursing	7,870 s.f.
Department of Biology	
Labs and Faculty	7,700 s.f.
Animal Care	1,650 s.f.
Natural Hist. Museum	1,880 s.f.
Greenhouse	5,850 s.f.
Total Net Sq Ft	**27,650 s.f.**
Total Gross Sq Ft	**42,350 s.f.**

The new Science Center addition will provide 27,650 net square feet of much needed teaching lab and support space for fully equipped, state-of-the-art undergraduate science preparation.

The building addition will primarily provide spaces for teaching hands-on science in modern labs for Life Science and Physical Science (e.g. pre-medicine, pre-dentistry, and pre-Pharmacy), and Nursing.

Thanks to a generous private donation of $3 million dollars, the State of Utah can more affordably improve and expand SUU's science teaching space for the benefit of the state as well as the nation.

Probable Construction Cost

Based on the information presented in this facility program for the construction of a new Science Center addition within the schedule described, the probable total construction cost of the new building is estimated at $20 Million.

Project Schedule

The schedule for the project has architectural design beginning in Sept., 2008, with construction documents and contractor bidding being completed by summer of 2009. Construction of the new facility will start early in the summer of 2009 and the expanded Science Facility will be ready for occupancy by November, 2010.

Funding Sources Secured

Cedar City, Southern Utah University and the State of Utah are committed to the development of educational resources that will further facilitate the economic growth in the area.

State funding for the project is requested to allow the project to begin in the summer of 2008.

Aerial July 2006
Footprint of 12,936 s.f available for the new Science Center addition

Project Description

This project is to construct a 42,350 sq. ft. building addition to the east end of the east wing of the existing Science Center. The current Life Science Building, built in 1977, is located on a portion of the space required for the new addition. After reviewing the cost analysis conducted by a previous architect the most cost effective solution is to remove the Life Science Building and the antiquated greenhouse (currently connecting the Life Science Building to the Science Building) and construct the new addition on this site.

Goals of the proposed building:

1. Help relieve SUU's Undergraduate Science bottlenecks caused by limited teaching labs, and enable continued growth in preparing students for employment as science teachers, nurses, scientists, or graduate programs in medicine, dentistry, pharmacy, and basic sciences.

2. Further consolidate College of Science space for programs that produce some of the highest quality undergraduate science majors in the state and region.

Resource: Southern Utah University Capital Development Request FY09

Project Justification

Examples of wise investments for the State of Utah include enhancing educational opportunities that help meet the projected needs in health care and medical research (doctors, nurses, and research scientists in drugs and genetics). Graduate institutions and employers are basing their qualifications for admission or hiring choice on those who have experience in undergraduate research and demonstrate their knowledge, abilities, and communication skills.

The College of Science is in desperate need of lab space to provide the required training in undergraduate research. The college has approximately 1,500 undergraduate majors, and graduates nearly 200 students each year. Approximately 60% of these graduates continue their education in professional or other graduate programs.

The 1,500 undergraduate majors in the College of Science are among the disciplines of Agriculture, Biology, Chemistry, Geo-Sciences, Nursing, and Nutrition. Additionally, SUU serves another 6,000 non-science majors taking General Education science courses in partial fulfillment of the requirements of a baccalaureate of science degree from the University. Student credit hours (SCH) production has grown 78% from the year 2002.

While providing all SUU undergraduate students with science courses that include a laboratory component is important, providing SUU science majors with significant laboratory and undergraduate research training is essential and not an option. If the University fails to provide undergraduate science majors with such training and experience, students will not be competitive for employment or admission to post-baccalaureate higher education. This would be a very unfortunate outcome for the State of Utah given the compelling need for science teachers, health professionals and other science careers.

Project Justification continued

In May 2007, the College of Science graduated approximately 200 students. Many of these graduates continue their higher education in professional or other graduate programs. This year, for example, 19 have been accepted to Medical, Dental, or Pharmacy schools representing 26% of SUU Biology and Chemistry graduates.

SUU has gained a reputation for prestigious placements into graduate programs such as the Case Western, George Washington, Ohio State, Oxford, Penn State, University of Utah, Utah State University, University of Washington, and Wake Forest, just to name a few. For SUU students to gain acceptance into these and other graduate programs, however, students must demonstrate proficiency in conducting undergraduate research and producing a tangible product (usually a presentation at a professional meeting and/or a publication).

The teaching labs of the new addition will include space for students to leave equipment and experiments setup for extended periods of time. This will enable undergraduates to discover and follow through with science research projects that can culminate in standard types of scholarly products such as presentations and papers. Such products are required for today's competitive job market and competitive admission into graduate and professional programs.

Enrollment growth is strong. Science enrollment has increased 100% in 15 years since 1992 when the current Science Building was built, and SCH has increased 78% in the last four years. In fact, three of the programs (Biology, Chemistry, and Nursing) are developing significant bottlenecks in campus-wide programs because of their respective growth and subsequent limitations in numbers of lab sections of service courses. The College of Science also serves approximately 6,000 non-science majors who are taking General Education science courses which are necessary for program completion.

One example of a robust program with exceptional growth potential that will be enabled by the new addition is Nursing. Being able to move the Nursing Program from the General Classroom Building basement to the new Science addition will free up critically needed space for expansion by departments and programs in the College of Humanities and Social Sciences (e.g. Psychology and Criminal Justice). Additional Nursing space will also facilitate SUU's role in producing baccalaureate prepared Nurses for rural Utah and beyond.

Essential Program Growth Requirements

When SUU was founded 109 years ago, its central focus was to be a Teacher Training School. One of the primary foundations of this institutional mission and service to Utah's future is promoting education of the Sciences.

The College of Science offers curricula in Agriculture, Anatomy, Astronomy, Agronomy, Biology, Botany, Chemistry, Equine Management, Food Science, Forensic Sciences, Geology, Geography, Geographic Information Systems (GIS), Natural Resources, Nursing, Nutrition, Physics, Physiology, Range Management, and Zoology.

Essential Program Growth Requirements continued

The fundamental essence of all the sciences, however, is hands-on scientific experience either in the field or in the lab and approximately 60% of our undergraduates continue their higher education in professional or other post-baccalaureate graduate programs.

Dr. Wayne Samuelson, Associate Dean of Admissions for the U. of Utah School of Medicine, in a letter to Dean Ornes at SUU states that:

> "We require that every student applying to the U. of Utah School of Medicine have at least some experience in the conduct of hypothesis based research" . . . "we will not even interview a candidate who cannot demonstrate at least a minimal level of participation in a meaningful research project" . . . "a student who has presented or published his/her work makes a very strong impression on our committee. We consider success in a peer-review process to be reliable validation of the quality of the work."

Dr. Harold Ornes, the Dean of the College of Science has received similar statements from Utah State University, BYU, and the School of Engineering at the U. of Utah, as well as statements from UVSC and Weber State University regarding the requirement for science undergraduates to actually perform scientific based study and research in a laboratory setting in addition to theoretical classroom science.

The increased teaching laboratory space will support numerous programs on the SUU campus. For example, the Sciences support several degree programs related to science teacher preparation and education. SUU has enlarged the Nursing program (78% increase in graduates from 2006 to 2007) and the basic Sciences are the primary support curriculum for Nursing. Pre-medicine, dentistry, pharmacy, and veterinary medicine also are strong programs at SUU. Approximately 75 % of our 1,500 science majors have career goals related to health professions.

The Engineering program at SUU is growing and the Sciences support this Interdisciplinary Engineering 4-year degree program. Additionally, the College of Science provides core and specialty coursework that support expanding programs such as Forensic Sciences (a newly approved graduate degree started fall 2006, the Master of Science in Forensic Science, with 40 students enrolled).

SUU has earned membership in the Colorado Plateau Cooperative Ecosystem Study Unit (CPCESU), a regional unit of the nationwide CESU system whereby universities partner with federal agencies in their region for the purpose of expeditious and cost-effective scientific education and research endeavors. SUU is involved in talks with the Governor's Centers of Excellence representatives and hope to become a partner in this statewide initiative.

The College of Science has a growing institutional relationship with the National Park Service and the science programs are quite naturally a lead partner in that relationship. We are the educational partner in the Bryce Canyon National Park's High Plateaus Institute. All of these initiatives require that our undergraduates have training in science teaching laboratory settings that will enable them to enter graduate programs or become employees in science-related careers.

Capital Development Project

State Funded Request FY2009

Agency/Institution: Southern Utah University

Project Name:	Science Center Addition
Agency/Institution Priority:	1
Preliminary Cost Estimate:	$20,000,000
Total Project Space (Gross Square Feet)	42,350
New Space (Gross Square Feet)	42,350
Remodeled Space (GSF)	0
Space to be Demolished (GSF)	9,491
Increase in State Funded O&M	$324,400

The 9,491 sq. ft. Life Science Building O&M = $51,346. Total O&M for the new Science Center Addition (construction cost only $14,891,115) was calculated using by using the USHE O&M Budget Request Model for laboratory space is $375,746. The total request is the difference between existing Life Science O&M and the total for the new Science Center Addition [$375,746 - $51,346 = $324,400].

New Program Cost	$0
New FTEs Required for O&M	$0
New FTEs Required for Programs	$0
Other Sources of Funding (Donation)	$3,000,000
Previous State Funding	$0

Planning/Programming:

The preliminary master plan analysis for the Science Center Building addition was completed in the summer of 2005. The Dean of the College of Science in conjunction with University Administrative staff offered extensive input in detailing the space needs of the department and the programs. Historical data has been used to project space needs based on growth rates over the past ten years. However, because of the explosive growth of SUU's Nursing Program (45 graduates in May 2006 and 80 graduates in May 2007, we have added the Department of Nursing space requirements in hopes that additional space will enable SUU to help meet the extreme need in Utah and in the nation for Nurses and the need for educating future Nursing faculty.

Resource: Southern Utah University Capital Development Request FY09

Program Methodology/Program Format

This program was developed through personal interaction with the Dean of the College of Science, Department Chairpersons and many faculty and staff personnel. Through questionnaires, interviews and discussion sessions, information regarding the schools needs, desires, coordination issues and limitations was gathered and documented. The information and conceptual space diagrams were reviewed and re-reviewed by the users for accuracy and completeness. Following focused decision making discussions the many and varied building components were modified, consolidated and refined to fit within the approved budget and size limitations. All pertinent information from this in-depth process is compiled in this program document in such a way as to be readily accessible. Beginning with an executive summary and project justification, the program documents the needs and requirements of the College of Science, as well as the vision, goals, and history of SUU and each Science Department. Next, through the aid of civil, mechanical, electrical, and structural engineers, a site analysis and facility analysis were completed and documented which is followed by a space by space needs analysis including detailed conceptual drawings and adjacency diagrams. Lastly, and critical to the success of the project is an informed project estimate including a detailed construction takeoff and a compilation of soft costs. These are referenced in the program and included in their entirety in the Appendix. Also included in the appendix are proposed site layouts, existing site and interior photographs, images of requested science equipment, and a soils analysis.

Southern Utah University History

The creation of SUU was authorized in 1897. A large federal grant was matched by the County to establish a center for higher education at a time when Cedar City was just getting started.

In the spring of 1897 the people of Cedar City learned that the Utah Legislature had authorized a branch of the state's teacher training school to be located in Southern Utah.

Immediately upon the Legislative approval of the bill, each of the communities of Southern Utah began appointing committees and making necessary plans to influence the decision of the legislative commission. A petition was framed to the commission setting forth the advantages of locating the school in Cedar City.

There is much conjecture about why Cedar City was selected for the location of the school. Members of the commission publicly said it was because of its central location and its excellent educational record, but privately the determining factor seems to have been that alone of all the towns competing for the school, Cedar City was the only one without a saloon or pool hall.

The community was notified in late May of the commission's action and for the next three months it labored to complete the Ward Hall and make it ready for the first school year. In September, the school opened its doors for the first time.

School had been in session for only two months, however, when the Attorney General ruled that Cedar City's use of the Ward Hall did not comply with the provision of the law which required that the school have its own building on land deeded to the state for that purpose. Furthermore, the Attorney General stated that if a building was not erected by the following September, the school would be lost.

Winter had already set in and the town's building materials were nonexistent because of the construction of the Ward Hall. Still, the people of Cedar City set out to do the impossible. Nobody, they argued, was going to take their school away from them, not even if it meant bucking the mountain snows to get the lumber to construct the new building, which, of course, they did.

On January 5, 1898, a group of men, the first of a long line of townsmen left Cedar City to face the bitter winter weather of the mountains. Their task was to cut logs necessary to supply the wood for the new building. and bring it to the saw mills, located near the present day ski resort, Brian Head. Once they got there they realized they had to go back to Cedar City again. The wagons they brought with them could not carry logs through the heavy snows, and it was determined that sleighs were needed to do the task.

"Old Sorrel" was the horse that pulled those logs and was credited with being the savior of the expedition.

From January through July they kept up their labors and when September 1898 arrived the building was almost completed. It had a large chapel for religious programs and assemblies, a library and reading room, a natural history museum, biological and physical laboratories, classrooms, and offices.

Names this School has been known by:

1897-1913 Branch Normal School
1913-1953 Branch Agricultural College
1953-1969 College of Southern Utah
1969-1990 Southern Utah State College
1991-present Southern Utah University

The College of Science Mission

The College of Science is made up of academic programs in agriculture, biology, chemistry, geology and nursing. These programs are housed in the departments of agriculture and nutrition science, biology, physical science, and nursing. We operate or participate in the operation of several special learning environments for students that include a KECK sponsored undergraduate research lab, an observatory, a GIS lab, certified water lab, scanning electron microscopy lab, the Southern Utah Natural History Museum, and the Cedar Mountain Science Center. We serve as the center of scientific learning for the undergraduate and graduate programs offered at SUU. We also serve as the resource center of scientific knowledge and expertise for Southern Utah. The purpose of the College of Science is to provide comprehensive classroom and experiential learning that emphasizes critical thinking, problem solving, decision making, and communication in science for students from Utah and the Southwestern United States.

The College of Science Vision

The College of Science will become the most respected undergraduate science unit in Utah and the Southwestern United States. Our graduates will demonstrate high levels of academic achievement through admission to graduate schools and professional schools and/or gainful employment. Our faculty will be renowned as educators and scholars, through involvement in scholarly activities, developments in our respective fields, and service to the university and the communities of southern Utah, thereby increasing the value of our students' degrees.

The College of Science Philosophy

The values and beliefs that guide the College of Science in all activities and serve as our basic foundation are:

A. Undergraduate education is our highest priority.

B. Well-planned and executed, pedagogically sound classroom, laboratory, and outdoor educational activities are expected.

C. Life-long learning will be modeled by our faculty by being professionally active and productive scholars in their fields.

D. Undergraduate research provides opportunities for students and faculty to create new knowledge and to apply knowledge they have learned in the classroom. Research also builds proficiency in the skills of critical thinking, problem solving, decision making, and communication.

The College's Goals and Objectives

The observable, measurable goals of the College of Science and our objectives by which we will accomplish them are:

A. To prepare students for graduate schools and professional schools by offering coursework and active learning experiences appropriate to the prerequisites of specified post-baccalaureate programs.

B. To prepare students for careers using their baccalaureate degree by offering coursework appropriate for specified departmental majors or minors.

C. To help students develop skills in analysis, critical thinking, problem solving, and decision making by offering well-planned and pedagogically sound learning exercises in courses and in research projects.

D. To offer students hands-on experiences with state-of- the art scientific and computational equipment by providing coursework and research opportunities.

E. To provide highly skilled teachers and professors that are also respected scholars by recruiting Ph.D.- prepared faculty, rewarding good teaching, encouraging faculty to conduct funded research and publish results, and encouraging participation in professional organizations.

F. To utilize the Valley Farm, Mountain Ranch, Cedar Mountain Science Center, SUU Observatory, Water Lab, Scanning Electron Microscopy Lab, the Southern Utah Natural History Museum, the GIS lab, and the KECK Molecular genetics and ecology labs by enhancing the physical facilities and encouraging classroom and research utilization of these facilities.

Department of Biology

Mission - The Biology Department maintains a highly educated and academically, philosophically and culturally diverse faculty in order to:

1. Offer all students the opportunity to understand and use scientific thinking and techniques in the study of living things, to realize the relationships of science to other modes of thought, and to become familiar with contemporary models of biological functions and with the facts of regional ecosystems of southwest Utah and its neighbors.

2. Offer interested students the rigorous opportunity to prepare for advanced study in biology and for careers in agriculture, health care, secondary teaching and biological aspects of land management.

3. Build partnerships for service within the regional community.

4. Foster productive scholarship by students and faculty.

5. Create a collegial atmosphere and free exchange of ideas in the department.

The department provides undergraduate programs in agriculture, botany and zoology. Prescribed course work in the department supports the general education program of the University, builds a solid base for graduate or professional study, prepares public school teachers, and provides the instructional foundation necessary for careers in many fields.

Goals

Provide our students with quality lecture, laboratory, and field instructional experiences which foster student inquiry into science, and prepare them for post-baccalaureate pursuits.

Department of Nursing

Vision - The Southern Utah University (SUU) Department of Nursing will be a hallmark Baccalaureate Nursing Program, providing quality nursing education that efficiently and effectively meets the needs of students and the regional community.

Mission - The Department of Nursing is made up of academic programs that prepare individuals for professional nursing practice. A Bachelor of Science in Nursing is recommended for students preparing for entry into nursing practice. We offer a learning-centered education that meets the requirements for a baccalaureate degree at SUU and ensures that graduates have the abilities to be successful professional nurses. The purpose of the Department of Nursing is to provide learning opportunities that engage students in a comprehensive program of classroom and experiential learning that emphasizes caring, critical thinking, problem solving, ethical decision making, and communication.

Department of Nursing

Goals - The observable, measurable goals of the Department of Nursing and our objectives by which we will accomplish them are:

1. To prepare graduates to successfully pass the NCLEX and enter nursing practice by offering well-planned and pedagogically sound learning exercises in courses and in research projects that develop skills in analysis, critical thinking, problem solving, and ethical decision making.

2. To develop technically proficient nurses by offering students hands-on experiences with state-of- the-art health care equipment and providing coursework and clinical practice opportunities.

3. To foster faculty development in health care professionals who demonstrate excellence in teaching, scholarly endeavors, practice, and professional community service and who provide leadership in nursing practice by rewarding good teaching, encouraging participation in clinical practice and professional organizations, recruiting doctoral-prepared faculty, and encouraging attainment of doctorate in current faculty.

Program Outcomes

Upon completion of the Southern Utah University Baccalaureate Nursing Program, graduates will be able to do the following:

Provide quality professional nursing care based on a synthesis of theoretical and empirical knowledge from nursing, physical and social sciences, arts and humanities, and life experiences.

Use evidence as the bases for clinically competent contemporary nursing care.

Communicate effectively using various means in a variety of roles and settings.

Optimize health care to diverse individuals, families, groups and communities through collaboration with interdisciplinary health care teams.

Demonstrate intellectual curiosity, critical thinking, and motivation toward life-long learning.

Influence the quality of nursing and health care using leadership skills, management concepts, and a knowledge of the political system.

Be legally and ethically accountable for clinical nursing practice.

Assume the role of generalist nurse and become a responsible member of the profession.

Department of Physical Science Chemistry

Mission - Chemistry, a central science, is an active discipline vital to human existence and essential to the understanding of biological, medical, industrial, economic, and environmental issues.

The Southern Utah University chemistry faculty are committed to instilling an understanding of chemistry and its relevance through quality teaching, scholarly activities, and service. In a world that is becoming increasingly more technical and complex, providing chemical instruction with the depth, breadth, and rigor required to meet this need is of primary importance.

As chemistry faculty, we strive to provide students with quality, current, comprehensive, courses of study which serves the following needs including:

1. Preparation of students who choose to pursue graduate degrees in chemistry.

2. Preparation of students who choose to pursue degrees in the health sciences (medicine, dentistry, pharmacy, etc.).

3. Preparation of students who choose to gain employment in a science related field with an undergraduate degree.

4. Preparation of students who choose to become chemical educators.

5. Education of students to think critically and independently.

6. Helping students improve communicative, creative, analytic and information gathering skills.

To accomplish these goals, the chemistry faculty will provide the following:

Honest evaluations of student abilities and potential.

A climate of mutual trust and respect among faculty, staff and students.

The application and involvement of basic scientific principles and methodologies.

Competitive opportunities for mentorship through undergraduate research, employment, and other hands-on educational means.

Site Analysis Master Plan Analysis

The existing Science Center, constructed in 1992, is located on the southeast side of campus. It is in good condition both physically and functionally. The campus master plan has also designated this southeast corner of the campus as the science zone for the campus. With the recent realignment of 200 south, there is adequate land available on this corner of campus for the science zone to expand.

The proposed site is University owned and relatively flat so only moderate design adaptations should be required to blend with the existing Science Center and walkways. It is anticipated that the actual building foot print will be approximately 135' x 85'. All utilities are available at the site location as they now supply the existing Life Science Building. Heat would be provided by the University's central heat plant. Natural gas, electricity, water, and sewer lines are also located on the proposed site. The building will be cooled with a stand-alone cooling system.

Survey of Existing Site Conditions Detail

The proposed New Science Center is intended to be located in the South East Corner of the Southern Utah University Campus. The area is relatively quiet with residential homes located to the east across Third West Street and to the south. There is a park immediately south of the property, and campus parking south across 2nd South Street. Third West, the main access to the construction site, is a relatively busy city street with one lane in each direction and student parking on each side of the street. The street has a center lane.

The site has a view of Cedar Mountain to the east and is located at elevation 5685 feet above sea level.

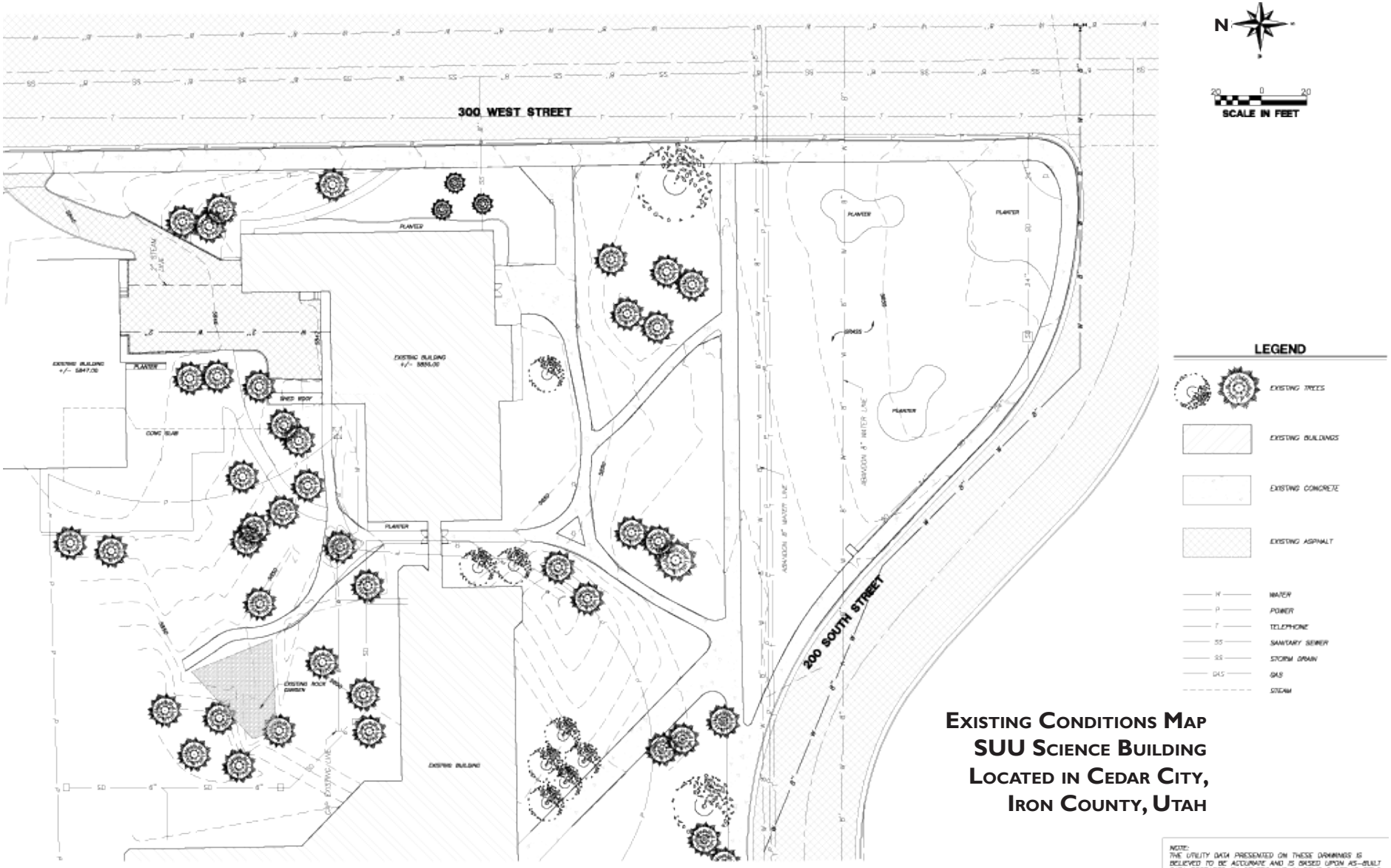
The Southern Utah University Campus is located within the township of Cedar City, Utah and is served fire, water, culinary water and sanitary sewer from the town of Cedar City. Fire water pressures and flow capacities are currently in place for all of major buildings of Southern Utah University of which this building will be a part. The North-South Gutter of 300 West Street carries irrigation water in summer. This water flow can be easily addressed but the contractors should be cautious to protect the site from these flows and to protect this water from contamination from construction activity.

In addition, Cedar City provides sanitary sewer for SUU facilities through its existing treatment plants. A North-South sewer main is located below 300 West Street that is large enough to carry the sanitary sewer flows from the new science building.

Power and communications are provided by SUU facilities on the main campus. The existing Life Science Building (which will be removed) is fed power and communications the university grid. An electrical site plan map has been prepared which shows the locations of utility flow on page 2-4.

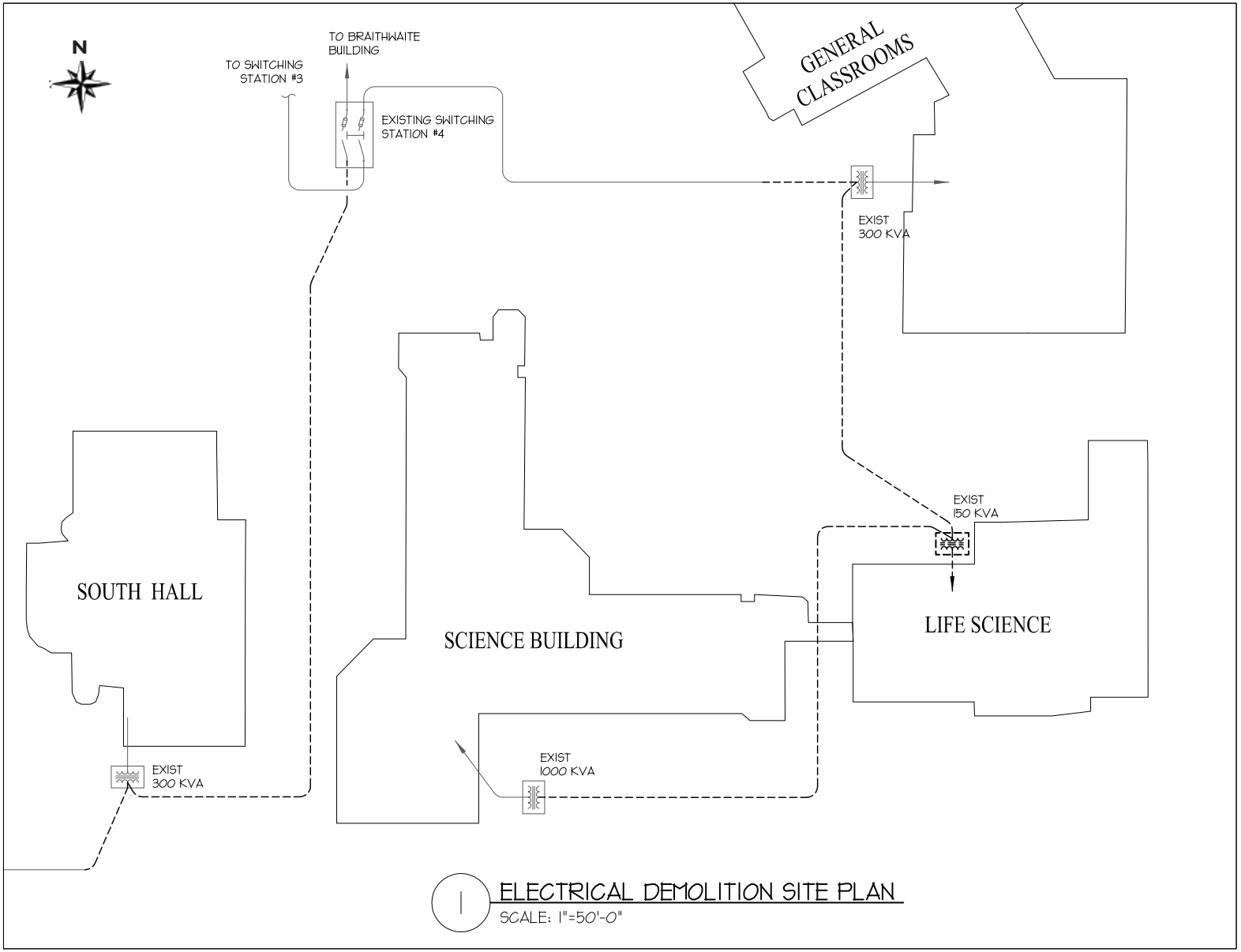
Heating for this building will be provided by the University through its campus wide steam heating system from a steam plant located central to the campus. Steam tunnels and condensate return are provided by the University and are shown on the following existing conditions map.

It is anticipated that a new steam pipe which is larger than the existing line would need to be installed to serve the new building.



Existing Conditions Map
SUU Science Building
Located in Cedar City, Iron County, Utah

NOTE:
THE UTILITY DATA PRESENTED ON THESE DRAWINGS IS BELIEVED TO BE ACCURATE AND IS BASED UPON AS-BUILT DATA PREPARED BY OTHERS AND IN SOME CASES IS FIELD VERIFIED. HOWEVER, THE CONTRACTOR SHALL VERIFY ALL UTILITIES PRIOR TO COMMENCEMENT OF WORK. THE ENGINEER TAKES NO RESONSIBILITY FOR ERRORS IN LOCATION, DIMENSION OR TYPE OF UTILITY


N
TO BRAITHWAITE BUILDING
TO SWITCHING STATION #3
EXISTING SWITCHING STATION #4
GENERAL CLASSROOMS
EXIST 300 KVA
EXIST 150 KVA
SOUTH HALL
SCIENCE BUILDING
LIFE SCIENCE
EXIST 300 KVA
EXIST 1000 KVA
1
ELECTRICAL DEMOLITION SITE PLAN
SCALE: 1"=50'-0"

Survey of Existing Site Conditions continued

Access to the site will be along Cedar City 300 West Street and most trucks and vehicles can access the property via this existing street. Because 3rd West is a major city artery, this street could not be blocked for an extended period of time, but a temporary blockage for loading and unloading equipment would be acceptable if coordinated with the city.

Foot traffic will be along the sidewalk on 300 West that is used primarily by students and campus visitors.

A short distance north of the construction site, is the Shakespearean Festival that holds plays and shows in an outdoor forum throughout the summer with some events in the fall. Summer performances begin in the evening at about 6 pm. These performances (especially outdoor theater) could be impacted by construction noise and this would be a consideration for constructing contractors.

GEM Material Testing has prepared a Geotechnical Analysis of the site that is not known to possess any unique or unusual features at this time. See attached report.) Some areas of Cedar City have been known to have collapsible soils, and over excavation and recompaction are sometimes required.

There is no foreseen groundwater conditions that would affect construction as the water table is below 40 feet in the area.

The area is served by major shipping and trucking lines, and there is a rail spur in Cedar City for the transport of large equipment. The rail head is several miles from the site.

The Cedar City Engineer is Mr. Kit Wareham and he can be reached at 435-586-2963. The city has an excellent reputation and is glad to work with the University.

Surrounding Facility Analysis

The College of Science is currently housed in three separate campus buildings: the Science Center, Life Science, and General Classroom.

Science Center Building:

The existing Science Center building is a 4-story concrete and steel reinforced structure with brick veneer and a pitched roof. It is 65,082 sq. ft. and has 39,324 sq. ft. of assignable space and is in good condition. The building contains labs, lecture halls, classrooms, faculty offices and support space. The building adequately meets the needs of its purposes in most respects but does have a number of heating / cooling and type ventilation problems. The principal occupant of the Science Center Building is the Department of Physical Science.

Life Science Building:

The Life Science Building, constructed in 1977, is a single story concrete and steel reinforced structure with brick veneer and a flat roof. The building is 9,491 gross sq. ft. with 6,781 net sq. ft., and of that net square footage 3,120 sq. ft is greenhouse and ancillary prep space.

It is located approximately 60' east of the east wing of the Science Center Building, and is comprised of a green house; labs, offices, a small museum of natural history, and support space.

This building is not compliant to the current codes, in many respects, and has many deficiencies in relation to its laboratory and ventilation functions. The Biology Department is the principal occupant.

This building sits on the footprint of the proposed addition to the Science Center Building. Under this proposal, the 30-year old Life Science Building would be razed so as not to compromise building design or functionality of the new addition by trying to build around/over the Life Science Building. It is anticipated that portions of Biology, Chemistry, Nursing, and a Natural History Museum will be housed in the improved facilities.

existing Greenhouse at SUU

existing Life Science Building

General Classroom Building:

The General Classroom Building is located directly north of the Life Science Building. It is a five story brick veneer and concrete structure and was constructed in 1962. The College of Science uses only a portion of the space in this building. The Nursing Program is assigned 5,224 sq. ft. and Agriculture and Nutrition have 2,450 sq. ft.

Demolition Requirements:

The main demolition work for this project would require removal of the existing 30 year old Life Sciences building which is a 9,491 sq. ft. single story concrete and steel structure with brick veneer, concrete slab on grade and flat roof. Part of this building is a 3120 sq. ft. greenhouse area. The Life Science building attaches to the existing newer Science Center Building at the west end by way of a glass enclosed breezeway between the Science Building and the Greenhouse. This attachment shouldn't pose much problem during demolition and won't affect the main entry doors into the Science Building after demolition. However, during construction it will be necessary to remove doors and/or portions of wall at each level of the existing Science Center to attach the new building.

Associated with the exiting Life Sciences building is a parking area and loading dock which will need to be removed. Care must be taken during demolition to preserve all existing trees and some of the sidewalk areas around the trees.

Additionally, there are existing rooms in the Science Center Building that will be remodeled to accommodate new uses. An existing Success Academy classroom in the basement will accommodate a new geology lab and existing Physiology lab will be reused as a General Biology Lab. Success Academy on the third level that will be remodeled to serve as science faculty offices.

Site Function and Relationships

Siting the new Science Center addition adjacent to the existing Science Center on the corner of 300 West and 200 South will identify it as a prominent architectural element.

The new facility will serve both the local community as well as a national student body attending SUU who are needing science courses and credits. It is therefore necessary to design the building to be multisided, welcoming all users from outside of the facility and the existing Science Center. Landscaped and architectural spaces should welcome users and shelter them from Cedar City's various climatic conditions.

Site Access

It is the objective of the programming team to anticipate future expansion of the campus and accommodate new construction by allowing areas for additional parking and access.

In the future, once construction is complete, most student and faculty pedestrian access to the new Science Center addition will be from the existing parking adjacent to the existing Science Center. Pedestrian traffic will also occur from other parts of the campus as students, staff and faculty continue from class to class.

All perimeter sidewalks, roads and surface parking areas should be accessible to disabled persons in accordance with the American Disabilities Act (ADA): curb-cuts, ramps and parking for disabled persons being of utmost importance.

existing pathways - north side of Greenhouse

existing pathways -south side of Science Center

Fire Exiting

The proposed building must provide emergency egress with a code required width from all levels into either a new stair enclosure, preferably at the east end of the building, and into the existing stair enclosure located at the east end of the existing Science Building, if code allows, or into a new stair enclosure at the west end of the new building. These stair enclosures must empty directly onto an exterior public way. Additionally, the entrance/exits at the main level must empty onto a pathway that leads away from the building. In the event that the proposed building is designed with a light well on the south side, it would be prudent to also provide a direct exterior exit from the basement into and out of this light well. The adjacent parking area must also provide adequate width for easy entrance and exit to and from building.

Fire and Emergency Apparatus Access

Due to the proposed and/or potential location of the new science building, where much of it is oriented away from 300 West it may be required, and certainly would be prudent to design the small adjacent parking area with the ability to accommodate a fire apparatus. Taking into account widths and turning radiuses of the entrance, exit, and within the lot. It may also be required to design the sidewalks on the opposite side to accommodate the width and weight of a fire apparatus. The fire sprinkler room and fire department connection should also be located near the public road or apparatus access.

Pedestrian Circulation Patterns

Currently there are well used student pedestrian pathways that leads from the parking and housing areas on the south, southeast, and east sides of campus onto the school grounds toward the Science Buildings, General Classroom Building, and to the grass covered plaza at the heart of the original part of the campus. These pathways lead around the Science Buildings as well as between them though the enclosed breezeway next to the greenhouse. This latter pedestrian pathway should be preserved in the new buildings configuration.

Vehicular Circulation Patterns

In addition to the main public roads that allow for circulation around the east and south ends of the campus and Science Buildings there is also a small parking area between the Life Science Building and Classroom Building. It is used mostly for service type loading and unloading of both the science building and the general classroom building as well as a few private parking stalls. This function should remain intact and may be expanded to allow additional parking stalls and a more suitable drop off location for students with special needs as well as elementary school students visiting the museum.

Parking Requirements

Currently, general faculty and student parking requirements are being met by off site parking. The addition of ADA accessible parking stalls and visitor parking stalls adjacent to the Science and Classroom building will add additional accommodation and compliance with parking related codes.

Dock & Service Access

The current function for dock, dumpster and service access to the General Classroom Building and Science Buildings will need to be retained and simplified. Adequate back up space into dock and dumpster areas and truck turn-around space should be provided and provisions to avoid conflicts with pedestrian and visitor parking traffic should be included in the design. The docks and associated areas will provide service for loading and unloading of supplies, water samples, equipment and other materials to be used in the labs or by faculty or removed from the building.

ADA Access

ADA access into the building should be accommodated by way of direct entrances at grade level with at least one entrance leading directly to an elevator. All grade level exits shall empty on to an accessible public pathway leading away from the building. The proposed adjacent ADA parking stalls will provide close and direct access to at least two of these grade level entrances.

Existing Landscape Assessment & Future Landscape Considerations

The existing landscape includes many existing mature trees, sod, concrete sidewalks and some planter areas at the east side of the building. It is the desire of SUU administration and campus planners to preserve all existing mature trees that are in good health and which do not present a hazard to the public or to utilities. Within reason, it will be the duty of the designer to design a building and parking area that avoids conflicts with all trees and root systems where possible. Future landscape considerations should include planter areas that require low or no water usage. Sod areas, additional trees, and an excavated light well area on the south side should allow basement labs to receive sunlight and views. Excavations may be finished with sloped sod or terraced planters that could relate to the students activities in the greenhouse. A pathway leading from the basement exit could extend up though this retained or terraced area. Additionally, it is the desire of the users to incorporate sustainable methods and systems into the design of the building which could include reuse of rain and/or greenhouse runoff water in planter areas.

Impact on neighbors adjacent to the housing facilities

Because the proposed building will be occupying and replace an existing demolished building, it should not be no taller than the existing science building, and provide little or no increase in traffic onto the site from 300 West. The impact onto the existing neighborhood and housing is perceived to be negligible after construction is complete. During construction however there may be substantial impact on the existing sidewalks and 300 West while trucks remove and supply material and equipment to the site as there is minimal area for on site construction staging. While 300 West may be partially closed during construction, the housing across the street should not need to be affected.

Site Utilities

Utilities for the addition are available on the site. However, a comprehensive land survey to determine the exact location of utility lines after demolition will be required in the future.

Sewer

It may be deemed necessary to provide a new sanitary sewer line that will serve the new buildings and connect into the existing sewer line running along 300 West. Cedar City codes must be followed as the system will drain in the city sanitary sewer system. Special attention needs to be paid to the filtering of waste from labs and greenhouse areas.

There is an existing sewer connection from the existing Life Science Building that leads to a sewer main that runs under 300 West which is large enough to accommodate the new proposed Science Addition.

Storm Drainage

Rainwater drainage shall be coordinated with the existing rainwater drainage collection system. A suitable collection system shall be provided for the new building. Special attention needs to be paid to wastewater drainage from the greenhouse and whether it may enter the storm drainage system. There is a storm drainage line on the north east side of the existing Science Center Building that will remain and may be able to serve the new building as well.

Water

There is also a culinary water source along 300 West. The approximate size of the new water supply needed is 2 inch. Metallic piping shall not be buried in this area. Approved piping materials shall be plastic or wrapped type K copper.

There is an existing 2" water line that comes from the Classroom Building that serves the existing Life Science Building that may be used in the new building. Most of the utilities that serve the site and existing Science Building come from the classroom building on 300 West. There is also a utility easement on the south side of the science buildings that runs under and parallel with 200 South. The easement contains underground telephone, power, and an abandoned 8" water line. Additionally, the campus wide steam heating system will be able to serve this new proposed building with a branch line that may come from the west, near the existing Science Center.

Gas

The area has natural gas available along 300 West which can be extended to the new building.

Power

Power will be fed from existing campus high voltage system through an underground duct bank.

Underground Duct Bank

Power will be fed from existing campus high voltage system.

Fire Sprinklers

The buildings shall be fully sprinkled with a wet pipe sprinkler system, using fire line water. Fire hydrants with extended fire lines will also be required.

Tunnel

All underground utilities need to be installed in a tunnel or duct bank.

Steam Heating

Currently a 2" steam line serves the existing Life Sciences Building from the classroom building. The size of this line is too small for the new building so a new branch line will need to be capped at the main line. It is anticipated steam will come from the line serving the existing Science Building. Coordination will have to take place with SUU if an additional branch line is required.

See page 2-3 site utility drawing for location information.

Climate

The climate in Cedar City is fairly dry at about 45% relative humidity with moderate temperatures ranging from 90 degrees in the summer months to 20 degrees in the winter months, most of the moisture coming from occasional summer thunderstorms and winter snow storms. The prevailing winds that are from the south are fairly consistent year round with an average wind speed of about 7 mph. Because of these conditions, it would be a good idea to provide vestibule areas at the entry ways to help temper the air temperature and pressure that would enter the building. And a recessed, 'covered' service dock entry will also provide added protection to the openings and the delivery vehicles that would otherwise be vulnerable to rains and snows.

While the design of the facilities exterior should accommodate cold winter weather the occasional summer rains, the more important determinants will be aesthetics, longevity and economics.

Aesthetic

Historically, the buildings on campus are of masonry construction, with brick exteriors. SUU has chosen to continue this aesthetic where possible because it corresponds to the campus's past and regional architecture and because by its nature displays a sense of permanence, tradition, and quality.

The campus has a variety of building configurations and styles with the common brick theme throughout all of the structures. Campus buildings range from very early 20th century structures with punched windows in straight masonry walls and formal entrances to the 1960's modern classroom building immediately north of the proposed site. The adjacent Science Building is quite contemporary in its configuration with buff colored common brick and strong vertical elements reflecting the interior science lab need for ventilation to the exterior. It would be anticipated that the proposed building relate positively to the science building both in exterior materials and configuration of the building form.

In response to new State Energy Codes and trends for improved building sustainability and environmental awareness as well as requests from the Science Faculty, SUU Administration and end users, this building should be designed with the latest innovations in energy conservation and recycling. While the State does not require LEED certification for its buildings it would be prudent to incorporate many of those design guidelines into the building design where economically feasible and realistic to the goals of the project.

Exterior Signage

All exterior signage for building and parking need to comply with Exterior Graphics Master.

Exterior Finish Considerations continued

Glazing systems should take advantage of current technologies that prohibit most of the UV rays but allow a greater percentage of natural daylight. These glazing systems should be well insulated and may also include the option to be operable where requested by the owner and user to enhance room ventilation where odors and chemicals become a problem. However, this should be weighed against the energy efficiency of the room with fixed windows.

Structurally, the building may employ a masonry wall exterior which could be of structural atlas brick or brick veneer on block. Or it may be brick veneer over studs and a steel frame system. In either case, care should be taken to employ 'movement' joints both because of the size of the brick wall and because of the potential for ground settlement due to the collapsible soils. This latter reason has already been evident in the existing Life Science building that will be removed.

Because of the permanent physical connection to the existing Science Center, the proposed Science Building 'Addition' will need to utilize an aesthetic that compliments the existing building without mimicking it. The use of similar materials with similar or complimentary colors and textures would be appropriate when assembled in a slightly different manner. The existing building's use of concrete or masonry lintels over the windows, its use of a light colored brick, and a third level or roof top level that steps back away from the main exterior perimeter wall are all components that could be employed by the new building to help visually connect it to the existing building.

In reference to the roof top level, it has been programmed to be a smaller footprint that the first two levels which will help accommodate its change in use and exterior appearance as a greenhouse.

SUU Science Center Building

This smaller size will allow for an isolated and elevated structural system which will help to provide a separate roof drainage system around and under the greenhouse. Thus creating a waterproof barrier at the third level floor line in addition to the roof drainage above and away from the greenhouse further protecting and isolating it from the second level.

The design of this roof top barrier system will be very important to avoid future leakage into the building. The area around the greenhouse will also provide great exterior patio area similar to the third level roof area on the existing science building where the built area is set back from the main building well and parapet leaving a flat, rubber pad covered area.

Facility Analysis

General

The facility analysis will address the new building surroundings, structure, and performance. This includes HVAC, plumbing systems, and fire protections systems as well as electrical and lighting systems.

The outward appearance of the building will need to reflect the established style and character of the SUU campus. Color and material choices should reflect both the literal and figurative connection with the existing Science Center. The positioning of the building on the corner makes it a focal point. The entrances should be obvious and welcoming and correspond to existing access patterns and pathways.

A new parking lot next to the facility will include only a few stalls for visitors and those with spatial needs as well as for loading and unloading of people and materials. This lot will serve both the classroom building and receive buildings. All other parking needs are accommodated by off site parking.

State funding, appropriated through the legislature will help finance the new Science Center addition with the addition of funding from generous donations.

New Construction

Architectural design shall follow the DFCM Design Process including the latest DFCM Design Requirements and Guidelines.

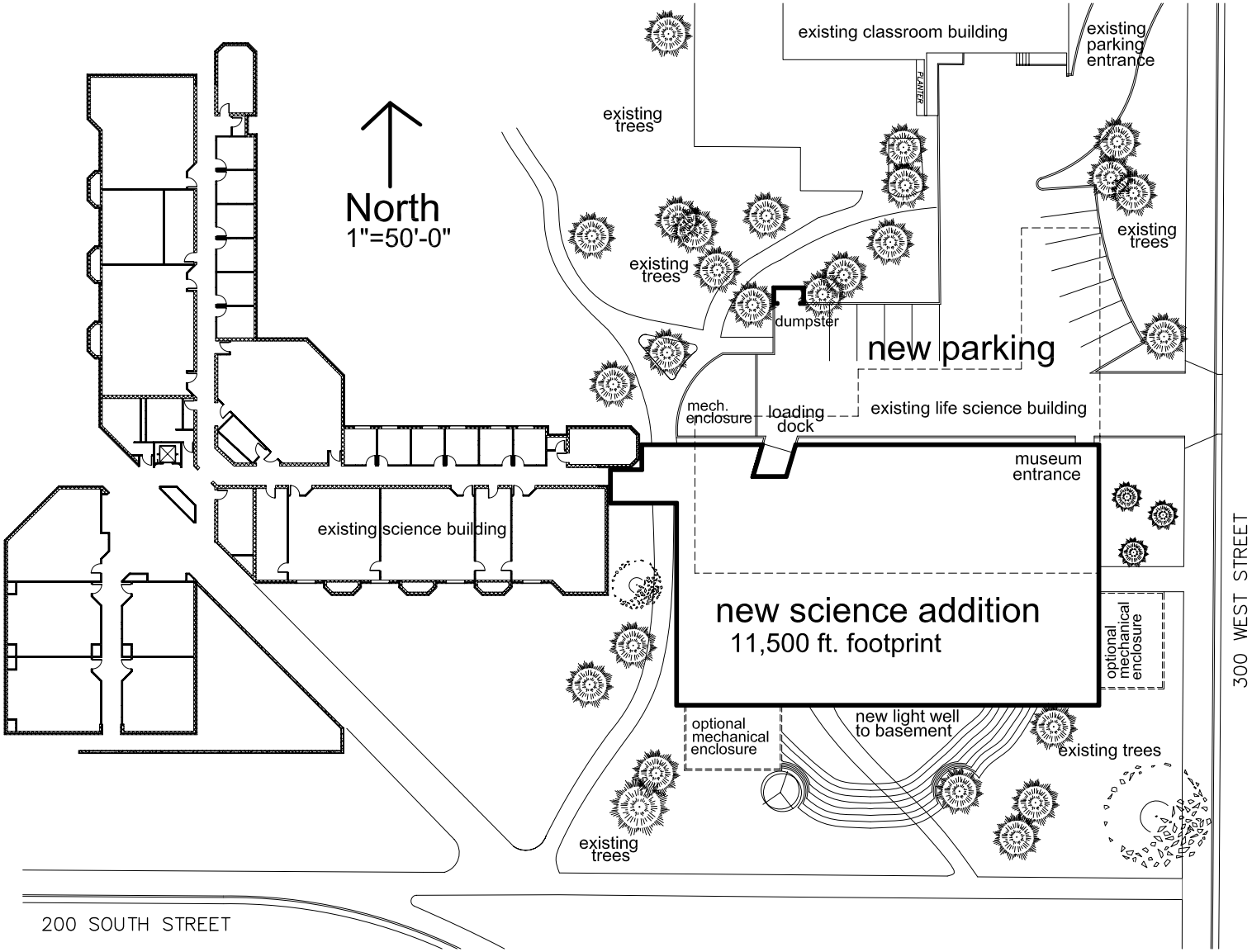
The new Science Center addition will house departments of Science, including Biology, Physical Sciences, Nursing, the Natural History Museum and a roof top greenhouse.

The entrances will be to the north from parking to the areas off of 300 West and at the connection between the old and new buildings.

Landscaping

Landscape design should provide adequate pedestrian access from the existing and new parking areas to the new building as well as the existing building.

The design should also aid in the development of future pathways according to the master plan. All materials selected should be suitable for this climate. Consideration should be given for low water and low maintenance vegetation. A complete automatic sprinkler system shall be installed.


North
1"=50'-0"
existing classroom building
existing parking entrance
PLANTER
existing trees
existing trees
existing trees
dumpster
new parking
mech. enclosure
loading dock
existing life science building
museum entrance
existing science building
new science addition
11,500 ft. footprint
optional mechanical enclosure
optional mechanical enclosure
new light well to basement
existing trees
existing trees
300 WEST STREET
200 SOUTH STREET

Finishes and Standard Requirements

Architectural standards for details, finishes, hardware, and building systems should be coordinated with the SUU Facilities Department. Standards such as 80% minimum light reflectance from interior walls and ceilings should be followed. Items such as glass covered bulletin boards, trash containers, parable telephones and outdoor smoking areas should be provided in accordance with current SUU standards.

General hard surface flooring: Provide resilient floor coverings in all storage areas, utility areas, stairways and public areas, unless otherwise specified in this document. Floor finishes shall have a light reflectance of 20%. Many labs and storage areas to have sealed concrete for durability and cleanability.

Ceramic tile: Restrooms shall have ceramic tile floors and wainscots to 48" unless full height is needed for showers. Coordinate tile wainscot with bathroom fixture locations.

Administrative offices and conference rooms should have upgraded finishes to convey a businesslike atmosphere for visitors from the community which support activities and curriculum on campus.

Signage: Provide a building directory and signs to direct visitors, designate room numbers and identify staff work areas. Interior signs shall be metal frames with tactile interchangeable sign faces and comply with accessibility requirements.

Whiteboards & tack boards: Whiteboards and tack boards shall be provided where shown on the space diagrams and in all areas where computers are used. Generally, whiteboards and tack boards will be 5'-0" high, with length as indicated by individual diagrams.

Support Spaces: The following support and service areas are to be provided in the new building: (Refer to mechanical and electrical systems in this section.)

- Restrooms
- Custodial Closets
- Main Mechanical room
- Main Electrical Room
- Telecommunications/Data Room: Central incoming telephone/ communications, main clock and alarm system room with data control/distribution system.
- Date & Electronics Distribution Rooms at each level.
- An adequately sized, secure storage room for stock of building supplies, this can be jointly located with a central custodial supply room.
- An adequately roof top area to accommodate exhaust outlets should be maintained. See mechanical systems portion in this section.

Ceilings: Suspended grid (intermediate duty or heavier with appropriate fire or antibacterial and cleanability rating) and panel system. Acoustical panels shall have a minimum NRC rating of .75, with pattern, surface and color as selected by Architect. Fixed offices and conference rooms will receive construction measures to assure confidentiality as necessary. Many labs and storage areas will also need construction isolation measures to avoid cross contamination and provide odor containment.

Such measures may include, but are not limited to:

• Full height walls at perimeter, up to and sealed air tight to the structure above.

• Proper treatment of wall and ceiling penetrations and sound blankets over top of ceiling.

• Acoustically lined or acoustically trapped air ducts, both supply and return systems.

• The ceiling in the microbiology labs should be an epoxy painted gyp. board to allow thorough cleaning. Additionally, a UV sterilization light may be installed to further sterilize the room.

Noise Isolation Classes:

Between adjacent classrooms or labs	NIC 50
Between classrooms and corridors	NIC 45
Between restrooms and other spaces	NIC 48
Between private offices or conference rooms and other spaces	NIC 48
Between storage and other spaces	NIC 30

It is important that the entire system (ceiling, floor, duct, doors, etc.) be analyzed, and not just the walls. Many labs in this building will need to double as lecture areas and will need special acoustical analysis and consideration to allow for voice clarity.

The HVAC system will be designed so as not to produce excessive noise in any of the occupied areas of the building.

This will be defined as follows:

General Open Office Spaces	NC-38 Max.
Classrooms, Conference Rooms and Private Office Areas	NC-35 Max.
Study Halls, Media and other Low Noise Areas	NC-30 Max.

Furniture Systems

Furniture for the offices, conference room, study areas, labs, and prep areas should be durable, functional with durable maintenance free surfaces. Whenever possible the State Contract for furniture should be utilized. Furniture systems will contribute to the working environment by providing task lighting, acoustical control, disabled person access and support for computer systems. It is desirable that all furniture systems be adaptable to meet the needs of persons with disabilities through adjustable work surfaces or the rearrangement of components.

Lab Safety

The following criteria should be use in designing the Biology and Chemistry Lab spaces in the proposed Building. This information can be found in the reference book - Biosafety in Microbiological and Biomedical Laboratories (BMBL) 4th Edition under Laboratory Biosafety Level Criteria - Biosafety Level 2. http://www.cdc.gov/od/ohs/biosfty.htm

1. Provide lockable doors for facilities that house restricted agents (as defined in 42 CFR 72.6).

2. Consider locating new laboratories away from public areas.

3. Each laboratory contains a sink for handwashing.

4. The laboratory is designed so that it can be easily cleaned with at least one floor drain in each space (excluding offices). Carpets and rugs in laboratories are inappropriate.

5. Bench tops are impervious to water and are resistant to moderate heat and the organic solvents, acids, alkalis, and chemicals used to decontaminate the work surfaces and equipment.

6. Laboratory furniture is capable of supporting anticipated loading and uses. Spaces between benches, cabinets, and equipment are accessible for cleaning. Chairs and other furniture used in laboratory work should be cove red with a non-fabric material that c an be easily decontaminated.

7. Install biological safety cabinets in such a manner that fluctuations of the room supply and exhaust air do not cause the biological safety cabinets to operate outside their parameters for containment. Locate biological safety cabinets away from doors, from windows that can be opened, from heavily traveled laboratory areas, and from other potentially disruptive equipment so as to maintain the biological safety cabinets' air flow parameters for containment.

8. An eyewash station is readily available. (Emergency shower and fire blanket case located near the exit)
9. Illumination should be adequate for all activities, avoiding reflections and glare that could impede vision. Provide latest technology for cell, molecular, genetics labs and greenhouse.
10. There are no specific ventilation requirements. However, planning of new facilities should consider mechanical ventilation systems that provide an inward flow of air without recirculation to spaces outside of the laboratory.
If the laboratory has windows that open to the exterior, they are fitted with fly screens.

MECHANICAL SYSTEMS ANALYSIS

General

Careful control of temperature, humidity, relative space pressures, air cleanliness, odor control, air motion and sound is required. A primary concern will be the safety of personnel and the safety of the animals. Comfort of the personnel and the animals is also important. Since lab facilities typically consume about three times the energy of a classroom or office building, energy efficient design is crucial. Laboratory mechanical systems are complex and maintenance intensive. Mechanical systems must be kept as simple as possible and must be accessible for proper maintenance. Laboratory space requirements are constantly evolving and changing. The mechanical systems must be flexible to accommodate future requirements.

Codes

- International Building Code, 2006
- International Mechanical Code, 2006
- International Plumbing Code, 2006
- International Fire Code, 2006
- International Energy Conservation Code, 2006
- National Fire Protection Association 13
- Utah State Boiler Code

Standards

- Utah Division of Facilities and Construction Management Design Criteria
- Southern Utah University Architect & Engineer Manual
- American Industrial Hygiene Association (AIHA). ANSI/AIHA Z9.5 National Standard for Laboratory Ventilation.
- American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE). Laboratory Design Guide
- ASHRAE Fundamentals Handbook, HVAC Applications Handbook, Systems and Equipment Handbook.
- Centers for Disease Control (CDC) and National Institute of Health (NIH). Biosafety in Microbiological and Biomedical Laboratories.
- Institute of Laboratory Animal Research (ILAR), Commission on Life Sciences, National Research Council. Guide for the Care and Use of Laboratory Animals. Washington DC: National Academy Press.
- National Institute of Health. NIH Design Policy and Guidelines – Design Criteria. Bethesda, Maryland.
- National Institute of Health. Reference Materials for Design Policy and Guidelines – Mechanical.
- National Institute of Health. Office of Research Services. NIH Vivarium Design Policy and Guidelines.
- National Fire Protection Association (NFPA). NFPA 15 Fire Protection for Laboratories Using Chemicals.
- Occupational Safety and Health Administration (ASHA). 29 CFP Part 1910.1450.
- Scientific Equipment & Furniture Associates (SEFA). Laboratory Fume Hood Recommended Practices.

Sustainability

Sustainable design features will be considered and incorporated where appropriate.

Mechanical Systems (continued)

Water Use Reduction should be incorporated by using Water Closets with 1.6 gal/flush maximum and possibly waterless urinals. The Lavatory faucets should be Low Flow, 1.8. GPM sensor type. The water closets in the Women's Toilet Rooms should be the dual flush type.

Energy Conservation will require computer modeling to verify compliance with ASHRAE Standard 90.1 Energy Standard. Commissioning of mechanical systems will be done. Hot Water System should be variable flow with VFD. Occupancy control on VAV boxes (combined with lighting control) should be provided. Direct and Indirect Evaporative Cooling should be included to reduce operating cost. Heat Recovery System will be provided on exhaust air systems.

The energy goal is to obtain an energy efficiency rating of 50% greater than that acceptable by the ASHRAE Standard 90.1-2004,

To protect the Atmosphere, only non-CFC and non-HCFC Refrigerants will be used.

Indoor Environmental Quality should include the monitoring and control CO2 levels in all densely occupied spaces. Follow SMACNA Guidelines to protect HVAC system during construction. Ventilate the building prior to occupancy to flush out contaminants. Exhaust Janitors closets and photocopy areas. Provide individual thermostatic controls for exterior offices, corner offices, unique spaces, each classroom, Lab, Animal Room, etc. Provide baseboard radiation in areas with a high proportion of exterior glass, for comfort and energy savings.

Building Systems Commissioning

The building systems will undergo commissioning to verify installation, calibration, and performance are in accordance with the project requirements and design documents. DFCM will determine the level of commissioning to be performed. The design team must cooperate and coordinate with the commissioning agent.

As a minimum, the building's heating, exhaust, ventilating, air conditioning, and refrigeration systems (passive and active), plumbing systems, and respective controls shall be commissioned.

Design Parameters

1. Temperature:

	Winter	Summer
Outdoor Temperature	-10° F	94° DB/65° MCWB
Indoor Temperature – Typical Labs	70° F	72° F
Indoor Temperature – Animal Rooms	65° F Min	80° F

2. Chemical Fume Hood Exhaust
   Occupied Mode Face Velocity - 100 feet/minute
   Unoccupied Mode Face Velocity – 60 feet/minute
   Use of proximity sensors to reduce air flow when hood is not in use.

3. Minimum Air Change Rates
   Typical Lab Space, Occupied Mode – 6 ACH (Air Changes per Hour)
   Vivarium – 10 ACH

4. Air Handler Pressure Drop/Air Tunnel Velocity – 4" W.G..400 ft

5. Duct Pressure Drop/Velocity – 2" W.G./2500 ft/maximum

6. Heat Recovery: Provide heat recovery from general and fume hood exhaust.

Mechanical Systems (continued)

7. Laboratory plug load design: For preliminary design purposes use 10 watts/square foot. Final loads to be determined during design process, but should not be less than 6 w/SF as usage may change in the future.

8. Humidification Requirements

Typical Laboratories

Summer	50% RH Max.
Winter	NA

Vivarium

Summer	50% RH Max.
Winter	30% RH Min.

Mechanical dehumidification is not anticipated.

9. Acoustic Design: The HVAC-related background noise shall comply with ASHRAE Handbook HVAC Applications 2007:

Laboratories (with fume hoods)	RC(N)
Testing/Research with telephone use and Speech communication	40 to 50
Group Teaching	35 to 45
Offices	25 to 35
Conference Rooms	25 to 35

Heat Source

The heat source will be medium pressure steam from campus central boiler plant. The steam and condensate lines serving the existing building on the proposed site are of insufficient size to adequately serve the anticipated heating load of the new building. SUU has commissioned a master plan study of the campus utilities which should address where connections to the existing steam and condensate lines can be made to adequately service this new building.

Cooling Source

The cooling source should utilize a minimum of two water cooled chillers for redundancy. Each chiller should be sized for 50% of the load. The chillers will have capacity to cool the building if the heat recovery system fails. There should be a cooling tower for each chiller.

Ventilation

Ventilation will be provided in compliance with the 2006 IMC.
Classrooms – 15 CFM/person
Office Space – 20 CFM/person
Typical Lab – 100% Outside Air
Vivarium – 100% Outside Air
HVAC – Designer to accommodate operable windows for exterior ventilation in some spaces. See space diagrams in section 4.0.

Steam System

A central high pressure (60 psi) steam system will be provided to serve sterilizers, cage washers, animal room wash down and the Vivarium humidification.

Heating Hot Water Piping System

Each heating pump should be sized at 100% flow. Provide VFD's on each pump.

Chilled Water Piping System

Chilled water supply temperature - 42º F
Chilled water return temperature - 55º F
Primary – Standby pumps, each sized at 100% flow. VFD's on each pump.

Mechanical Systems (continued)

HVAC Systems

Typical Laboratories: General - The design of the HVAC system for a laboratory should maintain a safe working environment for the users. All laboratory areas shall be served by 100% outside air systems. Rooms should be maintained at a negative pressure with respect to adjacent areas. High air discharge velocities should be avoided (not more than 50 feet per minute) in the immediate vicinity of the fume hood. Fume hood face velocity should be maintained at 100 fpm all sash positions in the occupied mode. The system design shall be based on 100 feet per minute hood face velocity when the fume hood sash is opened to a height of 18 inches. Fume hood shall be equipped with a motion sensor which will reduce face velocity to 60 FPM when the area around the hood is unoccupied.

The HVAC system should have features that enable control of supply and exhaust air flow, laboratory pressurization control, hood face velocity and hood air flow, energy consumption, and room temperature.

Laboratories will be provided with variable volume fume hoods, variable volume supply air and variable volume general exhaust air. Room supply and exhaust air will be controlled through linear or nonlinear air terminal devices utilizing either a volumetric or pressure differential room control device. The recommendation to use such as system will be dependent upon the results of the engineering analysis.

The animal rooms shall be positive with respect to the animal suite and corridor.

Vivarium

General - The design of the HVAC system will maintain a stable environment for the animals and safety and comfort for animals and personnel. The Vivarium suite shall be negative to adjacent spaces.

The HVAC system for the Vivarium will be similar to the Typical Laboratories. The Vivarium systems will be 100% outside air. Rooms will be designed such that they can be positive pressure or negative pressure.

The HVAC system will have features that enable control of supply and exhaust air flow, room pressurization control (positive or negative), energy consumption, room temperature, and room humidity.

The designer shall verify the requirements for ventilation of cage racks. Some racks require individual supply air and exhaust air control with filters. The designer shall coordinate the requirements for automatic watering and monitoring systems for animal cages with the users.

HVAC redundancy is required. The HVAC system will have redundant supply fans and exhaust fans which will provide operation of the facility at a reduced level in the event of a fan failure. HVAC equipment serving the Vivarium will be on emergency power. This includes chiller, boiler, pumps, supply fans, exhaust fans and controls.

Greenhouse

Lighting of the Greenhouse shall be of the latest technology and include emergency power for heat and cooling.

An HVAC system shall be provided to maintain the temperature in the greenhouse between 60º F and 90º F. Evaporative cooling is recommended to provide ventilation and cooling during the summer. Air velocities should be maintained low as high air velocities will damage plants. Minimal ventilation is necessary during the winter to help maintain the inside carbon dioxide levels. Continuous air circulation should be provided within the green house as this will reduce conditions that favor plant disease. Greenhouse prep area sinks need sediment traps.

Mechanical Systems (continued)

Biosafety Level 2 Labs

The ventilation system shall be 100% outside air. The BSL2 Lab shall be negative pressure in relationship to adjacent spaces. There will be audible and visual alarms to notify personnel on loss of pressure control. Gas tight dampers will be provided in the supply and exhaust duct work to allow for decontamination of the BSL2 Lab. The duct work will be gas tight.

Air Handlers

The supply air handlers will be located indoors to accommodate servicing and piping and to avoid freezing problems. The exhaust air handlers may be located outdoors. The air handlers will have multiple fans for redundancy.

Outside Air Intakes and Exhaust Air Discharge

Air intakes shall be positioned to avoid short-circuiting of exhaust air back into the building. Exhaust from laboratories must be discharged to the atmosphere through stacks at the top of the building with a minimum velocity of 3000 fpm. If variable volume systems are employed for supply and exhaust, then design provision must be made to assure that the 3000 fpm exhaust velocity is maintained at all times at all conditions.

Exhaust Air Systems

There will be several sources of exhaust air: (1) General Lab Exhaust (Typical Labs and Vivarium) (2) Chemical Fume Hood Exhaust (3) Biological Safety Cabinet Exhaust (4) General Building Exhaust (Toilet Rooms, Photocopy areas, Janitor's closets, etc.). (5) Special Chemical Fume Hood Exhaust (Radioisotope hoods and Perchloric acid hoods).

The General Lab Exhaust, Chemical Fume Hood Exhaust and Biological Safety Cabinet Exhaust should commit to a central manifolded variable air volume (VAV) system. A central system provides redundancy, flexibility to add future hoods, diversity and heat recovery capability. Another advantage is that central exhaust systems reduce the noxious and hazardous substance levels through dilution.

Biological Safety Cabinets with HEPA filters in the exhaust air connection will be ducted to independent fans. General Building Exhaust will be ducted to separate exhaust fans to preclude contamination. Special Chemical Fume Hood Exhaust Hoods (Radioisotope and Perchloric acid) will be ducted to independent exhaust fans.

A dedicated exhaust system will stainless steel duct work will be required for the down draft Dissection Table. Duct work will need to be water tight and slope from the fan down to the table.

Automatic Temperature Control System

The ATC system will be a Direct Digital Control (DDC) type. ATC (DDC) will be Yamas or Honeywell - other vendors via Gateway are not accepted. The system must be compatible with the SUU Campus Control System.

PLUMBING SYSTEMS ANALYSIS

The number of fixtures shall be in accordance with the 2006 International Building Code. Fixtures for persons with disabilities shall be as required by the IBC and the ADAAG (Americans with Disabilities Act Accessibility Guidelines). Drinking fountains shall be of the refrigerated type with at least one per floor. Each floor shall be provided with one service sink.

Plumbing Systems (continued)

Properly designed plumbing systems are critical to the operation of the Lab facility. Due to the large number of piped utilities, the piping must be carefully organized and properly labeled. Safety of the personnel and the animals is a primary concern. Care must be taken to protect the water supplies to the building and the public sewer system which serves the building. Care must be taken to prevent the domestic water systems within the building from contamination. The plumbing system must be flexible to allow for future changes as the needs change.

Pure Water System

A central distilled water system may be installed to pipe pure water throughout the building. The pure water system will be capable of generating 18 Megohm purity water. Pure water will be recirculated through a storage tank with ultraviolet light to keep the system free of bacteria. Point-of-use water stations will be provided where ultra pure water is required. The alternative would be independent water purifiers and distillers in labs.

Water Softening System

A duplex water softener will be provided. The softeners will pre-treat water supply to the pure water system, domestic and industrial hot water systems, and make-up water for the mechanical heating and cooling piping systems.

Acid Waste and Vent System

Currently, in the existing science building the volume of acidic toxic chemical waste is small enough as to allow contained type disposal in each lab. The waste is bottled and taken off site by an independent agency. Students and faculty are instructed to prohibit toxic chemical drainage at sinks in the typical lab. Depending on volume and type of use, the building code may require a central acid waste treatment system. In which case, the designer shall provide acid resistant polypropylene piping at each lab sink leading to a central system, which involves a dedicated acid waste and vent system with an automatic central wastewater PH control system with acid and caustic injection.

Laboratory Vacuum System

Provide a central system with two vacuum pumps for redundancy.

Laboratory Air System

Provide a central system with two compressors for redundancy.

Medical Gases

Central medical gas system will be provided for use in Surgery, Pre-Op and Post-Op Rooms. Medical gases include oxygen, vacuum and air. Systems shall meet AIA guidelines for hospitals.

Domestic Hot and Cold Water Systems

There will be two separate hot and cold water systems: (1) Potable hot and cold water (2) Industrial (Non-potable) hot and cold water, the Industrial hot and cold water will be piped to lab spaces. The Industrial water will be served by parallel reduced pressure backflow preventers.

Water Heaters

There will be separate Industrial and Potable water heaters. There will be two Industrial water heaters and two Potable water heaters, for redundancy in each system. Design to investigate use of "on demand" water heaters.

Fire Sprinkling

Automatic wet-pipe sprinkler system with a Class I standpipe in two stairways. Piping will be standard weight black steel with mechanical couplings, threaded joints or welded joints. Comply with NFPA 13.

Some areas, such as the herbarium, specimen storage, museum, computer lab, and some biology lab support spaces will need a "dry-gas" extinguishing system to avoid damaging sensitive equipment and specimen.

BUILDING ELECTRICAL SYSTEMS ANALYSIS

Codes and Standards

Codes, Standards, and Guidelines, which are applicable to the design of the electrical systems, are listed below. Comply with each of the latest adopted publications:

ADA, Americans with Disabilities Act
International Energy Conservation Code
EIA/TIA, Electronics Industries Assoc./Telecommunications Industry Assoc.
IBC 2006, International Building Code
IEEE 1100-1999, Recommended Practice for Power and Grounding Electronic Equipment
IESNA, Illuminating Engineering Society of North America
NFPA, National Fire Protection Assoc. (Sections including but not limited to):
- NFPA 70, National Electrical Code
- NFPA 72, National Fire Code

UL, Underwriter's Laboratories
Utah State Fire Marshal Laws, Rules and Regulations
Division of Facilities Construction and Management, Design Criteria
Southern Utah University Design Standards for Electrical Engineering

LIGHTING SYSTEMS

Lighting Systems for the facility should maximize energy efficiency while providing adequate illumination for performance of specified tasks. Lighting levels should be in conformance with the Recommended Illuminance Categories and Illuminance Values for Lighting Design. Where applicable, task lighting systems should be employed to minimize energy consumption.

Providing the latest in UV light sterilization in labs, such as microbiology that handle bacteria is desired for optimal lab performance.

Consideration should be given to multi-level and motion sensing switching systems, load shedding, and other energy reducing techniques. Energy conserving lamps and ballasts should be used where applicable. System design must conform to State Energy Codes.

Economic comparison. Initial and life cycle costs should be compared for major system types, with emphasis on maximizing efficiencies of light sources and utilizing the most efficient luminaries suitable for the task involved. Lamps of standard manufactures should be used as much as possible to allow ease of replacement from campus stock.

Fixture types selected for spaces requiring flexibility should be capable of simplified relocation. Consideration should be given to lenses and up-lighting systems which reduce reflected glare from CRT screens. Minimum maintained average foot-candle levels for typical spaces are listed below. Deviations from these criteria may be required to accommodate individual space needs.

Space Category	Lighting Level
Offices	50
Greenhouse	Plant Species Specific
Classrooms	50
Labs	50 – plus task lighting to 80
Workrooms	50
Conference Rooms	50
Computer Rooms	50 (controlled)
Stairways	30
Toilet Rooms	30
Stock Rms/Equip. Storage	30

Building Electrical Systems (continued)

Exterior lighting Systems

Provide exterior systems which are compatible with light levels and fixture types presently in us on the campus. Circuit fixtures so that a minimum amount of security illumination will be provided for late night until dawn, by simplified automatic switching. Prefer photo electric eyes on outdoor lighting. Outdoor lighting designed to minimize errant light pollution.

Power Distribution

Service voltage should be 480Y/227 volt and 208Y/120 volt at the main electrical room with panels for both on each level. Provide a watt-hour/demand meter to measure building consumption.

Emergency Power System

Emergency power is required for life safety functions, and as back-up for commercial power to critical equipment items. Life safety functions include means of egress lighting, lighting in certain critical spaces, and power for the fire alarm system. University specifications call for 8 hours operation and longer for critical systems.

A diesel-driven engine generator and automatic transfer switch will provide the power source and transfer control for the system. Fuel tanks should be sized for 12 hour operation at full load. Critical systems include vivarium, green house and biology labs and associated sensitive storage. DEQ approval order must be amended for a diesel generator - natural gas generator preferred.

Line Conditioning

Provide transient over voltage and "noise" protection on the service entrance and on selected panel boards in the facility which are likely to serve computer equipment. Provide capability similar to that provided by standard equipment of EFI Corporation.

Lightning Protection System

Building vulnerability to lightning strike and damage must be studied. A lightning protection system should be included if consistent with campus policy, or warranted by reasonable susceptibility to strikes. If a system is installed, it should be U.L. master labeled.

SITE UTILITIES

High Voltage Power Distribution

Currently, the existing Life Sciences Building is fed by a 150 KVA loop-fed transformer. This transformer will need to be removed as part of the Life Science Building demolition. Unfortunately, the transformer feeds a radial-fed transformer at the existing Science Building. The Science building will lose power when this the transformer at the Life Sciences Building is removed. Records indicate that the medium voltage line between the two transformers is routed below the connector between the two buildings. It is likely that this line will need to be removed in order to construct the new Science Building Addition. The transformer at the existing Life Science Building is loop-fed receiving medium voltage power from a loop-fed transformer at the General Classrooms Building. All three transformers mentioned above receive power from a single medium voltage line originating from Switching Station #4.

Please refer to the attached Electrical Demolition Site Plan. There is a small load center mounted on the Life Sciences Building transformer which serves walkway lighting. When it is removed, the walk-way lights will need to be re-circuited to a source that will remain active during construction.

Building Electrical Systems (continued)

The existing Science Building is presently served by a 1,000 KVA transformer and has a 2,000 amp, 480Y/277 volt, three-phase, four-wire service. According to facilities personnel, the building operates at around 800 amps during peak loading conditions. At estimated peak loading, the new connected load is calculated to be approximately 1,000 amps. Based on the new connected load of 1,000 amps, the electrical service is loaded to approximately 50% and the transformer is loaded to approximately 80%. At the planned square footage of 43,385 SF for the new addition and an estimated load of 20VA/SF, the new load added is approximately 1,000 amps. Therefore, it appears that there is a possibility that the existing service has capacity to serve the new load; however, the transformer would need to be replaced. There is space to add breakers in the existing main switchboard, but space is limited. Since design is not yet fully developed, we do not know if there is sufficient space in the main electrical switchboard to add the new breakers. Given that loading on the switchboard is borderline and available space questionable, we recommend that a new service and new transformer be installed. It shall be connected into the existing "South" medium voltage loop. The electrical engineer shall evaluate both possibilities during design and make a recommendation after actual loads are determined and the design solidified. Additionally, a study shall be conducted by the electrical engineer to determine if the existing medium voltage loop has sufficient capacity to accommodate the new load. A coordination study shall also be conducted to determine the appropriate settings of fuses, breakers, and/or relays which are necessary to carry the new load and the increased inrush on the system caused by new transformers. The study shall include the main medium voltage switch gear which is located on the east side of the Heat Plant and any other customer-owned upstream devices. Modification shall be made to the main switch gear depending upon the results of the study.

Presently, the existing Science Building is served by a radial-fed transformer. It is not set up to be fed from two directions as some of the other buildings on campus. To improve system reliability, we recommend that the new medium voltage system be reconstructed into a loop configuration. This will require two (2) new medium voltage pad-mounted fused switches, three (3) new manholes, and new medium voltage lines. Each medium voltage line shall consist of (2) 5" conduits. One conduit shall contain 3 # 2/0 EPR CU., 15 KV, 133% insulation level, Type MV-90, 5 Mil Copper tape shield and one 3/0, 600 V, THWN, CU. and the other conduit shall be spare. Please refer to the attached Electrical Site Plan.

The electrical engineer shall coordinate all electrical work with Matt Vandenberghe at (435) 559-1859.

Telecommunication Distribution

Presently there are (4) 4" conduits that route into the existing Science building from a large man hole on the south-west side of the building. The conduits contain (1) 200 pair copper cable and (1) 48 strand single-mode/42 strand multimode fiber cables. The cables are routed to the main communication room in the basement. Facilities personnel estimate that only 75 of the 200 copper pairs are active. The fiber cable shall remain in place, but new fiber cable is needed for the addition. Presently there are also (4) 4" conduits that run from the East end of the Science Building into the Life Science building. These conduits need to be extended into the new communication room in the addition. There is (1) 6 strand multimode fiber and (2) 50 pair copper cable in these conduits. SUU IT department will remove these cables prior to or as part of the demolition.

Building Electrical Systems (continued)

Currently, there is also (1) 4" conduit with (1) 50 pair copper cable and (1) fiber cable routed to the existing Life Sciences Building from the existing General Classroom (GC) Building. The copper and fiber cables shall be removed back to the existing General Classroom Building as part of the building demolition, but the existing 4" conduit shall remain and shall be extended into the communication room in the new Science Building addition.

(1) hybrid fiber cable consisting of 12 single-mode and 12 multimode fibers shall be routed from the hub on the 3rd floor of Building 13 (The Electronic Learning Center) to the main communication room in the new Science Building addition. The cables shall be routed through new and existing ducts via the existing Science Building back to Building 13. The cable should be Corning Freedom Cable which is rated for both indoor and outdoor use. The campus desires to perform all cable work pending DFCM approval. The campus desires IP type telephones in the new addition. The electrical engineer shall coordinate all work with facilities IT personnel during design. Contact Jerry Carpenter at (435) 586-5437

POWER DISTRIBUTION SYSTEMS

The main electrical room shall be constructed to house a 480/277 volt main distribution switchboard. This room should be located as close as possible to the pad-mounted high voltage transformers to reduce the length of feeder conduit and conductors.

The 480Y/277 volt main distribution switchboard shall be free-standing and equipped with a meter that meets SUU requirements. This board shall be utilized to provide power to lighting panel boards, 480 volt motors, elevators, and large mechanical equipment such as air handlers, pumps, chillers, fans, etc. One large dry-type transformer shall be utilized to feed a 208Y/120 volt main distribution switchboard. The switchboard shall be utilized to feed lighting and appliance branch circuit panel boards. 480Y/277 volt lighting and appliance branch circuit panel boards shall be utilized to provide power for lighting, HVAC, and other electrical motor loads. Panel boards shall be dedicated to serve either lighting or HVAC loads but not both.

The 208Y/120 volt lighting and appliance branch circuit panel boards shall be utilized to provide power for incandescent lighting, computer equipment, owner furnished equipment, duplex outlets, small mechanical equipment, etc.

Electrical rooms shall be constructed on each floor in the core areas to house 480/277 volt and 208/120 volt branch panel boards.
Electrical rooms shall be stacked on top of each other (floor-to-floor) where possible to reduce length of feeder runs.
Electrical rooms shall have a minimum of 25 % additional space for future growth.

Separate branch panel boards shall be installed to feed power to computer equipment. Computers and any sensitive equipment shall be tied to separate panel boards to isolate them from other equipment such as small mechanical equipment and general-purpose duplex outlets. Main distribution switchboards and branch panel boards shall have 50% excess capacity for future growth and flexibility.

Transient voltage surge suppressors shall be provided for 480/277 volt and 208/120-volt main distribution switchboards, also for computer equipment branch panel boards.

Building Electrical Systems (continued)

All conductors shall be copper. Conductors for branch circuits shall be sized to prevent voltage drop exceeding 3% at the farthest point with 80% of circuit breaker demand load (duplex outlets, equipment, etc.). The total voltage drop on both feeders and branch circuits shall not exceed 5%.

All conductors shall be installed in conduit. Minimum size of conduit to be ¾". Type MC Cable may be used only for light fixture whips. Conduit runs to cable trays should not exceed 50'. Cable tray shall be installed in corridors. Pull strings shall be installed in all empty conduits.

A fault current and coordination study should be performed to indicate available fault current at all points in the 15 KV and building power distribution system. New switchboards, panel boards, etc., should be adequately rated for the available fault current. Fuses and circuit breakers should be selected to ensure minimum system power outage due to overloads or faults. Circuit breakers with adjustable long lime, short time, instantaneous and/or ground fault setting shall be set at levels for optimum system coordination. The coordination study shall include all devices in the new building plus the existing upstream feeder device.

Mechanical equipment requiring variable frequency drives (VFDs) shall comply with DFCM and SUU Standards. Starters for fans and pumps shall have hand-off-auto switches. See notes on Generator on page 3-13.

Uninterrupted Power System (UPS)

It is anticipated that a small UPS will be used to backup telephone and data systems for the building addition. Uninterrupted power system shall be backed up 100% by building a natural gas or diesel stand-by engine generator.

Standby Power Distribution System

The existing Science Building has an emergency generator; however, it likely does not have enough capacity to service the new addition. A 480Y/277 volt standby natural gas or diesel engine generator with an under-skid mounted fuel tank shall be provided. The generators shall be located exterior to the building in a sound attenuated and screened enclosure. The generator shall support building life safety equipment including lights and fire alarm equipment. The generator shall also support optional standby loads such as telephone and data equipment, A/C equipment for communication rooms, and other standby outlets as designated by the users. Standby diesel engine generator shall have approximately 10% excess capacity for future growth and flexibility. The fuel tank should be sized for 12 hours of engine operation at full load. The generator shall be monitored via the building automation system.

A dedicated automatic transfer switch and distribution shall be provided for life safety equipment. A dedicated automatic transfer switch and distribution shall be provided for the stand-by branch. Small dry-type transformers shall be utilized to step down the voltage down to 208V/120 volt lighting and appliance panel boards.

OUTLETS

Locations and number of outlets should be coordinated for each space with users and comply with their needs and requirements. Refer to Section 4.0 Individual Space Analysis. The following is to be used as general guidance:

Building Electrical Systems (continued)

Offices

For each workstation, provide two duplex outlets dedicated to computer terminals and one additional normal outlet for every 6' of wall space. Conference and Board Rooms: One outlet for every 6' of wall space, plus one outlet dedicated to computer terminals on all walls. Provide floor outlets underneath conference room tables.

Lounges/Break rooms/Kitchenettes

GFCI outlets on dedicated outlets every 4' on counter top plus dedicated outlets for refrigerator, microwave, and disposal (switched at counter top), vending machines, plus one outlet for every 6' of other wail space in room.

Counter tops (in general): One outlet every 4'.

Labs/Teaching Labs

Provide outlets for instructor's station, audio/visual equipment and each student. At lab stations, provide two-compartment surface raceway for power and data outlets. Where tables are fixed in place, coordinate power outlets mounted directly into the mill work.

Practice Labs

Provide outlets similar to those required for health care facilities.

Lounges and Study Areas: Provide power outlets for laptop computers, at least one four-plex for each group of four seats, but no less that one outlet per each 6' of wall space. Provide floor outlets where stations or equipment cannot be served directly from the wall without crossing aisle space.

Telecommunication Rooms

Provide a UPS outlets (208 V) and emergency outlets (120 V) for equipment, designated by a red outlet with a red cover plate and labeled "EMERGENCY POWER", and a normal power duplex outlet for general-purpose use.

Electrical Rooms

Provide at least one outlet on emergency power, designated by a red outlet with a red cover plate and labeled "EMERGENCY POWER". Provide at least one outlet on normal power.

Restrooms/Shower Rooms

One GFI outlet near each lavatory counter top.

Corridors

Provide at least one outlet every 25', on alternating sides of the corridor.

Lobbies

Provide at least one outlet every 6', on alternating sides of the lobby.

Stairs

One outlet at the landing of each level.
Storage Rooms (small), Janitors Closets: Two GFI duplex outlets.
Building Exterior: One WP/GFCI outlet near each entrance and adequately spaced in the outside display and student interaction areas.

Grounding: Grounding Conductors

Grounding conductors shall be installed with all feeder and branch circuits. Provide an additional isolated grounding conductor to all 120/208-volt branch panel boards

Provide a grounding riser system throughout the telecommunication rooms with grounding bus bars mounted on the wall in each room. All raised floors (if any) shall be grounded to the ground bus bars - ground bus bars shall be installed under the raised floors.

Building Electrical Systems (continued)

LIGHTING

Lighting should be coordinated for each space with users and comply with their needs and requirements. Refer to Section 4.0 Individual Space Analysis. Lighting design shall comply with illumination levels and uniformity criteria of IESNA and its recommended practices. Comply with RP1-93 "Office Lighting", RP-3-00 "Lighting for Educational Facilities", and RP-33-99 "Lighting for Exterior Environments". Except for specialized applications, design lighting with a minimum efficacy of 64 lumens per watt. Specify maximum 20% THD electronic ballasts. In addition, design lighting with a CRI exceeding 82, except in storage, mechanical, electrical, and similar non-public applications. Where appropriate, different lamp types shall be minimized. Use 4' T-8 lamps with CRI of 86 or greater wherever possible. Lamps should be specified to comply with EPA TCLP requirements.

Maintained foot candle level in offices shall be approximately 30 FC. As a minimum controls shall include occupancy sensors with manual override. Daylight harvesting controls shall be provided where practical. Maintained ambient illumination levels in laboratory spaces shall be 50 FC, not including illumination from task lighting. Lighting controls shall include various levels of switching and/or dimming as may be appropriate in front-to-back arrangements.

Comply with the International Energy Conservation Code, except that overall energy target requirements shall be exceeded by 15%. Design lighting controls to harvest day lighting where practical, to control based upon occupancy, and according to programmable scheduling as applicable to the application.

Only campus standard lighting fixtures compatible with the campus surroundings should be used for walkways and plaza. Exterior lighting shall be controlled by a photocell with a hand-off-auto switch. Outdoor lighting shall be designed to minimize errant light pollution

To meet the requirements of the International Energy Conservation Code, a lighting control system shall be provide to automatically switch off the lights in the building. Manual switches shall be provided to override the system. The lighting control systems shall also control all exterior lighting. Exterior security lighting shall be programmed to be switched on at dusk and off at dawn. All other types of exterior lighting shall be programmed to be switched on at dusk at timed off as directed by SUU.

Interior Lighting

In general, low-glare fluorescent lighting with electronic ballasts should be utilized. Pendant indirect lighting should be strongly considered, but must be carefully coordinated in rooms with projectors so that the fixtures will not interfere with the projected image. Select luminaries for areas where VDTs are planned which are designed to minimize veiling reflections, and provide multilevel lighting control and task lighting to reduce the illuminance on the VDT. Comply with RP-1-93 for office lighting.

In rooms with audio/visual such as classroom teaching labs, provide fluorescent lighting with various switched levels to reduce glare and illuminance on the audio/visual display. Lighting system shall not be designed to interface with audio/visual control system. In rooms with projectors such as lab teaching classrooms, provide switching stations near the instructor position for ease of controlling lighting during presentations in addition to stations at each entrance. Provide whiteboard lighting on separate lighting control zone for each classroom, seminar room, and conference room.

Building Electrical Systems (continued)

Glare from whiteboard lighting shall be minimized to the greatest extent possible. Comply with RP-3-00 for classroom lighting. It is desired that occupancy sensor be provided in classrooms, seminar rooms, and conference rooms with provision for override during A/V presentations. Supplemental task lighting shall be provided at all lab work stations.

Light fixtures in practice labs for the college of nursing shall be similar to those utilized in heath care facility. Comply with illumination levels as established by the IESNA for health care facilities.

Provide weather-proof and corrosion resistant light fixtures in all green house areas. Lamp source, illumination levels, and illumination times shall vary depending upon the species of plants. Comply with all IESNA requirements. The electrical engineer shall confirm all species of plants to be located in the green house with SUU during design.

Occupancy sensors should be used for the appropriate applications and control for daylight harvesting. Specify dual technology, ceiling mounted directional sensors in private offices, labs, and classroom teaching labs with manual off-switches. Ultrasonic sensors shall be provided in restrooms. Programmable lighting control with manual timed overrides should be in all common areas such as open offices, corridors, lobbies, and similar areas.

Provide exit lighting to comply with the IBC. Emergency lighting should be designed for means of egress to 1 FC minimum to comply with the IBC. In addition, include emergency lighting in restrooms, mechanical rooms, electrical rooms, and communication rooms.

FIRE ALARM SYSTEM

Fire alarm system shall be designed to comply with Utah State Fire Marshall's "Rules and Regulations" and SUU Design Standards. Only Simplex fire alarm systems are allowed on campus. An addressable fire alarm system shall be designed capable of networking with the campus system. The call center has a Simplex 4100U panel where all branch panels report to via dedicated telephone lines. Presently, only dry contacts are being monitored.

Design strobes visible from all locations except private offices. Horn installation shall comply with NFPA including for higher ambient noise requirements. Provide duct detectors and fan shutdown where required by NFPA and the IMC, including detection of smoke at all return air shafts servicing multiple floors. Coordinate location of the building fire alarm control panel and annunciator panel with the Campus fire marshal.

TELECOMMUNICATION SYSTEM

The voice and data system shall consist of two main categories: 1) Pathways and Spaces to support the voice and data system, and 2) The structured cabling system provided by the SUU IT Department.

Pathways and Spaces

There shall be one main communication room. This room shall house the main computer and phone equipment that serves the building. Each equipment room should be a minimum of 150 square feet in size. The room shall be located as close to the center of the building as possible, horizontally as well as vertically. If the building is 4 levels, it should be located on the main level, assuming that one of the levels is a basement. If the building is only 3 levels, it should be located in the middle level.

Building Electrical Systems (continued)

Each floor shall have at least one communication room that is 110 square feet in size. Additional communication rooms of the same size may be required on each floor if the horizontal cable length to a telecommunications outlet exceeds 90 meters. (The standards set the maximum cable length at 100 meters. That includes the length in the comm room from the wall to the switches, and in the classrooms, from the wall to the computers.) This building is small enough that all telephone and data lines should be able to be terminated in the main communication room. The intermediate communications rooms should be used as a collecting point for all the lines on that floor and pass them through to the main communications room. There should be no terminations in these rooms at this time.

A minimum of two (2) 3" conduits shall be run from the communication room on level three to the roof of the building for roof mounted external wireless communications. All communication rooms shall be located in a stacked configuration and shall be interconnected with at least (4) 4" sleeves. There shall be no water (for example but not limited to restrooms, drinking fountains or janitors sinks) adjacent to or above any of the communications rooms. All communications rooms shall have access directly from a hallway without needing to go through a classroom or office to enter the room

Each floor shall have a cable tray system that covers each floor. The cable tray system shall connect communication rooms on the same floor. Generally, it shall be routed in corridors and coordinated with ducts, piping, and electrical conduits. It should also be extended into each lecture room or major area. It is anticipated by 12" wide by 4" deep tray should be sufficient; however, this should be carefully evaluated during design. The tray should be trapeze-hung and seismically braced; center-hung trays are not allowed. The location of the tray should be coordinated with duct work and piping during design.

Mechanical fire stop systems should be utilized where the cable tray passes through fire rated partitions to allow for moves, adds, and changes in a flexible and easy manner. Wherever possible, each room should have cable tray entering the room from two directions to maximize flexibility and future moves, adds, and changes. The cable tray shall be a minimum of 18" wide (the previous paragraph says 12" wide) with a 4" loading depth.

Each telephone/data outlet shall utilize a 4" square by minimum 2-1/8" deep junction box with a single-gang plaster –ring. Two 1" conduits with nylon pull rope shall be run from each junction box to the nearest cable tray and a protective bushing should be provided at the end of the conduit at the cable tray. Conduit to tray clamps shall be employed. The SUU IT Department shall provide the voice and data cables, jacks, and terminations if approved by DFCM.

In small offices, provide one (1) telephone/data outlet. In larger offices where it is anticipated that there could be two (2) workstations, provide at least two (2) telephone/data outlets and more as may be required. Provide data outlets at nooks and vending areas.

STRUCTURED CABLING SYSTEM

The structured cabling system shall be designed and installed by the SUU IT Department at the approval of DFCM. The following information is provided only for documentation of the requirements of the user. The electrical engineer should coordinate their work closely with the SUU IT Department to provide the best and most flexible environment for the structured cabling system.

Building Electrical Systems (continued)

The structured cabling system shall be designed to support high-speed voice/data/video and future high bandwidth applications. The system should be a Category 6 solution or the applicable standard at the time of construction.

The campus network service entrance cable and backbone cable shall be fiber-optic. Horizontal cabling to each telephone/data outlet shall be unshielded twisted pair. All backbone cables shall be terminated in a wall-mounted fiber break out enclosure. All horizontal cabling shall be terminated on wall mounted Systimax visipatch patch panels. The main communication room shall have one 7'-0" high, 19" floor-standing rack.

Provide telephone outlets for payphones, ATM's, elevator panels, fire alarm panel, building automation system, security system, wall phone and other required uses. Each telephone outlet shall have one Category 6 RJ-45 4-pair port with a dedicated horizontal Category 6 cable ran from the main communication room to the port.

Wireless

The user desires that the building and all immediate adjacent outdoor areas, be provided with reliable wireless local area network coverage. Provide data outlets at owner designated location for wireless points to cover all interior areas, as well as to spill out into all immediate adjacent outdoor areas. Design wireless access point data outlet with one category 6, RJ-45 data jack mounted in a 4" square by minimum 2-1/8" deep junction box with a cover plate. Contact Glen Pryor at SUU 586-7737.

SECURITY SYSTEMS

A security system shall provided with the following features (depending upon the needs or the user): Measures to protect materials on public display; perimeter alarms such as door contacts on exterior doors to monitor these possible entry points after hours; passive infrared motion sensors that will detect human movement in the areas to be secured; and security cameras.

If security cameras are desired, it is recommended that digital Internet Protocol (IP) cameras in conjunction with a digital video recorder and server be provided.

This will allow access to the system by authorized personnel over the Intranet.

As a minimum, the contract will include boxes and raceways for future devices.

BUILDING CARD ACCESS SYSTEMS

A building card access system shall be provided with card readers, magnetic alarm contacts, and electric door strikes for card access to all outside doors, inside doors to computer rooms, communication rooms, and inside doors to mechanical room (depending upon the needs of the user). Rough-in shall include the installation of conduits and outlet boxes as required for card readers, alarm contacts and door strikes. The SUU IT Department should be included in the discussions about selecting a vendor for the card access system in order to make sure it is compatible with existing systems where necessary.

As a minimum, the contract will include boxes and raceways for future devices.

Electronic access control: Currently labs are on standalone electronic access control systems. To meet the needs of faculty and students a hardwired access control system is needed including access to the required labs and exterior of building. Also position indicator switches to ensure security of the building.

Building Electrical Systems (continued)

CLOCK SYSTEM

Provide battery-operated clocks in classrooms, public areas, common areas, etc. Locations of the clocks should be coordinated with the users.

Provide at least one GPS receiver/transmitter at a central location with a roof mounted antenna. The GPS receiver should provide NTP (Network Time Protocol) to a directly connected computer system. Clocks should be correctable by either Code Division Multiple Access (CDMA) or the Global Positioning System (GPS) transmission via wireless communication directly to each clock.

AUDIO AND VIDEO SYSTEMS

Audio and video systems shall be specified as part of the building construction work. Audio and video systems in all classrooms will be specified in full compliance with established campus standards. Audio and video systems in all lab teaching rooms will be similar in design, function and operation to facilitate user friendly operation by faculty from room to room. Coordinate with Glen Pryor at SUU 586-7737.

Lab Teaching Classroom

Each lab teaching classroom will be provided with a building standard teaching station (lectern). Several media source devices will be provided and housed at each lectern. These devices will include, but not be limited to, one permanent computer, inputs for one portable computer, a DVD player, a VCR, a document camera, and audio/video/data sources originating from outside the classroom. Access to the Internet using hard wired and wireless connections with authentication is required. Audio originating from these source devices will be selected, processed, and amplified to a speaker system. Voice will be captured using wireless, ear microphones. Once captured, the audio signal will be processed and amplified to a speaker system. In compliance with the Americans with Disabilities Act, a wireless assisted listening and video captioning systems will be provided.

Size projection screens using industry-wide accepted mathematical formulas appropriate for the nearest and furthest viewers. Locate projection screens in close coordination with seating layouts to assure appropriate viewing sight lines. Provide projectors with a minimum native resolution of 1280 x 1024 with 2,000 to 5,000 ANSI Lumens to suit application. As with screen sizing, utilize industry-wide accepted mathematical formulas to calculate the required light output for each projector to assure that images will not be "washed out" by ambient room lighting. Include all video system calculation in the construction drawings.

Additional conduits shall be provided between media devices locations, projectors, equipment rooms, etc. in sizes that will allow for future cabling. Minimum size shall be 2". The ultimate goal is flexibility.

Power and data outlets shall be provided for each student. (This will need to be discussed with the campus on a room by room basis)

TV Distribution System

SUU typically does not utilize a TV distribution system although is does have cable television. Raceway provisions shall be provided for a future campus TV distribution system and be extended into the new building. Outlet boxes and raceways shall be provided in locations as determined by the users.

Building Electrical Systems (continued)

SUSTAINABILITY:

SUU desires that the new Science Building addition demonstrate sustainable design, construction and operation principles. High performance electrical systems are central to this vision, not only because they directly affect energy consumption, but also indoor air quality, work performance and thermal comfort. Additionally, those systems, in order to function at their highest level, require commissioning and on-going measurement and verification. This program lists steps that the electrical designer must to take to exceed code-minimum standards in each of those categories, through an integrated design process with all design team members, and a commitment to high-performance design.

PROJECT DOCUMENTATION

Provide a design narrative that includes the following:

1. Basis of design, including all information required to prepare the design.

2. Sequence of operation of all systems, as well as their interaction with other systems.

3. System description, including operating parameters and assumptions.

4. Acceptance testing requirements, in tabular form, for use by the installing contractor and verification by the design engineer. This may be incorporated into the commissioning documentation.

5. A description of the methods used by the design team to achieve sustainability, including the integrated design process; and a description of the results, i.e. a description of the sustainable elements included in the design. Include in this section how the requirements of this program were met.

6. Results of the energy simulation, with a design energy performance standard for the building.

Structural Systems

The design of the new facility must address local conditions and shall be in conformance with applicable local/state ordinances, building codes regulations, and referenced criteria herein. Aesthetic values, connection to the existing building and community acceptance will be key issues driving the overall appearance and height of the building. The structural design shall be performed in accordance with the provisions of Southern Utah University design requirements and the 2006 International Building Code.

All viable structural systems must be considered to determine the most appropriate structural system for this facility. The structural framing systems shall be selected with the following considerations:

1. Meeting the functional needs of the facility.
2. Aesthetics.
3. Overall economy.
4. Constructability.
5. Construction sequence and duration.

Building Geometry

The building is comprised of an 11,500 sf basement and two 11,500 sf above grade levels with a 7,800 sf greenhouse on the roof. Although entirely self supporting, because of the connections at each level the building is an addition to the adjacent science building constructed in 1991.

Structural Systems (continued)

There are two options for the floor plan, one being rectangular with a high degree of symmetry about both axes, the other being an "L" shape. New parking will be added on the north side of the addition. The existing building consists of a basement and 3 above grade levels. Proximity to existing building will need to be addressed in the addition in order to accommodate excavations and building separations appropriately.

Structural Framing Systems

The structural framing systems shall be selected for their functional characteristics, economy, compatibility with architectural, mechanical, and electrical systems, and constructability.

The recommended floor framing systems are composed of composite steel beams with metal deck and hard-rock concrete topping slabs. A superimposed live load of 100 psf shall be used in the design for all floors. A vibration analysis per the AISC design guide 11 critiron shall be performed on floor systems to ensure acceptable end user comfort. As a minimum, the walking excitation at 90 paces per minute shall be used. More stringent requirements may be appropriate in sensitive areas at owners request.

The roof mounted greenhouse structure may be a pre-engineered/pre-manufactured greenhouse or a custom designed structure constructed of materials appropriate for the anticipated high moisture conditions.

The columns may be steel wide-flange or HSS sections.

Foundations/Geotechnical

The foundations are based on the recommendations presented in the project geotechnical report prepared by GEM Engineering, December 2007. Borings indicate that collapsible soils exist from the surface down to a depth of approximately 20'-0". It is recommended in the soils report that these poor soils be removed and replaced with compacted structural fill. Total excavation would amount to approximately 8 to 10 feet below the basement slab on grade. Conventional spread type foundations are presented with compacted engineered fill to control settlements. Potential detrimental settlements of the existing science building must be considered and mitigated. Shoring systems for excavations adjacent to the existing building shall be designed and stamped by a licensed engineer qualified to perform such design. All excavations shall be inspected by the project geotechnical engineer prior to placement of concrete in foundation systems.

Lateral Force Resisting System

Lateral wind and seismic forces shall be resisted by an appropriate system to meet the minimum requirements per the 2006 International Building Code.

It is expected that the lateral force resisting system will be comprised of reinforced masonry or concrete shear walls and concrete topped steel deck horizontal diaphragms similar to the adjacent existing science building. A steel frame system may be considered.

Exterior Enclosure

The design of the exterior enclosure systems (cladding) shall be designed and detailed to be compatible with lateral building movements due to wind and seismic forces. These systems shall be designed and stamped by an engineer who is experienced in designing exterior enclosure systems.

Structural Systems (continued)

Structural Design Criteria

The structure shall be designed to support actual dead loads plus live loads and combinations according to current 2006 International Building Code, ASCE 7-05, and DFCM Design Standards. These loads are as follows:

IBC Building Category III

Roof Snow Load, Pf = 0.7CeCtIPg

Ce	=	1.0
Ct	=	1.1
Is	=	1.0
Pg	=	43 psf
Pf	=	33 psf

Seismic Loads

Seismic Use Group	II
Seismic Design Category	D
Spectral Response Coefficient, Ss	0.705g
Spectral Response Coefficient, S1	0.223g
Site Class	D
Site Coefficient, Fa	1.236
Site Coefficient, Fv	1.953
Seismic Importance factor, Is	1.25
Seismic Coefficient	R = Value dependent on system
Seismic Weight	W = Dead load of Structure

Wind Loads

Basic Wind Velocity	V = 90 mph
Exposure Type	B
Importance Factor	Iw = 1.15

Working Stresses (Minimum Recommended)

Concrete (28 day)	Footings	f'c = 3000 psi
	Slabs-on-Grade	f'c = 4000 psi
	Columns, Walls, Floor Systems	f'c = 4000 psi
Reinforcing Steel	ASTM A615 Grade 60	Fy = 60 ksi
Structural Steel	ASTM A572 or A 992	Fy = 50 ksi
Open Web Steel Joists & Girders (if used)	per SJI	
Steel Deck	per SDI	

Assumed Allowable Soil Bearing Pressure 2500 psf
On Engineered Fill
(GEM Engineering, December 2007)

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Individual Space Analysis

This section contains the building program space summary which lists all of the spaces required for the new facility. It is organized into departmental or functional areas in the building. Detailed information regarding the contents, size and character of each space is located in each of the sub-sections that follow the space summary.

Terminology

Terminology used in this program is standard terminology used by Architects. Terms such as NSF and GSF relate to square footage of spaces describe in the program. NSF is Net Square Footage or ASF is Assignable Square Footages the area directly attributable or assigned to students and faculty. GSF is Gross Square Footage which includes corridor systems, wall widths, and miscellaneous support spaces such as mechanical rooms rest rooms, etc. Typically in education facilities the GSF can be derived from the ASF by using a multiplying factor. This factor is based on historical trends in education facilities and standards used by the State of Utah. The net to gross ratio used in this program is 65.3% of the GSF is ASF for new construction. This factor of utilization for this type of building requires care by the Architect to achieve the most efficient use of

AFFINITY CHART

			Biology													Nursing								P. Science				Museum				Orientation			
Dept.	Abv.	Room	BF	WL	DL	SP	GB	SS	AC	MG	CM	SR	GH	HR	PR	NF	PL	LS	VL	CC	CO	FD	WR	PF	CL	TL	CS	MO	MR	MD	MS	EE	CE	DE	P
B	BF	Faculty		2	2	4	2	4	4	2	2	2	4	4	4	4	4	4	4	4	2	4	2	4	4	4	4	4	4	4	3	4	2	4	4
I	WL	Eco Wet Lab	2		1	1	4	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4
O	DL	Eco Dry Lab	2	1		1	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4
L	SP	Eco Storage/Prep	4	1	1		4	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	2	4
O	AL	Anatomy/Phys. Lab	2	4	4	4		2	4	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	2	2	2	4	2	4
G	SS	Specimen Storage	4	2	4	2	2		4	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	2	1	2	4	2	4
Y	AC	Animal Care	4	3	3	3	4	4		4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	4	4	4	5	5	5	5	5	5	2	4
	MG	Micro/Genetic Lab	2	4	4	4	2	2	4		1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	CM	Cell/Molec Lab	2	4	4	4	2	2	4	1		1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	SR	Bio Support Rm	2	4	4	4	2	2	4	1	1		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4
	GH	Green House	4	4	4	4	4	4	5	4	4	4		1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	2	4
	HR	Herbarium	4	4	4	4	4	4	5	4	4	4	1		1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4
	PR	Plant Lab/Office	4	4	4	4	4	4	5	4	4	4	1	1		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	4
N	NF	Faculty	4	4	4	4	4	4	5	4	4	4	4	4	4		3	3	3	3	3	1	2	4	2	2	2	4	4	4	4	5	4	4	2
U	PL	Practice Labs	4	4	4	4	4	4	5	4	4	4	4	4	4	3		1	2	3	4	3	3	4	4	4	4	4	4	4	4	5	5	5	4
R	LS	Lab Support	4	4	4	4	4	4	5	4	4	4	4	4	4	3	1		1	3	4	3	3	4	4	4	4	4	4	4	4	5	5	4	4
S	VL	Validation Lab	4	4	4	4	4	4	5	4	4	4	4	4	4	3	2	1		3	4	1	3	4	4	4	4	4	4	4	4	5	5	5	4
I	CC	Computer Classrm	4	4	4	4	4	4	5	4	4	4	4	4	4	3	3	3	3		4	3	4	4	4	4	4	4	4	4	4	4	4	4	4
N	CO	Conference Rm	2	4	4	4	4	4	5	4	4	4	4	4	4	3	4	4	4	4		3	4	2	4	4	4	4	4	4	4	4	2	4	2
G	FD	Faculty/Stud. Discus.	4	4	4	4	4	4	5	4	4	4	4	4	4	1	3	3	1	3	3		4	4	4	4	4	4	4	4	4	4	2	4	4
	WR	Workroom	2	4	4	4	4	4	5	4	4	4	4	4	4	2	3	3	3	4	4	4		2	4	4	4	4	4	4	4	4	2	2	2
P	PF	Faculty	4	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4	2	4	2		2	2	2	4	4	4	4	4	2	4	2
S	CL	Chem. Lab	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	2		1	1	4	4	4	4	4	4	4	4
C	TL	Chem. Teach Lab	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	2	1		1	4	4	4	4	4	4	4	4
I	CS	Chem. Support	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	2	1	1		4	4	4	4	4	2	2	4
Nat.	MO	Museum Office	4	4	4	4	2	2	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		1	1	2	2	4	4	2
Hist.	MR	Reception	4	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1		1	2	2	4	2	2
Mus.	MD	Museum Display	4	4	4	4	2	2	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1		1	2	4	2	2
	MS	Storage/Prep	3	4	4	4	2	1	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	1		2	4	2	1
	EE	East Entry/Stairs	4	2	2	2	2	2	5	4	4	4	2	4	4	5	5	5	5	4	4	4	4	4	4	4	4	2	2	2	2		4	4	2
	CE	Connect Entry/Elvtr.	2	4	4	4	4	4	5	4	4	4	4	4	2	4	5	5	5	4	2	2	2	2	4	4	2	4	4	4	4	4		1	1
	DE	Dock Entry/Srv. Elvtr.	4	4	4	2	2	2	2	4	4	2	2	2	2	4	5	4	5	4	4	4	2	4	4	4	2	4	2	2	2	4	1		1
	P	Parking - North	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	2	4	2	2	4	4	4	2	2	2	1	2	1	1	
Exist.	EB	Basement	4	3	3	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	4	4	4	4	4	4	4	1	4	4	4
Bld.	EM	Main Floor	2	4	4	4	3	3	4	3	3	3	4	4	4	5	5	5	5	5	4	5	2	4	4	4	4	1	1	1	1	1	1	2	1
	ES	Second Floor	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	3	2	2	2	2	2	4	4	4	4	1	4	4	4
	ET	Third Floor	4	4	4	4	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	4	4	4

AFFINITY KEY

1	2	3	4	5
Adjacency Required	Adjacency Desired	Same Floor Prfrd.	No Adjacency Required	Avoid Adjacency

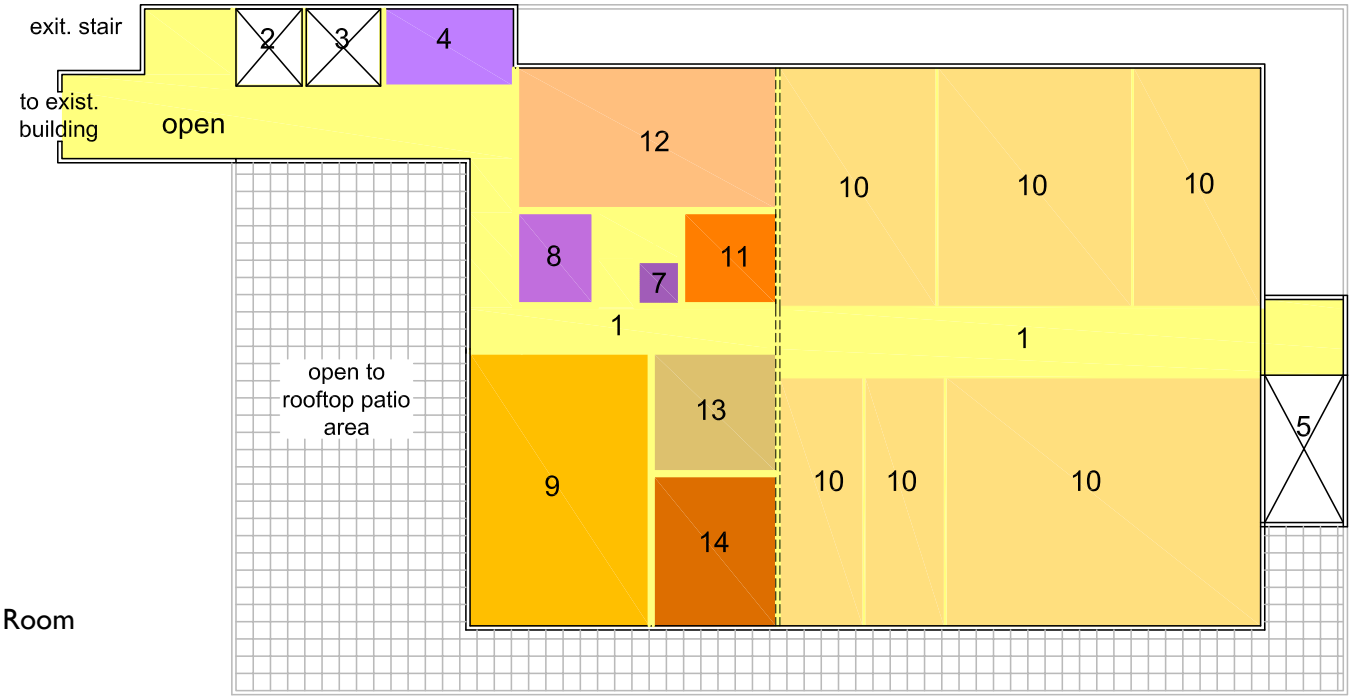
DEPT	SPACE DESCRIPTION	# Occupants	Code	Occupants	Width	Length	Total NSF	FACTOR	GSF
S	Chemistry Teaching Lab	29	1:50	29	34	31	1,200	1.65	1,980
C	Chemistry Open Lab	22	1:50	22	31	35	1,100	1.65	1,815
I	Chemistry Support Room	2	1:300	3	16	25	400	1.65	660
	Subtotal Physical Science Department	**53**		**54**			**2,700**		**4,455**
B	Faculty Offices (7), recept, stor, stud cubes.	7	1:100	11	10	12	1,130	1.45	1,639
I	Vivarium - Animal Units (5)	3	1:300	3	10	15	750	1.65	1,238
O	Vivarium - Operating Room	3	1:50	3	15	10	150	1.65	248
L	Vivarium - Storage Room	1	1:300	1	15	20	300	1.65	495
O	Vivarium - Washing/Sterile Room/Entry	3	1:100	3	15	20	300	1.65	495
G	Vivarium Mech. Control Room	1	1:100	1	15	10	150	1.65	248
Y	Ecology - Wet Lab	17	1:20	25	20	25	500	1.65	825
	Ecology - Dry Lab	17	1:20	25	20	25	500	1.65	825
	Ecology - Lab Support	3	1:300	2	18	25	450	1.65	743
	Anatomy/Physiology Lab	24	1:40	25	28	36	1,000	1.65	1,650
	Moelcular/Genetics Lab	25	1:40	28	30	37	1,110	1.65	1,832
	Cellular/Histology Lab	25	1:40	28	30	37	1,110	1.65	1,832
	Lab Support Room	4	1:300	4	35	35	1,200	1.65	1,980
	Green House	26	1:100	39	58	67	3,900	1.25	4,875
	GreenHouse-Plant Lab/Office/Prep/(Classrm.)	24	1:40	24	37	33	1,450	1.65	2,393
	Green House - Herbarium	4	1:100	5	30	17	500	1.65	825
	Specimen Storage	2	1:300	2	18	40	700	1.65	1,155
	Museum Curator Office & Entry/Reception	20	1:15	21	26	15	380	1.45	551
	Musuem Prep & Storage Area	3	1:100	3	23	15	350	1.45	508
	Natural History Museum - Display Area	20	1:15	21	50	24	1,150	1.45	1,668
	Subtotal Biology Department	**232**		**274**			**17,080**		**26,020**

DEPT	SPACE DESCRIPTION	# Occupants	Code	Occupants	Width	Length	Total NSF	FACTOR	GSF
N	Faculty Offices (12), recept., stor., stud. cubes.	12	1:100	11	12	10	2,070	1.45	3,002
U	Department Chair Office	1	1:100	2	12	12	150	1.45	218
R	Science Faculty - Conference Room	30	1:15	33	32	17	500	1.5	750
S	Workroom	1	1:300	1	29	10	320	1.5	480
I	Practice Lab	24	1:50	24	41	40	1,600	1.5	2,400
N	Lab Instructor Office	2	1:100	2	16	10	150	1.45	218
G	Hospital Bathroom	1	1:300	1	11	9	80	1.5	120
	Validation Lab	12	1:50	15	23	40	890	1.5	1,335
	Testing Control Room	3	1:50	3	11	12	140	1.45	203
	Equipment Storage	1	1:300	1	14	14	180	1.45	261
	Discussion/Study Area	30	1:15	21	18	17	310	1.45	450
	Computer Teaching & Testing Lab/Server Room	38	1:20	70	42	33	1,480	1.65	2,442
	Subtotal Nursing Department	**155**		**170**			**7,870**		**11,877**
	Building Total	**267**		**282**			**27,650**		**42,350**

FLOOR	SPACE DESCRIPTION	AREA	
BASEMENT	Animal Care Units, OR, Clean, Stor.	1,650	
	Ecology Wet Lab	500	
	Ecology Lab Support	450	
	Ecology Dry Lab	500	
	Chemistry Open Lab	1,100	
	Chemistry Teaching Lab	1,200	
	Chemistry Support Room	400	
	Subtotal		**5,800**
	Support Space		
	Mechanical/Electrical Space	2,850	
	Stairway	250	
	Service Elevator/Vestibule	170	
	Passenger Elevator	80	
	Elevator Mechanical Room	100	
	Electrical/Communications Room	100	
	Hallways	1,770	
	Walls	380	
	Support Space Total		**5,700**
	Basement Total Net Sq. Ft.		**5,800**
	Estimated Total Gross Sq. Ft.		*11,500*
ROOF LEVEL	Greenhouse	3,900	
	Plant Lab/Office/Toilet Room	1,450	
	Herbarium	500	
	Roof Total Net Sq. Ft.		**5,850**
	Support Space		
	Stairway	250	
	Service Elevator	250	
	Passenger Elevator	70	
	Elect./Comm. Room	100	
	Hallways	980	
	Walls	350	
	Support Space Total		**2,000**
	Estimated Total Gross Sq. Ft.		*7,850*

Total Net Assignable Sq. Ft.	**27,650**	
Total Unassignable Space	**14,700**	
Total Gross Sq. Ft.		**42,350**
Net to Gross Ratio		***65.3%***

FLOOR	SPACE DESCRIPTION	AREA	
MAIN LEVEL	Museum	1,880	
	Biology Staff	1,130	
	Specimen Storage	700	
	Histology/Embryology Lab	1,110	
	Support/Storage	1,200	
	Cellular/Molecular Genetics Lab	1,110	
	Anatomy/Physiology Lab	1,000	
	Subtotal		**8,130**
	Support Space		
	Stairway	250	
	Service Elevator/Vestibule	250	
	Passenger Elevator	100	
	Hallways	1,470	
	Walls	600	
	Toilet Rooms (2)	350	
	Mech, etc.	200	
	Elect./Comm. & & Janitor Rooms	150	
	Support Space Total		**3,370**
	Main Level Total Net Sq. Ft.		**8,130**
	Estimated Total Gross Sq. Ft.		*11,500*
SECOND LEVEL	Nursing Labs/Office & Support	3,040	
	Computer Lab	1,480	
	Faculty	2,550	
	Conference Room	500	
	Faculty/Student Study	300	
	Subtotal		**7,870**
	Support Space		
	Stairway	250	
	Service Elevator	250	
	Passenger Elevator	100	
	Hallways	1,730	
	Walls	600	
	Toilet Rooms (2)	350	
	Mech, etc.	200	
	Electrical/Communications Rooms	150	
	Support Space Total		**3,630**
	Main Level Total Net Sq. Ft.		**7,870**
	Estimated Total Gross Sq. Ft.		*11,500*

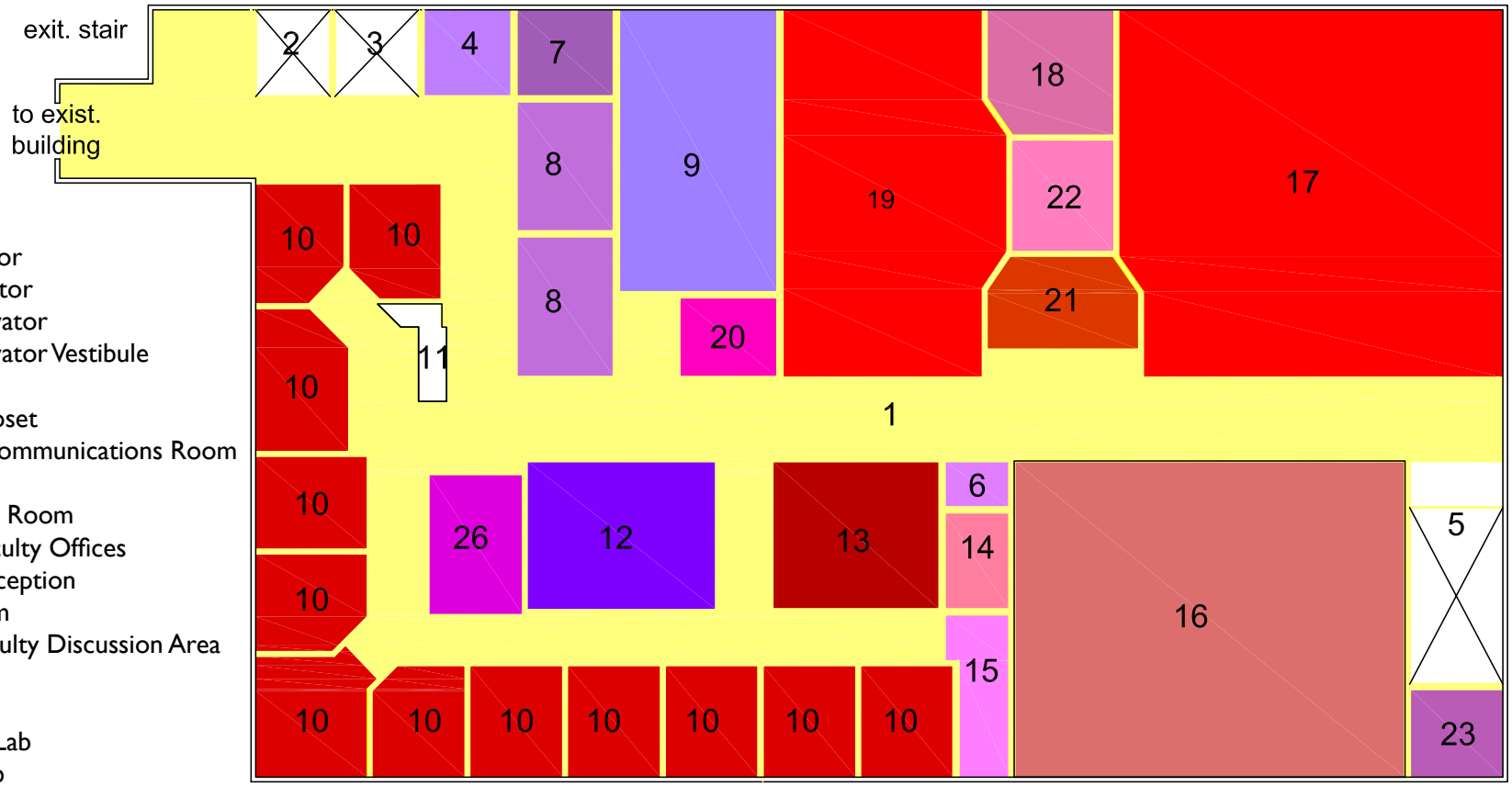


Roof Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Restroom
9. Classroom
10. Greenhouse
11. Instructors office
12. Herbarium
13. Potting Area
14. Storage

ROOF LEVEL ADJACENCY DIAGRAM
W/ ACURATE PROGRAMMED AREA SQ.FT.
SCALE: 1/16 = 1'-0"

* THIS DIAGRAM IS ONLY INTENDED TO SHOW RELATIVE ADJACENCIES AND SIZES OF AREAS WITHIN THE CONTEXT OF A PROPOSED FOOTPRINT THAT IS THE SIZE PROGRAMMED. THIS DOES NOT NECESSARILY REFLECT THE FINAL DESIGN.

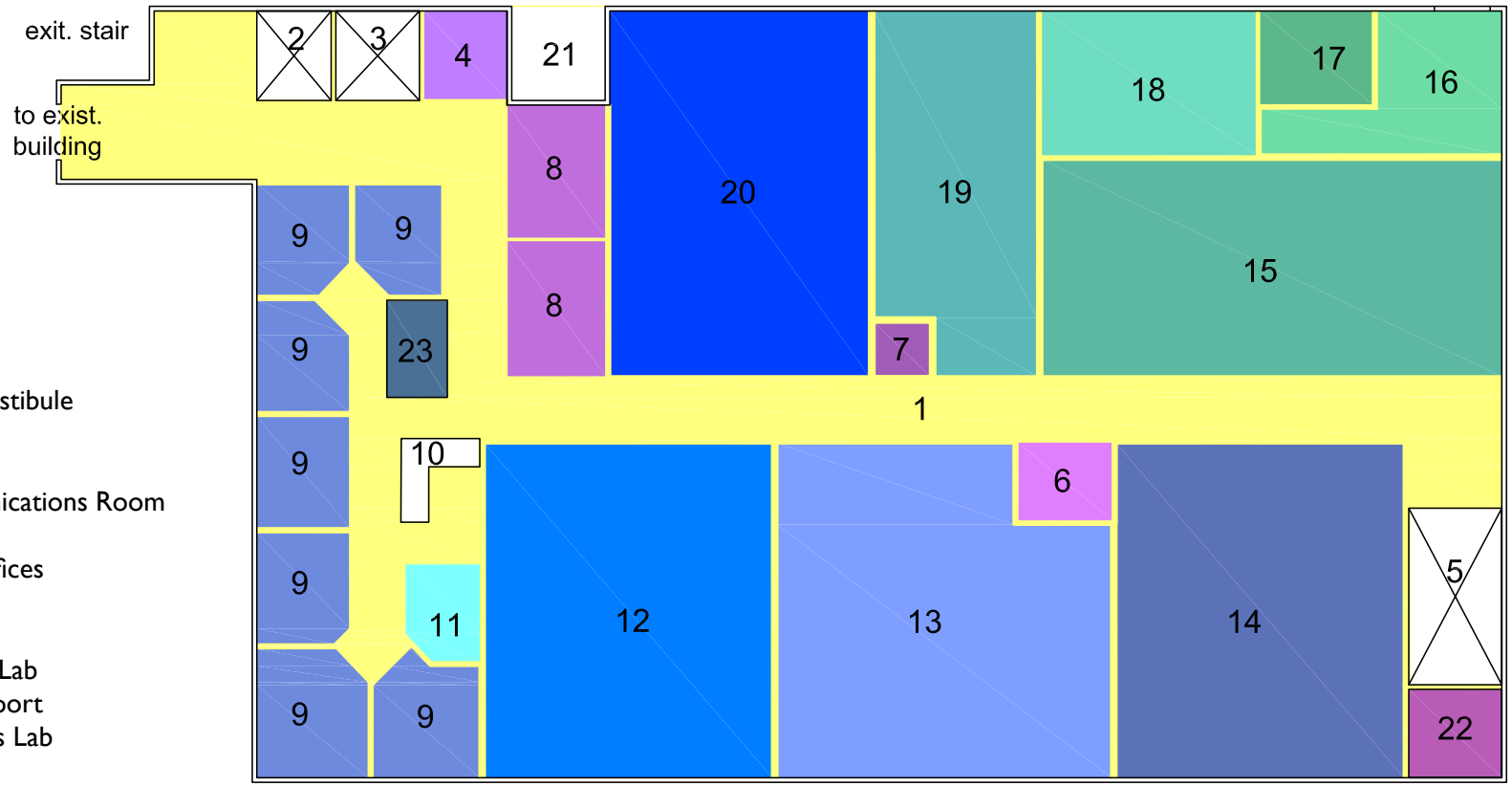


Second Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Restrooms
9. Conference Room
10. Nursing Faculty Offices
11. Nursing Reception
12. Work Room
13. Student/Faculty Discussion Area
14. Server
15. Storage
16. Computer Lab
17. Practice Lab
18. Equipment Storage
19. Validation Lab
20. Hospital Bathroom
21. Instructor's Office
22. Practice Lab
23. Testing Control
25. Fire Sprinkler Riser Room
26. Student Cubicals

SECOND LEVEL ADJACENCY DIAGRAM
W/ ACURATE PROGRAMMED AREA SQ.FT.
SCALE: 1/16 = 1'-0"

* THIS DIAGRAM IS ONLY INTENDED TO SHOW RELATIVE ADJACENCIES AND SIZES OF AREAS WITHIN THE CONTEXT OF A PROPOSED FOOTPRINT THAT IS THE SIZE PROGRAMMED. THIS DOES NOT NECESSARILY REFLECT THE FINAL DESIGN.

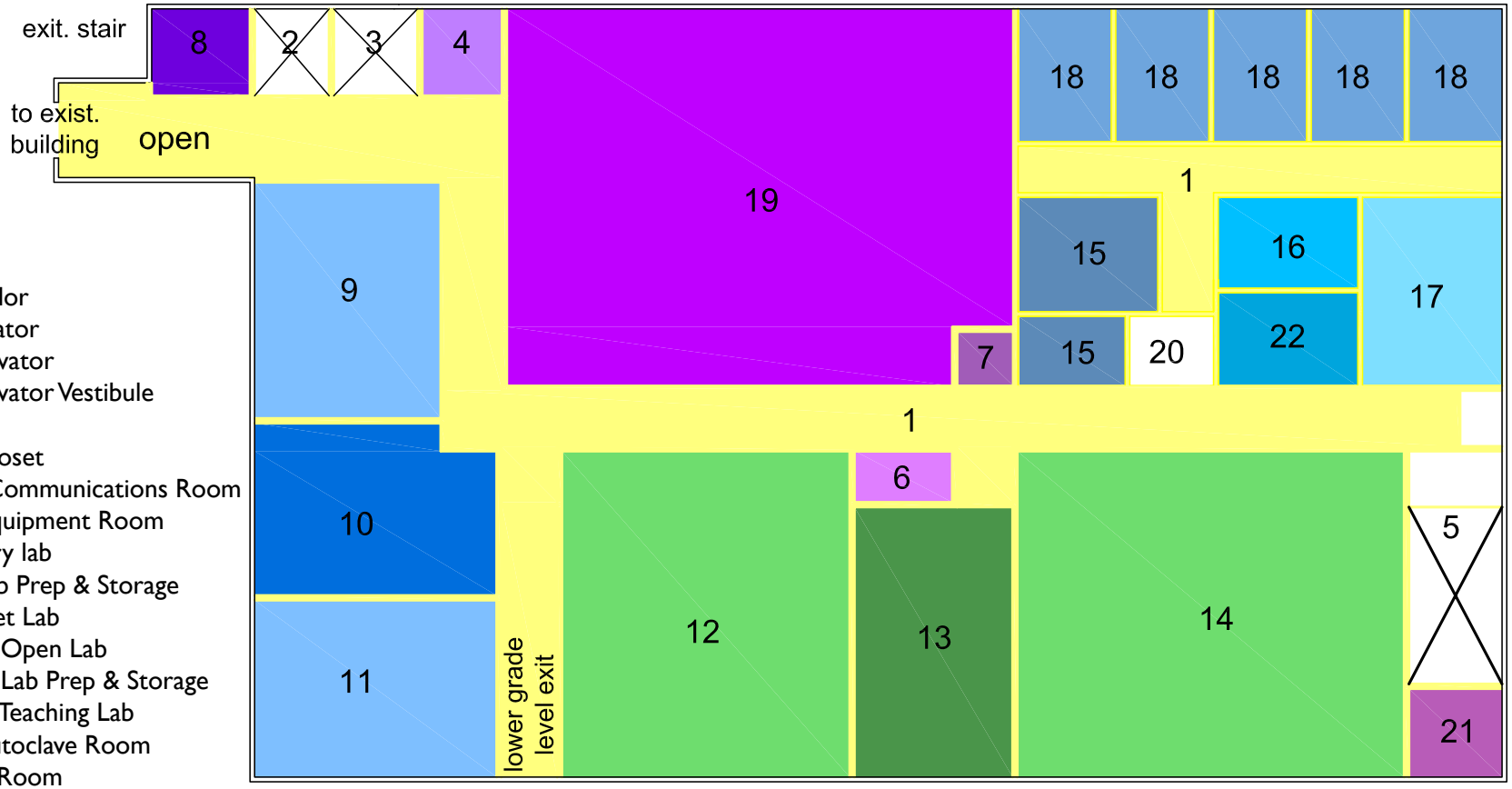


Main Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Restrooms
9. Biology Faculty Offices
10. Biology Reception
11. Storage
12. Cellular/Histology Lab
13. Lab Storage & Support
14. Molecular/Genetics Lab
15. Museum Display
16. Museum Reception
17. Museum Office
18. Museum Prep.
19. Specimen Storage
20. Anatomy/Physiology Lab
21. Dock
22. Fire Sprinkler Riser Room
23. Student Cubicals

MAIN LEVEL ADJACENCY DIAGRAM
W/ ACURATE PROGRAMMED AREA SQ.FT.
SCALE: 1/16 = 1'-0"

* THIS DIAGRAM IS ONLY INTENDED TO SHOW RELATIVE ADJACENCIES AND SIZES OF AREAS WITHIN THE CONTEXT OF A PROPOSED FOOTPRINT THAT IS THE SIZE PROGRAMMED. THIS DOES NOT NECESSARILY REFLECT THE FINAL DESIGN.



Basement Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Elevator Equipment Room
9. Ecology Dry lab
10. Ecology Lab Prep & Storage
11. Ecology Wet Lab
12. Chemistry Open Lab
13. Chemistry Lab Prep & Storage
14. Chemistry Teaching Lab
15. Clean & Autoclave Room
16. Operating Room
17. Storage
18. Animal Unit
19. Mechanical Room
20. Vestibule
21. Fire Sprinkler Riser Room
22. Vivarium Mechanical Control Room

BASEMENT LEVEL ADJACENCY DIAGRAM
W/ ACURATE PROGRAMMED AREA SQ.FT.
SCALE: 1/16 = 1'-0"

* THIS DIAGRAM IS ONLY INTENDED TO SHOW RELATIVE ADJACENCIES AND SIZES OF AREAS WITHIN THE CONTEXT OF A PROPOSED FOOTPRINT THAT IS THE SIZE PROGRAMMED. THIS DOES NOT NECESSARILY REFLECT THE FINAL DESIGN.

Department of Physical Science

DEPARTMENT NET SQUARE FEET

Chemistry Open Lab	1100
Lab Support	400
Chemistry Teaching Lab	1200
Total	**2700**

KEY PLAN

Basement Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Elevator Equipment Room
9. Ecology Dry lab
10. Ecology Lab Prep & Storage
11. Ecology Wet Lab
12. Chemistry Open Lab
13. Chemistry Lab Prep & Storage
14. Chemistry Teaching Lab
15. Clean & Autoclave Room
16. Operating Room
17. Storage
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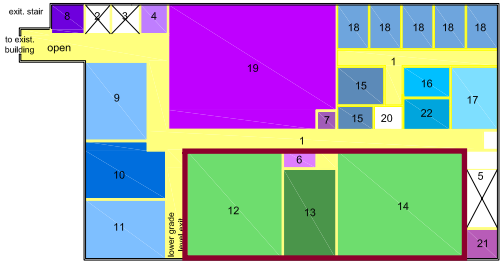
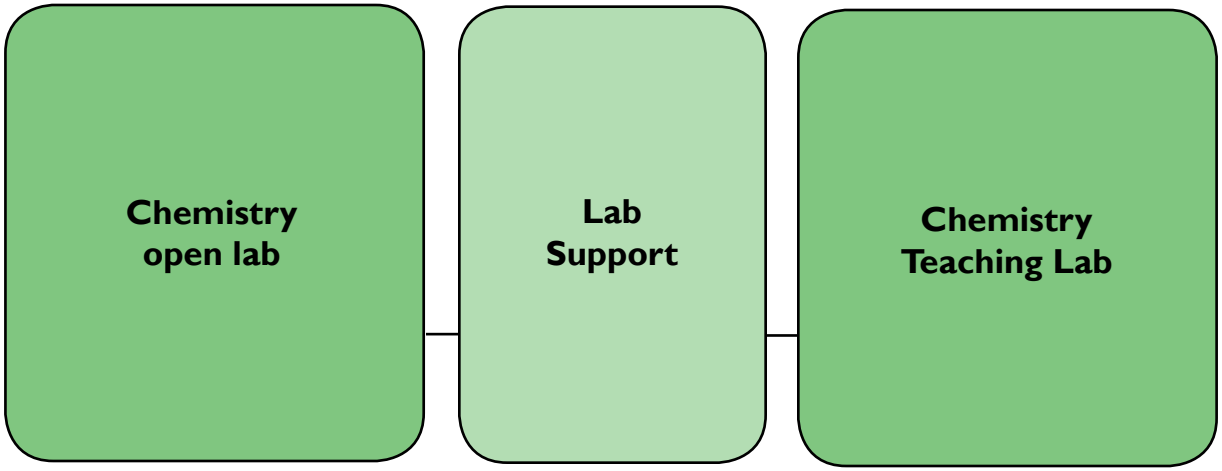
19. Mechanical Room
20. Vestibule
21. Fire Sprinkler Riser Room
22. Vivarium Mechanical Control Room



BASEMENT LEVEL

AFFINITY DIAGRAM



Room Name: Chemistry Teaching Lab

Space Description

Department:	Physical Science
Room name:	Chemistry Teaching Lab
Occupancy group:	B-Educational
Area Required (sq. ft.):	1200
Adjacent to:	Chemistry Support Rm Chemistry Open Lab
Separated From:	
Preferred Floor:	Basement
Occupants	Staff: 1
	Students: 25
	Total: 26

Total # occupants allowed by code: 30

Special Requests:

- Wide Hallways
- Windows preferred
- Double wide study tables - 36" x 30"
- Drawers and knee space at each station
- Perimeter counters and upper cabinets
- Acoustically treated to accommodate lectures
- Energy Star appliances

Room Function

Narrative: General and organic chemistry are taught. Room must accommodate lecture type teaching.

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	10'
Doors:	3 3.5'x7" s.c. wood door
Windows:	operable window preferrd
Counters:	Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	75
42″ Base Cabs/Full Ht. Cabs. (L.F.):	80
40″ Upper Cabs/Shelving (L.F.):	18
30″ Lab Tables (L.F.):	98

Fixed Equipment: white board, ceiling projector, projector screen, fire blanket, emerg shower, fume hoods (2 to accommodate perchloric acid)

Mobile Equipment: Balances

Misc Considerations

- Raceway electrical stripping at perimeter
- Cabinets desired and a group of (4) 120 outlets is desired for each lab station
- Analyze and design room for optimal speech type acoustics

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	40 db
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Specialized HVAC

Plumbing:

- 2 floor drains
- 2 deep basin sinks
- 4 wash sinks
- 3 eye wash fixtures

Gas outlets:	33	Water taps:	6
Air outlets:	33	Distilled water:	33
Vac outlets:	33		

Lighting: indirect suspended fluorescent and task lighting

Lighting Control: occupancy sensors

Electrical 208 / 120 power typical

120V outlets:	142
220V outlets:	33

Communication

Phone Jacks:	2
Video Jacks:	2

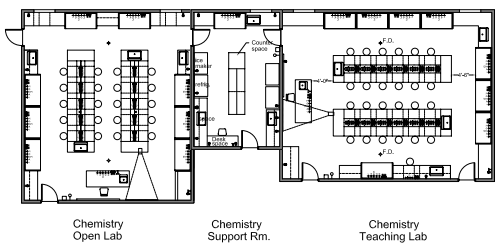
Computer:

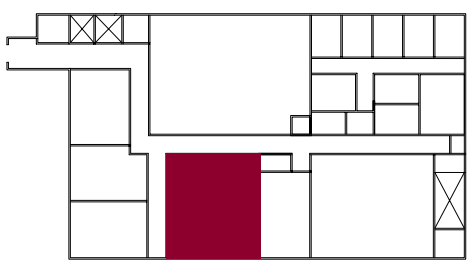
Data Jacks:	10

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

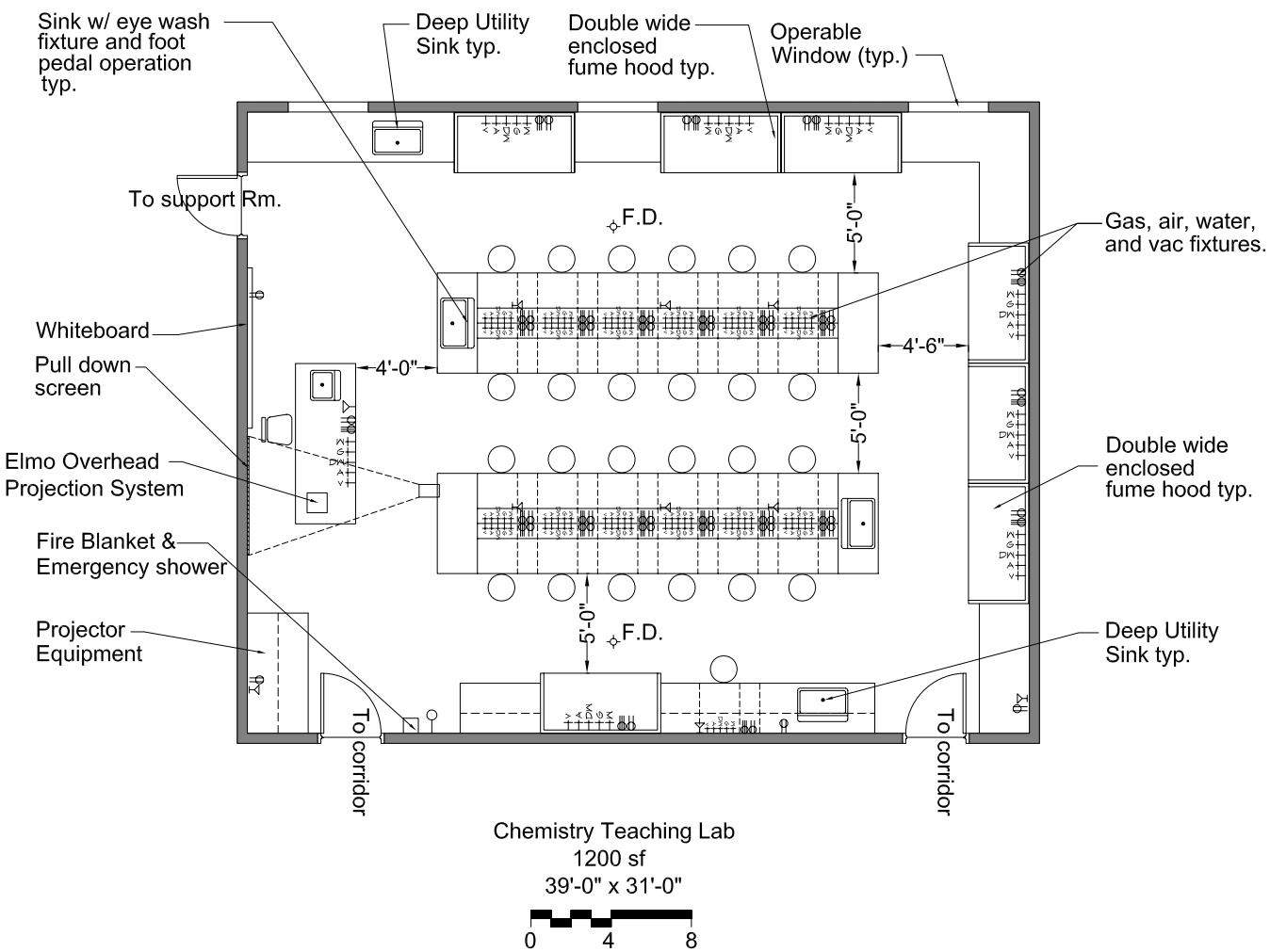
DEPARTMENT KEY





BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Chemistry Open Lab

Space Description

Department:	Physical Science
Room name:	Chemistry Open Lab
Occupancy group:	B. Educational
Area Required (sq. ft.):	1100
Adjacent to:	Chemistry Support Rm / Clean Teaching Lab
Separated From:	2nd Level (same as existing)
Preferred Floor:	Basement
Occupants	Staff: 1
	Students: 22
	Total: 23

Total # occupants allowed by code: 22

Special Requests:

- Wide Hallways
- Windows preferred
- Double wide study tables - 36" x 30"
- Drawers and knee space at each station
- Perimeter counters with base and upper cabinets
- Acoustically treated to accommodate lectures
- Energy Star appliances

Room Function

Narrative: General and organic chemistry are taught. Room must accommodate lecture type teaching.

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	10'
Doors:	1 large door min.
Windows:	operable window preferrd
Counters:	Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	50
42″ Base Cabs/Full Ht. Cabs. (L.F.):	59
40″ Upper Cabs/Shelving (L.F.):	19
30″ Lab Tables (L.F.):	68

Fixed Equipment: white board, ceiling projector, projector screen, fire blanket, emerg shower, fume hoods (2 to accommodate perchloric acid)

Furniture:

Misc Considerations

- Raceway electrical stripping at perimeter
- Cabinets desired and a group of (4)

120 outlets is desired for each lab station

- Analyze and design room for optimal speech type acoustics

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	40 db
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical:

Plumbing:

- floor drains
- 2 deep basin sinks
- 3 wash sinks
- 2 eye wash fixtures

Gas outlets	31	Water taps:	33
Air outlets:	31	Distilled water:	31
Vac outlets:	31		

Lighting: indirect suspended fluorescent and track lighting

Lighting Control: occupancy sensors

Electrical: 2 component surface raceway at lab tables

120V outlets:	136
220V outlets:	20

Communication

Phone Jacks:	2
Video Jacks:	2

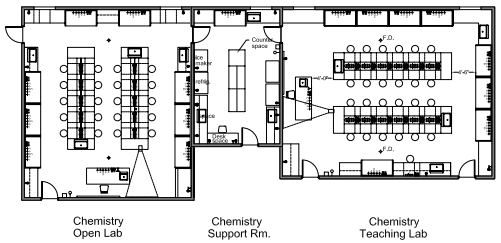
Computer

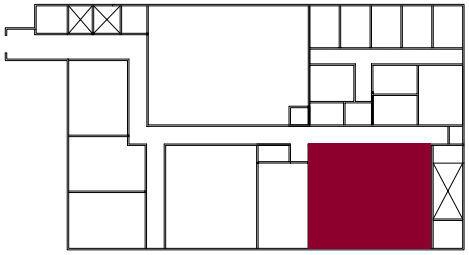
Data Jacks:	10

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

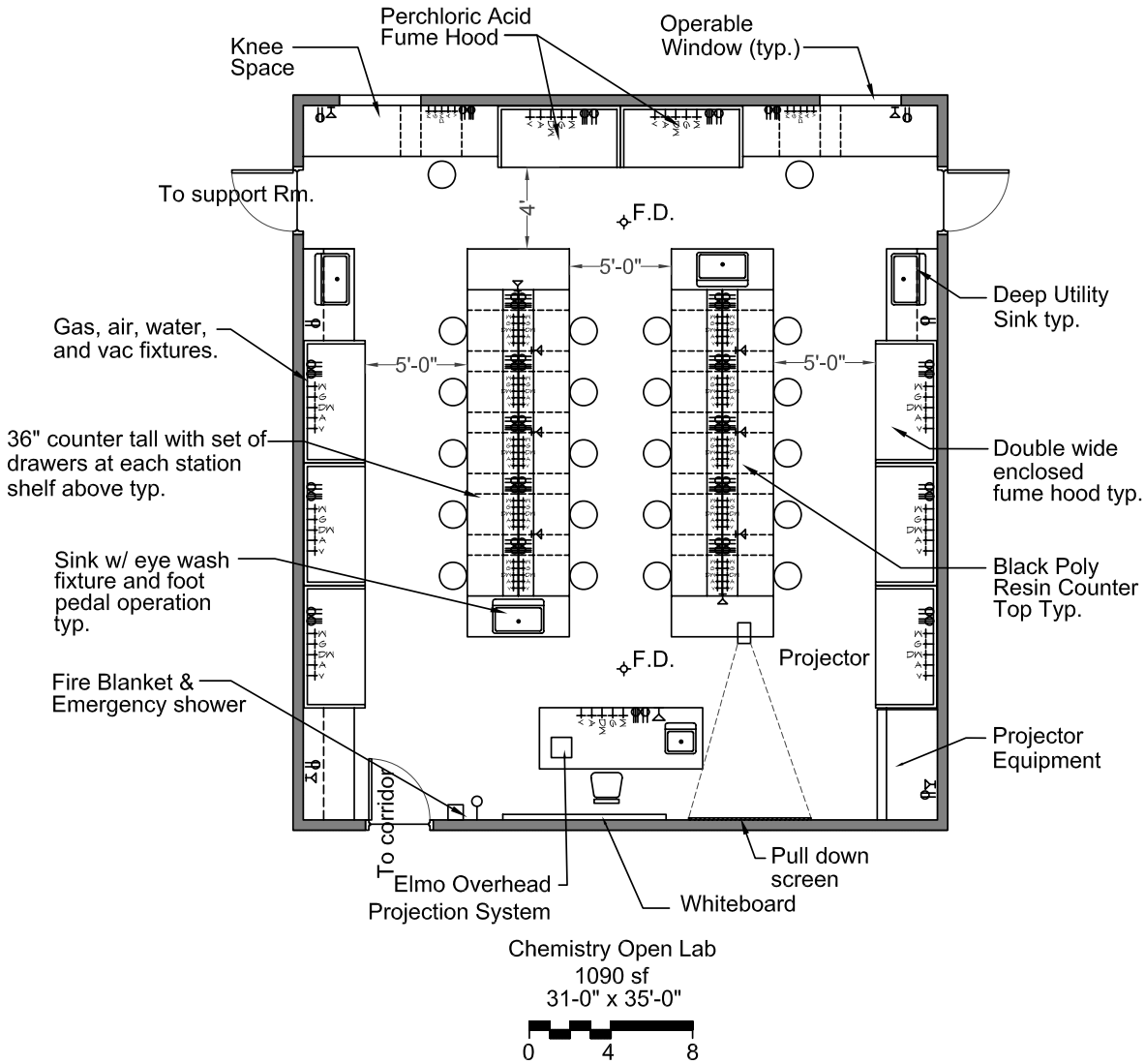
DEPARTMENT KEY





BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Chemistry Support Room

Space Description

Department:	Physical Science
Room name:	Chemistry Support Rm
Occupancy group:	B. Educational
Area Required (sq. ft.):	400
Adjacent to:	Chemistry Open Lab / Chemistry Teaching Lab
Separated From:	2nd Level (same as existing)
Preferred Floor:	2nd Level
Occupants	Staff: 2
	Students:
	Total: 2

Total # occupants allowed by code: 3

Special Requests:

- Fume hood for organic solvents
- Windows preferred
- Desk space
- Provide a door into each lab and one to the corridor
-
-

Room Function

Narrative: This room to provide storage of wet, dry or cold chemicals and chemistry equipment as well as space for preparation and a small staff desk area.

Finishes

Floor:	VCT
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	10'
Doors:	3 large doors
Windows:	Preferred
Counters:	Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	70
42″ Base Cabs/Full Ht. Cabs. (L.F.):	70
40″ Upper Cabs/Shelving (L.F.):	42
30″ Lab Tables (L.F.):	-

Fixed Equipment: Emergency shower, fire blanket, fume hood

Furniture: Full size refrigerator, large ice maker, chemical storage cabinets, neutralizer tanks

Misc Considerations

Lighting positioned and designed to light shelves and or tables from top to floor so labels can be read

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	50 dB
Min. Ventilation:	6 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: standard HVAC

Plumbing:

- 2 floor drains
- 2 deep basin sinks
- 1 hand sink with eyewash
-

Gas outlet:	1	Water:	1
Air outlet:	1	Distilled water:	1
Vac outlet:	1		

Lighting: 2x4 fluorescent lay in

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	12
220V outlets:	2

Communication

Phone Jacks:	1
Video Jacks:	0

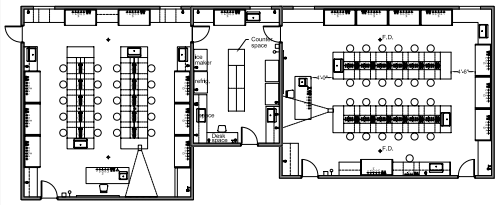
Computer

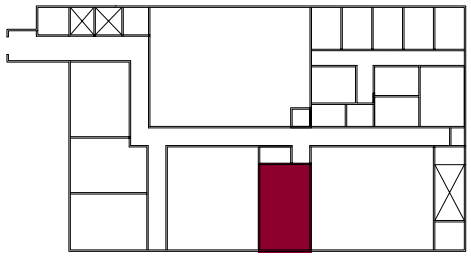
Data Jacks:	2

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

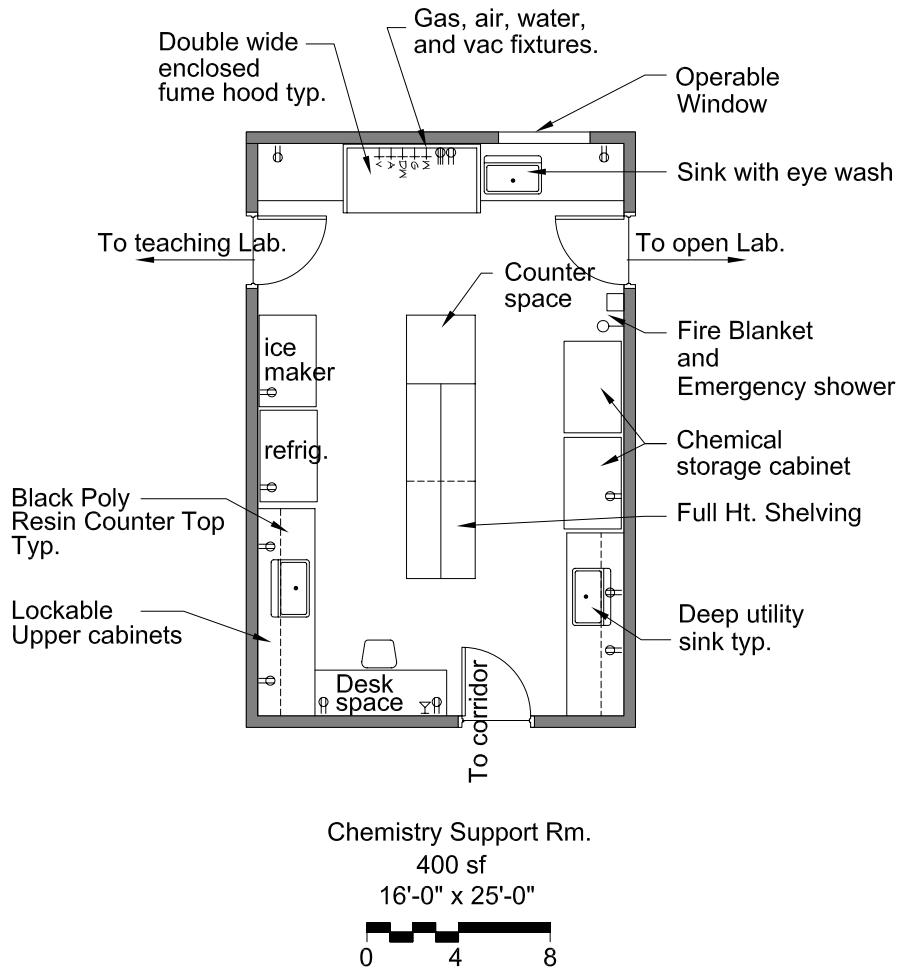
DEPARTMENT KEY





BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Geology General Lab

Space Description

Department:	Physical Science
Room name:	Geology Open Lab
Occupancy group:	B. Educational
Area Required (sq. ft.):	1050
Adjacent to:	Existing Geology Labs
Separated From:	
Preferred Floor:	Basement (of existing building)
Occupants	Staff: 1
	Students: 20
	Total: 21

Total occupancy allowed by code: 21

Special Requests:

- 2 heavy duty sinks
- 8 knee spaces at perimeter counters
- 1 exhaust hood to handle hydroflouric acid fumes
- Drawers and knee space at each station
- Acoustically treated to accommodate lectures
-

Room Function

Narrative: A lab for students of geology for teaching and required research curriculum

Finishes

Floor:	Sealed painted concrete
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	10'
Doors:	1 large door min.
Windows:	operable windows preferrd
Counters:	Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	70
42″ Base Cabs/Full Ht. Cabs. (L.F.):	75
40″ Upper Cabs/Shelving (L.F.):	50
30″ Lab Tables (L.F.):	

Fixed Equipment: white board, ceiling projector, projector screen, fire blanket, emerg shower, fume hoods (to accommodate hydroflouric acid)

Mobile Equipment: balances and gauges

Misc Considerations

This room will be part of the existing building

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	40 dB
Min.Ventilation:	20 cfm/person
Air Exchange Rate:	6 AC/hr
Air Recycle / Filtration:	No/100% outside air

Engineering Requirements

Mechanical: Standard HVAC

Plumbing:

- 2 heavy duty sinks
- 2 deep basin sinks
- 2 wash sinks
- 2 eye wash fixtures

Gas outlet:	12	Water:	12
Air outlet:	12	Distilled water:	12
Vac outlet:	12		

Lighting: indirect suspended fluorescent and track lighting

Lighting Control: occupancy sensors

Electrical 208 / 120 power typical

120V outlets:	74
220V outlets:	12

Communication

Phone Jacks:	2
Video Jacks:	2

Computer

Data Jacks:	5

LEGEND

110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

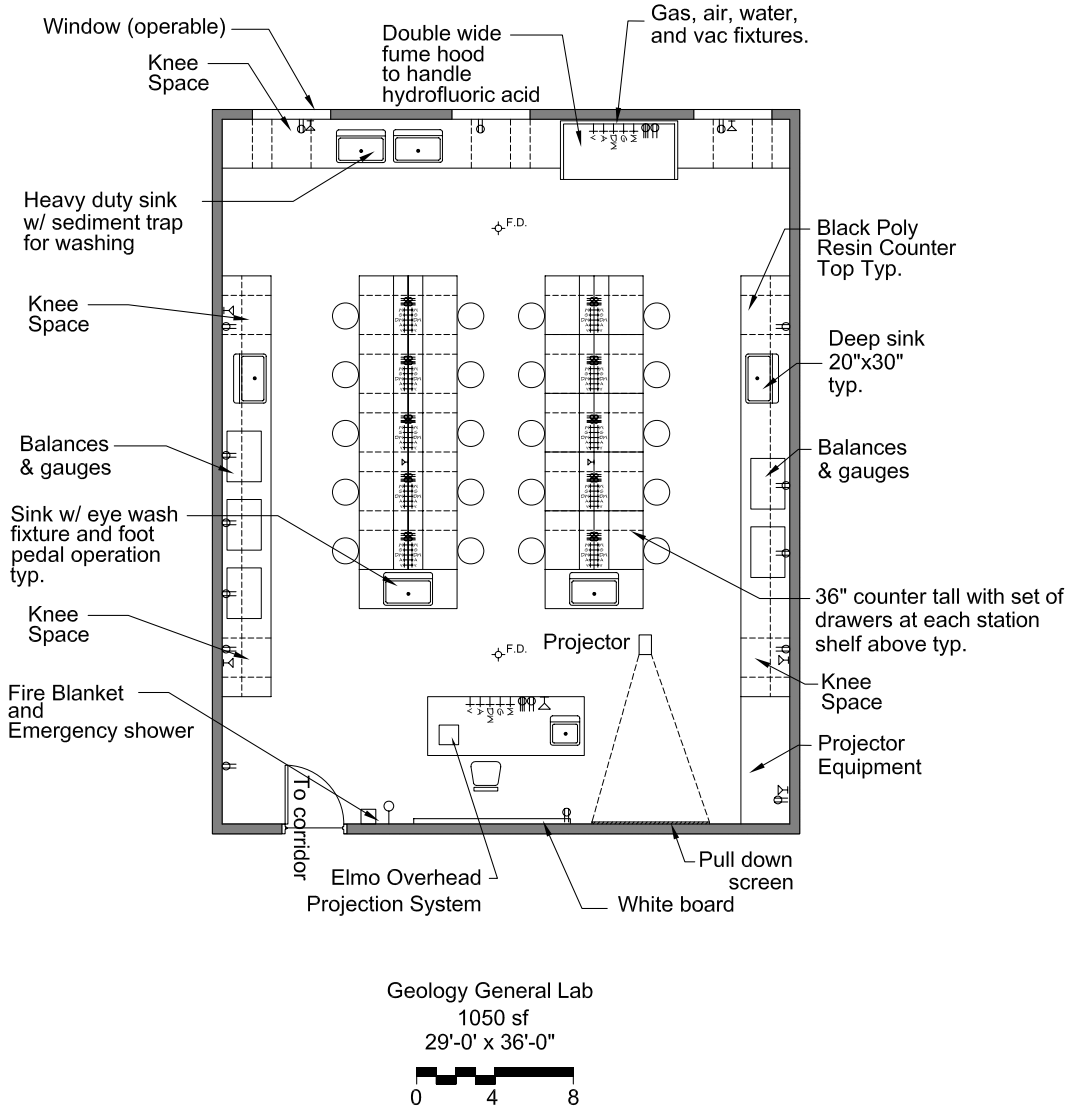
DEPARTMENT KEY

Key not avail. (Existing geology department)

BUILDING KEY

BASEMENT LEVEL
OF EXISTING BUILDING

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Department of Biology

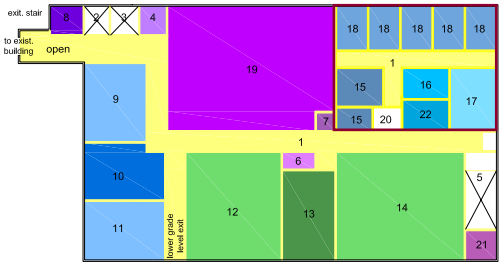
DEPARTMENT NET SQUARE FEET

Animal Care Units (5)	750
Operations Room	150
Storage Room	300
Washing & Steril. Rm / Entry Rm	300
Mechanican Control Rm	150
Total	**1,650**

KEY PLAN

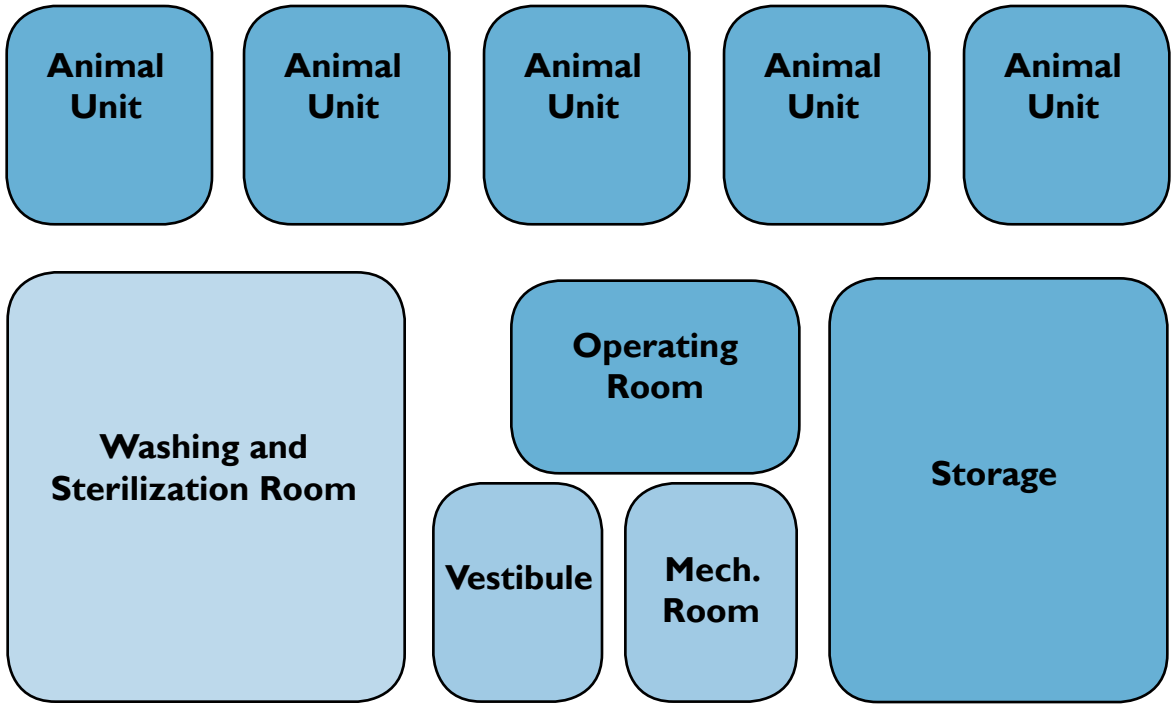
Basement Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Elevator Equipment Room
9. Ecology Dry lab
10. Ecology Lab Prep & Storage
11. Ecology Wet Lab
12. Chemistry Open Lab
13. Chemistry Lab Prep & Storage
14. Chemistry Teaching Lab
15. Clean & Autoclave Room
16. Operating Room
17. Storage
18. Animal Unit
19. Mechanical Room
20. Vestibule
21. Fire Sprinkler Riser Room
22. Vivarium Mechanical Control Room



BASEMENT LEVEL

AFFINITY DIAGRAM



Room Name: Animal Care Facility - Animal Unit

Space Description

Department:	Biology	
Room name:	Animal Units	
Occupancy group:	B Educational	
Area Required (sq. ft.):	6 @150	
Adjacent to:	operating room	
Separated From:	all the other spaces	
Preferred Floor:	Basement	
Occupants	Staff:	2
	Students:	30
	Total:	**32**

Total occupants allowed by code: 3

Special Requests:

- Meets animal care federal and state guidelines
- No public access
- No windows
- Independent and regulated climate controls
- Large doors that seal completely
- Special vent covers to prevent escape
-

Room Function

Narrative: This room provides storage for live lab specimen. Access is limited to faculty and staff and research students.

Hours of operation:

Finishes

Floor:	Sheet vinyl
Walls:	T16, FRP or vinyl
Base:	Vinyl
Ceiling:	Painted gypsum
Ceiling Height (ft.):	9'
Doors:	3.5'x7' sc wood door w/seals
Windows:	prohibited
Counters:	none

Furnishings and Equipment

24" Counter (L.F.):	6
- Base Cabs/Full Ht. Cabs. (L.F.):	0
- Upper Cabs/Shelving (L.F.):	0
- Full size wall cabinets:	0

Fixed Equipment:

Mobile Equipment: Animal cages

Furniture:

Misc Considerations

- Independent and regulated climate controls for light, humidity, and temperature.
- Negative pressure with no cross contamination
- Sterile room
- Doors to be large and seal completely
- Special vent covers to prevent escapes

Room Environment

Lighting Level:	50 fc
Temperature:	65 - 80 degrees F.
Security:	lockable
Sound Considerations:	40 dB
Min. Ventilation:	Independent system
Air Exchange Rate:	special
Air Recycle / Filtration:	special

Engineering Requirements

Mechanical: Specialized HVAC

Plumbing:

- 1 floor drains
- 1 hose bib
- 4 wash sinks
- 3 eye wash fixtures

Gas outlet:	0	Water:	1
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: track lighting

Lighting Controls: timed to mimic daylight and nocturnal pattern

Power Required: 208 / 120 power typical

Electrical

120V duplex outlets:	2 wp/cfi
220V outlets:	0

Communication

Phone Jacks:	0
Video Jacks:	0

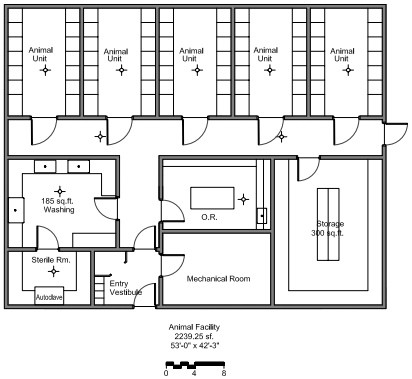
Computer

Data Jacks:	1

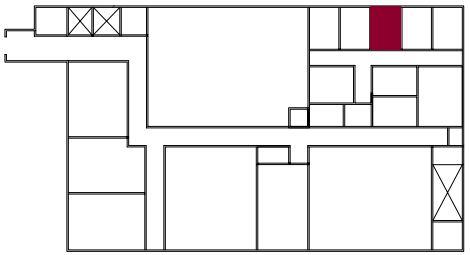
LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY

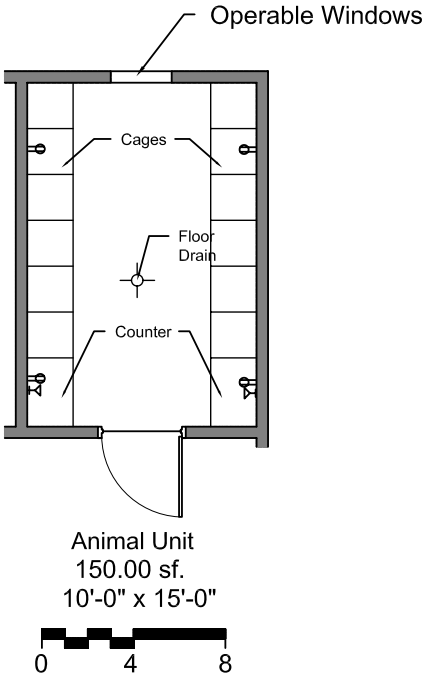


BUILDING KEY



BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Animal Care Facility - Operating Room

Space Description

Department:	Biology
Room name:	Operating Room
Occupancy group:	B. Educational
Area Required (sq. ft.):	150
Adjacent to:	Animal units
Separated From:	Main public areas
Preferred Floor:	Basement
Occupants	Staff: 1
	Students: 2
	Total: 3

Total occupants allowed by code: 3

Special Requests:

- Meets animal care federal and state guidelines
- No public access
- No windows
- Independent and regulated climate controls
- Large doors that seal completely
- Special vent covers to prevent escape
- Independent ventilation
-

Room Function

Narrative: This room provides a clean dedicated OR to properly process animals used in research. Same general features as animal care rooms.

Finishes

Floor:	Sheet vinyl
Walls:	T16 FRP or vinyl
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	9'
Doors:	3'x7' sc wood door
Windows:	none
Counters:	solid surface

Furnishings and Equipment

24″ Counter (L.F.):	7.5
24″ Base Cabs/Full Ht. Cabs. (L.F.):	7.5
12″ Upper Cabs/Shelving (L.F.):	9.75
12″ Full size wall shelving:	13
Fixed Equipment:	Operating table
Mobile Equipment:	Surgical light
Furniture:	Stools

Misc Considerations

- Independent and regulated climate controls for light, humidity, and temperature.
- Negative pressure with no cross contamination
- Sterile room
- Doors to be large and seal completely
- Special vent covers to prevent escapes

Room Environment

Lighting Level:	50 fc + task lighting
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	40 dB
Min. Ventilation:	Independent system
Air Exchange Rate:	special
Air Recycle / Filtration:	special

Engineering Requirements

Mechanical: Specialized HVAC

Plumbing:

- 1 floor drain
- 1 hose bib
- 1 hand sink
-

Gas outlet:	0	Water:	2
Air outlet:	1	Distilled water:	1
Vac outlet:	1		

Lighting: 2x4 fluorescent lay in, surgical light

Lighting Controls: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	5
220V outlets:	0

Communication

Phone Jacks:	1
Video Jacks:	0

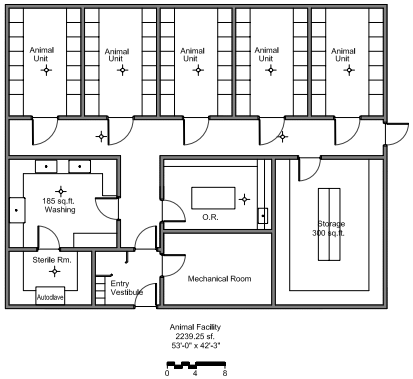
Computer

Data Jacks:	1

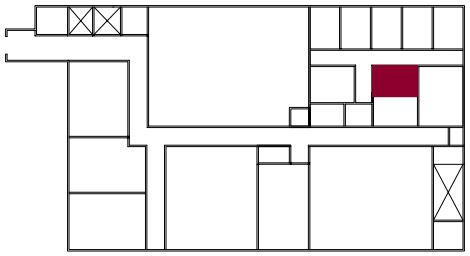
LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY

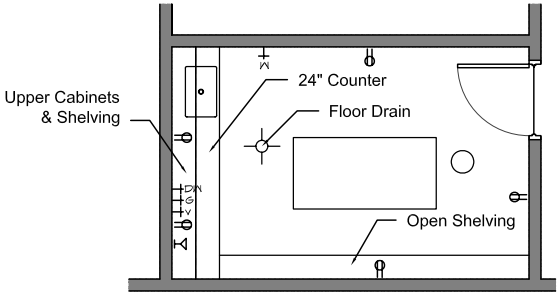


BUILDING KEY



BASEMENT LEVEL

ROOM DIAGRAM



Operating Room
150 sf.
15'-0" x 10'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Animal Care Facility - Storage Rooms

Space Description

Department:	Biology
Room name:	Storage
Occupancy group:	B. Educational
Area Required (sq. ft.):	2 @ 300
Adjacent to:	Animal units
Separated From:	Main public areas
Preferred Floor:	Basement
Occupants	Staff: 1
	Students: 0
	Total: 1

Total occupants allowed by code: 1

Special Requests:

- Meets animal care federal and state guidelines
- No public access
- No windows
- Open shelving at perimeter
-
-
-
-

Room Function

Narrative: This room provides storage for cages, tanks and other animal care materials.

Finishes

Floor:	VCT or Sheet vinyl
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	10'
Doors:	3'x7' sc wood door
Windows:	none
Counters:	P. lam

Furnishings and Equipment

- Counter (L.F.):	0
- Base Cabs/Full Ht. Cabs. (L.F.):	0
24″ Upper Cabs/Shelving (L.F.):	47.5
18″ Full size wall shelving:	20

Fixed Equipment: Operating table

Mobile Equipment:

Furniture:

Misc Considerations

- Negative pressure with no cross contamination
- Sterile room

Room Environment

Lighting Level:	30 fc + task lighting
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	50 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 ac/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: specialized HVAC

Plumbing: none

-
-
-
-

Gas outlet:	0	Water:	0
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: 2x4 fluorescent lay in

Lighting Control:

Electrical 208 / 120 power typical

120V duplex outlets:	4
220V outlets:	none

Communication

Phone Jacks:	0
Video Jacks:	0

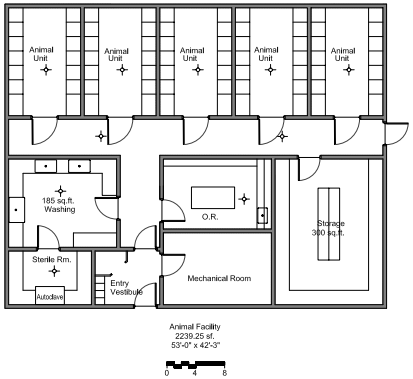
Computer

Data Jacks:	0

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



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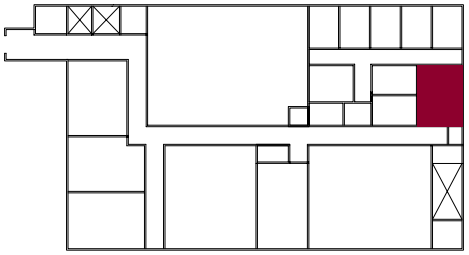
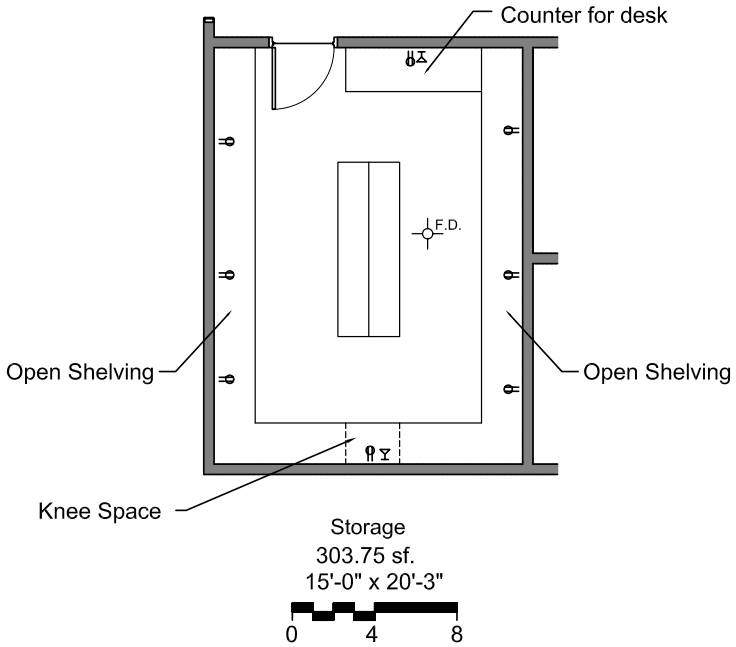


BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Animal Care Facility - Washing/Sterile Room

Space Description

Department:	Biology
Room name:	Cleaning room
Occupancy group:	B. Educational
Area Required (sq. ft.):	303
Adjacent to:	Operating room
Separated From:	Main public areas
Preferred Floor:	Basement
Occupants	Staff: 2
	Students: 1
	Total: 3

Total occupants allowed by code: 3

Special Requests:

- Meets animal care federal and state guidelines
- No public access
- No windows
-
-
-
-
-

Room Function

Narrative: This room provides space for cleaning and sterilization of animal cages with cage washier and large sinks. Space includes separate sterile room for autoclave and sterile storage.

Finishes

Floor:	VCT or Sheet vinyl
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	9'
Doors:	3'x7' sc wood door
Windows:	none
Counters:	Stainless steel

Furnishings and Equipment

24″ Counter (L.F.):	38
24″ Base Cabs/Full Ht. Cabs. (L.F.):	38
- Upper Cabs/Shelving (L.F.):	0
- Full size wall shelving:	0

Fixed Equipment: Case washer, autoclave

Mobile Equipment:

Furniture:

Misc Considerations

- Negative pressure with no cross contamination
- Sterile room

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	50 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 ac/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: specialized HVAC

Plumbing:

- 1 cage washer
- 2 floor drains
- 2 large sinks
- 1 floor sink

Gas outlet:	0	Water taps:	4
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: 2x4 fluorescent lay in

Lighting Control:

Electrical 208 / 120 power typical

120V duplex outlets:	5 wp/gfi
220V outlets:	1

Communication

Phone Jacks:	0
Video Jacks:	0

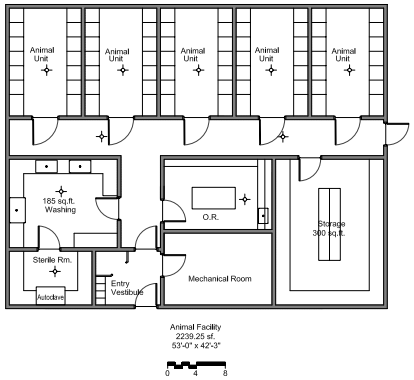
Computer

Data Jacks:	2

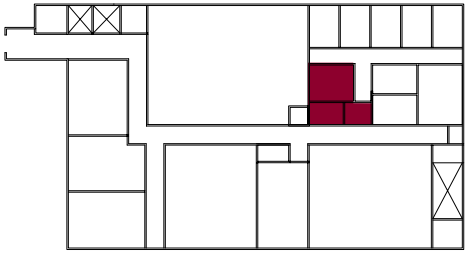
LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY

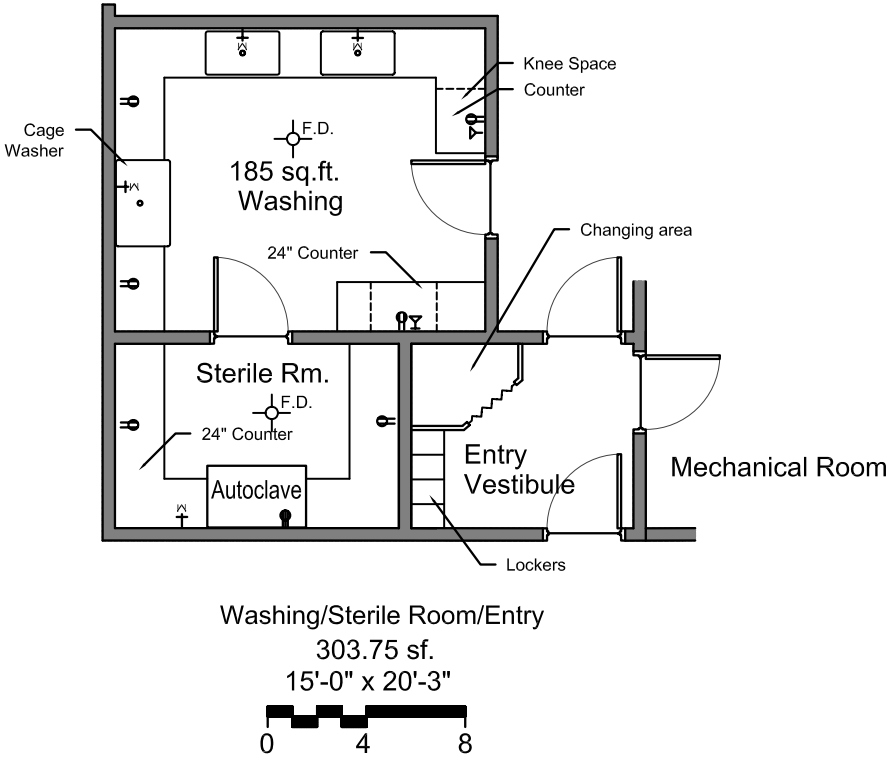


BUILDING KEY



BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

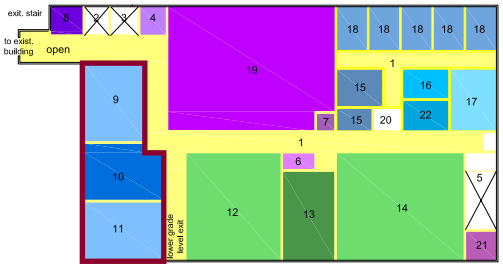
DEPARTMENT NET SQUARE FEET

Ecology Dry Lab	500
Lab Support	450
Ecology Wet Lab	500
Total	**1450**

KEY PLAN

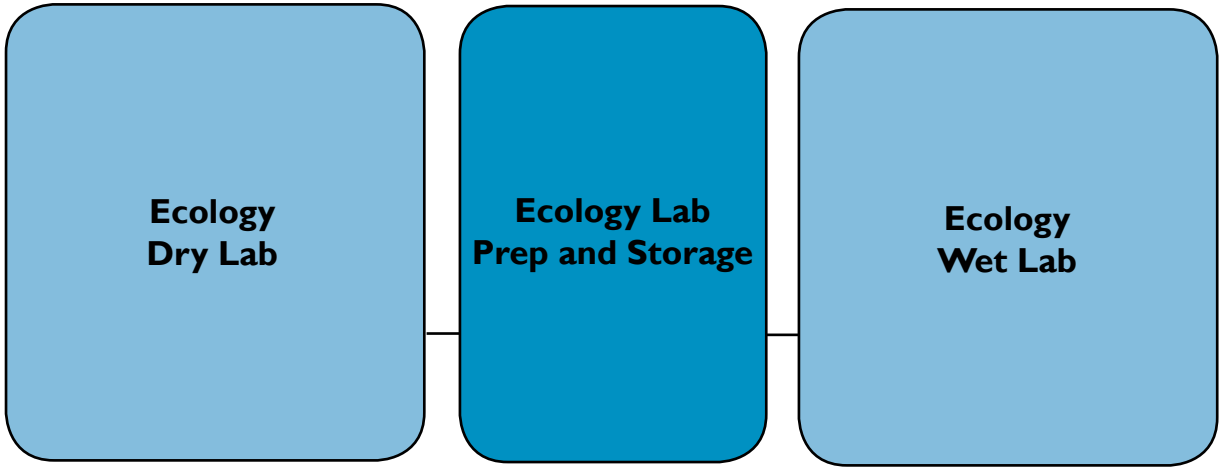
Basement Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Elevator Equipment Room
9. Ecology Dry lab
10. Ecology Lab Prep & Storage
11. Ecology Wet Lab
12. Chemistry Open Lab
13. Chemistry Lab Prep & Storage
14. Chemistry Teaching Lab
15. Clean & Autoclave Room
16. Operating Room
17. Storage
18. Animal Unit
19. Mechanical Room
20. Vestibule
21. Fire Sprinkler Riser Room
22. Vivarium and Mechanical Control Room



BASEMENT LEVEL

AFFINITY DIAGRAM



Room Name: Ecology - Wet Lab

Space Description

Department:	Biology
Room name:	Ecology - wet lab
Occupancy group:	B. Educational
Area Required (sq. ft.):	500
Adjacent to:	Loading docks, dry lab, museum, ecology faculty offices
Separated From:	
Preferred Floor:	Basement
Occupants	Staff: 1
	Students: 16
	Total: 17
Total occupants allowed by code:	25

Special Requests:

- Room to be washable
- Room to be reconfigurable
-
-
-
-
-
-

Room Function

Narrative: This room provides space for processing aquatic samples and aquaria.

This lab will be used for student projects and could also be used by ecology, entomology and animal behavior classes.

Finishes

Floor:	VCT or Sheet vinyl
Walls:	Washable paint, tile or FRP
Base:	Rubber
Ceiling:	Washable painted gypsum
Ceiling Height (ft.):	9'
Doors:	3'x7' sc wood door
Windows:	preferred
Counters:	Black poly resin solid surface stainless steel

Furnishings and Equipment

30″ Counter (L.F.):	46
30″ Base Cabs/Full Ht. Cabs. (L.F.):	22
12″ Upper Cabs/Shelving (L.F.):	40
24″ Lab Tables (L.F.):	24

Fixed Equipment: 2 ovens, water bath

Mobile Equipment:

Furniture: (4) 2'x6' movable experiment tables and tools

Misc Considerations

- Potential to serve ecology, entomology and animal behavior classes
- Close proximity to office for Paul S and Fred G
- Non-chlorinated water (this could be the same as that used in the greenhouse).
- Overhead power, water and air to allow flexibility

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	40 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 ac/hr
Air Recycle / Filtration:	No/100% outside air

Engineering Requirements

Mechanical: standard HVAC

Plumbing:

- Non chlorinated water faucet
- 1 floor drain
- 1 large utility sink

Gas outlet:	1	Water:	14
Air outlet:	8	Distilled water:	1
Vac outlet:	0		

Lighting: direct recessed acrylic fluorescent - water resistant

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	17 wp/gfi
220V outlets:	3

Communication

Phone Jacks:	1
Video Jacks:	1

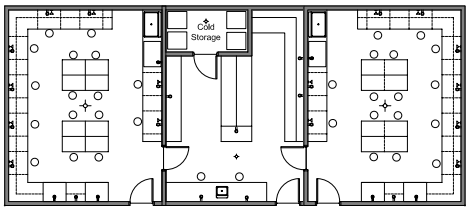
Computer

Data Jacks	8

LEGEND

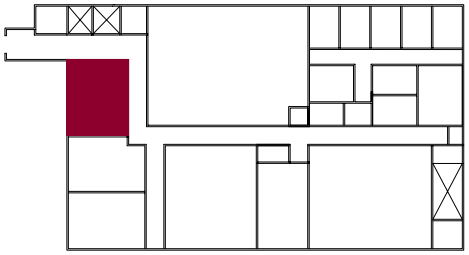
110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

DEPARTMENT KEY



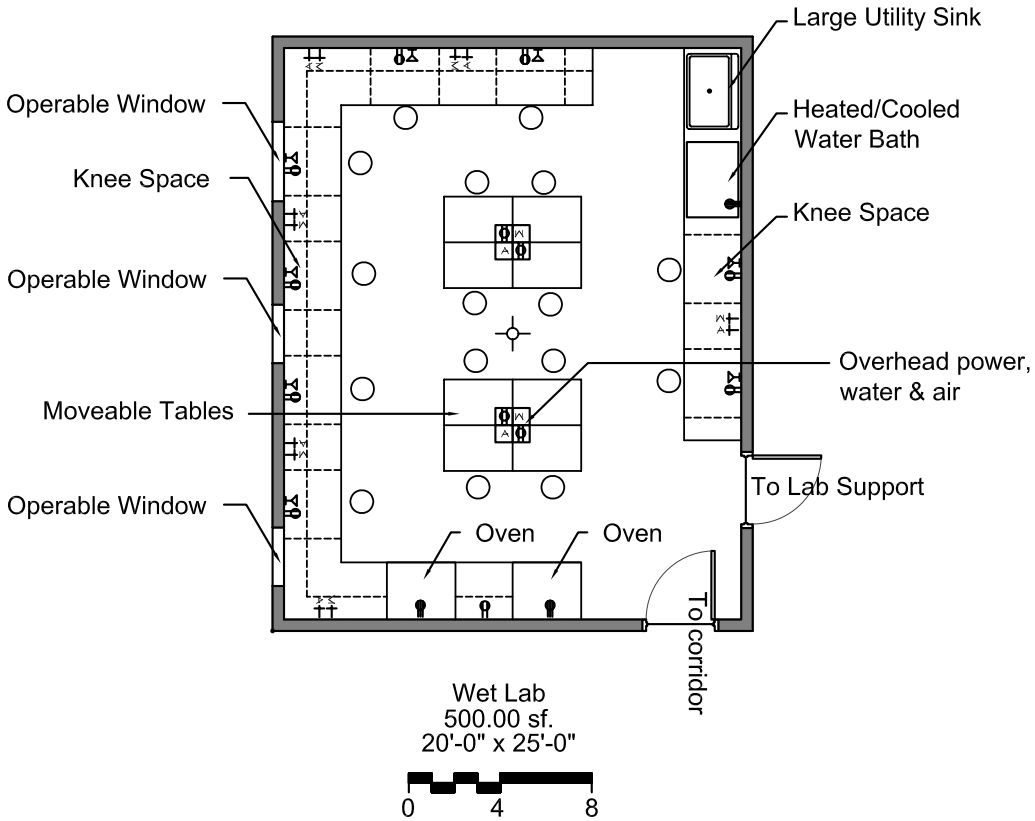
WET LAB LAB SUPPORT DRY LAB

BUILDING KEY



BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Ecology - Dry Lab

Department: Biology

Space Description

Department: Biology
Room name: Ecology - Dry Lab
Occupancy group: B. Educational
Area Required (sq. ft.): 500
Adjacent to: Loading dock, Wet lab, museum, ecology faculty offices
Separated From:
Preferred Floor: Basement
Occupants Staff: 1
Students: 16
Total: 17
Total occupants allowed by code: 25
Special Requests:

- Room to be washable
- Room to be reconfigurable
-
-
-
-
-
-

Room Function

Narrative: This room provides space for processing dry terrestrial samples.

This lab will be used for student projects and could also be used by ecology, entomology and animal behavior classes.

Finishes

Floor: VCT or Sheet vinyl
Walls: Epoxy paint, tile or FRP
Base: Rubber
Ceiling: Washable suspended grid
Ceiling Height (ft.): 9'
Doors: 3'x7' sc wood door
Windows: preferred
Counters: Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.): 46
30″ Base Cabs/Full Ht. Cabs. (L.F.): 22
12″ Upper Cabs/Shelving (L.F.): 40
24″ Lab Tables (L.F.): 24
Fixed Equipment: 2 ovens, water bath
Mobile Equipment:
Furniture: (4) 2'x6' movable experiment tables and stools

Misc Considerations

- Potential to serve ecology, entomology and animal behavior classes
- Close proximity to offices for Paul S and Fred G
- Non-chlorinated water
- Overhead power, water and air to allow flexibility

Room Environment

Lighting Level: 50 fc
Temperature: 70 degrees F. +1 or -1
Security: lockable
Sound Considerations: 40 dB
Min. Ventilation: 20 cfm/person
Air Exchange Rate: 12 ac/hr
Air Recycle / Filtration: No/100% outside air

Engineering Requirements

Mechanical: standard HVAC
Plumbing:

- 1 non chlorinated water faucet
- 1 floor drain
- 1 heated cooled water bath

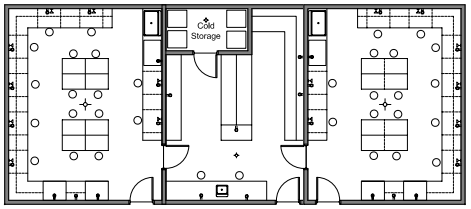
Gas outlet: 1 Water taps: 14
Air outlet: 8 Distilled water: 1
Vac outlet: 0

Lighting: direct recessed acrylic fluorescent - water resistant
Lighting Control: occupancy sensor
Electrical 208 / 120 power typical
120V duplex outlets: 17 wp / gfi
220V outlets: 3
Communication
Phone Jacks: 1
Video Jacks: 1
Computer
Data Jacks: 8

LEGEND

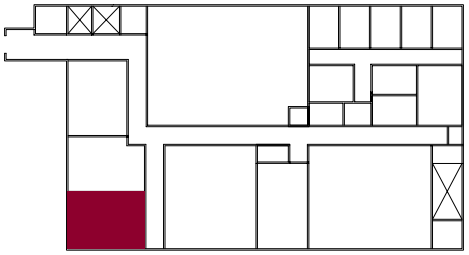
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



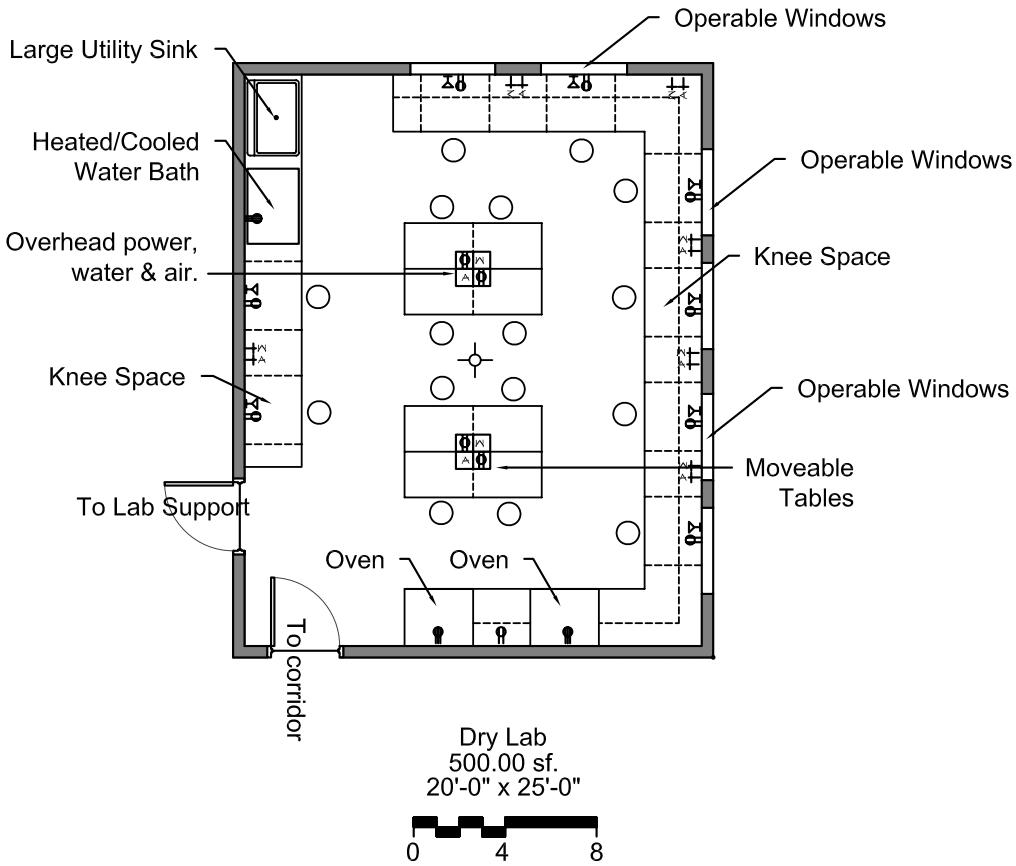
WET LAB LAB SUPPORT DRY LAB

BUILDING KEY



BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Ecology - Lab Support

Space Description

Department:	Biology	
Room name:	Ecology - Lab Support	
Occupancy group:	B. Educational	
Area Required (sq. ft.):	450	
Adjacent to:	Wet Lab, Dry Lab	
Separated From:		
Preferred Floor:	Basement	
Occupants	Staff:	1
	Students:	1
	Total:	**2**

Total occupants allowed by code: 2

Special Requests:

- Separate cold storage room
-
-
-
-
-
-
-
-

Room Function

Narrative: Storage/prep room 300 ft storage space for sampling gear and equipment located between the wet and dry ecology labs. This room would also have a 50 ft, 2 cold storage room.

Finishes

Floor:	VCT or Sheet vinyl
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Epoxy paint on gyp. board
Ceiling Height (ft.):	9'
Doors:	3'x7' sc wood door
Windows:	preferred
Counters:	Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	37
30″ Base Cabs/Full Ht. Cabs. (L.F.):	37
24″ Counter (L.F.):	33.5
24″ Shelving (L.F.):	33.5

Fixed Equipment:

Mobile Equipment:

Furniture:

Misc Considerations

- Potential to serve ecology, entomology and animal behavior classes
- Close proximity to Paul S and Fred G

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	50 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 ac/hr
Air Recycle / Filtration:	No/100% outside air

Engineering Requirements

Mechanical: standard HVAC

Plumbing:

- 1 utility sink
- 2 floor drains
-
-

Gas outlet:	0	Water:	4
Air outlet:	4	Distilled water:	0
Vac outlet:	0		

Lighting: direct recessed fluorescent

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	6
220V outlets:	1

Communication

Phone Jacks:	0
Video Jacks:	0

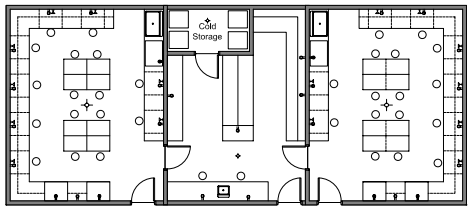
Computer

Data Jacks:	4

LEGEND

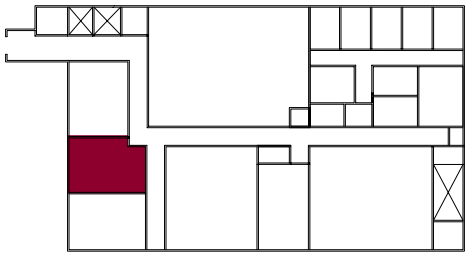
110V duplx			Fire Blankt
220V single	W		Water
Ph/Data	DW		Distilled Water
Video	G		Gas
Eyewash	A		Air
Emer Shwr	V		Vacuum

DEPARTMENT KEY



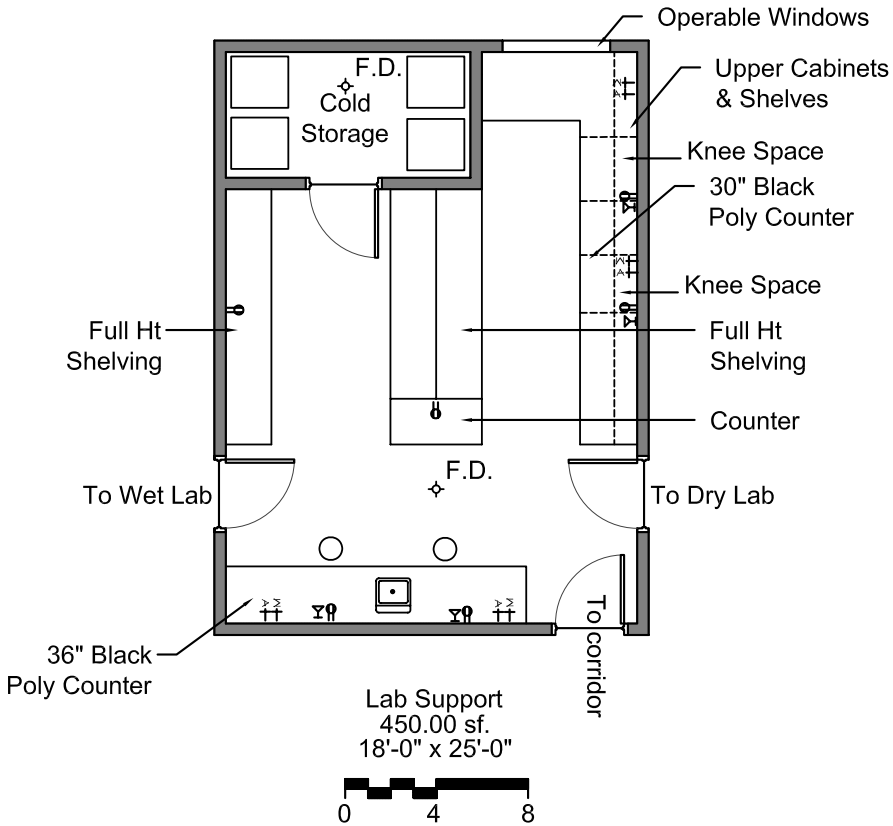
WET LAB LAB SUPPORT DRY LAB

BUILDING KEY



BASEMENT LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

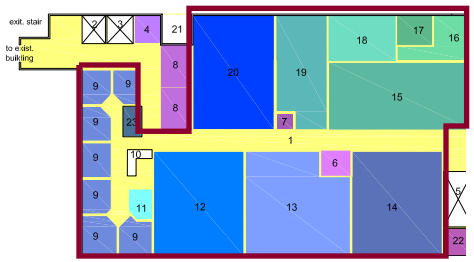
DEPARTMENT NET SQUARE FEET

Biology Faculty	1100
Anatomy / Physiology Lab	1000
Specimen Storage	700
Molecular / Genetics Lab	1110
Lab Support	1200
Cellular / Histology Lab	1110
Total	**6120**

KEY PLAN

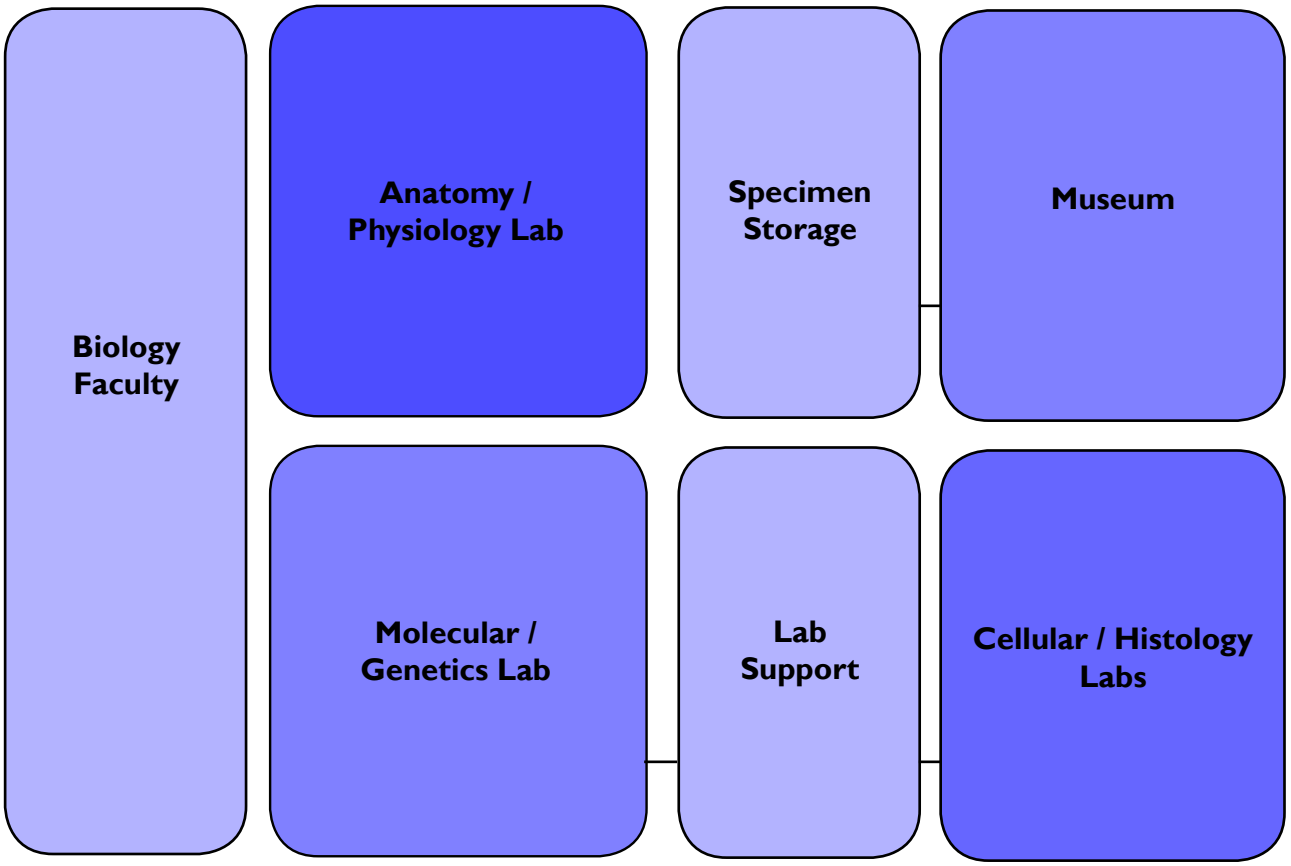
Main Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Restrooms
9. Biology Faculty Offices
10. Biology Reception
11. Storage
12. Cellular/Histology Lab
13. Lab Storage & Support
14. Molecular/Genetics Lab
15. Museum Display
16. Museum Reception
17. Museum Office
18. Museum Prep.
19. Specimen Storage
20. Anatomy/Physiology Lab
21. Dock
22. Fire Sprinkler Riser Room
23. Student Cubicles



MAIN LEVEL

AFFINITY DIAGRAM



Room Name: Instructor's Office

Space Description

Department:	Physical Science
Room name:	Instructors Office
Occupancy group:	B Office
Area Required (sq. ft.):	120
Adjacent to:	Labs / Other Offices
Separated From:	Main Entry
Preferred Floor:	2nd Level
Occupants	Staff: 1
	Students: 2
	Total: 3

Total # occupants allowed by code: 1

Special Requests:

- Space for visitor chairs
- Windows preferred
- Shelving for books
- Filing cabinets
-
-
-
-
-

Room Function

Narrative: Room to serve as instructor's home base with space for written materials. Students will come to this office to talk to the instructor.

Finishes

Floor:	Carpet
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	9'
Doors:	3x7 s.c. wood door
Windows:	preferred
Counters:	laminate

Furnishings and Equipment

15″ Counter (L.F.):

15″ Base Cabs/Full Ht. Cabs. (L.F.):

16″ Upper Cabs/Shelving (L.F.):

- Tables (L.F.):

Fixed Equipment: Systems office furniture

Mobile Equipment: computer

Furniture: 3 chairs, 2 book shelves

Misc Considerations

• Coordinate system furniture or furniture placement with electrical at time of rough in

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	10 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing: none

-
-

Gas outlet:	0	Water:	0
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: acrylic, direct, 2x4 fluorescent layin fixtures

Lighting Control: dimmable with occupancy sensor and daylight harvesting

Electrical 208 / 120 power typical

120V duplex outlets: 3

220V outlets: none

Communication

Phone Jacks: 1

Video Jacks: 0

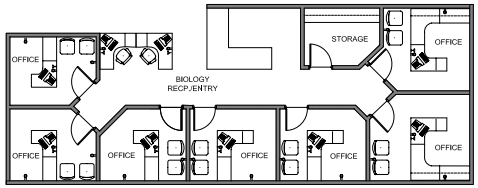
Computer:

Data Jacks: 3

LEGEND

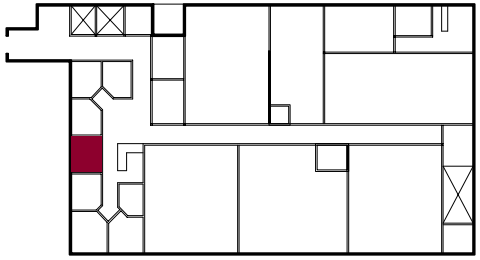
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



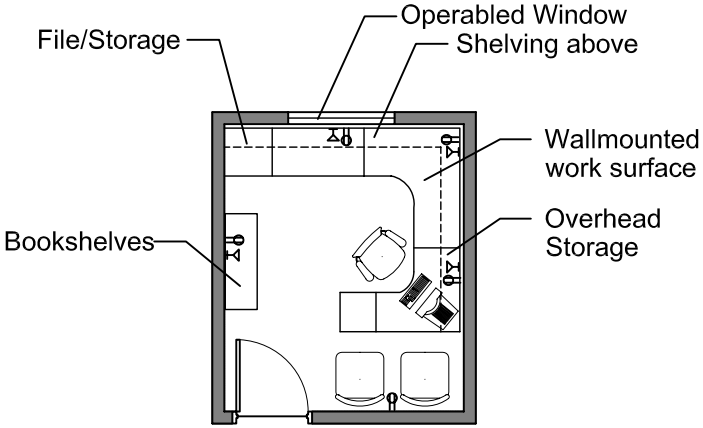
BIOLOGY FACULTY OFFICES

BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Faculty Office
120.00 sf.
12'-0" x 10'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Anatomy / Physiology Lab

Space Description

Department:	Biology
Room name:	Anatomy - Physiology Lab
Occupancy group:	B Educational
Required (sq. ft.):	1000
Adjacent to:	Biology labs, specimen storage
Separated From:	
Preferred Floor:	Main Level
Occupants	Staff: 1
	Students: 24
	Total: 25

Total occupants allowed by code: 25

Special Requests:

- Wide hallways
- Windows preferred
- Drawers and knee space at each station
- Perimeter counters and upper cabinets
- Connect to specimen storage room
- Special cadaver storage containers will be used. See appendix.

Room Function

Narrative: Anatomy= study of skeleton, bones and body parts in general.

Physiology= the way the body works and reacts to environment

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Rubber
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	9'
Doors:	3'x7' sc wood door
Windows:	operable windows preferred
Counters:	black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	52
30″ Base Cabs/Full Ht. Cabs. (L.F.):	33
12″ Upper Cabs/Shelving (L.F.):	36
30″ Full size wall cabinets:	98

Fixed Equipment: White board, ceiling projector, projector screen fire blanket, emergency shower, 6 fume hoods

Mobile Equipment: 2 cadaver storage and dissection tables

Furniture: Double wide study tables 36" x 30"

Misc Considerations

- Equipment power in Anatomy lab for 2 cadaver ventilation hoods, 6 computers, 12 std. mircroscopes and 1 std. refrigerator
- Fumes and odors from cadaver storage and dissection need to be contained in corner of room - special ventilation is needed
- Equipment power for Physiology lab for 6 computers interfaced with 6 Biopac data acquistion systems (110V/60Hz or 220V/50Hz) 1 fume hood, 12 std. microscopes, 6 hotplates, 1 std. refrigerator

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: see Special Requests

Plumbing: none

- 2 floor drains
- 2 deep basin sinks
- 4 wash sinks
- 3 eye wash fixtures

Gas outlet:	4	Water:	7
Air outlet:	6	Distilled water:	4
Vac outlet:	2		

Lighting: indirect suspended fluorescent and task lighting at work stations

Lighting Control: occupancy sensors

Electrical: 2 component surface raceway at lab tables and perimeter cabs.

120V duplex outlets:	26
220V outlets:	2

Communication

Phone Jacks:	2
Video Jacks:	2

Computer

Data Jacks	12

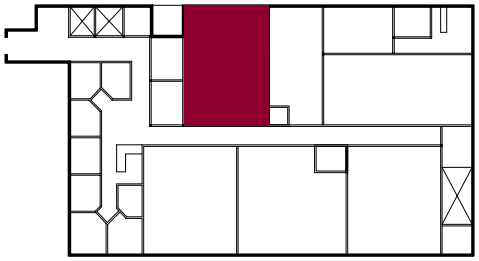
LEGEND

110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

DEPARTMENT KEY

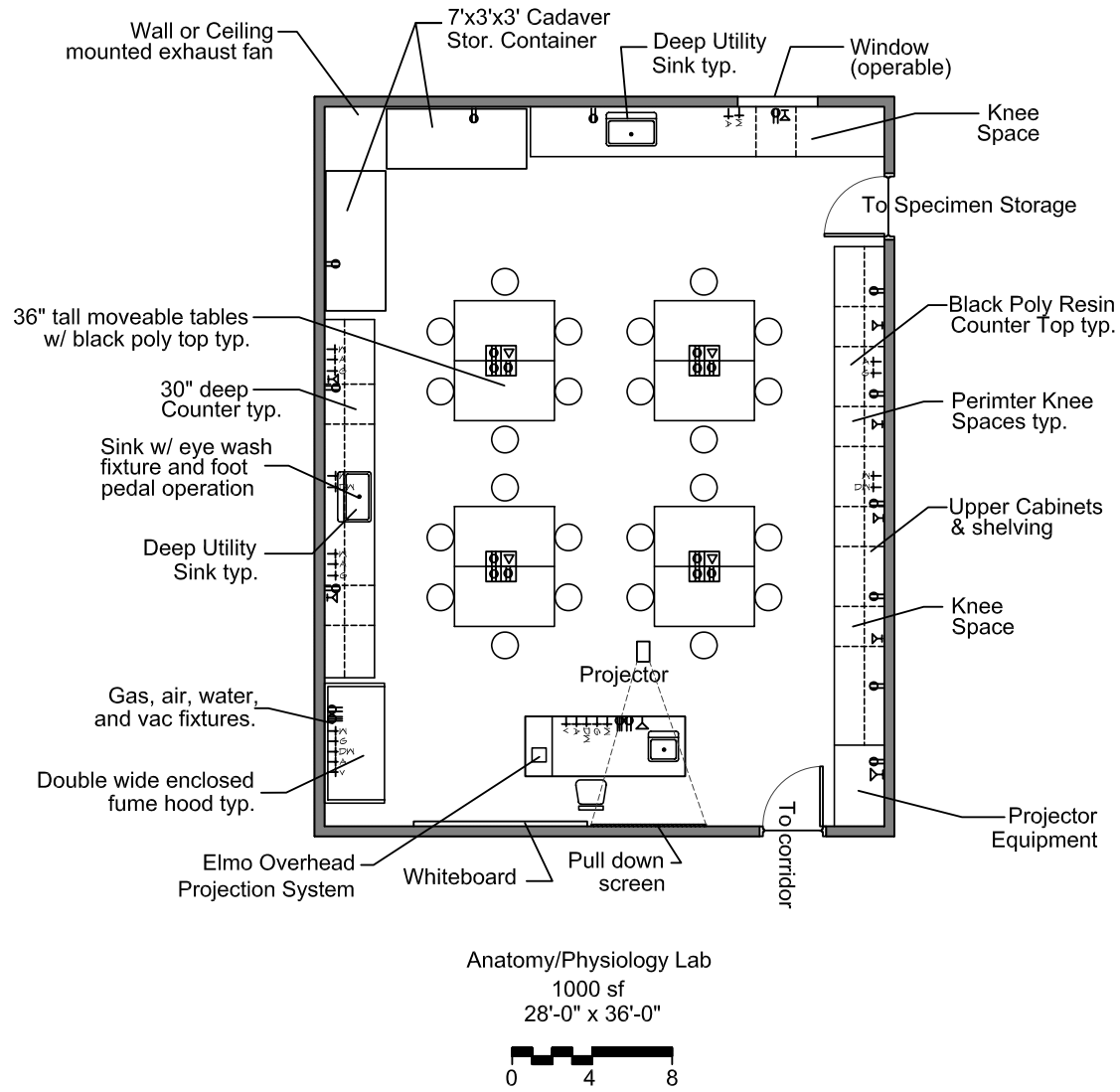
Note: See page 4-17

BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Molecular / Genetics Lab

Space Description

Department:	Biology
Room name:	Molecular / Genetics Lab
Occupancy group:	B. Educational
Area Required (sq. ft.):	1110
Adjacent to:	Cellular/Histology Lab
Separated From:	Animal care area
Preferred Floor:	Main level
Occupants	Staff: 1
	Students: 24
	Total: 25

Total occupants allowed by code: 28

Special Requests:

- Wide hallways
- Windows preferred
- Each lab station to be 36"x30"
- Drawers and kneespace at each station
- Perimeter counters and upper cabinets
-
-
-

Room Function

Narrative: Study of cell and molecular biology, evolution, conservation and biotechnology. Properties and functions of DNA and other genetic molecules and experimental evidence for genetic processes.

Examination of all important human tissues and systems such as skeletal, muscular, nervous and cardiovascular.

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Rubber
Ceiling:	Epoxy painted gyps board
Ceiling Height (ft.):	10'
Doors:	3'x7' sc wood door
Windows:	Operable window preferred
Counters:	Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	74
30″ Base Cabs/Full Ht. Cabs. (L.F.):	56
12″ Upper Cabs/Shelving (L.F.):	42
30″ Lab Tables (L.F.):	78

Fixed Equipment: White board, ceiling projector pull down screen, fire blanket, refrigerator, emergency shower, (3) fume hoods (2) incubators, Elmo, overhead projector

Mobile Equipment: balances

Furniture:

Misc Considerations

- Provide dedicated circuits with hook-up power to refrigerators, freezer and incubators
- CO^2 taps
- Foot pedal operation at wash sinks
- Raceway electrical stripping at perimeter
- Cabinets with group of (4) 120 outlets is desired for each lab station
- Analyze and design room for optimal speech type acoustics
- Consider UV light sterilization device

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	40 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 ac/hr
Air Recycle / Filtration:	No/100% outside air

Engineering Requirements

Mechanical: standard HVAC

Plumbing:

- 2 floor drains
- 3 wash sinks
- 3 eye wash fixtures

Gas outlet:	28	Water:	34
Air outlet:	30	Distilled water:	28
Vac outlet:	28		

Lighting: suspended indirect fluorescent with task lighting at work stations

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V outlets:	27
220V outlets:	16

Communication

Phone Jacks:	2
Video Jacks:	2

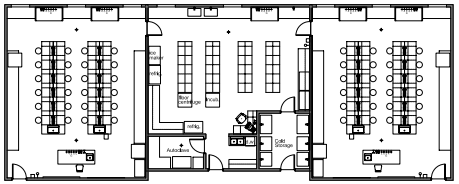
Computer

Data Jacks:	12

LEGEND

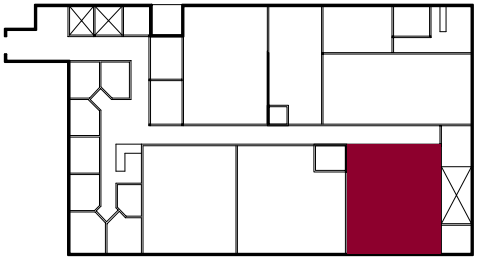
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



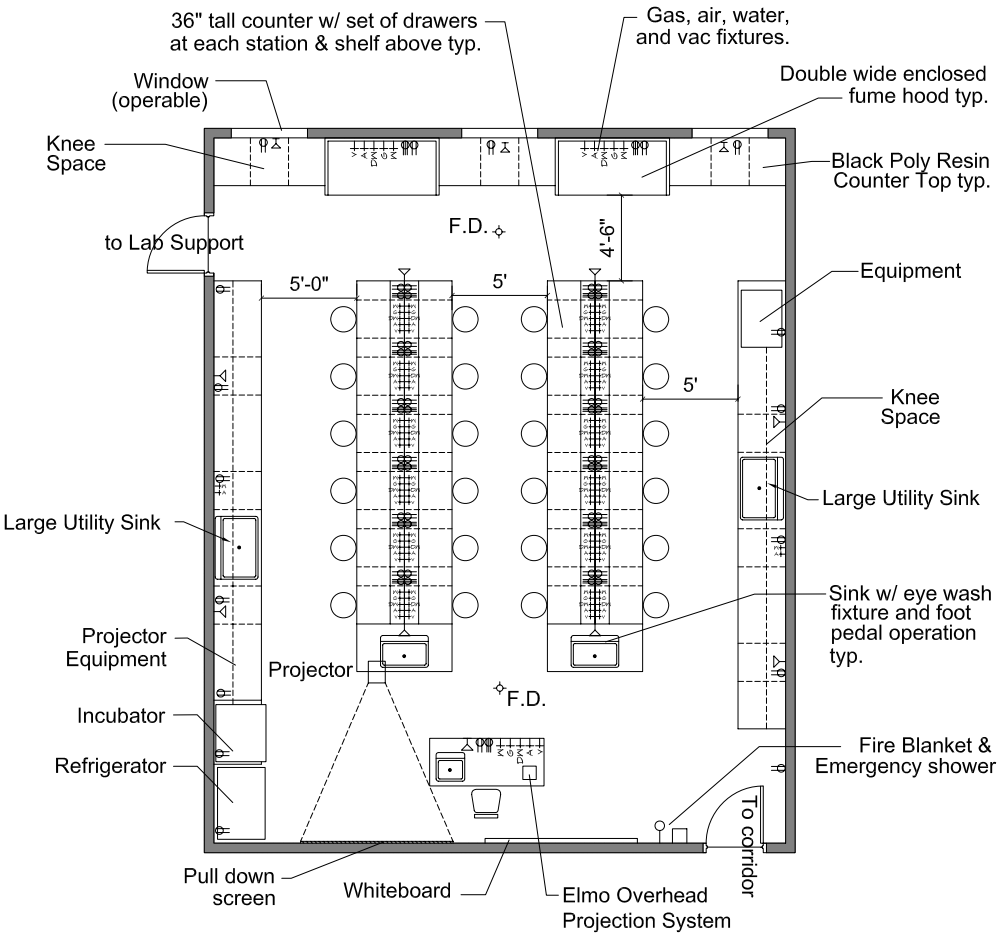
Cellular / Histology Lab Storage/Support Molecular / Genetics Lab

BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Molecular / Genetics Lab
1110 sf.
30'-0" x 37'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Cellular / Histology Lab

Space Description

Department:	Biology
Room name:	Cellular / Histology lab
Occupancy group:	B. Educational
Area Required (sq. ft.):	1110
Adjacent to:	
Separated From:	-
Preferred Floor:	Main level
Occupants	Staff: 1
	Students: 24
	Total: 25

Total occupants allowed by code: 28

Special Requests:

- Wide hallways
- Windows preferred
- Each lab station to be 36″x30″
- Drawers and knee space at each station
- Perimeter counters
- Provide dedicated circuits with hook-up power to refrig, freezer and incubators
- Foot pedal operation at wash sinks
- Raceway electrical stripping at perimeter
- Cabinets with group of (4) 120 outlets is desired for each lab station

Room Function

Narrative: Histology is the study of tissue sectioned as a thin slice, using a microtome. It can be described as microscopic anatomy. Histology is an essential tool of biology.

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Rubber
Ceiling:	Epoxy painted gyps board
Ceiling Height (ft.):	10’
Doors:	3’x7’ sc wood door
Windows:	operable windows preferred
Counters:	Black poly resin solid surface

Furnishings and Equipment

30″ Counter (L.F.):	74
30″ Base Cabs/Full Ht. Cabs. (L.F.):	33
__ Upper Cabs/Shelving (L.F.):	82
30″ Lab Tables (L.F.):	78

Fixed Equipment: White board, ceiling projector pull down screen, fire blanket, refrigerator, emergency shower, (3) fume hoods (2) incubators, Elmo, overhead proj.

Mobile Equipment: balances

Furniture: chairs, stools

Misc Considerations

- Equipment power in Histology lab for 2 fume hoods, 1 cryostat (microtome), 12 std. microscopes, 3 dissceting microscopes, 8 hotplates, 1-80 freezer, 1 std. freezer, 1 std. refrigerator, 3 paraffin oven/incubators, 3 slide warmers
- CO^2 taps
- Analyze and design room for optimal speech type acoustics
- Consider UV light sterilization device

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	40 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 ac/hr
Air Recycle / Filtration:	No/100% outside air

Engineering Requirements

Mechanical: specialized HVAC

Plumbing:

- 2 floor drains
- 3 wash sinks
- 2 eye wash fixtures

Gas outlet:	28	Water:	34
Air outlet:	30	Distilled water:	28
Vac outlet:	28		

Lighting: suspended indirect fluorescent w/task lighting @ work stations

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V outlets:	27
220V outlets:	16

Communication

Phone Jacks:	2
Video Jacks:	2

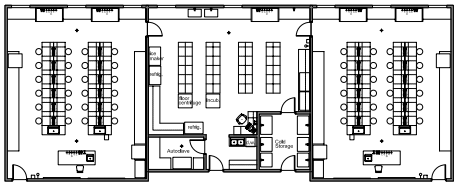
Computer

Data Jacks:	12

LEGEND

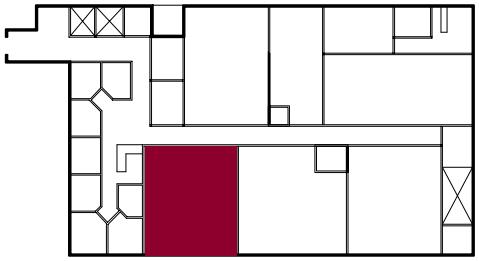
110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

DEPARTMENT KEY



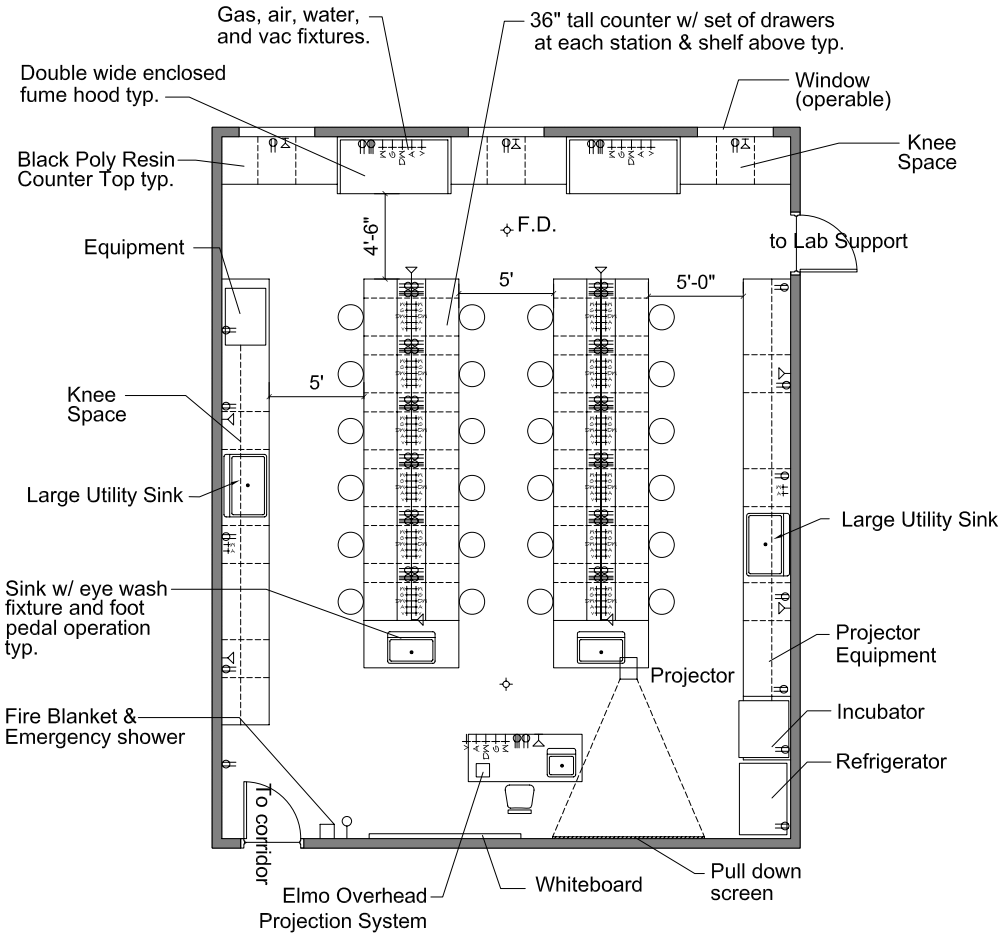
Cellular / Histology Lab Storage/Support Molecular / Genetics Lab

BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Cellular/Histology Lab
1110 sf.
30'-0" x 37'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Lab Support Room

Space Description

Department:	Biology
Room name:	Lab Support Room
Occupancy group:	B. Educational
Area Required (sq. ft.):	1225
Adjacent to:	Molecular / Genetics Lab, Cellular / Histology Lab
Separated From:	
Preferred Floor:	Main level
Occupants	Staff:
	Students:
	Total:

Total occupancy allowed by code:

Special Requests:

- Cabinets for chemical storage
- Attached cold storage room
- Raceway electrical stripping at perimeter
- Provide dedicated circuits to refrigerator, freezers and incubators
-
-

Room Function

Narrative: Support the function of Biology labs

Finishes

Floor:	VCT or sheet vinyl or conc.
Walls:	Washable paint
Base:	Rubber
Ceiling:	Epoxy painted gyps. board
Ceiling Height (ft.):	10'
Doors:	3'x7' sc wood door
Windows:	operable windows preferred
Counters:	Black poly resin solid surface

Furnishings and Equipment

24″ Counter (L.F.):	6
30″ Counter (L.F.):	64
24″ Base Cabs/Full Ht. Cabs. (L.F.):	6
30″ Base Cabs/Full Ht. Cabs. (L.F.):	56
12″ Upper Cabs/Shelving (L.F.):	43

Fixed Equipment: (2) refrigerator, autoclave, neutralization tanks, fume hood, sequence, centri fuge, ice maker, (3) incubators, freezers, dishwasher, fire blanket, emergency shower

Mobile Equipment: Chair, desk

Misc Considerations

- Lighting to accommodate label reading on shelf fronts from top to bottom.
- Adequate ventilation because of potential build up of fumes.
- Foot pedal operation at wash sinks
- Provide dedicated power to various circuits emergency power to sensitive storage.
- Provide power for cleaning systems.

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	50 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	6 ac/hr
Air Recycle / Filtration:	No/100% outside air

Engineering Requirements

Mechanical: specialized HVAC

Plumbing:

- 2 floor drains
- 1 deep double sink
-
-

Gas outlets:	2	Water taps:	9
Air outlet:	4	Distilled water:	1
Vac outlet:	1		

Lighting: direct recessed fluorescent

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	25
220V outlets:	2

Communication

Phone Jacks:	1
Video Jacks:	0

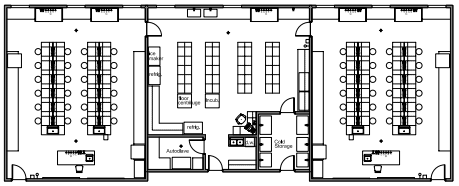
Computer

Data Jacks:	7

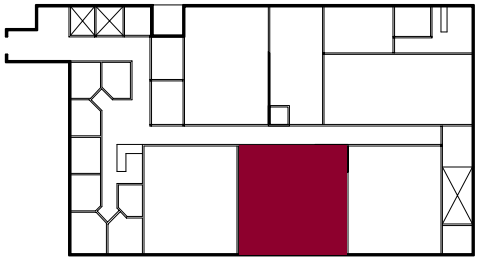
LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY

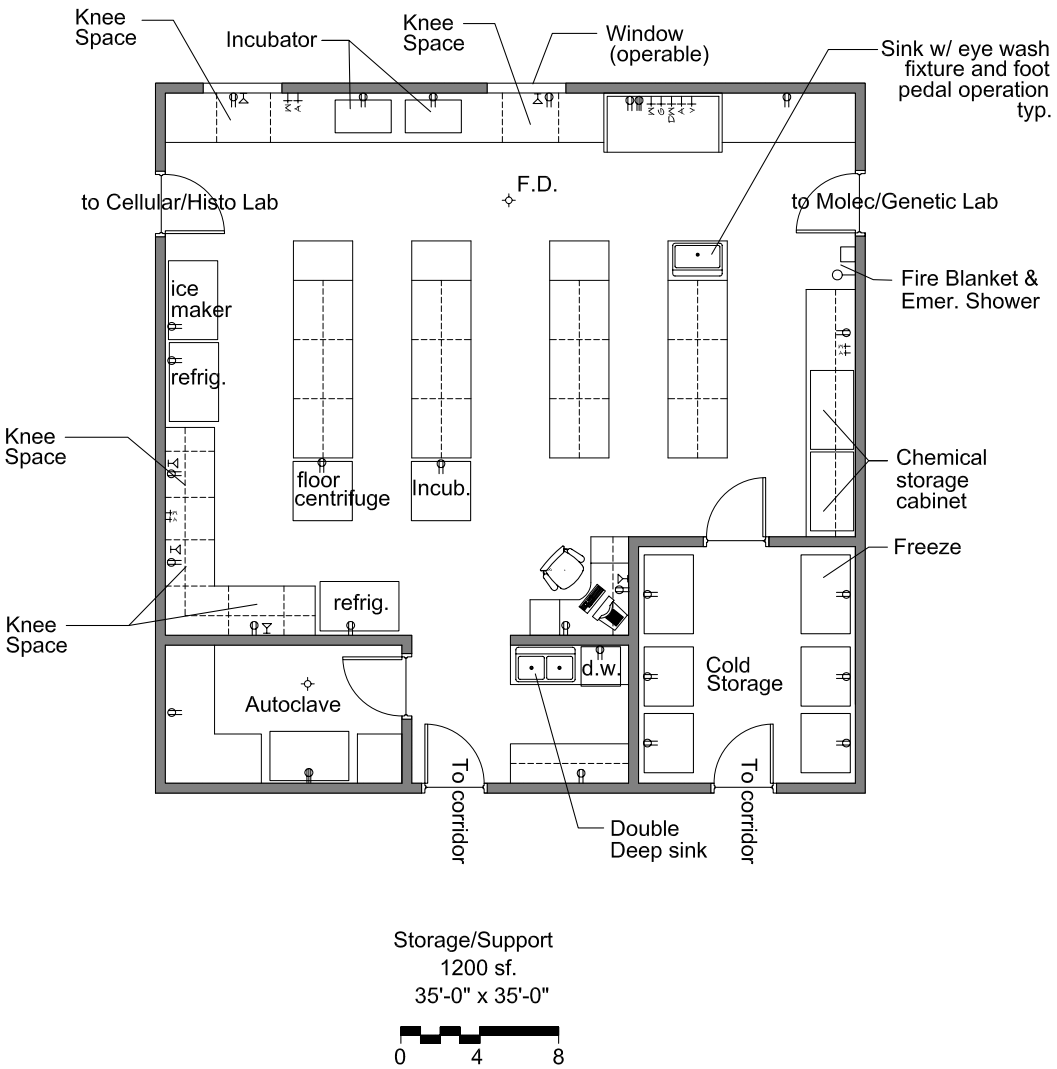


BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Storage/Support
1200 sf.
35'-0" x 35'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Specimen Storage

Department: Biology

Space Description

Department:	Biology
Room name:	Specimen Storage
Occupancy group:	B Educational
Area Required (sq. ft.):	700
Adjacent to:	Museum, Biology Lab, Anatomy / Physiology Lab
Separated From:	
Preferred Floor:	Main Level
Occupants	Staff:
	Students:
	Total:

Total occupancy allowed by code:

Special Requests:

- Ethyl acetate is used for specimen storage
- Emergency air evacuation and ventilation needed
-
-
-
-

Room Function

Narrative: Storage for biological specimen

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Vinyl
Ceiling:	Black painted susp. lay in acoustical
Ceiling Height (ft.):	10'
Doors:	3'x7' sc wood door
Windows:	1 operable window preferrd
Counters:	black poly resin solid surface

Furnishings and Equipment

30" Counter (L.F.):	33
30" Base Cabs/Full Ht. Cabs. (L.F.):	33
12" Upper Cabs/Shelving (L.F.):	29
36" Full size wall cabinets:	42

Fixed Equipment:

deep full height herbarium cabinets

Mobile Equipment: -

Furniture: -

Misc Considerations

- Provide adequate lighting for clarity on shelf labels from top to bottom
- Provide adequate ventilation for specimen preservation.

Room Environment

Lighting Level:	30 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	50 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: specialized HVAC

Plumbing: none

-
-
-
-

Gas outlet:	0	Water taps:	2
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: direct recessed fluorescent

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	4
220V outlets:	0

Communication

Phone Jacks:	0
Video Jacks:	0

Computer

Data Jacks:	2

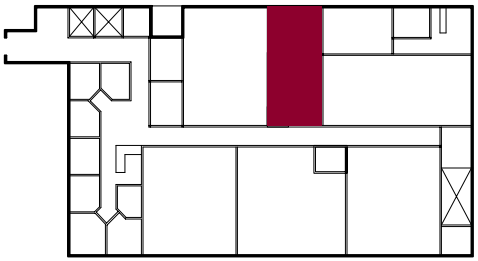
LEGEND

110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

DEPARTMENT KEY

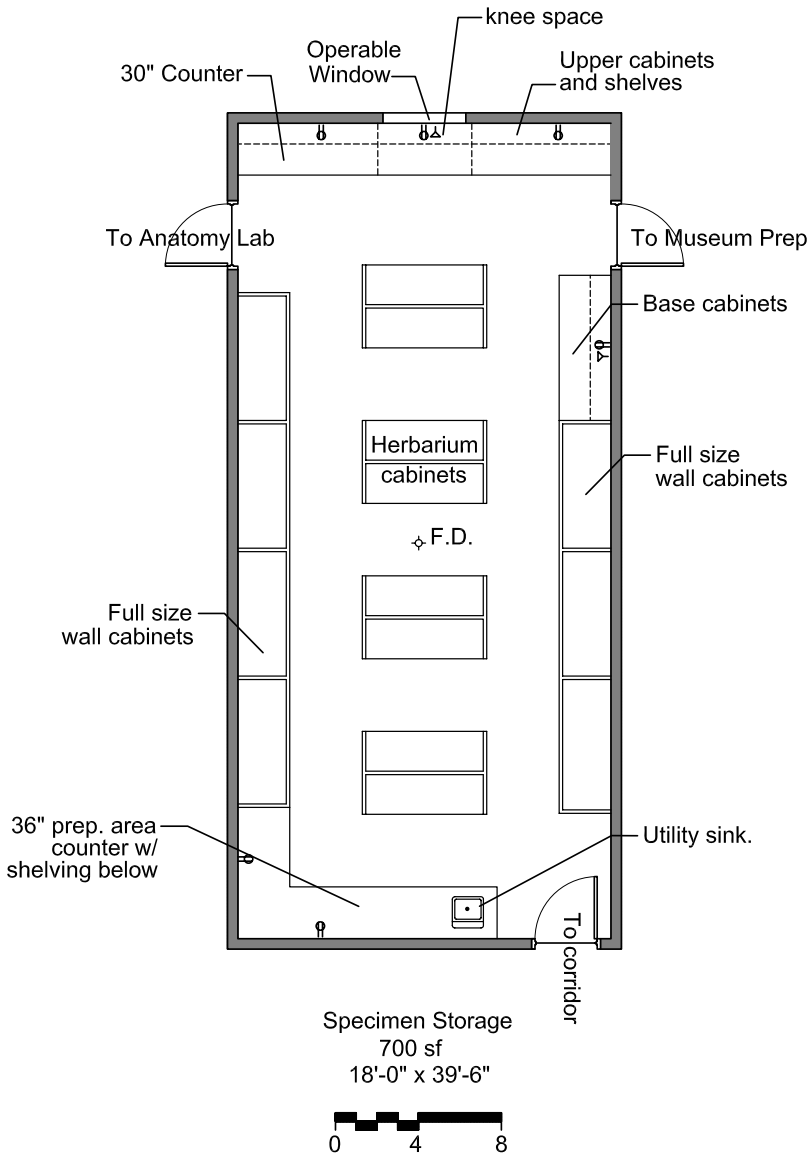
see page 4-17

BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

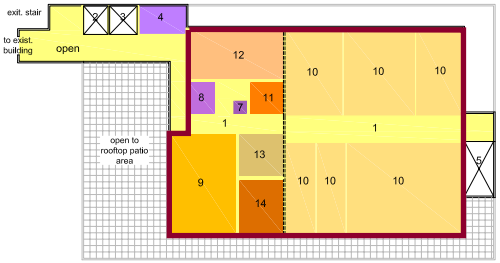
DEPARTMENT NET SQUARE FEET

Herbarium	500
Restroom	100
Storage	120
Classroom	290
Greenhouse	940
Total	**5850**

KEY PLAN

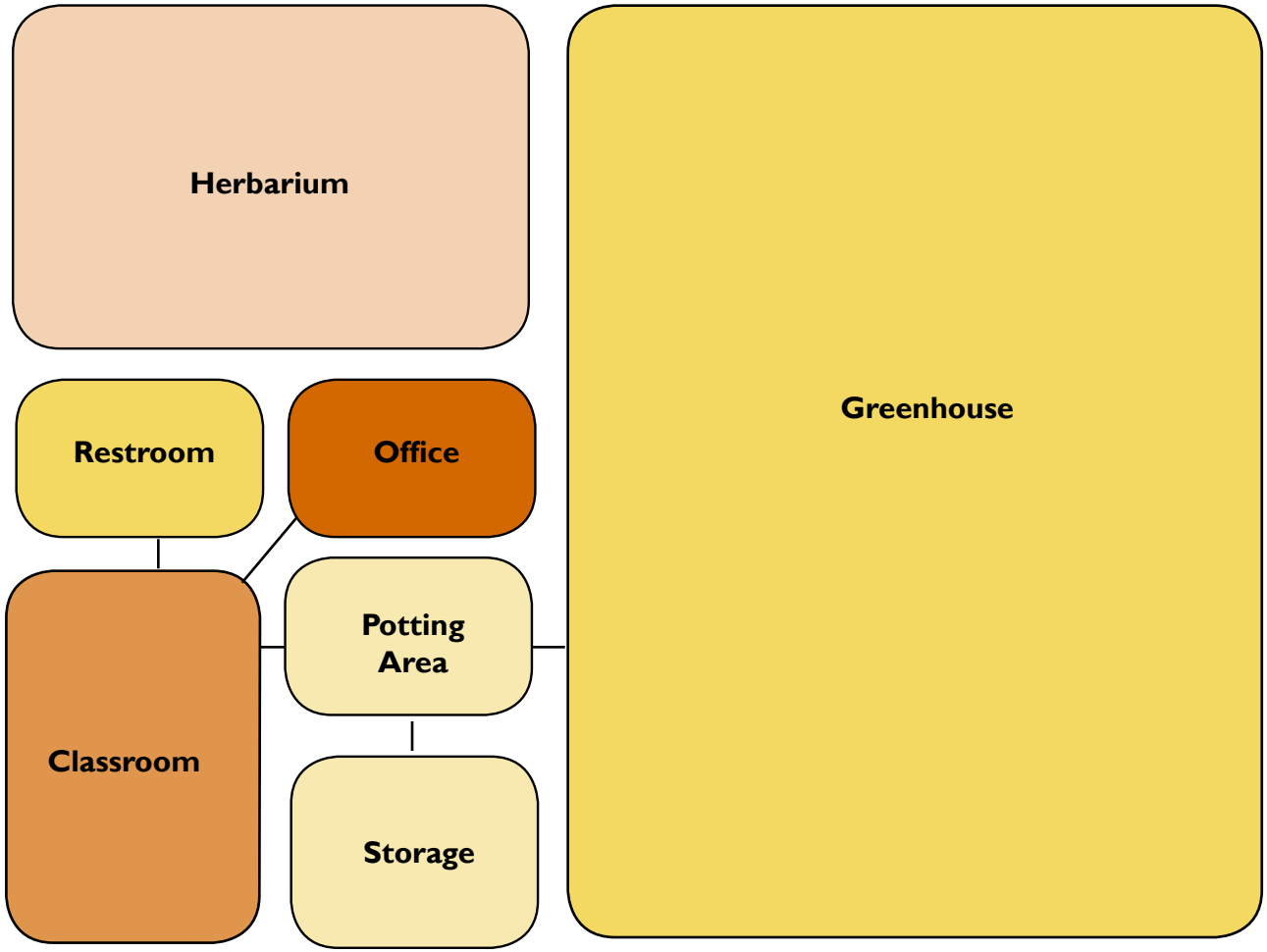
Roof Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Restroom
9. Classroom
10. Greenhouse
11. Instructors office
12. Herbarium



ROOF LEVEL

AFFINITY DIAGRAM



Room Name: Greenhouse

Space Description

Department:	Biology
Room name:	Green House
Occupancy group:	B Educational
Area Required (sq. ft.):	4100
Adjacent to:	Greenhouse classroom, herbarium
Separated From:	-
Preferred Floor:	Roof level
Occupants	Staff: 1
	Students: 25
	Total: 26

Total occupants allowed by code: 39

Special Requests:

- Translucent walls and ceiling (lexar, polycarb, etc.)
- Special ventilation and drainage needs
- Controlled lighting - each room
- Possibilities of re-use of green house drainage for irrigation or heat in building
- Emergency power and coding - heating for entire greenhouse

Room Function

Narrative: Study of anatomy and development biology of major members of the plant kingdom including structure and development of cells, tissues, and reproduction. And learn practical aspects of greenhouse operations and various propagation techniques.

Finishes

Floor:	Sealed concrete
Walls:	translucent panels
Base:	none
Ceiling:	none
Ceiling Height (ft.):	9-14'
Doors:	6'x7' double metal door, 3'x7' ext. door
Windows:	translucent appearing panels
Counters:	Metal or wood plank

Furnishings and Equipment

30″ Counter (L.F.):	515
24″ Counter (L.F.):	24
- Upper Cabs/Shelving (L.F.):	0
- Lab Tables (L.F.):	0

Fixed Equipment:

Mobile Equipment:

Furniture:

Misc Considerations

- Switch for high intensity lights on opposite side of doorway in Plant Investigation Room
- Light curtain capability for half of Student Technical Growing lab
- Hot water circulation for rooting in form of bench tubing in the Plant Propagation room
- Pressurized pesticide application system throughout greenhouse
- Fertiziling injector system throughout greenhouse
- Auxillary greenhouse heating system
- All individual bench sections to have automatic watering controls in a central location

Room Environment

Lighting Level:	species specific
Temperature:	species specific
Security:	lockable
Sound Considerations:	none
Min. Ventilation:	greenhouse specific
Air Exchange Rate:	6 ac/hr
Air Recycle / Filtration:	No/100% outside air

Engineering Requirements

Mechanical: specialized independent HVAC

Plumbing:

- 15 floor drains
-

Gas outlet:	0	Water taps:	28
Air outlet:	8	Distilled water:	0
Vac outlet:	0		

Lighting: susp. (NEMA 3) waterproof fluorsct species specific lighting

Lighting Control: for greenhouse needs

Electrical 208 / 120 power typical

120V duplex outlets:	11 (NEMA 3 wp)
220V outlets:	0

Communication

Phone Jacks:	0
Video Jacks:	0

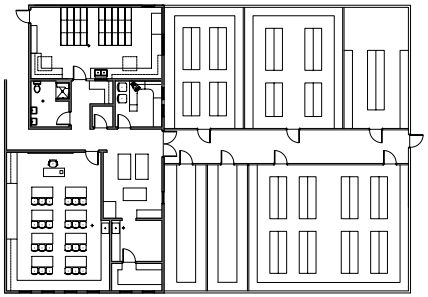
Computer

Data Jacks:	2

LEGEND

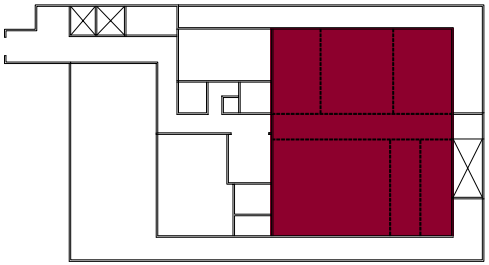
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



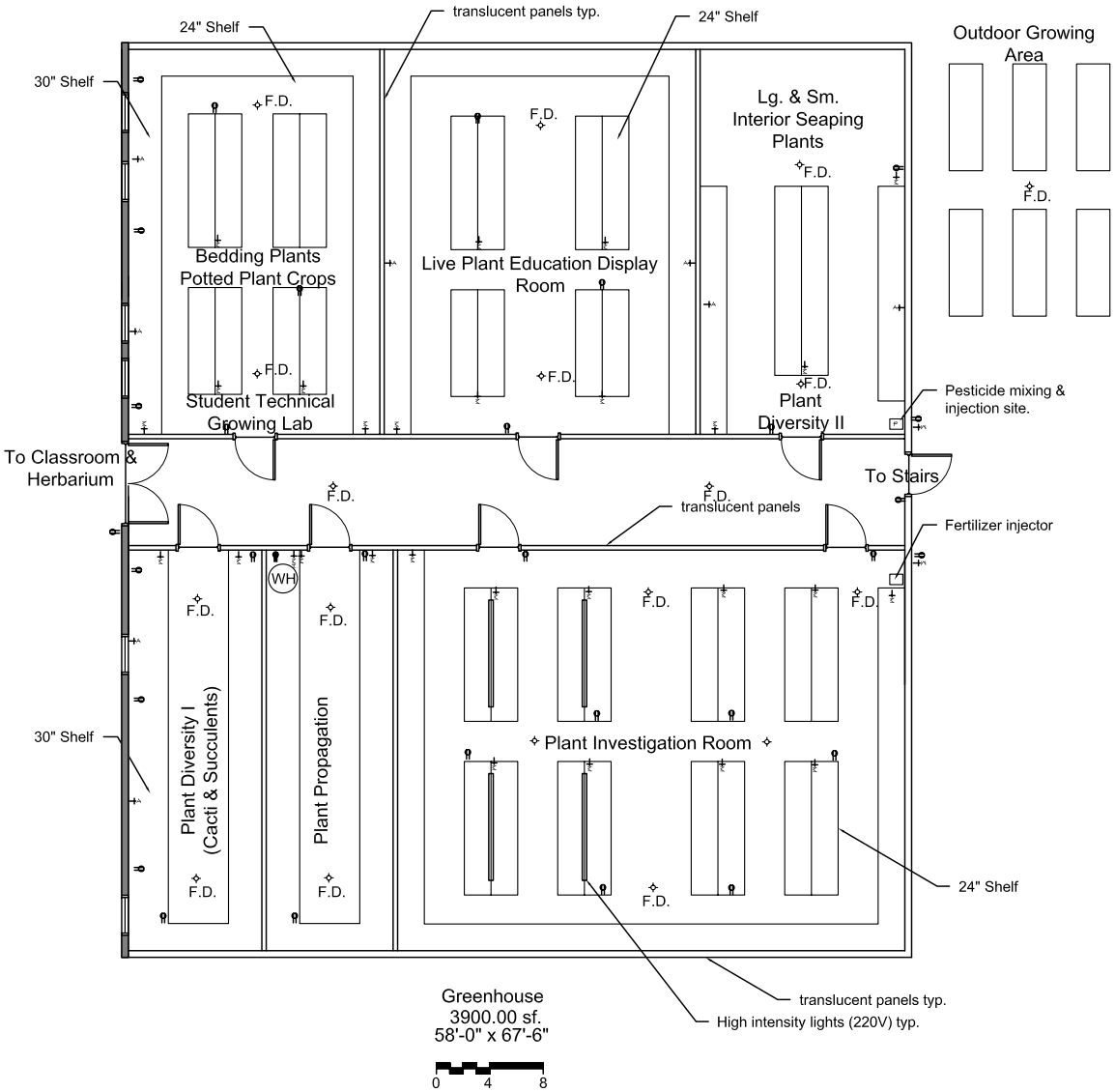
Greenhouse Rooftop Area

BUILDING KEY



ROOF LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Greenhouse - Plant Lab / Office

Space Description

Department:	Biology
Room name:	Plant Lab / Office
Occupancy group:	B. Educational
Area Required (sq. ft.):	1450
Adjacent to:	Greenhouse, herbarium
Separated From:	
Preferred Floor:	Roof level
Occupants	Staff: 1
	Students: 24
	Total: 25

Total occupancy allowed by code:

Special Requests:

- High shelf capability in potting area for storage
- Six additional seats in class room
- As many windows as practicle, some operable
- As much storage space in classroom as practical
- Exhaust system above media mixing are (also in classroom)

Room Function

Narrative: This room is for plant study and potting preparation. Study of anatomy and development biology of major members of the plant kingdom including structure and development of cells, tissues, and reproduction. And learn practical aspects of greenhouse operations and various propagation techniques.

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Rubber
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	10'
Doors:	3'x7' sc wood door
Windows:	Required
Counters:	Solid surface

Furnishings and Equipment

30″ Counter (L.F.):	58
29″ Base Cabs/Full Hght Cabs (L.F.):	62
30″ Upper Cabs/Shelving (L.F.):	18
30″ Lab Tables (L.F.):	35

Fixed Equipment:

Mobile Equipment:

Furniture:

Misc Considerations

- Central location for auto controls including: water, lighting, cooling exhaust fans and vents, etc.
- Special ventilation needs for room plants, chemical storage and fertilizer storage
- Special ventilation needs for storage area

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	40 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 ac/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: standard HVAC

Plumbing:

- 2 floor drains
- 3 sinks
- toilet

Gas outlet:	0	Water:	81
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: indirect suspended fluorescent lay in

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	15
220V outlets:	0

Communication

Phone Jacks:	2
Video Jacks:	2

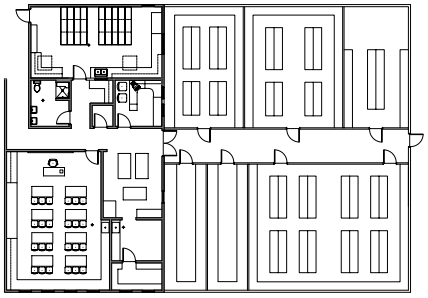
Computer

Data Jacks:	4

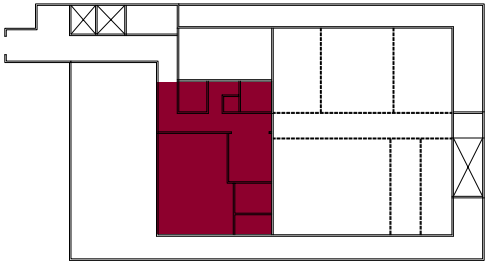
LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY

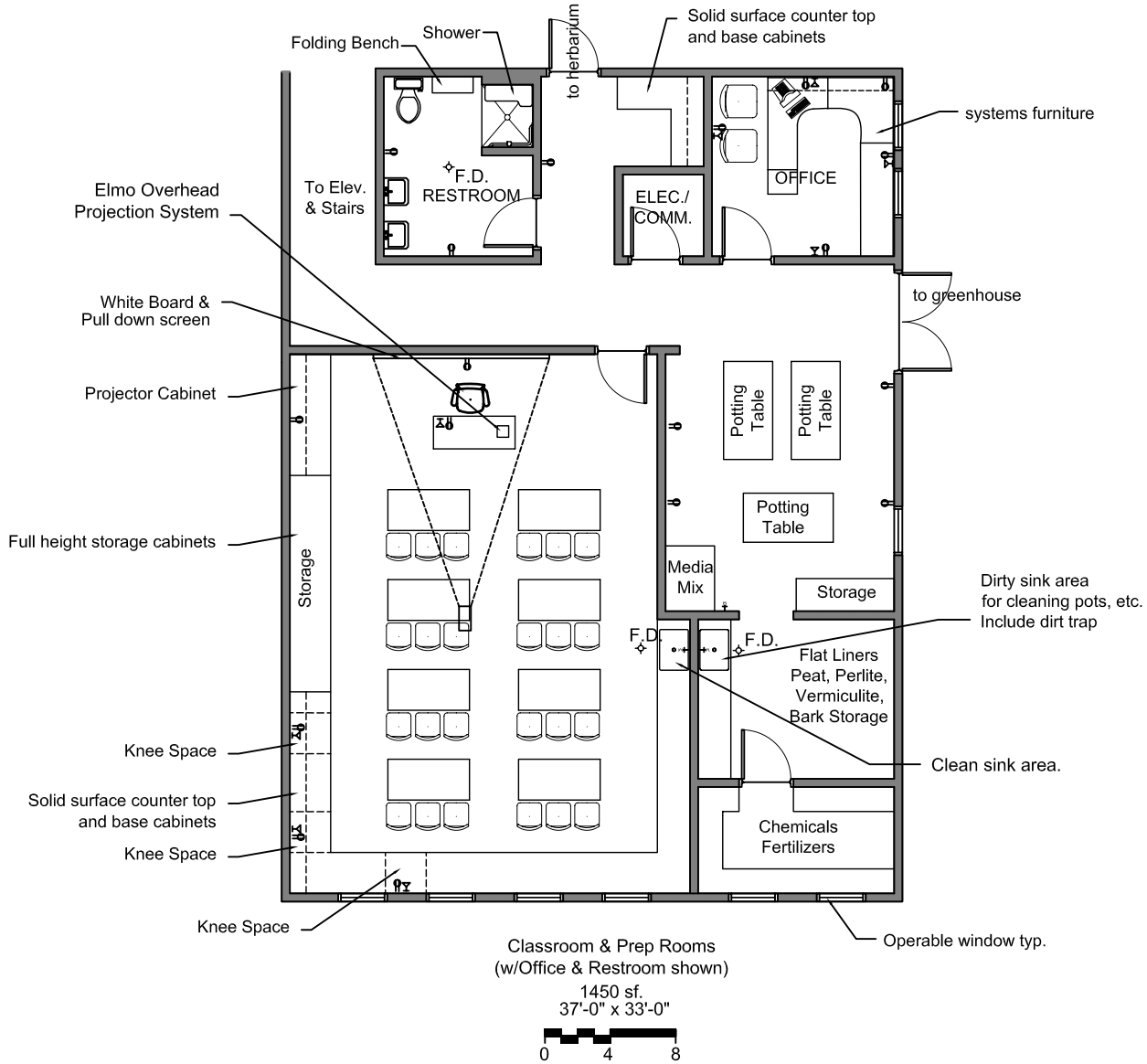


Greenhouse Rooftop Area



ROOF LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Green House - Herbarium

Space Description

Department:	Biology
Room name:	Herbarium
Occupancy group:	B. Educational
Area Required (sq. ft.):	500
Adjacent to:	Greenhouse, Classroom lab
Separated From:	-
Preferred Floor:	Roof level
Occupants	Staff: 2
	Students: 2
	Total: 4

Total occupancy allowed by code: 5

Special Requests:

- Special ventilation needs
- Early warning smoke detector system
- Gaseous clean agent fire supression system (no water)
- Environmental controls for temperature (20-23c) and humidity ((40-60%
-
-

Room Function

Narrative: Storage of plant samples and other specimen

Finishes

Floor:	Sealed concrete
Walls:	Washable paint
Base:	Rubber
Ceiling:	Washable painted gyp. board
Ceiling Height (ft.):	10'
Doors:	3.5'x7' sc wood door
Windows:	Preferred
Counters:	Solid surface

Furnishings and Equipment

30″ Counter (L.F.):	85
30″ Base Cabs/Full Hght Cabs (L.F.):	85
18″ Upper Cabs/Shelving (L.F.):	80
- Lab Tables (L.F.):	0

Fixed Equipment:

Mobile Equipment:

Furniture:

Misc Considerations

- Possible reuse of green house heat in building (HVAC)
- Provide adequate ventilation to preserve specimen
- Pest management is critical

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or -1
Security:	lockable
Sound Considerations:	50 dB
Min.Ventilation:	20 cfm/person
Air Exchange Rate:	12 ac/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: standard HVAC

Plumbing:

- 2 floor drains
-
-

Gas outlet:	0	Water taps:	2
Air outlet:	0	Distilled water:	-
Vac outlet:	0		

Lighting: direct recessed fluorescent

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	4
220V outlets:	0

Communication

Phone Jacks:	0
Video Jacks:	0

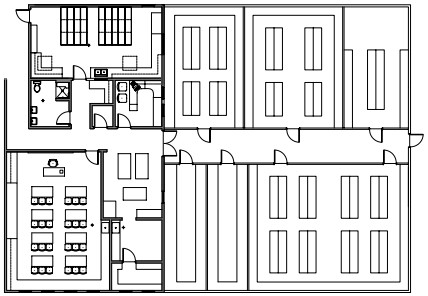
Computer

Data Jacks:	2

LEGEND

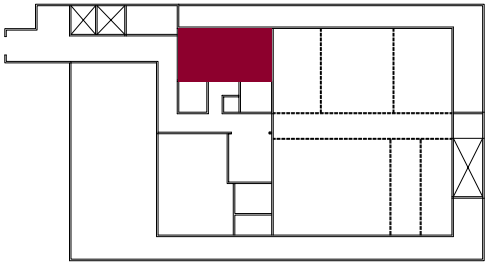
110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

DEPARTMENT KEY



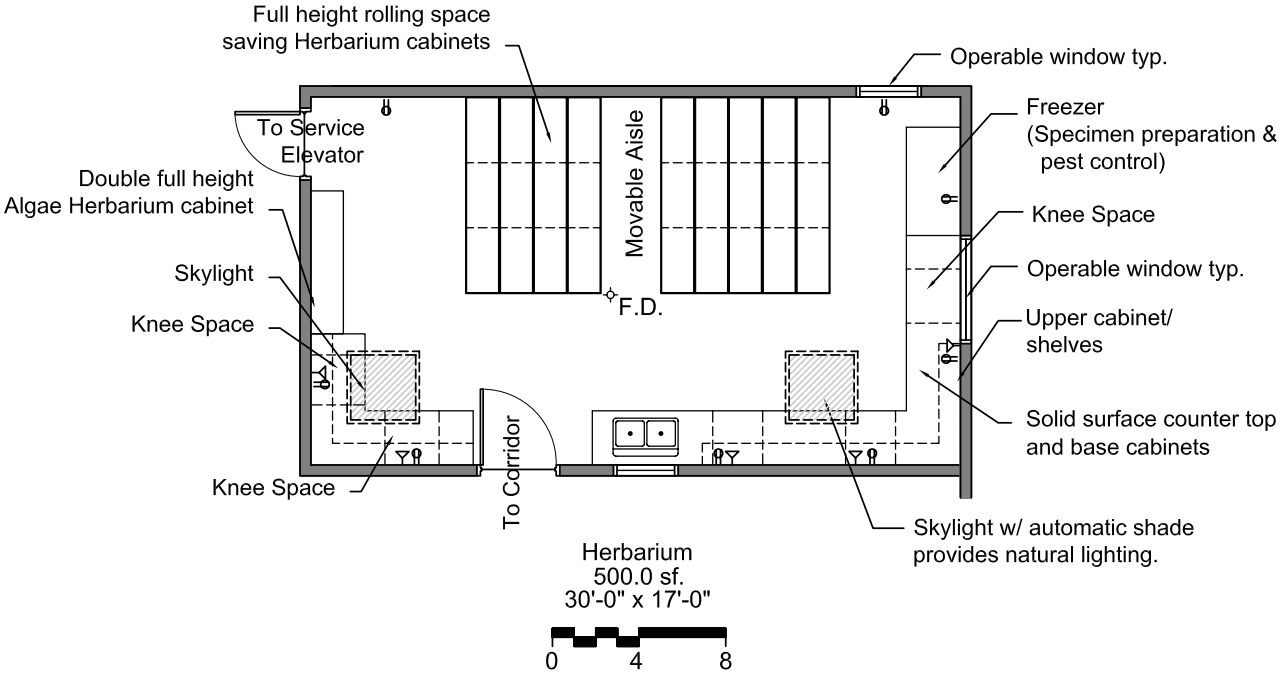
Greenhouse Rooftop Area

BUILDING KEY



ROOF LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

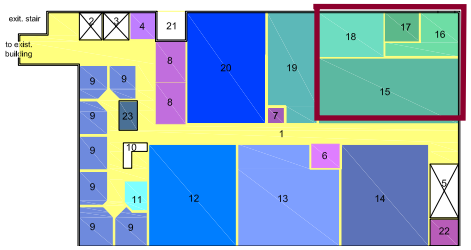
DEPARTMENT NET SQUARE FEET

Entry Reception	260
Museum Office	120
Museum Prep Storage	350
Museum Display Area	1150
Total	**1880**

KEY PLAN

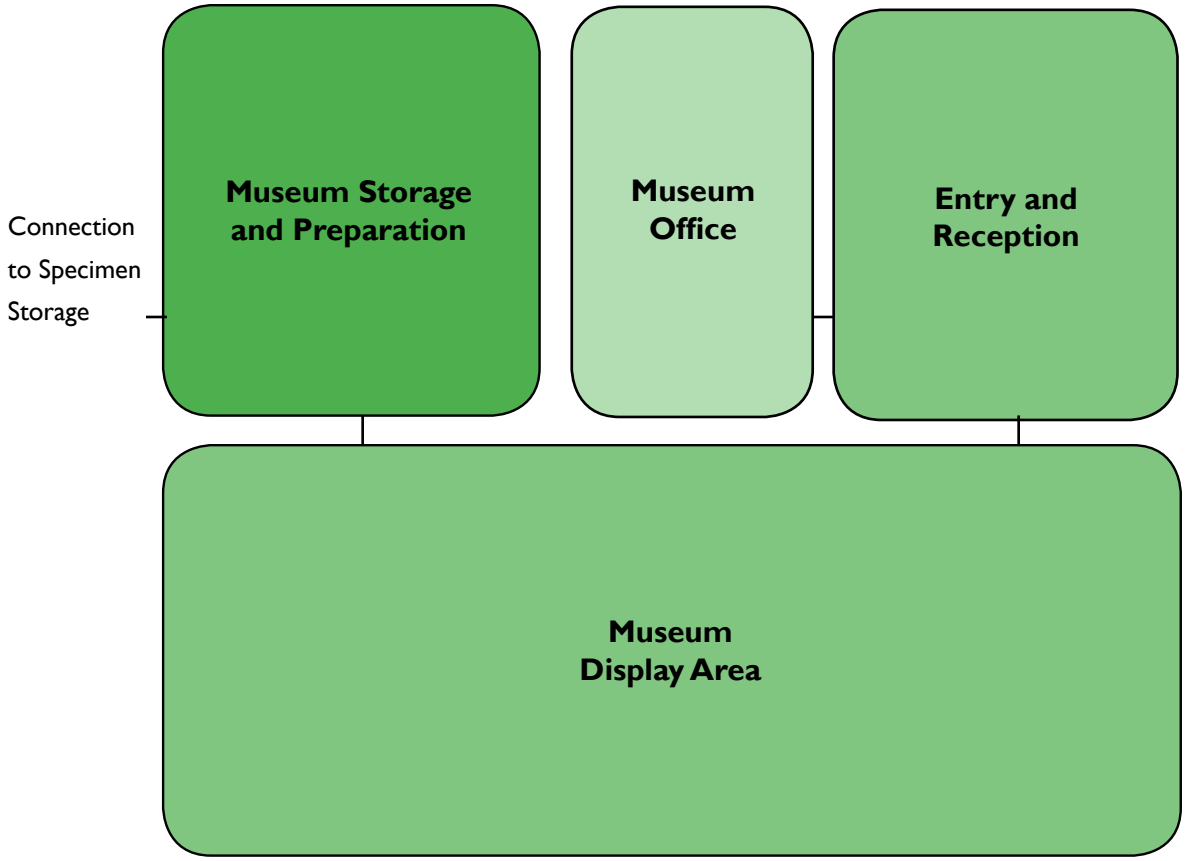
Main Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Restrooms
9. Biology Faculty Offices
10. Biology Reception
11. Storage
12. Cellular/Histology Lab
13. Lab Storage & Support
14. Molecular/Genetics Lab
15. Museum Display
16. Museum Reception
17. Museum Office
18. Museum Prep.
19. Specimen Storage
20. Anatomy/Physiology Lab
21. Dock
22. Fire Sprinkler Riser Room
23. Student Cubicles



MAIN LEVEL

AFFINITY DIAGRAM



Room Name: Museum Curator Office & Entry / Reception Area

Space Description

Department:	Biology	
Room name:	Museum Curator Office & Entry / Rec. Area	
Occupancy group:	B. Educational	
Area Required (sq. ft.):	120 + 350	
Adjacent to:	Museum	
Separated From:		
Preferred Floor:	Main level	1
Occupants	Staff:	1
	Students:	2
	Total:	

Total occupancy allowed by code:

Special Requests:

- Office view to entry
- Visual control of entry and display area
- Possible monitoring camera
- Reception desk for volunteer receptionist/ docent
- Visitor seating
-
-

Room Function

Narrative: Waiting area for visitors to check in and enter museum

Finishes

Floor:	VCT or sheet vinyl
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	9'
Doors:	(2) 3'x7' glass doors
Windows:	preferred, 2 interior windows needed, 1 exterior
Counters:	plastic laminate

Furnishings and Equipment

30″ Counter (L.F.):	10
24″ Base Cabs/Full Ht. Cabs. (L.F.):	10
12″ Upper Cabs/Shelving (L.F.):	10
- Lab Tables (L.F.):	0
Fixed Equipment:	-
Mobile Equipment:	computer
Furniture:	chairs

Misc Considerations

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	30 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: standard HVAC

Plumbing: no•

-
-

Gas outlet:	0	Water:	0
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: indirect suspended fluorescent

Lighting Control: occupancy sensor, dimmable

Electrical 208 / 120 power typical

120V duplex outlets:	7
220V outlets:	0

Communication

Phone Jacks:	1
Video Jacks:	1

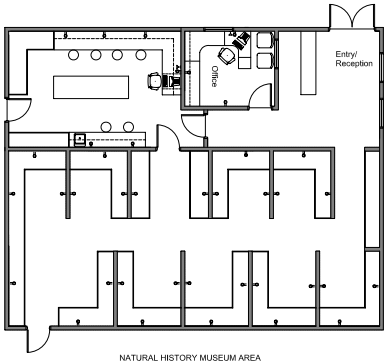
Computer

Data Jacks:	4

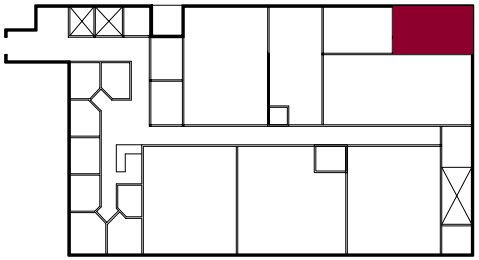
LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY

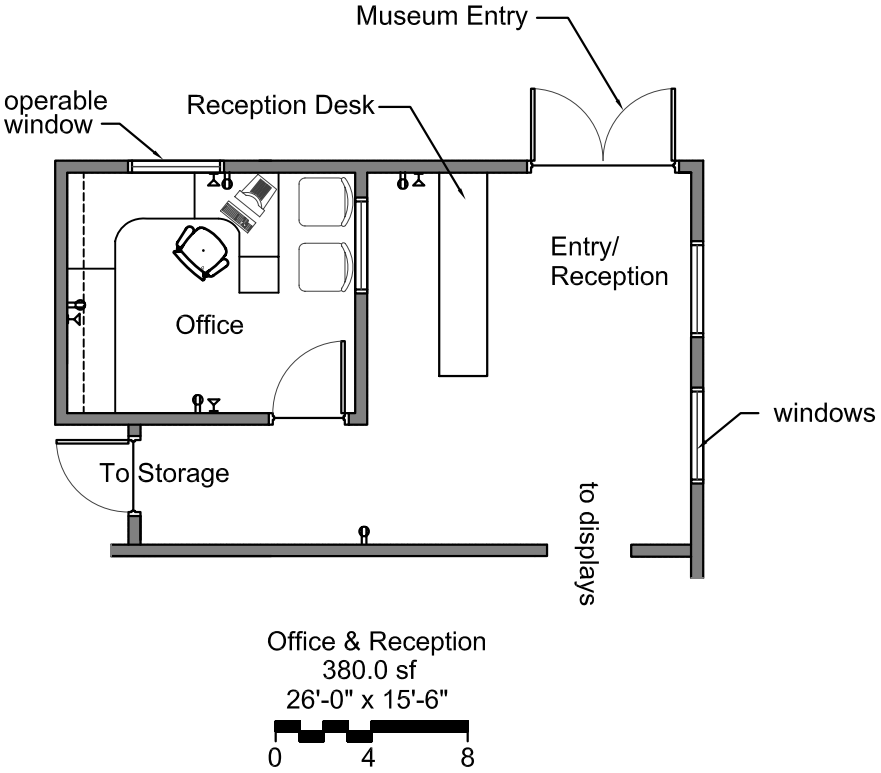


BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Museum Prep and Storage Area

Department: Biology

Space Description

Department:	Biology
Room name:	Museum Prep
Occupancy group:	B. Educational
Area Required (sq. ft.):	350
Adjacent to:	Museum Display, Specimen Storage, Exterior Entrance
Separated From:	
Preferred Floor:	Main Level
Occupants	Staff: 2
	Students: 2
	Total: 3

Total occupants allowed by code: 3

Special Requests:

- Shelving of different sizes and depth. Small and lockable cabinets
- Storage for alcohol filled jars
- Dry environment
- Directly adjacent to large teaching lab for easy transfer of specimens
-

Room Function

Narrative: This room is for specimen processing, examination, preparation of exhibits, database entry, etc.

Finishes

Floor:	VCT or sheet vinyl
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Painted gypsum board
Ceiling Height (ft.):	10'
Doors:	3'x7' wood door
Windows:	operable windows preferred
Counters:	solid surface

Furnishings and Equipment

30″ Counter (L.F.):	30
30″ Base Cabs/Full Ht. Cabs. (L.F.):	48
12″ Upper Cabs/Shelving (L.F.):	34
36" Lab Tables (L.F.):	10
Fixed Equipment:	-
Mobile Equipment:	computer
Furniture:	lab tables, stools

Misc Considerations

- Provide adequate lighting

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	40 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: standard HVAC

Plumbing:

- 1 deep basin sink
-
-
-

Gas outlet:	0	Water:	1
Air outlet:	1	Distilled water:	1
Vac outlet:	1		

Lighting: 2x4 fluorescent lay in

Lighting Control:

Electrical 208 / 120 power typical

120V duplex outlets:	6
220V outlets:	0

Communication

Phone Jacks:	0
Video Jacks:	0

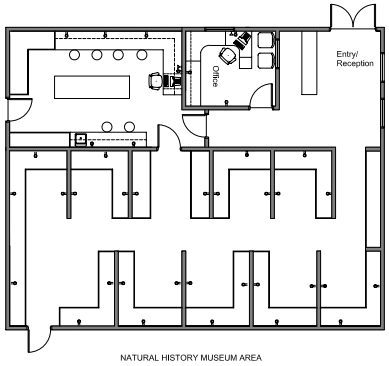
Computer

Data Jacks:	6

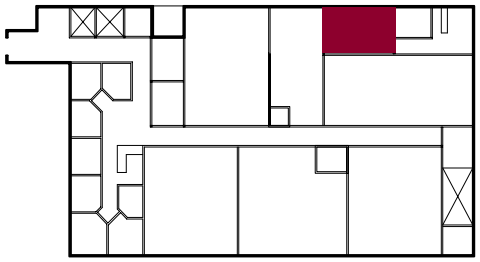
LEGEND

110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

DEPARTMENT KEY

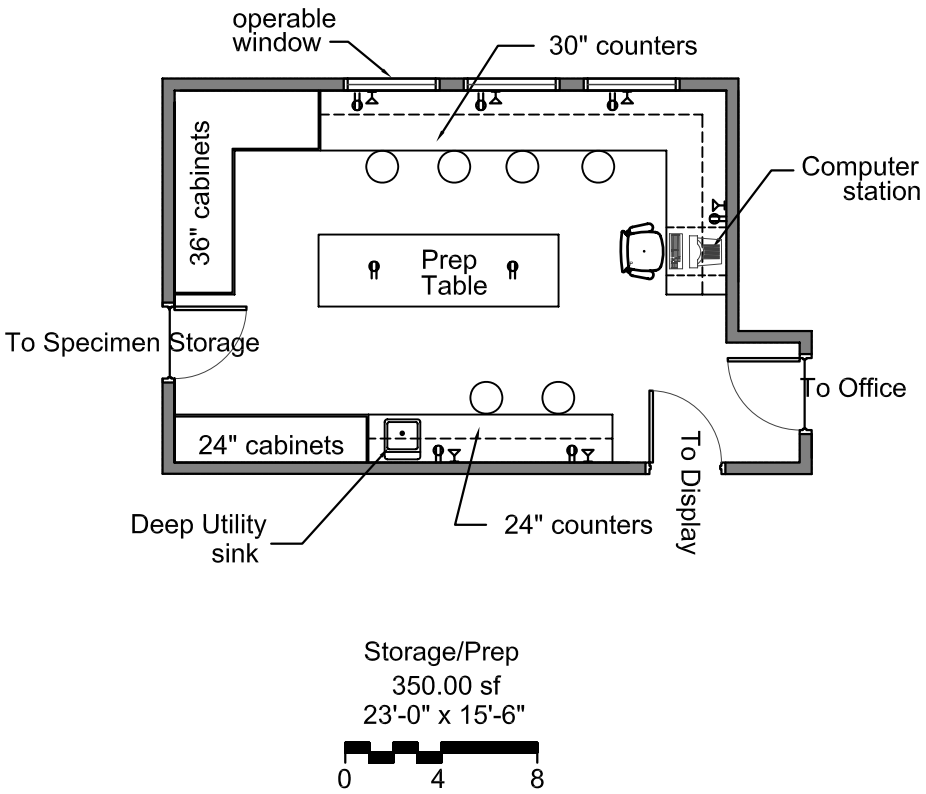


BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Natural History Museum - Display Area

Space Description

Department: Biology
Room name: Natural History Museum - Display area
Occupancy group: B. Educational
Area Required (sq. ft.): 1150
Adjacent to: Parking, Specimen Storage, Museum Prep/Storage, Ext. Entrance
Separated From:
Preferred Floor: Main Level
Occupants Staff: 1
Students: 20
Total: 21
Total occupancy allowed by code: 21
Special Requests:

- Rooms or display areas for 10 different display types
- Muted general lighting and display specific lighting
- Display cases with glass fronts and with space above
-

Room Function

Narrative: Museum will be used to display both museum and teaching specimen collections including:

- Entomology specimens (dried, in cases)
- Bird skins, mounted animals
- Fish, reptiles, amphibians (in alcohol)
- Invertebrates (mollusks, corals, sponges)
- Fossils, minerals, arrowheads, etc.

Finishes

Floor: Carpet
Walls: Painted gypsum board
Base: Rubber
Ceiling: Black painted susp. lay in acoustical
Ceiling Height (ft.): 10'
Doors: 3'x7' wood door
Windows: prohibited
Counters: none

Furnishings and Equipment

- Counter (L.F.): 0
30″ Base Cabs/Full Ht. Cabs. (L.F.): 210
- Upper Cabs/Shelving (L.F.): 0
- Lab Tables (L.F.): 0
Fixed Equipment: 0
Mobile Equipment: 0
Furniture: lab tables, stools

Misc Considerations

- Provide adequate and paper lighting for displays and minimal lighting for walking areas to reduce glare on display cabinets.
- Provide adequate ventilation for preservation of display items.
- Provide proper humidity control for various displays

Room Environment

Lighting Level: 5 fc ambient
30 fc display (sfc vert)
Temperature: 70 degrees F. +1 or - 1
Security: lockable
Sound Considerations: 30 dB
Min. Ventilation: 20 cfm/person
Air Exchange Rate: 12 AC/hr
Air Recycle / Filtration: Yes/60-65%

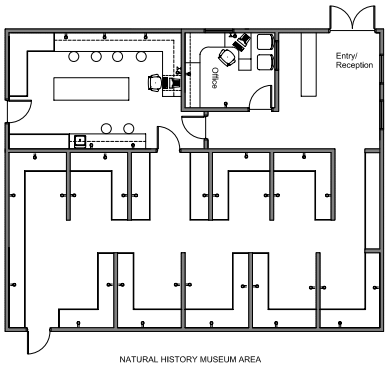
Engineering Requirements

Mechanical: standard HVAC
Plumbing: none
•
•
Gas outlet: 0 Water: 1
Air outlet: 1 Distilled water: 0
Vac outlet: 0
Lighting: low voltage halogen and color corrected UV protected case lighting, indirect low level ambient track lighting
Lighting Control: dimmable at case
Electrical 208 / 120 power typical
120V duplex outlets: 30
220V outlets: 0
Communication
Phone Jacks: 0
Video Jacks: 0
Computer
Data Jacks: 2

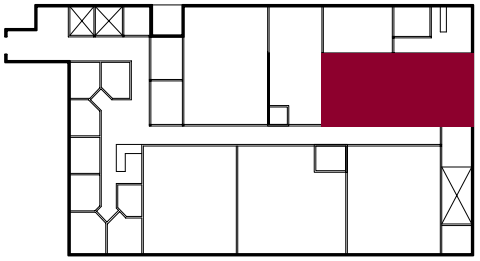
LEGEND

110V duplx		Fire Blankt	
220V single	W	Water	
Ph/Data	DW	Distilled Water	
Video	G	Gas	
Eyewash	A	Air	
Emer Shwr	V	Vacuum	

DEPARTMENT KEY

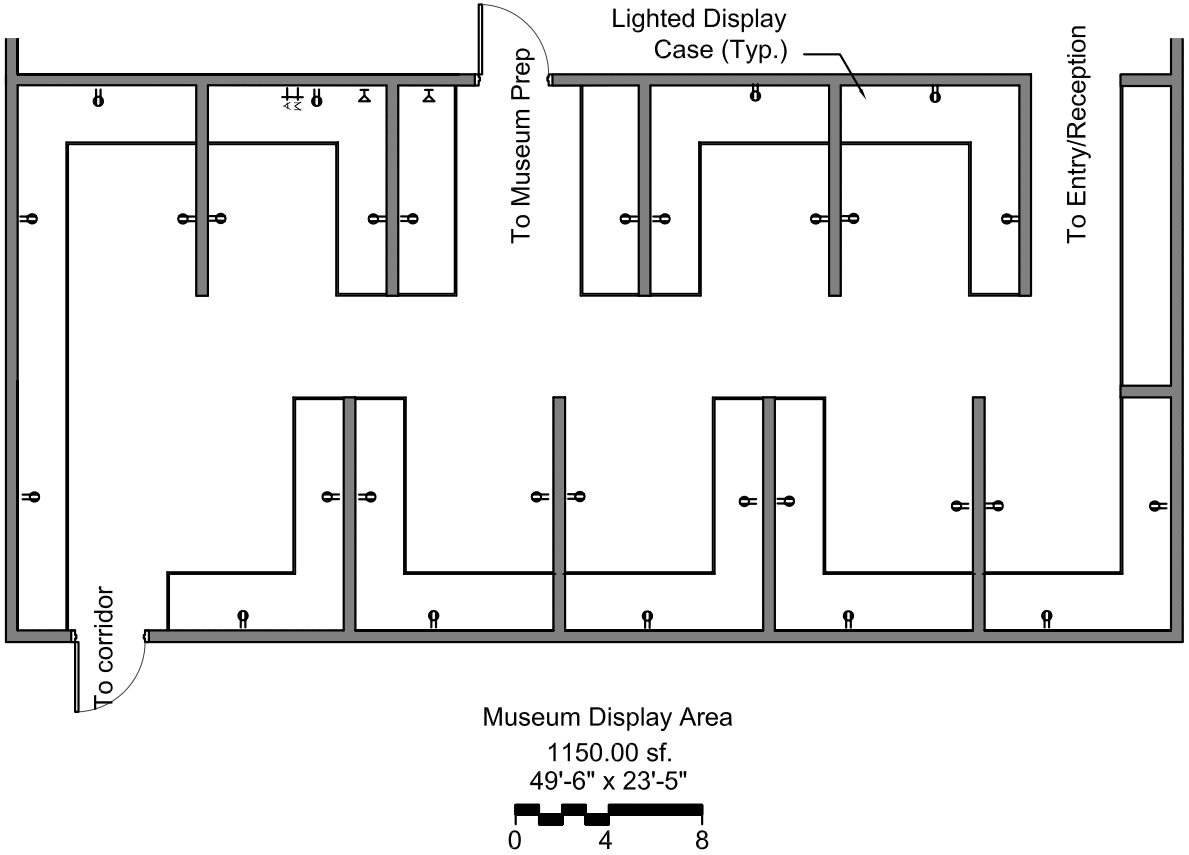


BUILDING KEY



MAIN LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Department of Nursing

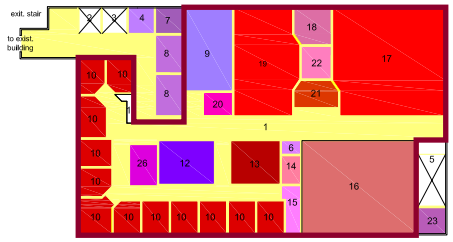
DEPARTMENT NET SQUARE FEET

Faculty Area	2550
Conference Room	500
Discussion Area	300
Practice Labs	1600
Hospital Bathroom	80
Equip. Storage	180
Lab Office	150
Computer Lab	1480
Validation Lab/Control Rm.	1030
Total	**7870**

KEY PLAN

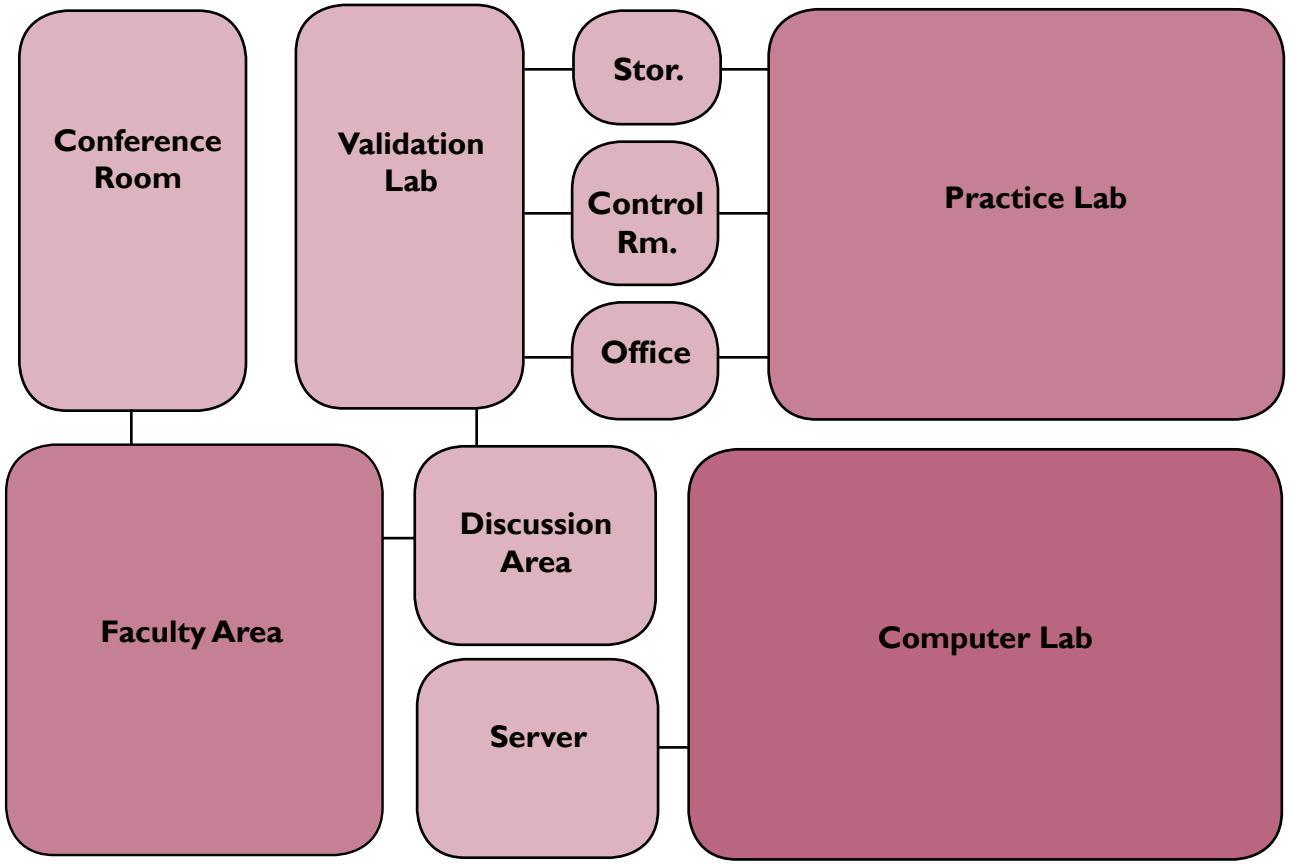
Second Level

1. Hall/Corridor
2. Public Elevator
3. Service Elevator
4. Service Elevator Vestibule
5. Stairs
6. Janitor's Closet
7. Electrical/Communications Room
8. Restrooms
9. Conference Room
10. Nursing Faculty Offices
11. Nursing Reception
12. Work Room
13. Student/Faculty Discussion Area
14. Server
15. Storage
16. Computer Lab
17. Practice Lab
18. Equipment Storage
19. Validation Lab
20. Hospital Bathroom
21. Instructor's Office
22. Practice Lab
23. Testing Control
25. Fire Sprinkler Riser Room
26. Student Cubicles



SECOND LEVEL

AFFINITY DIAGRAM



Room Name: Faculty Office

Department: Nursing

Space Description

Department:	Nursing	
Room name:	Faculty Office	
Occupancy group:	B. Educational Office	
Area Required (sq. ft.):	13 @120	
Adjacent to:	Faculty Offices, Conf. Reception, Work Room	
Separated From:	Main Public Areas	
Preferred Floor:	2nd Level	
Occupants	Staff:	7
	Visitors:	1
	Total:	**8**
Total occupants allowed by code:		8

Special Requests:

- Acoustically private
- Windows preferred
- Space for visitors
- 2 bookshelves preferred
-
-
-

Room Function

Narrative: Room to serve as instructor's home base with space for written materials. Students will come to this office to talk to the instructor.

Finishes

Floor:	Carpet
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	8'
Doors:	3x7 sc wood door
Windows:	operable windows preferrd
Counters:	plastic laminate

Furnishings and Equipment

24″ Counter (L.F.):	17
24″ Base Cabs/Full Ht. Cabs. (L.F.):	14
12″ Upper Cabs/Shelving (L.F.):	16
- Tables (L.F.):	0

Fixed Equipment: Systems office furniture

Mobile Equipment:

Furniture: 3 chairs, 2 bookshelves

Misc Considerations

Coordinate system furniture or furniture placement with electrical at time of rough in

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	30 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing: none

-
-

Gas outlet:	0	Water:	0
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: parabolic recessed fluorescent fixtures

Lighting Control: occupancy sensor, dimmable

Electrical 208 / 120 power typical

120V duplex outlets:	4
220V:	0

Communication

Phone Jacks:	1
Video Jacks:	0

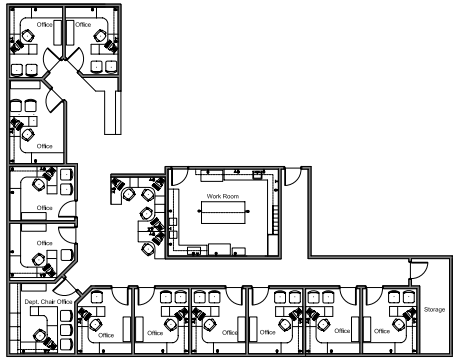
Computer:

Data Jacks:	4

LEGEND

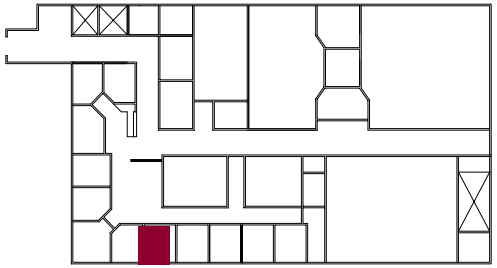
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



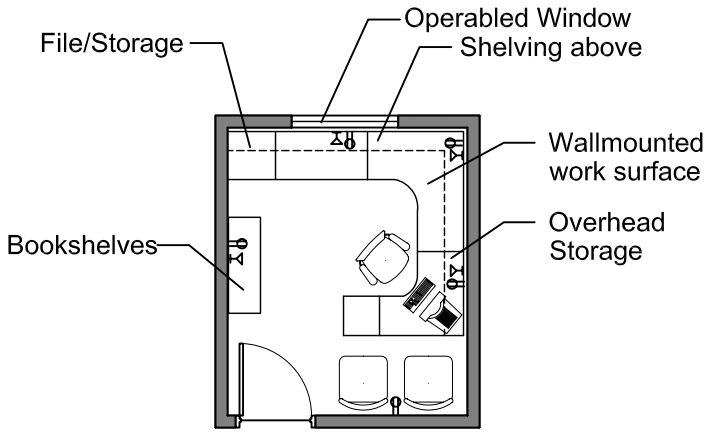
NURSING FACULTY AREA

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Faculty Office
120.00 sf.
12'-0" x 10'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Dept Chair Office

Space Description

Department:	Nursing
Room name:	Dept Chair Office
Occupancy group:	B. Educational Office
Area Required (sq. ft.):	150
Adjacent to:	Faculty Offices, Reception, Work Room
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 1
	Visitors: 3
	Total: 3

Total occupants allowed by code: 1

Special Requests:

- Space for visitor chairs
- Windows preferred
- Shelving for books
- Filing cabinets•
-
-
-

Room Function

Narrative: Room to serve as instructor's home base with space for written materials. Students will come to this office to talk to dept. chair.

Finishes

Floor:	Carpet
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	8'
Doors:	3x7 sc wood door
Windows:	operable windows preferrd
Counters:	plastic laminate

Furnishings and Equipment

24″ Counter (L.F.):	20
24″ Base Cabs/Full Ht. Cabs. (L.F.):	18
12″ Upper Cabs/Shelving (L.F.):	0
- Tables (L.F.):	
Fixed Equipment:	Systems office furniture
Mobile Equipment:	computer, phone
Furniture:	4 chairs

Misc Considerations

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	30 dB
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing: none

-
-

Gas outlet: 0 Water: 0

Air outlet: 0 Distilled water: 0

Vac outlet: 0

Lighting: parabolic recessed fluorescent fixtures

Lighting Control: dimmable, occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets: 6

220V outlets: 0

Communication

Phone Jacks: 1

Video Jacks: -

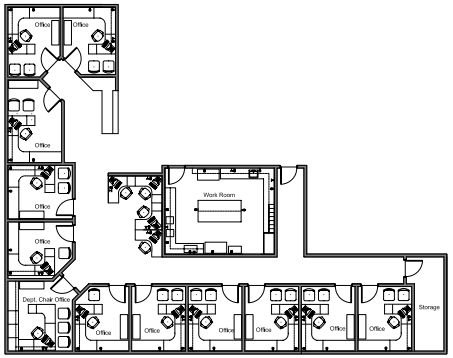
Computer:

Data Jacks: 4

LEGEND

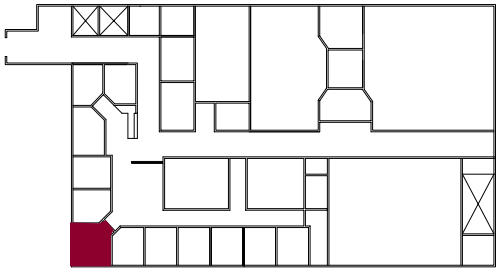
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



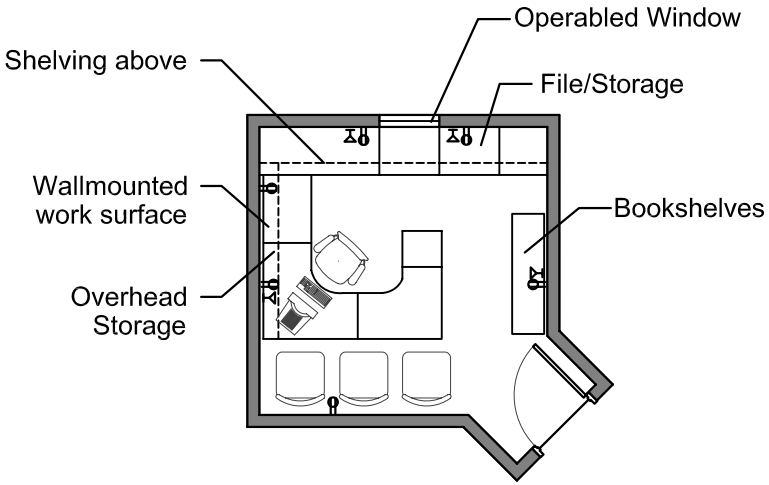
NURSING FACULTY AREA

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Dept. Chair Office
150.00 sf.
12'-0" x 12'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Science Faculty - Conference Room

Department: Nursing

Space Description

Department:	Nursing, Used by all Departments
Room name:	Conference Room
Occupancy group:	B. Educational - assembly
Area Required (sq. ft.):	500
Adjacent to:	Faculty offices, centrally located to all departments
Separated From:	main public areas
Preferred Floor:	2nd Level
Occupants	Staff: 28
	Visitors: 5
	Total: 33

Total occupancy allowed by code: 33

Special Requests:

- Room for faculty members and visitors
- Windows Preferred
- A/V accommodations
- Break Room type kitchen
-

Room Function

Narrative: For faculty and administrative meetings and to accommodate minor food preparation and storage. This space to be shared by all departments.

Finishes

Floor:	Carpet
Walls:	Painted gypsum board
Base:	Vinyl
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	10'
Doors:	3x7 sc wood door
Windows:	Very desirable to exterior
Counters:	Solid surface or p. lam

Furnishings and Equipment

24" Counter (L.F.):	14
24" Base Cabs/Full Ht. Cabs. (L.F.):	14
12" Upper Cabs/Shelving (L.F.):	17
54" Conference Tables (L.F.):	22

Fixed Equipment: White board, projector, projector screen, dishwasher

Mobile Equipment: Refrigerator

Furniture: 28 chairs, conf., table

Misc Considerations

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	30 db
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing:

- 1 sink
- 1 dishwasher
-

Gas outlet:	0	Water:	1
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: Indirect suspended fluorescent

Lighting Control: dimmable, occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets:	11
220V outlets:	none

Communication

Phone Jacks:	2
Video Jacks:	1

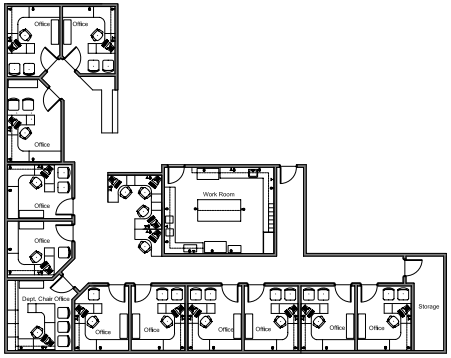
Computer:

Data Jacks:	9

LEGEND

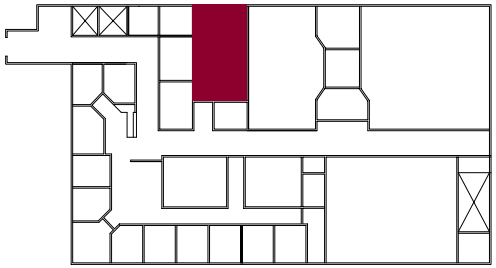
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



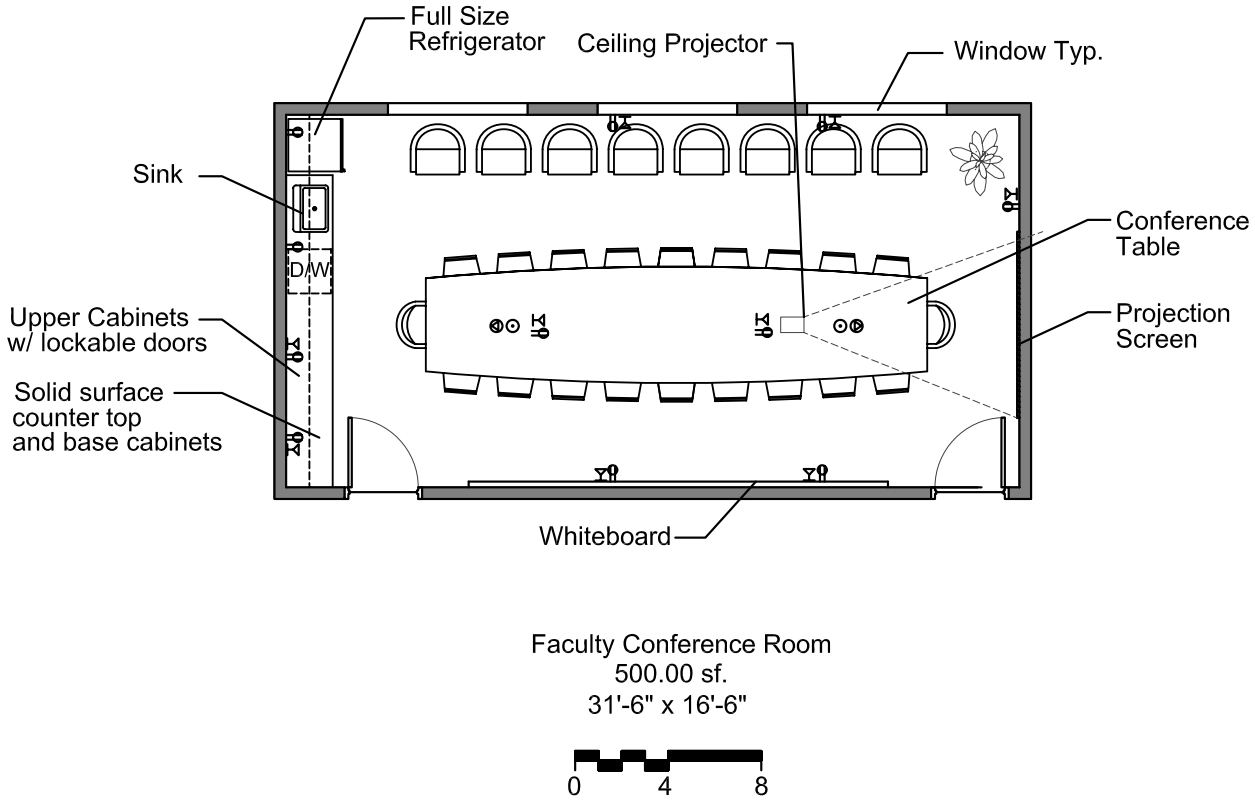
NURSING FACULTY AREA

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Faculty Conference Room
500.00 sf.
31'-6" x 16'-6"

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Shared Work Room

Department: Nursing

Space Description

Department:	Nursing
Room name:	Work Room (used by all departments
Occupancy group:	B. Educational - Office
Area Required (sq. ft.):	250
Adjacent to:	Faculty Offices, Reception
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 1
	Visitors: 3
	Total: 4

Total occupancy allowed by code: 1

Special Requests:

- Provide staff and faculty boxes
-
-
-
-

Room Function

Narrative: For faculty and administrative document and curriculum preparation. This space to be shared by all departments.

Finishes

Floor:	VCT
Walls:	Painted gypsum board
Base:	Vinyl
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	10'
Doors:	3x7 sc wood door
Windows:	None
Counters:	Solid surface or p. lam

Furnishings and Equipment

24″ Counter (L.F.):	48
24″ Base Cabs/Full Ht. Cabs. (L.F.):	50
12″ Upper Cabs/Shelving (L.F.):	40
- Tables (L.F.):	none

Fixed Equipment: Systems office furniture

Mobile Equipment: 2 copiers, fax machine, printer, scantron, shredder, paper cutter, stapler

Furniture:

Misc Considerations

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	40 db
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing: none

- 1 sink
-
-

Gas outlet: 0 Water: 1

Air outlet: 0 Distilled water: 0

Vac outlet: 0

Lighting: direct recessed fluorescent

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets: 12

220V outlets: 0

Communication

Phone Jacks: 1

Video Jacks: 0

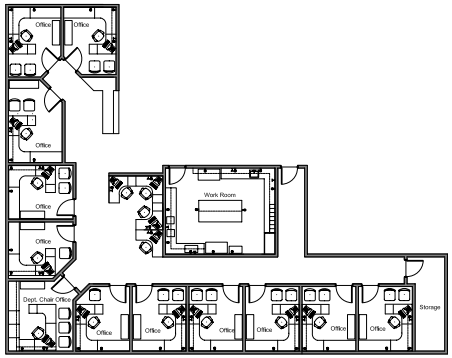
Computer:

Data Jacks: 4

LEGEND

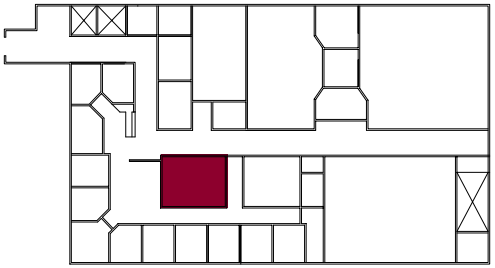
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



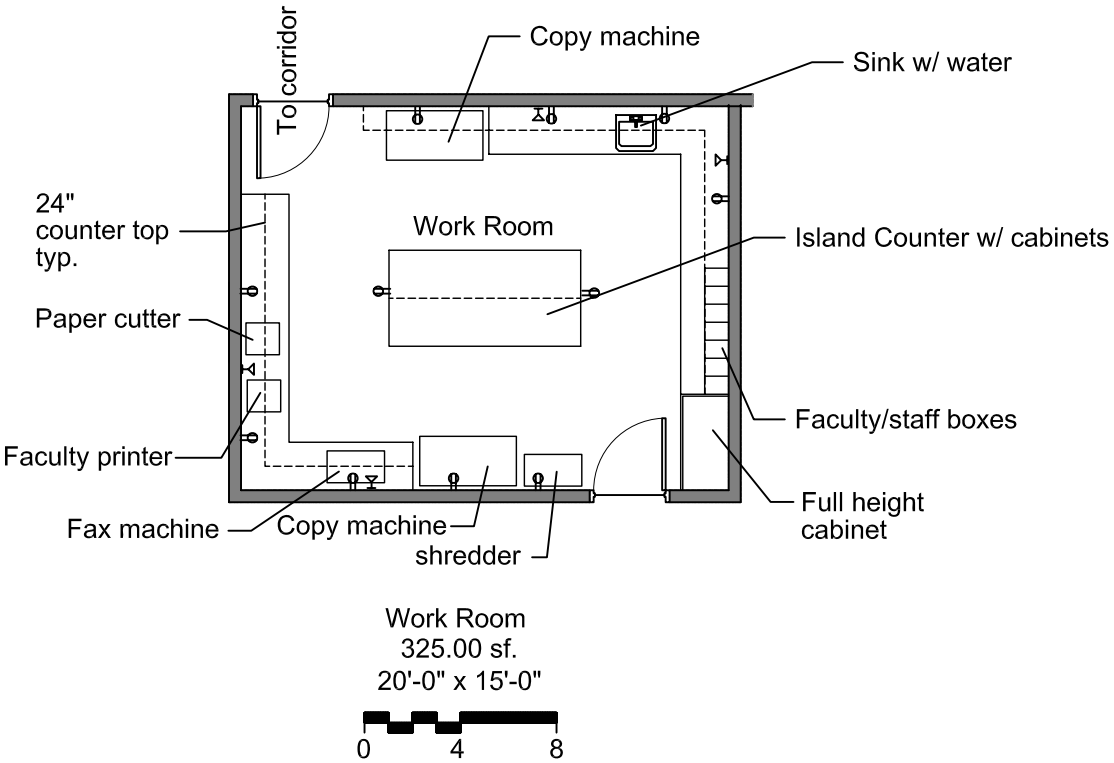
NURSING FACULTY AREA

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Practice Lab

Department: Nursing

Space Description

Department: Nursing
Room name: Practice Lab
Occupancy group: B. Educational
Area Required (sq. ft.): 1600
Adjacent to: Hospital Bathroom, Instructor Office, Validation Lab, Storage
Separated From: Main Public Areas
Preferred Floor: 2nd Level
Occupants Staff: 2
Students: 24
Total: 26
Total occupancy allowed by code: 32
Special Requests:

- Large doors
- Few windows preferred
- Needs to be near freight elevator
- More privacy than other depts
- Energy Star rated appliances
- Wide Hallways
- Labs to be back to back with storage and office between

Room Function

Narrative: Room used for hospital type nursing simulation practice with real equipment and setting. Medication administration, mannequin practice, I.V. practice, E.R. and triage practice.

Finishes

Floor: VCT or sheet vinyl
Walls: Washable Paint
Base: Rubber
Ceiling: Washable suspended grid
Ceiling Height (ft.): 10'
Doors: 42" doors, 36" doors
Windows: operable windows preferrd
Counters: solid surface or p. lam

Furnishings and Equipment

30" Counter (L.F.): 40
24" Base Cabs/Full Ht. Cabs. (L.F.): 40
12" Upper Cabs/Shelving (L.F.): 54
30" Lab Tables (L.F.): 24
Fixed Equipment: wall console and manufacture stretcher
Mobile Equipment: hospital beds, crash cart, IV arm, 2 medicarts
Furniture: table, recliner, chair, stools, crib

Misc Considerations

- Include smart room critical care area with stretcher and I.V. arm
- Provide typical hospital bed overnight - see appendix
- Provide hospital bed, wall console and transformer - see appendix

Room Environment

Lighting Level: 50 fc
Temperature: 70 degrees F. +1 or - 1
Security: lockable
Sound Considerations: 40 db.
Min. Ventilation: 20 cfm/person
Air Exchange Rate: 12 AC/hr
Air Recycle / Filtration: Yes/60-65%

Engineering Requirements

Mechanical: **Standard HV AC**
Plumbing:

- 5 hand sinks
-

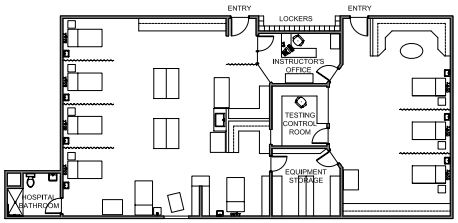
Gas outlets: 5 Water taps: 5
Air outlets: 5 Distilled water: 0
Vac outlets: 5

Lighting: direct recessed fluorescent, 5 treatment light fixtures
Lighting Control: occupancy sensor
Electrical
120V duplex outlets: 24 (includ. 5 emergency power outlets)
220V outlets: 0
Communication
Phone Jacks: 1
Video Jacks: 1
Computer:
Data Jacks: 9

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

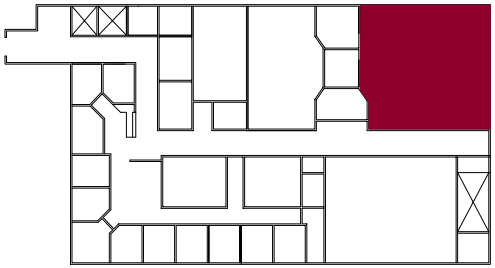
DEPARTMENT KEY



PRACTICE LAB
41'x40'
1600 sf.

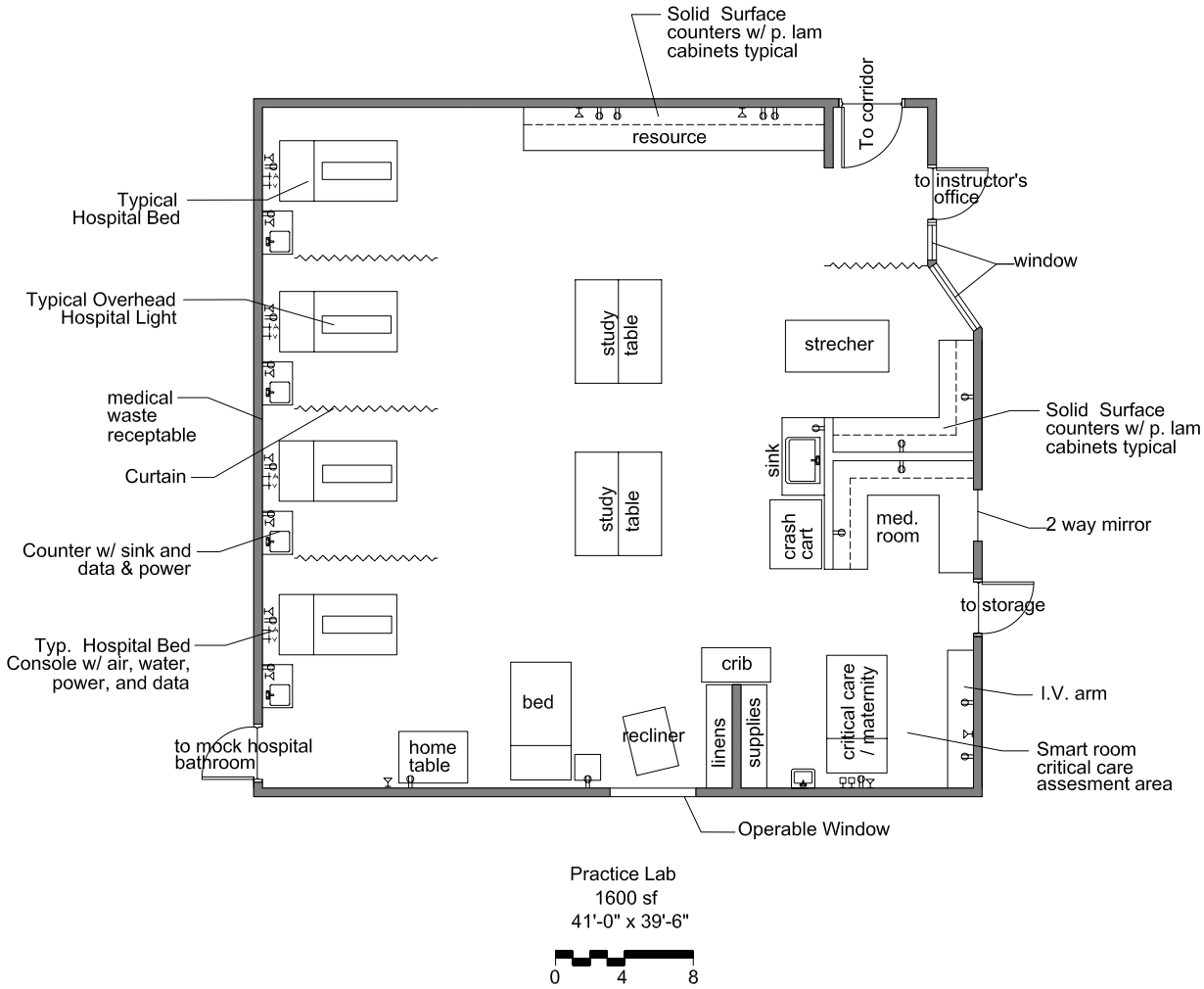
VALIDATION LAB
22'x40'
890 sf.

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Lab Instructor's Office and Hall Lockers

Space Description

Department:	Nursing
Room name:	Lab Instructor Office
Occupancy group:	B. Educational
Area Required (sq. ft.):	150
Adjacent to:	Practice Labs
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 1
	Visitors: 1
	Total: 2

Total occupancy allowed by code: 2

Special Requests:

- Office should have good lines of sight into two practice labs
- Preferred with exterior window
- 30 closable lockers to hold lab kits, student books, coats (3 bags ea. student) with open cubbies above and within visual reach of faculty and students

Room Function

Narrative: Main office for nursing lab instructor to have view of both labs and exterior window preferred.

Finishes

Floor:	VCT or sheet vinyl
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	9'
Doors:	(2) 3'x7' glass doors
Windows:	preferred, 2 interior windows needed
Counters:	plastic laminate

Furnishings and Equipment

24″ Counter (L.F.):	12
24″ Base Cabs/Full Ht. Cabs. (L.F.):	6
12″ Upper Cabs/Shelving (L.F.):	4
12″ Cubby type lockers	30

Fixed Equipment: -

Mobile Equipment: -

Furniture: systems desk, 3 chairs, filing cabinet, book shelf

Misc Considerations

Access by both practice labs

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	30 db.
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing: none

Gas outlet:	0	Water:	0
Air outlet:	0	Distilled water:	0
Vac outlet:	0		

Lighting: parabolic recessed fluorescent fixtures

Lighting Control: occupancy sensor dimmable

Electrical 208 / 120 power typical

120V duplex outlets:	4
220V outlets:	-

Communication

Phone Jacks:	1
Video Jacks:	-

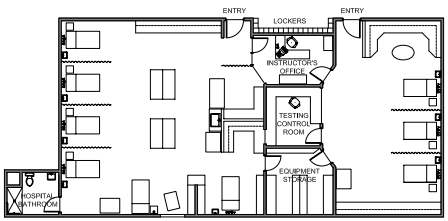
Computer:

Data Jacks:	2

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

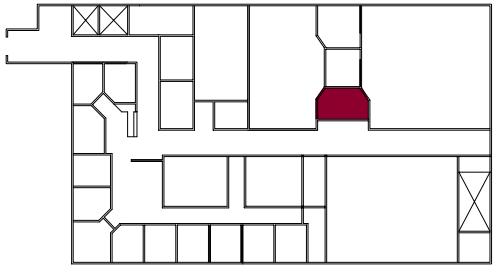
DEPARTMENT KEY



PRACTICE LAB
41'x40'
1600 sf.

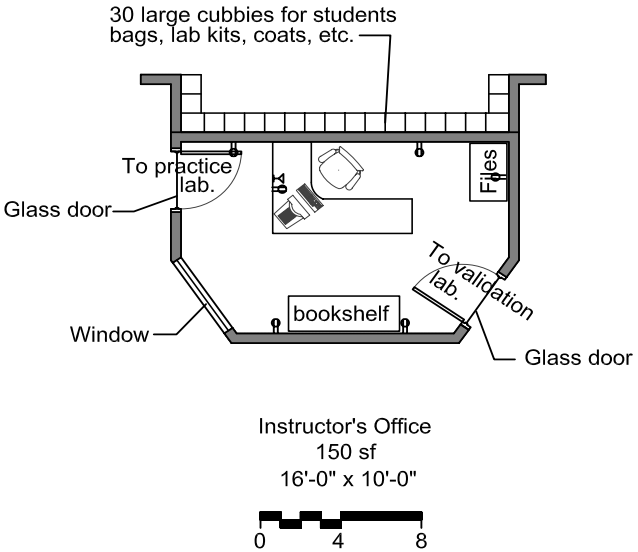
VALIDATION LAB
22'x40'
890 sf.

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Hospital Bathroom

Space Description

Department:	Nursing
Room name:	Hospital Bathroom
Occupancy group:	B. Educational
Area Required (sq. ft.):	90
Adjacent to:	Practice Labs, Instructor office
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 0
	Students: 1
	Total: 1

Total occupancy allowed by code: 1

Special Requests:

- Bathroom layout and fixtures to be same as typical hospital patient room bathroom
- Roll in shower, typical for hospital bathroom
- ADA sink and toilet
-
-

Room Function

Narrative: This room is to be typical for hospital patient room bathroom for students training.

Finishes

Floor:	Tile in bathroom
Walls:	Tile wainscot in bathroom
Base:	Tile in bathroom
Ceiling:	Painted gypsum board
Ceiling Height (ft.):	8'
Doors:	(2) 3'x7' sc wood doors
Windows:	none
Counters:	none

Furnishings and Equipment

24″ Counter (L.F.):	0
24″ Base Cabs/Full Ht. Cabs. (L.F.):	0
12″ Upper Cabs/Shelving (L.F.):	0
- Lab Tables (L.F.):	0

Fixed Equipment: roll in shower with fold down seat

Mobile Equipment:

Furniture:

Misc Considerations

Accessed by both practice labs

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	40 db.
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing:

- roll in shower
- 1 ADA toilet
- 1 ADA sink

Gas outlet: 0 Water taps: 3

Air outlet: 0 Distilled water: 0

Vac outlet: 0

Lighting: direct surface fluorescent fixtures

Lighting Control:

Electrical 208 / 120 power typical

120V duplex outlets: 1

220V outlets: 0

Communication

Phone Jacks: 0

Video Jacks: 0

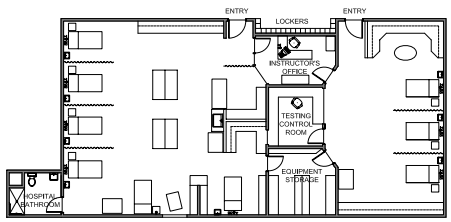
Computer:

Data Jacks: 0

LEGEND

110V duplx			Fire Blankt
220V single	W		Water
Ph/Data	DW		Distilled Water
Video	G		Gas
Eyewash	A		Air
Emer Shwr	V		Vacuum

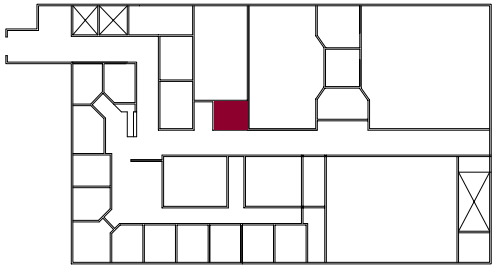
DEPARTMENT KEY



PRACTICE LAB
41'x40'
1600 sf.

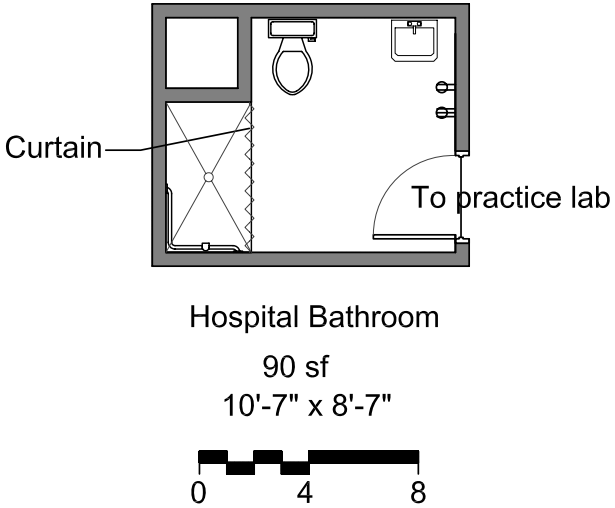
VALIDATION LAB
22'x40'
890 sf.

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Hospital Bathroom

90 sf
10'-7" x 8'-7"

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Validation Lab

Space Description

Department:	Nursing
Room name:	Validation Lab
Occupancy group:	B. Educational
Area Required (sq. ft.):	890
Adjacent to:	Practice Lab, Testing Control Room, Storage
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 2
	Students: 10
	Total: 12

Total occupancy allowed by code: 15

Special Requests:

- Mini Mock Nurses Station
- Operable two way mirrored window between lab and control room
- Nurse call system (mock)
- Medical waste receptacles
- Cameras, speakers in room for recording of student performance and evaluation

Room Function

Narrative: This room will be used for testing and evaluation of nursing students skills. All equipment and environment should be actual hospital type surroundings.

Finishes

Floor:	VCT or sheet vinyl
Walls:	Washable Paint
Base:	Vinyl
Ceiling:	Washable suspended grid
Ceiling Height (ft.):	10'
Doors:	42" doors, 36" doors
Windows:	none
Counters:	Solid surface or P. Lam

Furnishings and Equipment

30″ Counter (L.F.):

24″ Base Cabs/Full Ht. Cabs. (L.F.):

12″ Upper Cabs/Shelving (L.F.):

Fixed Equipment: Ceiling hung curtains

Mobile Equipment: 3 critical care beds, central supply mobile shelving unit, whiteboard

Furniture: side tables

Misc Considerations

Provide video taping capabilities at each station with camera, proper lighting and sound recording.

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	40 db (per A/V)
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing:

- 3 ss wall sinks with wing type hot and cold water controls and curved spout faucet

Gas outlet:	0	Water:	3
Air outlet:	3	Distilled water:	0
Vac outlet:	3		

Lighting: direct recessed fluorescent 3 hospital lighting fixtures

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets: 12 (w/ 3 emergency power outlets)

220V outlets: 0

Communication

Phone Jacks: 1

Video Jacks: 4

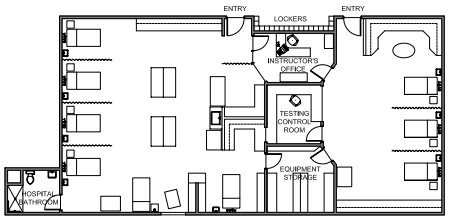
Computer:

Data Jacks: 4

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

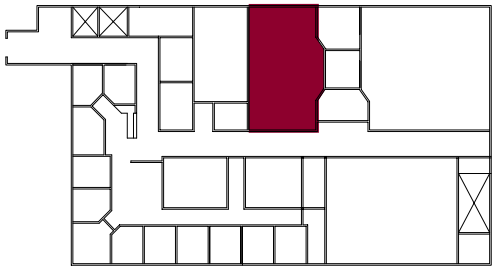
DEPARTMENT KEY



PRACTICE LAB
41'x40'
1600 sf.

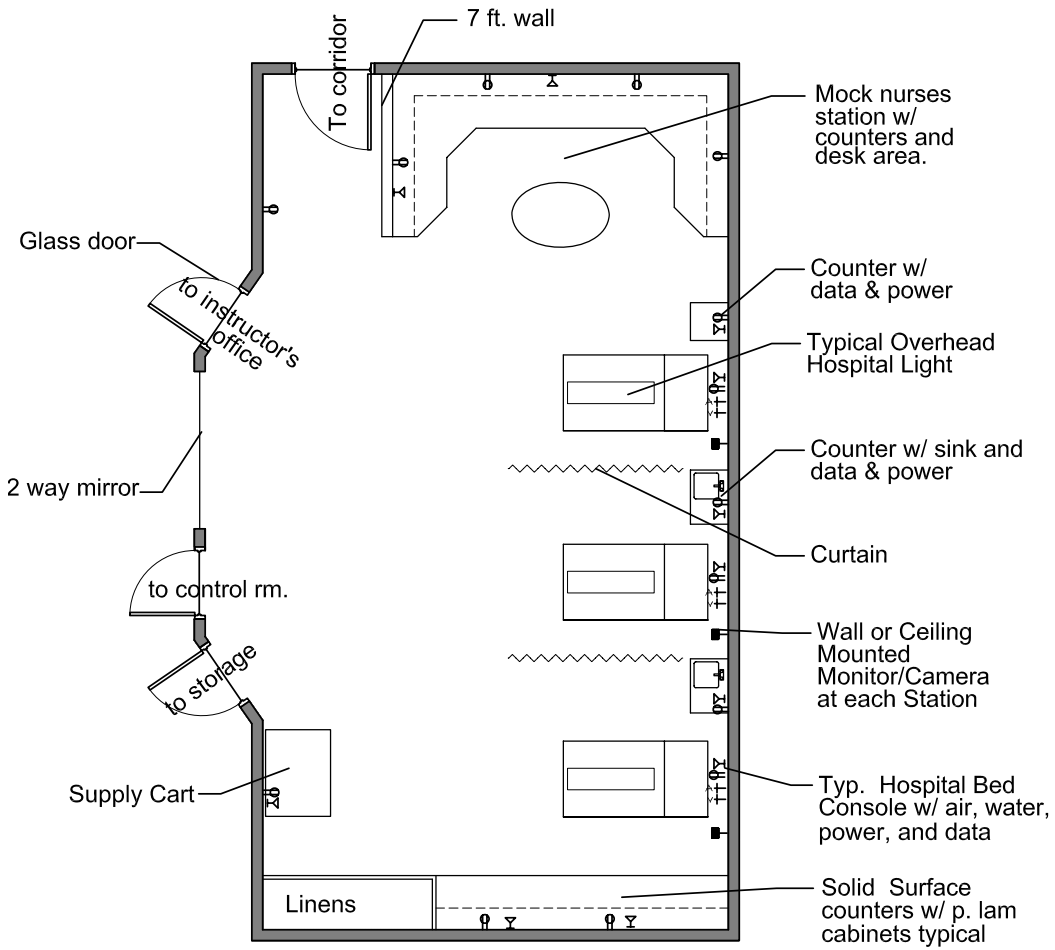
VALIDATION LAB
22'x40'
890 sf.

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



VALIDATION LAB
890 sf.
23'-0" x 39'-6"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Testing Control Room

Space Description

Department:	Nursing
Room name:	Testing control room
Occupancy group:	B. Educational
Area Required (sq. ft.):	130
Adjacent to:	Validation lab
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 3
	Students: -
	Total: 3

Total occupancy allowed by code: 3

Special Requests:

- Operable one way window between control room and validation lab - mirrored on lab side
- Operable one way window between control room and practice lab - mirrored on lab side•
-
-

Room Function

Narrative: For video and sound recording and instructor monitoring of nursing students abilities in a testing situation.

Finishes

Floor:	Carpet
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	9'
Doors:	3x7 sc wood door
Windows:	2 large operable windows with one way glass
Counters:	Solid surface or p. lam

Furnishings and Equipment

30″ Counter (L.F.):	19
24″ Base Cabs/Full Ht. Cabs. (L.F.):	28
12″ Upper Cabs/Shelving (L.F.):	12
- Lab Tables (L.F.):	0

Fixed Equipment:

Mobile Equipment: Videography equipment

Furniture: 3 chairs

Misc Considerations

Provide acoustical separtion between lab and control room and provide lighting contrast to be viewable only one way.

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	20 db
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing: none

-
-
-

Gas outlet: 0 Water: 0

Air outlet: 0 Distilled water: 0

Vac outlet: 0

Lighting: parabolic recessed fluorescent fixtures

Lighting Control: dimmable

Electrical 208 / 120 power typical

120V duplex outlets: 5

220V outlets: none

Communication

Phone Jacks: 2

Video Jacks: 4

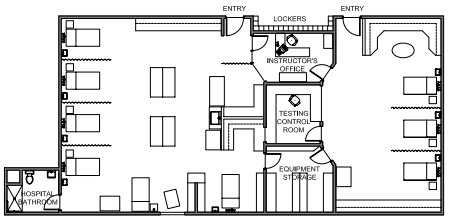
Computer:

Data Jacks: 4

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

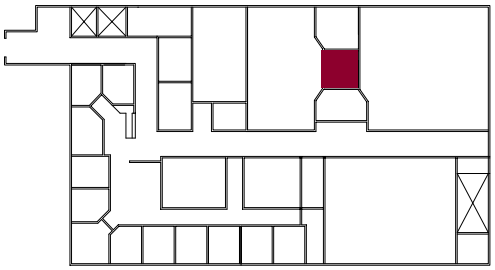
DEPARTMENT KEY



PRACTICE LAB
41'x40'
1600 sf.

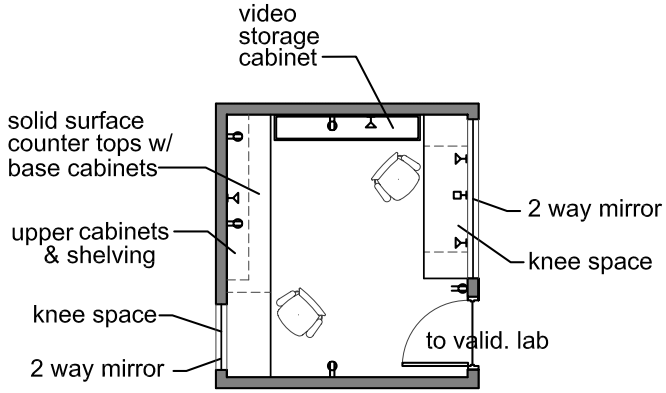
VALIDATION LAB
22'x40'
890 sf.

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Testing Control Room

130 sf

11'-0" x 12'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Equipment Storage

Space Description

Department:	Nursing
Room name:	Medical Supply Storage
Occupancy group:	B. Educational - Storage
Area Required (sq. ft.):	180
Adjacent to:	Practice and validation Labs
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 1
	Students: -
	Total: 1

Total occupancy allowed by code: 1

Special Requests:

- Provide washer and dryer hook ups
-
-
-
-
-

Room Function

Narrative: Room for storage of medications, medical equipment, hospital type supplies, linen carts and nurse testing equipment such as mannequins, washer and dryer, etc.

Finishes

Floor:	VCT or sheet vinyl
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	painted gypsum board
Ceiling Height (ft.):	9'
Doors:	(2) 42"x84", (1) 3'x7' sc wood doors
Windows:	none
Counters:	solid surface

Furnishings and Equipment

0	Counter (L.F.):	0
0	Base Cabs/Full Ht. Cabs. (L.F.):	0
30″	Upper Cabs/Shelving (L.F.):	28
-	Lab Tables (L.F.):	0

Fixed Equipment: washer and dryer

Mobile Equipment: none

Furniture: none

Misc Considerations

- Accessed by both labs
- Provide dryer vent hook-up

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	50 db.
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing:

- hose bib for washer
-
-

Gas outlet: 1 Water: 1

Air outlet: 0 Distilled water: 0

Vac outlet: 0

Lighting: direct surface fluorescent fixtures

Lighting Control:

Electrical 208 / 120 power typical

120V duplex outlets: 4

220V outlets: 1

Communication

Phone Jacks: 0

Video Jacks: 0

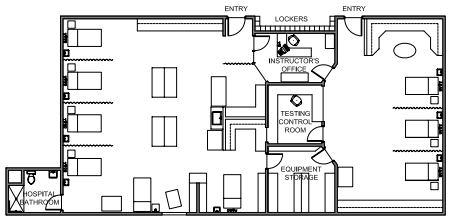
Computer:

Data Jacks: 0

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

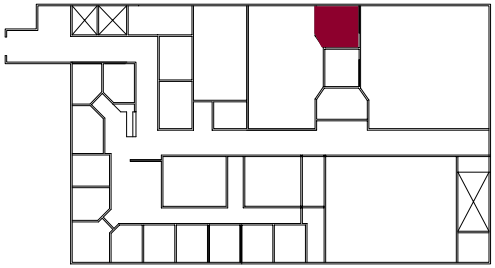
DEPARTMENT KEY



PRACTICE LAB
41'x40'
1600 sf.

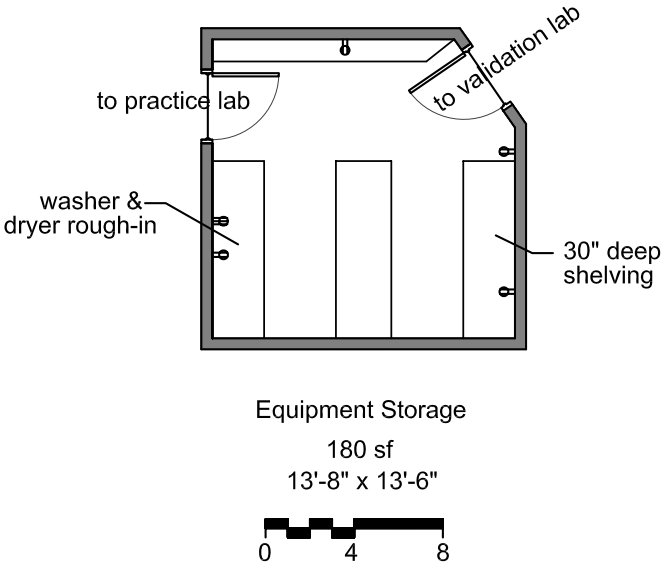
VALIDATION LAB
22'x40'
890 sf.

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Equipment Storage

180 sf

13'-8" x 13'-6"

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Discussion / Study Area

Space Description

Department:	Nursing
Room name:	Discussion/Study Area
Occupancy group:	B. Educational
Area Required (sq. ft.):	300
Adjacent to:	Nursing faculty and Validation lab
Separated From:	Main Public Areas
Preferred Floor:	2nd Level
Occupants	Staff: 4
	Visitors: 16
	Total: 20

Total occupancy allowed by code:

Special Requests:

- Provide windows to corridor
-
-
-
-
-

Room Function

Narrative: This room is used by the nursing faculty to review student performance with the student. It is also used as a common study / discussion area.

Finishes

Floor:	Carpet
Walls:	Painted gypsum board
Base:	Rubber
Ceiling:	Susp. lay in acoustical tile
Ceiling Height (ft.):	10´
Doors:	3´x7´ sc wood doors
Windows:	preferred into hall and exterior
Counters:	none

Furnishings and Equipment

- Counter (L.F.):	0
- Base Cabs/Full Ht. Cabs. (L.F.):	0
- Upper Cabs/Shelving (L.F.):	0
- Lab Tables (L.F.):	0
Fixed Equipment:	0
Mobile Equipment:	0
Furniture:	tables, chairs

Misc Considerations

Room Environment

Lighting Level:	50 fc
Temperature:	70 degrees F. +1 or - 1
Security:	lockable
Sound Considerations:	30 db.
Min. Ventilation:	20 cfm/person
Air Exchange Rate:	12 AC/hr
Air Recycle / Filtration:	Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC

Plumbing: none

-
-

Gas outlet: 0 Water: 0

Air outlet: 0 Distilled water: 0

Vac outlet: 0

Lighting: indirect suspended fluorescent

Lighting Control: occupancy sensor

Electrical 208 / 120 power typical

120V duplex outlets: 9

220V outlets: 0

Communication

Phone Jacks: 1

Video Jacks: 0

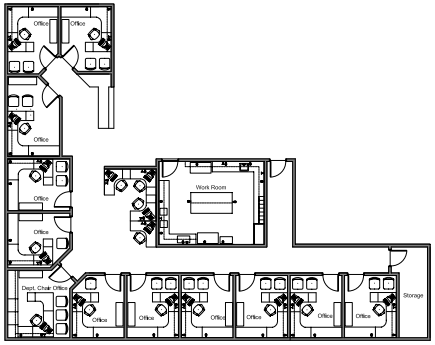
Computer:

Data Jacks: 9

LEGEND

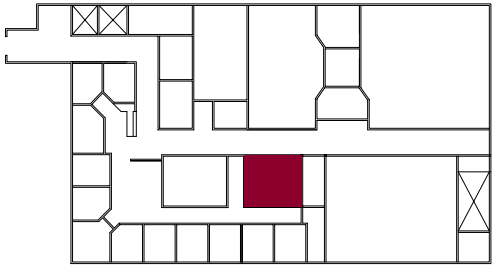
	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

DEPARTMENT KEY



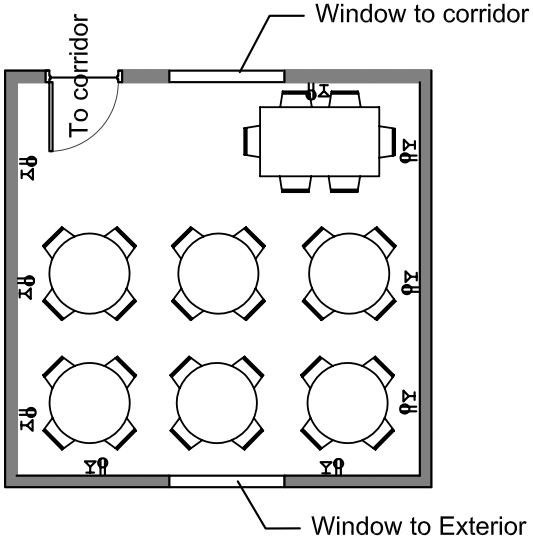
NURSING FACULTY AREA

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Nursing Student/Faculty
Discussion & Study Area

300.00 sf.
17'-6" x 17'-0"

0 4 8

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Room Name: Computer Teaching & Testing Lab

Space Description

Department: Nursing
Room name: Computer Teaching & Testing Lab
Occupancy group: B. Educational
Area Required (sq. ft.): 1390/90
Adjacent to: Nursing practice labs, server room, close to outside students
Separated From: none
Preferred Floor: 2nd Level
Occupants Staff: 2
Students: 36
Total: 38
Total occupancy allowed by code: 70
Special Requests:

- Located near main public access
- Tiered gradually (ie half step)
- Tables spaced for privacy and ease of travel for instructor
-
-

Room Function

Narrative: For instruction and testing of nursing students

Finishes

Floor: Static resistant carpet
Walls: Painted gypsum board
Base: Rubber
Ceiling: Susp. lay in grid
Ceiling Height (ft.): 10'
Doors: Standard
Windows: None or small high
Counters: Plastic laminate

Furnishings and Equipment

24" Counter (L.F.): 35
24" Base Cabs/Full Ht. Cabs. (L.F.): 39
12" Upper Cabs/Shelving (L.F.): 25
36" Lab Tables (L.F.): 120
Fixed Equipment: White board, projector, projector screen
Mobile Equipment: 37 computers, 2 printers, server room racks
Furniture: chairs

Misc Considerations

- Include server room that is accessible to both the classroom and the hall. Provide adequate cooling and ventilation for server.
- Provide latest design and technology for computerized testing

Room Environment

Lighting Level: 50 fc
Temperature: 70 degrees F. +1 or - 1
Security: lockable
Sound Considerations: 40 db.
Min. Ventilation: 20 cfm/person
Air Exchange Rate: 12 AC/hr
Air Recycle / Filtration: Yes/60-65%

Engineering Requirements

Mechanical: Standard HVAC
Plumbing: none

Gas outlet: 0 Water: 0
Air outlet: 0 Distilled water: 0
Vac outlet: 0

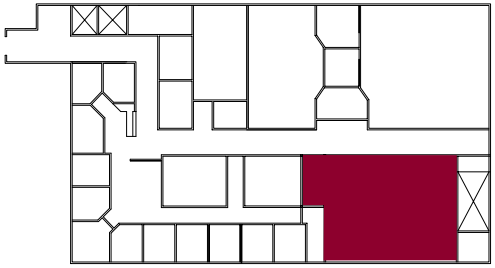
Lighting: indirect suspended fluorescent fixtures
Lighting Control: dimmable w/occupancy sensor
Electrical via multiservice floor boxes
120V duplex outlets: 40
220V outlets: 0
Communication
Phone Jacks: 1
Video Jacks: 2
Computer:
Data Jacks: 20

LEGEND

	110V duplx		Fire Blankt
	220V single	W	Water
	Ph/Data	DW	Distilled Water
	Video	G	Gas
	Eyewash	A	Air
	Emer Shwr	V	Vacuum

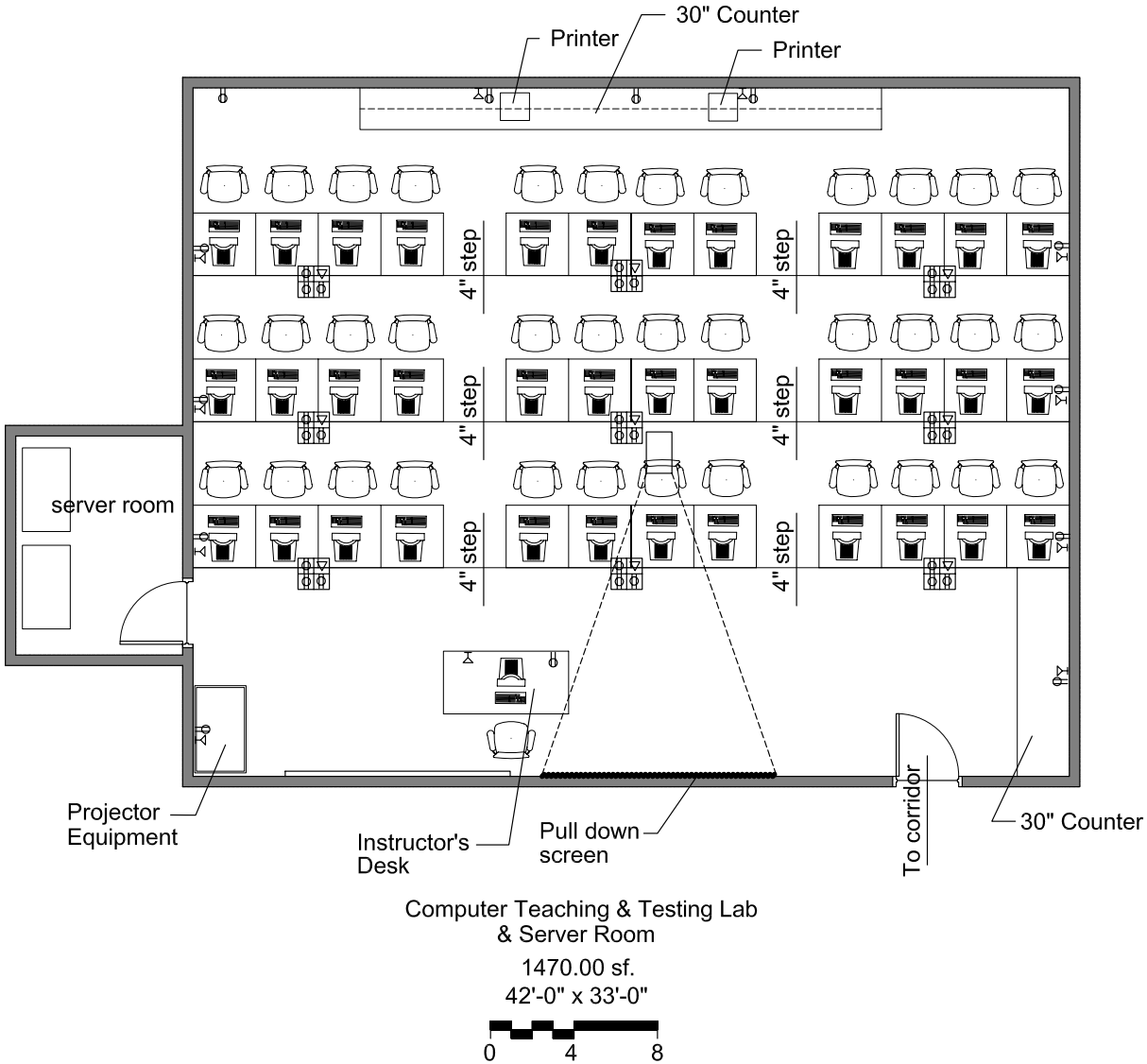
DEPARTMENT KEY

BUILDING KEY



SECOND LEVEL

ROOM DIAGRAM



Computer Teaching & Testing Lab
& Server Room
1470.00 sf.
42'-0" x 33'-0"

Note: This illustration is diagrammatic only. It is not intended to be the actual layout of this space.

Cost Estimate

1. This is a preliminary estimate only. Costs are based on square foot costs for similar type new construction and not on detailed quantity takeoffs.
2. Site work is assumed to be at the level and type now found on campus. No special site work is included, just normal grass, small planting areas and irrigation.
3. Substructure is assumed to have spot and strip footings with foundation wall. Slab-on-grade is assumed to be 4 to 5 inches thick with wire mesh reinforced. This estimate assumes building footprints of 333' by 100' with a partial second story for the classroom building and 220' by 120' for the shop building.
4. Superstructure is assumed to be steel structure with concrete floors on metal deck.
5. Exterior is assumed to be brick with approximately 40% of the exterior wall to be window.
6. It is assumed that there will be some type of roofing and waterproofing required at the roof and foundations. Insulation was assumed to be R-19 in the wall and R-30 at the roof.
7. Interior construction was assumed to be medium grade with interior doors for every 400sf, complete with hardware to meet codes.
8. Mechanical was estimated knowing that steam or hot water is available from a campus system and that many specialized lab exhaust systems will be needed.
9. Electrical assumed adequate power was available within 400 lineal feet of the building and that no special work would have to be done to connect into the main power line.
10. No utility extensions were considered in the offsite costs.

Cost Estimate Organization

The cost estimate is organized with the DFCM-Capital Budget Request System (CBRS) form followed by a space summary with preliminary cost figures noted) and then a more detailed summary of costs for both new construction and renovation. Backup construction costs and furniture and equipment costs follow the cost summary.

The cost estimate is organized using a uniformat approach. This approach gives you more of a systems approach to understanding where the costs are estimated within the building. It is broken down into the following:

1. Substructures- Building excavation, footings, and foundations.
2. Shell which includes the superstructure, and exterior enclosure system.
3. Interiors- Includes all of the interior finish components of the building
4. Services- Which includes Mechanical, Electrical, and Conveying systems.
5. Equipment & Furnishings- includes millwork, and any equipment for the building.
6. Special Construction & Demolition- Includes Demolition of the existing building and site elements.
7. Sitework- which includes all of the Site paving, landscaping, and grading.

Cost Summary	$ Amount	Cost Per SF	Notes	
Facility Cost (Including 12% escalation)	$ 15,318,755	$361.72		
Additional Construction Cost	$ -	$0.00		
Site Cost	$ -	$0.00		
High Performance Building (Incuded in const. estimate)	$ -	$0.00		
Total Construction Cost	**$ 15,318,755**	**$361.72**		
Soft Costs:				
Hazardous Materials	$ 56,000		Incl. Abatement &	removal
Pre-Design/Planning	$ -			
Design	$ 1,288,907		Incl. travel, geotech	and Alta survey
Property Acquisition	$ -			
Furnishings & Equipment	$ 1,562,443		Furn. = $14.31/s.f.	Equip. = $20/s.f.
Information Technology:	$ 297,000		infotech, fiber optic,	security system
Utah Art (1% of Construction Budget)	$ 153,188			
Testing & Inspection	$ 181,200			
Contingency	$ 692,704			
Moving/Occupancy	$ 30,000			
Builder's Risk Insurance (0.15% of Construction Budget)	$ 22,978			
Legal Services (0.2% of Construction Budget)	$ 30,638			
DFCM Management	$ 30,000			
User Fees	$ -			
Commissioning	$ 183,188			
Other Costs	$ 153,000			
Total Soft Costs	**$ 4,681,245**	**$110.54**		
TOTAL PROJECT COST	**$ 20,000,000**	**$472.26**		
Previous Funding	**$ -**			
Other Funding Sources (Identify in note)	$ 3,000,000			
REQUEST FOR STATE FUNDING	**$17,000,000**			

Project Information

Gross Square Feet	42,350	Base Cost Date	1-Jan-08
Net Square Feet	27,650	Estimated Bid Date	30-Jun-09
Net/Gross Ratio	65%	Est. Completion Date	0-Jan-00
		Last Modified Date	0-Jan-00
		Print Date	1/23/2008

PROJECT ESTIMATE **CONSTRUCTION CONTROL CORPORATION** **1/23/2008**

PROJECT NAME……..SUU SCIENCE BUILDING ADDITION **ORIGINAL PROGRAM**
LOCATION……..CEDAR CITY, UT
ARCHITECT……..EATON ARCHITECTURE SF 42,350
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	BUILDING ADDITION COST SUMMARY			
A	**SUBSTRUCTURES**		$ 15.27	$ 646,561
B	**SHELL**		$ 49.16	$ 2,081,849
C	**INTERIORS**		$ 28.78	$ 1,218,847
D	**SERVICES**		$ 91.77	$ 3,886,293
E	**EQUIPMENT & FURNISHINGS**		$ 36.93	$ 1,563,888
F	**SPECIAL CONSTRUCTION AND DEMOLITION**		$ 13.61	$ 576,410
G	**SITEWORK**		$ 22.86	$ 968,121
	SUBTOTAL		$ 258.37	10,941,968
	GENERAL CONDITIONS	10%	$ 25.84	$ 1,094,197
	OVERHEAD & PROFIT	5%	$ 12.92	547,098
	DESIGN CONTINGENCY	10%	$ 25.84	1,094,197
	TOTAL		$ 322.96	$ 13,677,460
	ESCALATION TO SUMMER OF 09'	12.0%	$ 38.76	$ 1,641,295
	TOTAL ESCALATED CONSTRUCTION COST		$ 361.72	$ 15,318,755

PROJECT ESTIMATE CONSTRUCTION CONTROL CORPORATION 1/23/2008

PROJECT NAME……..SUU SCIENCE BUILDING ADDITION **ORIGINAL PROGRAM**
LOCATION……..CEDAR CITY, UT
ARCHITECT……..EATON ARCHITECTURE SF 42,350
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**			
	Perimeter Footings	42,350 SF	$ 2.12	$ 89,782
	Spot Footings	42,350 SF	$ 1.16	$ 49,126
	Below Grade Foundation Wall	42,350 SF	$ 2.57	$ 108,840
	Slab on Grade	12,250 SF	$ 4.26	$ 52,124
	Foundation Drainage System	465 LF	$ 19.65	$ 9,137
	Foundation Waterproofing	42,350 SF	$ 0.62	$ 26,257
	Building Area Site Clearing	12,250 SF	$ 0.89	$ 10,903
	Building overexcavation	4,537 CY	$ 8.50	$ 38,565
	Imported Structural Fill	4,537 CY	$ 23.00	$ 104,351
	Building Excavation	6,806 CY	$ 8.50	$ 57,848
	Backfill & Compaction w/ Imported Fill	1,021 CY	$ 23.00	$ 23,480
	Remove Excess	11,343 CY	$ 6.00	$ 68,056
	Building Grading	12,250 SF	$ 0.25	$ 3,063
	Gravel Under Slab	240 TN	$ 21.00	$ 5,031
	TOTAL SUBSTRUCTURES			**$ 646,561**
B	**SHELL**			
B10	**Superstructure**			
	Steel Structure	42,350 SF	$ 23.13	$ 979,556
	Topping Slab	30,100 SF	$ 4.25	$ 127,925
B20	**Exterior Enclosure**			
	Exterior Wall Framing	42,350 SF	$ 2.05	$ 86,818
	Rigid Roof Insulation	12,250 SF	$ 2.45	$ 30,013
	Single Ply Roof Membrane	12,250 SF	$ 2.25	$ 27,563
	Exterior Wall Sheathing w/ vapor barrier	42,350 SF	$ 0.98	$ 41,503

Page 2

PROJECT ESTIMATE CONSTRUCTION CONTROL CORPORATION 1/23/2008

PROJECT NAME……..SUU SCIENCE BUILDING ADDITION **ORIGINAL PROGRAM**
LOCATION……..CEDAR CITY, UT
ARCHITECT……..EATON ARCHITECTURE SF 42,350
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Exterior Wall Finish	42,350 SF	$ 10.95	$ 463,733
	Building Fireproofing	42,350 SF	$ 1.25	$ 52,938
	Waterproofing at Greenhouse floor	6,230 SF	$ 6.85	$ 42,676
	Exterior Glazing & Curtainwalls	42,350 SF	$ 3.95	$ 167,283
	Fire Stopping/ Caulking	42,350 SF	$ 0.31	$ 13,129
	Exterior Doors	42,350 SF	$ 0.29	$ 12,282
	Metal Wall Cap	42,350 SF	$ 0.12	$ 5,082
	Metal Flashings	42,350 SF	$ 0.15	$ 6,353
	Caulking & Sealants	1 LS	$ 25,000.00	$ 25,000
	TOTAL SHELL			**$ 2,081,849**
C	**INTERIORS**			
	Partitions	42,350 SF	$ 8.34	$ 353,199
	Interior Doors	42,350 SF	$ 2.95	$ 124,933
	Interior Glazing	42,350 SF	$ 0.76	$ 32,186
	Identifying Devices	1 LS	$ 25,000.00	$ 25,000
	Free Standing Handrails	42,350 SF	$ 1.07	$ 45,315
	Stairs	42,350 SF	$ 1.14	$ 48,279
	Flooring	42,350 SF	$ 4.95	$ 209,633
	Ceiling	42,350 SF	$ 3.03	$ 128,321
	Painting	42,350 SF	$ 2.85	$ 120,698
	Specialties	42,350 EA	$ 3.10	$ 131,285
	TOTAL FINISHES			**$ 1,218,847**
D	**SERVICES**			
	Passenger Elevator- 3 Stop	1 EA	$ 85,000.00	$ 85,000
	Freight Elevator	1 EA	$ 80,000.00	$ 80,000

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PROJECT ESTIMATE CONSTRUCTION CONTROL CORPORATION 1/23/2008

PROJECT NAME……..SUU SCIENCE BUILDING ADDITION **ORIGINAL PROGRAM**
LOCATION……..CEDAR CITY, UT
ARCHITECT……..EATON ARCHITECTURE SF 42,350
STAGE OF DESIGN……..PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Plumbing	42,350 SF	$ 9.65	$ 408,678
	Distilled Water System- 50 Gallon Capacity	1 LS	$ 25,000.00	$ 25,000
	HVAC	42,350 SF	$ 40.00	$ 1,694,000
	Fume Hoods	30 EA	$ 9,500.00	$ 285,000
	Fire Protection	42,350 SF	$ 3.35	$ 141,873
	Electrical Service & Distribution	42,350 SF	$ 6.05	$ 256,218
	Electrical- Power	42,350 SF	$ 4.70	$ 199,045
	Electrical Lighting	42,350 SF	$ 8.66	$ 366,751
	Special Systems	42,350 SF	$ 3.75	$ 158,813
	Telecommunication	42,350 SF	$ 2.38	$ 100,793
	Fire Alarm	42,350 SF	$ 2.01	$ 85,124
	TOTAL SERVICES			**$ 3,886,293**
E	**EQUIPMENT & FURNISHINGS**			
	Miscellaneous Equipment	1 LS	$ 25,000.00	$ 25,000
	Medical Cuirtains	284 LF	$ 39.65	$ 11,261
	Lockers	42,350 SF	$ 1.19	$ 50,397
	Commercial Refridgerator	3 EA	$ 5,600.00	$ 16,800
	Electric Range & oven	12 EA	$ 950.00	$ 11,400
	Microwave Hood	12 EA	$ 3,560.00	$ 42,720
	Blinds	42,350 SF	$ 0.26	$ 11,011
	Dock Leveler	1 EA	$ 6,000.00	$ 6,000
	Lab Base Cabinets	2,184 LF	$ 235.00	$ 513,240
	Plam Base Cabinets	210 LF	$ 185.00	$ 38,850
	Herbarium Base Cabinets	551 LF	$ 235.00	$ 129,485
	Herbarium Full Height Cabinets	548 LF	$ 265.00	$ 145,220

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PROJECT ESTIMATE CONSTRUCTION CONTROL CORPORATION 1/23/2008

PROJECT NAME……..SUU SCIENCE BUILDING ADDITION **ORIGINAL PROGRAM**
LOCATION……..CEDAR CITY, UT
ARCHITECT……..EATON ARCHITECTURE SF 42,350
STAGE OF DESIGN……..PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Wall Hung Cabinets	2,388 LF	$ 165.00	$ 394,020
	Museum Display Cabinets	300 LF	$ 365.00	$ 109,500
	Entrance Mats	200 SF	$ 19.65	$ 3,930
	Miscellaneous Millwork	42,350 SF	$ 1.30	$ 55,055
	TOTAL EQUIPMENT & FURNISHINGS			**$ 1,563,888**
F	**SPECIAL CONSTRUCTION & DEMOLITION**			
	Demolish Existing Building	216,000 CF	$ 0.39	$ 84,240
	Green House	6,230 SF	$ 79.00	$ 492,170
	TOTAL SPECIAL CONSTRUCTION & DEMOLTION			**$ 576,410**
G	**SITEWORK**			
	Earhwork	42,350 SF	$ 7.65	$ 323,978
	Site Utilities	42,350 SF	$ 2.08	$ 88,088
	Site Concrete	42,350 SF	$ 5.05	$ 213,868
	Landscaping	42,350 SF	$ 3.98	$ 168,553
	Site Lighting	42,350 SF	$ 2.35	$ 99,523
	Asphalt Paving	42,350 SF	$ 0.85	$ 35,998
	Site Specialties	42,350 SF	$ 0.90	$ 38,115
	TOTAL SITEWORK			**$ 968,121**

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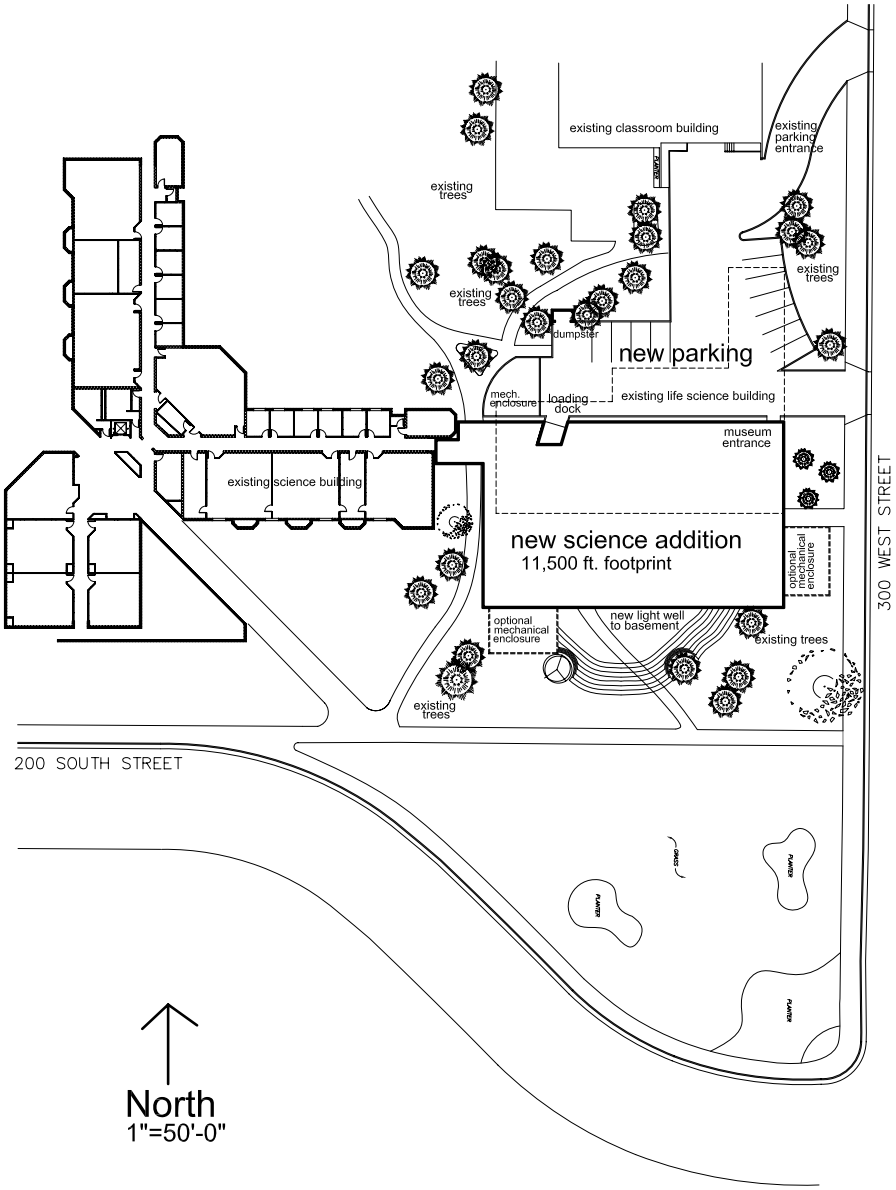
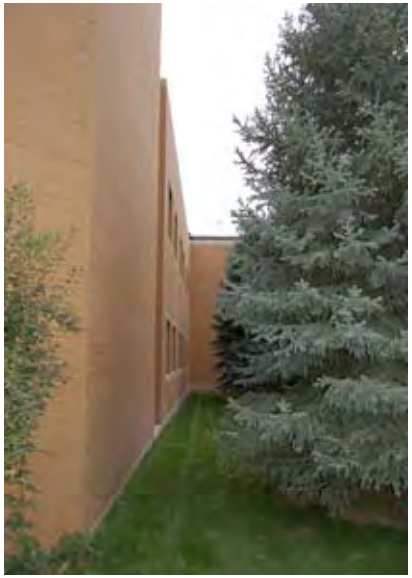
Site Plan

This proposed site plan layout represents a building footprint that matches the programmed and estimated space found in this document. The orientation of the parking and vehicular access accommodates both current needs to the classroom building as well as proposed needs associated with the new science addition and existing science center building. The layout maximizes the efficiency of a double loaded corridor and creates a functional connection to the existing building and established pathways. It is also the request of the administrators to provide day lighting in the basement areas where possible via a southerly light well shown in this drawing. Preservation of existing trees is a priority so the building and parking were sited as to avoid these conflicts. Existing pathways around and away from the building were preserved where possible. During the design process additional thought will need to be given toward optimal locations for grade level mechanical equipment enclosures.



300 WEST STREET



North Wall Science Bldg.

North side of greenhouse

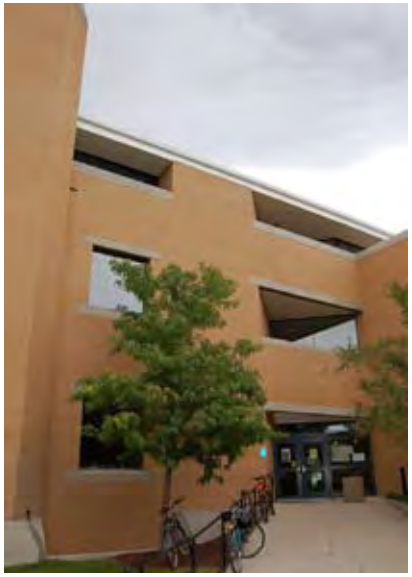
West side of Science Bldg

North side of Science Bldg.

Existing Landscaping - North side of Science Bldg.

North east roof level

North end stair tower


West entrance

South side of Science Bldg.

South side with mechanical enclosure

North roof level

South side of Science Bldg. looking north east

North side of Science Bldg. looking north east

Chemistry 1

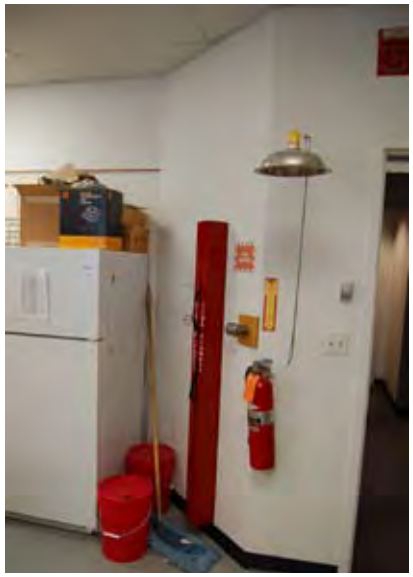
Chemistry 2

Chemistry 3

Chemistry 4

Chemistry 5

Chemistry 6



Chemistry 7

Chemistry 8

Chemistry 9

Biology Lab 1

Cellular Molecure Lab

Biology Lab 2

Biology Lab 3

Biology Lab Support 1

Biology Lab Support 2

Biology Lab Support 3

Biology Lab Support 4

Biology Lab Support 5

Biology Lab Support 6

Mortech Model 600024 Ventilated Dissection Table is quickly becoming the standard for any new dissection area. It is fabricated from heavy gauge 304 stainless steel with a No. 4 finish. Ventilation across the entire work area provides a better working environment for students by removing all odors and fumes.

STANDARD FEATURES:

•Maximum weight capacity of 750 pounds.
•Removable perforated grid plate around perimeter of work surface to provide proper ventilation
•Center plenum to be located below work surface along entire length of table
•Easily removable stainless steel air distribution baffle to create uniform downdraft air velocity around work surface
•6 inch diameter exhaust connection at one or both ends of table
•Table drain pan to slope under plenum for easy drainage
•Quarter turn stainless steel ball valve included for desired drainage
•6 inch casters, all with brake mechanism
•Approximate overall dimensions are 87.00 inches long x 30.00 inches wide x 36.00 inches high

Biology Lab Support 7

Biology Lab Support 8

Anatomy Lab 1

Anatomy Lab 2

Anatomy Lab 1

Ecology 1

Ecology 2

Specimen Storage

Genetics

Ecology

Greenhouse Storage

Greenhouse 1

Greenhouse 2

Plant Lab

Museum 1

Museum 2

Computer Lab

Genetics Lab

Chemical / Product / Remarks	Mol. Wt.	On Hand	Room / Location
Acacia Gum		X	SB 104A Open cupboard
Acetal	118.18	X	SB 104A Open cupboard
Acetic Acid			
Acetone			
Acetyl Choline Chloride			
Acetylcholine Chloride			
Acid Citric	210.14	X	LS 174
Aco) cis-Aconitic Acid	174.1	X	LS 153 Freezer
Acridin Orange		X	LS 174
Acridin Orange			
Acridine Yellow		X	LS 174
Acrylamide	71.08	X	LS 153 Gray cabinet
Acrylamide/Bis Solution 40% Acrylamid:N,N'-Methylenbisacrylamid		X	LS 153 Refrigerator
ActoCarmine		X	SB 104A Open cupboard
Adenosine	267.2	X	LS 153 Gray cabinet
Adenosine	267.2	X	LS 153 Refrigerator
Adenosine 5' – Diphosphate	427.2	X	LS 153 Freezer
Adenosine 5' – Monophosphate	347.2	X	LS 153 Freezer
Adenosine 5' – Triphosphate	551.1	X	LS 153 Freezer
Adenosine 5'-Triphosphate			
Adenosine-5'-Diphosphate			
Agar		X	LS 153 Gray cabinet
Agarose Low Standard – mr		X	LS 153 Gray cabinet
Agarose /Wide Range/Routine 3:1		X	LS 153 Gray cabinet
Agarose Type I –A:Low EEO		X	LS 153 Gray cabinet
Agarose Type II: Medium EEO		X	LS 153 Gray cabinet
Agarose w/ Tricine Buffer		X	LS 153 Gray cabinet
Al) DL – ALA - DL - MET	220.3	X	LS 153 Freezer
Al) DL-a Alanine			
Al) L - Alanine	89.09	X	LS 153 Gray cabinet
Albumin, Bovine			
Albumin, Chicken Egg GradeII (Ovalbumin)			
Albumin, Egg GradeIII (Ovalbumin)			
Alcian Blue 8 GN (Ingrain Blue 1)		X	LS 174
Alcian Blue 8 GX		X	SB 104A Open cupboard
Aldolase		X	LS 153 Refrigerator
Alizarin Blue BB, Acid		X	LS 174
Alizarin Blue S	499.39	X	LS 174
Alizarin Red S		X	LS 174
Alizarin Red S			
Am) 3-Aminobenzoic Acid Ethyl Ester			
Am) 5-Amino-2,3-Dihydro-1,4-Phthalazinedione Luminol			
Amaranth	604.5	X	LS 153 Gray cabinet
Ammonium Acetate		X	LS 174
Ammonium Acetate	77.8	X	LS 153 Gray cabinet
Ammonium Chloride	53.49	X	LS 153 Gray cabinet
Ammonium Chloride	53.49	X	SB 104A Open cupboard
Ammonium Hydroxide			
Ammonium Molybdate	1235.95	X	SB 104A Open cupboard
Ammonium Oxalate	142.12	X	SB 104A Open cupboard
Ammonium Persulfate	228.19	X	SB 104A Open cupboard
Ammonium Persulfate UN 1444	228.19	X	LS 153 Gray cabinet
Ammonium Sulfate	132.14	X	SB 104A Open cupboard
Ampicillin			
Amy) iso – Amyl Alcohol			
Amy) α-Amylase			
Amylase-DS		X	LS 153 Refrigerator
An) 5α – Androstan - 17β – OL – 3 – one		X	LS 153 Gray cabinet
Aniline Blue			
Aniline Red Merck (Fuchsine)		X	LS 174
Aniline Violet Merck (MethylBlue B)		X	LS 174
Antimycin A			
Aprotinin From Bovine Lung			
Arsenic Acid	312.0	X	LS 153 Gray cabinet
As) L – (+) Ascorbic Acid, Powder	176.13	X	SB 104A Open cupboard
Ascorbic Acid, Powder	176.13	X	LS 153 Gray cabinet
Aspartic Acid	133.1	X	LS 153Gray cabinet
Atropine			
Auramine O		X	LS 174
Azo Violet	259.23	X	LS 174
Azocarmine G		X	LS 174
Azure A		X	LS 174
Azure B		X	LS 174
Benedicts Solution		X	SB 104A Open cupboard
Benzene			
Benzene			
Bile Salts		X	LS 153 Gray cabinet
Bio-Rad Protein Assay (Bradford's Reagent)			
Bis – Tris (bis[2-Hydroxyethyl]iminotris-[hydroxymethyl]methane	209.2	X	LS 153 Gray cabinet
Biuret	103.0	X	SB 104A Open cupboard
Blacklight Tracing Powder		X	SB 104A Open cupboard
Blue Dextran	2,000,000	X	SB 104A Open cupboard
Boric Acid	61.83	X	LS 153 Gray cabinet
Boric Acid	61.83	X	SB 104A Open cupboard
Brilliant Blue G – 250	854.01	X	LS 153 Gray cabinet
Brilliant Blue R (Coomassie Brilliant Blue R)		X	LS 153 Gray cabinet
Brilliant Cresyl Blue			
Brilliant Cresyl Blue		X	LS 174
Bromcresol Purple	562.24	X	SB 104A Open cupboard
Bromocresol Green	698.04	X	LS 174
Bromocresol Green			
Bromophenol Blue		X	LS 153 Gray cabinet
Bromophenol Blue	646.4	X	LS 153 Gray cabinet
Bromophenol blue	669.98	X	LS 153 Gray cabinet
Bromophenol Blue pH 2.8-4.6	669.98	X	LS 174
BromoThymol Blue		X	LS 174
Bromothymol Blue		X	SB 104A Open cupboard
Bromothymol Blue	669.98	X	SB 104A Open cupboard
BTH (Butylated Hydroxy Toluene)			

2,6-Ditert-butyl-p-cresol crystalline			
Bu) 1 – Butanol	74.1	X	SB 104A Open cupboard
Bu) 2,3 – Butanediol	90.12	X	SB 104A Open cupboard
Bu) tert-Butyl Alcohol			
Bu) tert-Butyl Alcohol			
Butyl Alcohol (n-Butanol) (1-Butanol)			
Cacodylic Acid			
Caffine			
Calcium Chloride		X	LS 174
Calcium Chloride	147.0	X	LS 153 Gray cabinet
Calcium Chloride			
Calcium Hydroxide			
Calcium Nitrate			
Calcium Sulfide Sulfide Cubes			
Capryl Alcohol Merck			
Carmine (Alum Lake)			
Carmine Alum Lake		X	LS 174
Carminic Acid		X	LS 174
Cedarwood Oil			
Celestine Blue B		X	LS 174
Ceric Ammonium Sulfate			
Cesium Chloride	168.4	X	LS 153 Gray cabinet
Ch) 1 – Chloro-2,4-Dinitrobenzene			
Ch) 2 – Chloroethanol Anhydrous			
Chelex		X	LS 153 Gray cabinet
Chelex		X	LS 153 Refrigerator
Chelex			
Chloramphenicol			
Chloroform	119.4	X	LS 153 Fumehood
Chloroform			
Chloroform: Isoamyl Alcohol 24:1		X	LS 153 Fumehood
Chloroform: Isoamyl Alcohol 24:1			
Chlorophenol Red	423.27	X	LS 174
Chlorozol Black E (Eric Black GXOO)		X	LS 174
Chromium Trioxide			
Chromotrope 2 R	468.37	X	LS 174
Chrysoidin Y (Brown Salt R)		X	LS 174
Citric Acid Granular			
Citric Acid Monohydrate	210.10	X	LS 153 Gray cabinet
Citric Acid Trisodium Salt	294.1	X	LS 153 Gray cabinet
Clayton Yellow (Titan Yellow) (Thiazole Yellow)		X	LS 174
Cobalt Chloride			
Colchicine			
Congo Red			
Congo Red Indicator		X	LS 174
Congo Red Fibrin			
Coomassie – Brilliant Blue R – 250			
Copper Metal	63.54	X	LS 153 Gray cabinet
Creatine	131.1	X	LS 153 Gray cabinet
Cresol red		X	LS 174
Cresyl Violet Acetate		X	LS 174
Crystal Violet			
Cupric Sulfate			

Cyclohexene			
Cycloheximide			
De) 2-Deoxy-D-Glucose			
Deae Cellulose (Diethylaminoethyl Cellulose)		X	LS 153 Gray cabinet
Deoxyribonucleic Acid From Herring Sperm			
Deoxyribonuclese Acid From calf Thymus			
Dextrose Anhydrous		X	LS 153 Gray cabinet
Dextrose Powder			
Dextrose, Corn			
Dia) 6,9 – Diamino-2-Ethoxyacridine Lactate	361.4	X	LS 153 Freezer
Dia) o-Dianisidine	317.2	X	LS 153 Freezer
Dia) o-Dianisidine	317.2	X	LS 153 Refrigerator
Diacetyl			
Dic) 2,6-Dichlorophenol-Indophenol			
Dic) 2,6-Dichlorophenyl-Indophenol			
Dic) 3-(3,4-Dichlorophenyl)-1,1-Dimethylurea			
Dic) 3-(3,4-Dichlorophenyl)-1,1-Dimethylurea			
Diethyldithio-Carbamic Acid	171.3	X	LS 153 Freezer
Diethyldithiocarbamic Acid (DETC) Sodium Salt Trihydrate	225.3	X	LS 153 Gray cabinet
DIG DNA Labeling and Detection Kit		X	LS 153 Freezer
DIG Oligonucleotide 3'-End Labeling Kit		X	LS 153 Freezer
Digitoxin			
Dih) L-3,4-DiHydroxyphenyl-Alanine			
Dim) 1,3-Dimethylurea			
Dimethyl Sulfoxide	78.13	X	LS 153 Gray cabinet
Dimethylsulfoxide			
Din) 2,4-Dinitrophenol			
Diphenylamine			
Dodecyl Sodium Sulfate			
Dowex 50			
DTT Dithiothreitol	154.24	X	LS 153 Refrigerator
EDTA Ethylenediaminetetraacetic Acid Sodium Salt			
EDTA (Ethylenediaminetetraaceticacid) Disodium Salt: Dihydrate	372.2	X	LS 153 Gray cabinet
Eosin Y (Yellowish)	691.90	X	LS 174
Ep) (±)-Epinephrine			
Epinephrine			
Ery) L-Erythritol			
Erythrosin B		X	LS 174
Erythrosin - Bluish		X	LS 174
Ether Anhydrous			
Ethidium Bromide	394.31	X	LS 153 Gray cabinet
Ethidium Bromide			
Ethyl Acetate			
Ethyl Eosin		X	LS 174
Ethylene Glycol-bis-(β-Amino-Ethyl Ether) N,N'-Tetra-Acetic Acid EGTA			
Evan's Blue	960.82	X	LS 174
Evan's Blue			
Fast Blue BB Salt	415.9	X	LS 153 Freezer
Fast Blue BB Salt			

Fast Blue RR Salt	387.9	X	LS 153 Freezer
Fast Blue RR Salt			
Fast Green			
Fast Green FCF		X	LS 174
Fast Green FCF			
Ferric Chloride			
Ferrous Sulfate 7 Hydrate			
Ficoll			
Final Carolina Blu DNA Stain		X	LS 153 Gray cabinet
Fluorescein (Acid Yellow)		X	LS 174
Folic Acid			
Formamide GenAR	45.04	X	LS 153 Gray cabinet
Formic Acid			
Fr) D – Fructose 1,6-Diphosphate	340.1	X	LS 153 Freezer
Fr) D – Fructose 1-Phosphate	395.5	X	LS153 Freezer
Fr) D-(-)-Fructose			
Fr) D-Fructose			
Fuchsin, Acid			
Fuchsin, Acid			
Fuchsin, Basic		X	LS 174
Fuchsin, New		X	LS 174
Fumaric Acid			
Fushsin S.			
Ga) D – Galactose 6-Phosphate	395.5	X	LS 153 Freezer
Gallocyanin		X	LS 174
Gibberellic Acid			
Gibberellic Acid 85%			
Glass Wool			
Glo) y-Globulius, Human			
Globulins, Human			
Glu) D – Glucose 6-Phosphate	304.1	X	LS 153 Freezer
Glu) L-Glutamic Acid			
Glu) α-D-Glucose 1,6-Diphosphate	340.1	X	LS 153 Freezer
Glucose		X	LS 153 Gray cabinet
Glucose-1-Phosphate			
Glucose-6-Phosphate Dehydrogenase		X	LS 153 Refrigerator
Glutaraldehyde Solution 50%			
Glutathione	307.3	X	LS 153 Refrigerator
GLY –LEU	188.2	X	LS 153 Freezer
Gly) L-α-Glycerophosphate	370.4	X	LS 153 Freezer
Glyceraldehyde-3-Phosphate Dehydrogenase		X	LS 153 Refrigerator
Glycerine			
Glycerol (Glycerin)	92.09	X	LS 153 Gray cabinet
Glycine (Ammonia Free)			
Glycine (Aminoacetic Acid Sodium Salt)	97.05	X	LS 153 Gray cabinet
Glyoxalase I		X	LS 153 Refrigerator
Guaiacol			
Guanine (2-Amino-6-hydroxypurine)	151.1	X	LS 153 Gray cabinet
Guanosine 5'-Monophosphate	363.2	X	LS 153 Refrigerator
Gylcerol (Glycerin)			
Hamatoxylin Purple			
Harns Hematoxyln			
He) n-Hexanol			

He) 1- Hexanol			
Hematoxyln		X	LS 174
Hemocyanin			
Heparin			
HEPES (N-[2-Hydroxyethyl]piperazine-N'-[2ethanesulfonicacid])	260.3	X	LS 153 Gray cabinet
Hexadecyltrimethyl (Ammonium Bromide)			
Hexokinase		X	LS 153 Freezer
Hi) L- Histidine	209.6	X	LS 153 Gray cabinet
Hy) DL-β-Hydroxybutyric Acid			
Hy) DL-β-Hydroxybutyric Acid Sodium Salt	126.1	X	LS 153 Refrigerator
Hy) y-Hydroxybutyrate Acid			
Hydrochloric Acid			
Hydroxylamine			
Immersion Oil Type B			
In) 5,5-Indigodisulfonic Acid			
Indigo Carmine		X	LS 174
Indigo Carmine			
Indole-3-acetic Acid			
Inosine (Hypoxanthine 9 – D- ribofuranoside)			
Iodine			
Iodoactic Acid			
Is) DL – Isocitric Acid Trisodium Salt			
Iso-amyl Alcohol	88.1	X	SB 104A Open cupboard
Iso-amyl Alcohol	88.1	X	LS 153 Fumehood
Isocitric Dehydrogenase (NADP)		X	LS 153 Refrigerator
Isopropyl 70% Rubbing Alcohol			
Isopropyl Alcohol	60.10	X	LS 153 Freezer
Isopropyl Alcohol	60.10	X	LS 153 Fumehood
Isopropyl Alcohol			
Janus Green B		X	LS 174
Janus Green B			
Janus Green B (Stock Solution)			
Ke) α – Ketoglutaric Acid	168.1	X	LS 153 Freezer
Ke) α-Ketoglutaric Acid	146.1	X	LS 153 Refrigerator
La) L(+) Lactic Acid			
La) L-Latic Dehydrogenase		X	LS 153 Refrigerator
La) DL – Lactic Acid (Lithium Salt)			
Lactic Acid			
Lanolin, Anhydrous Wool-fat			
Lau) N - Lauroylsarcosine			
Lauryl Sulfate Sodium dodecyl Sulfate	288.4	X	LS 153 Gray cabinet
LDH Agaro-Stain Reagent			
LDH Electrophoresis Buffer			
LDH Incubation Buffer			
Le) L – Leucine L – 2 – Amino-4-methylpentanoic Acid			
Lead Acetate			
LEU-GLY-GLY	245.3	X	LS 153 Freezer
Lidocane Hydrochloride			
Light Green SF Yellowish			
Lipase From Porcine Pancreas			
Lithium Sulfate Reagent			
Lugol's Iodine			

Naphthol Blue Black			
Neomycin Solution			
Neutral Red		X	LS 174
Neutral Red			
Neutral Red (Stock Solution)			
Nic) (-)-Nicotine			
Nic) β – Nicotinamide Adenine Dinucleotide	709.4	X	LS 153 Refrigerator
Nic) β – Nicotinamide Adenine Dinucleotide Reduced Form	709.4	X	LS 153 Freezer
Nic) β – Nicotinamide Adenine Dinucleotide Phosphate	765.4	X	LS 153 Freezer
Nic) β-Nicotinamide Adenine Dinucleotide	663.4	X	LS 153 Freezer
Nic) β-Nicotinamide Adenine Di-nucleotide			
Nic) β-Nicotinamide Adenine Dinucleotide Phosphate Sodium Salt			
Nicotine			
Nicotine Acid			
Nigrosine			
Nit) p-Nitrophenol			
Nit) p-NitrophenylPhosphate Sigma-Fast Tablet Set (ONLY HALF)			
Nitric Acid			
Nitro Blue Tetrazolium	817.6	X	LS 153 Refrigerator
Nucleoside Phosphorylase		X	LS 153 Freezer
Nucleoside Phosphorylase		X	LS 153 Refrigerator
Nuetral Red			
Nystatin			
Oc) (+)-Octopine	246.3	X	LS 153 Freezer
Orange G		X	LS 174
Orange G			
Orange G.			
Orcein (Synthetic)			
Orcinol Monohydrate			
Osmium Tetroxide			
Oxalic Acid			
PAO Titrant			
Paraformaldehyde		X	LS 174
Pararosaniline			
PBS Phosphate Buffer			
Peppermint Spirit			
Pepsin From Porcine Stomach Mucosa			
Pepsin 1 x NF			
Pepsin 1:10,000			
Pepsin From Porcine Stomach Mucosa			
Perchloric Acid			
Periodic Acid (Paraperiodic Acid)			
Periodic Acid 0.5%			
Permount (Toluene Solution)			
Peroxidase		X	LS 153 Freezer
Petroleum Ether			
Petroleum Jelly			
Phe) 1,10-Phenanthroline			
Phe) 1-Phenyl-2-Thiourea			
Phenazine Methosulfate	306.3	X	LS 153 Freezer
Phenazine Methosulfate			
Phenazine Methosulfate			

Phenol			
Phenol / Chloroform / isoamyl alcohol 25:24:1			
Phenol Merck (Carbolic Acid)	94.11	X	LS 174
Phenol Reagent Folin-Ciocalteu			
Phenol Red			
Phenol Red Sodium Salt			
Phenol Red Solution			
Phenol, Tris-saturated		X	LS 153 Refrigerator
Phenol, Tris-saturated			
Phenolphthalein			
Phenolphthalein Diphosphate	566.2	X	LS 153 Freezer
Phenzaine Methosulfate			
PHE-PRO	262.3	X	LS 153 Freezer
Phloroglucinol			
Phloroglucinol (1,3,5 – Benzenetriol)		X	LS 174
Phloxine B		X	LS 174
Pho) 6-Phosphogluconic Acid	479.1	X	LS 153 Freezer
Pho) D (-)3 – Phosphoglyceric	252.0	X	LS 153 Freezer
Pho) D(+)2-Phosphoglyceic Acid	186.1	X	LS 153 Refrigerator
Pho) D(+)2-Phosphoglyceric Acid	186.1	X	LS 153 Freezer
Phosphatase, Alkaline From Porcine Intestine			
Phosphate Substrate			
Phospho(Enol)Pyruvate	206.1	X	LS 153 Freezer
Phosphocreatine	255.1	X	LS 153 Freezer
Phosphoglucomutase		X	LS 153 Freezer
Phosphoglucose Isomerase		X	LS 153 Refrigerator
Phosphoglycerate Mytase		X	LS 153 Refrigerator
Phosphomolybdic Acid	3939.49	X	LS 174
Phosphomolybdic Acid 20MoO3-2H3PO4-48H2O			
Phosphomolybdic Acid P205-24Mo03-xH2O			
Phosphoric Acid			
Phosphotungstic Acid P2O5-24WO3-x112O			
Photometric pH Indicator B pH5.0 – 10.0			
Polyethylene Glycol			
Polyvinylpyrolidone PVP-10			
Polyvinylpyrrolidone PVP-40			
Ponceau R			
Ponceau S			
Potassium Bromide			
Potassium Acetate	98.15	X	LS 153 Gray cabinet
Potassium Acid Phthalate			
Potassium Bisulfate			
Potassium Bromate			
Potassium Chloride Crystal			
Potassium Chloride Granular			
Potassium Chromate			
Potassium Chromate			
Potassium Chromium Sulfate		X	LS 174
Potassium Dichromate	294.19	X	LS 174
Potassium Dichromate			
Potassium Dicromate			
Potassium Ferricyanide			
Potassium Hydroxide			

Potassium Hydroxide			
Potassium Iodine			
Potassium Iodine			
Potassium Metabisulfite			
Potassium Nitrate			
Potassium Oxalate Tablets		X	LS 174
Potassium Permanganate			
Potassium Permanganate			
Potassium Phosphate			
Potassium Phosphate Monobasic			
Potassium Phosphate Dibasic			
Potassium Phosphate Monobasic			
Potassium Sodium Tartrate 4 Hydrate			
Potassium Thiocyanate			
Pro) 2-Propanol			
Pro) 2-Propanol			
Pro) iso-Propyl Alcohol			
Pro) L-(-)-Proline			
Pro) n-Propyl-Alcohol			
Propidium Iodide	668.4	X	LS 153 Refrigerator
Propionic Acid			
Propylene Glycol			
Proteinase K		X	LS 153 Refrigerator
Protrinase K			
Pyrazole			
Pyridoxal 5-phosphate	247.1	X	LS 153 Freezer
Pyrogallol			
Pyronin B		X	LS 174
Pyruvate Kinase		X	LS 153 Refrigerator
Pyruvic Acid	110.0	X	LS 153 Refrigerator
Qu) 8-Quinolinol			
Ready – Solv Mp Liquid Scintillation Cocktail			
Rennin From calf stomach			
Rhodamine B		X	LS 174
Ribonucleic Acid From Torula Yeast			
Ringers Solution Tablets		X	LS 174
Ringers Solution Tablets			
Rose Bengal			
Rose Bengal			
Rotenone			
Safranin O		X	LS 174
Safranin O			
Safranin O			
Safranin Solution			
Salicylic Acid	138.12	X	LS 174
Sand Purified			
Schiff Reagent		X	SB 104A
SDS		X	LS 153 Gray cabinet
Setopaline C Indicator		X	LS 174
Sigmacote		X	LS 153 Refrigerator
Silver Nitrate	169.89	X	LS 174
Silver Nitrate			
Snake Venom Western Diamondback		X	LS 153 Freezer

So) D-Sorbitol			
Sodium Acetate			
Sodium Acetate Anhydrous	82.03	X	LS 153 Gray cabinet
Sodium Arsenate Dibasic:Heptaydrate			
Sodium Azide			
Sodium Benzoate			
Sodium Bicarbonate	84.02	X	LS174
Sodium Bicarbonate			
Sodium Bicarbonate			
Sodium Borate			
Sodium Cacodylate Trihydrate			
Sodium Carbonate			
Sodium Chloride			
Sodium Citrate			
Sodium Cobaltinitrite			
Sodium Dichromate	298.05	X	LS 174
Sodium Floride			
Sodium Hydrosulfite			
Sodium Hyroxide			
Sodium Iodate			
Sodium Lactate Solution			
Sodium m-Arsenite			
Sodium Meta Bissulfate			
Sodium Nitrate	69.0	X	LS 174
Sodium Nitroferricyanide			
Sodium Perchlorate	122.46	X	LS 153 Gray cabinet
Sodium Perchlorate			
Sodium Phosphate (Monobasic, Monohydrate)			
Sodium Phosphate Anhydrous			
Sodium Phosphate Monobasic			
Sodium Silicate			
Sodium Sulfate	142.05	X	LS 174
Sodium Sulfate			
Sodium Sulfate Anhydrous			
Sodium Sulfite Anhydrous			
Sodium Thiosulfate 5 Hydrate			
Sodium Tungstate			
Sorbic Acid			
Stanard TitraVer Solution			
Starch Potato		X	LS 153 Gray cabinet
Streptomycin Sulfate			
Succinic Acid			
Succinic Acid (Butanedioic Acid)			
Sucrose			
Sudan Black			
Sudan III			
Sudan IV		X	LS 174
Sulfric Acid			
Superchrome Black TS		X	LS 174
Tannic, Acid			
Te) N,N,N',N'-Tetramethylethylenediamine			
TEMD N,N,N',N,'-Tetra-methylethlenediamine			
Temed		X	LS 153 Gray cabinet

N,N,N',N'-Tetramethyjethylenediamine			
Testosterone			
Tetraacetic Acid (Ethylenedinitrilo)-			
Tetracycline HCL			
Tetrasodium Pyrophosphate			
Thiamine Hydrochloride	337.27	X	LS 174
Thionin		X	LS 174
Thionin(e)			
Thiourea			
Thymol Blue			
Thymolphthalein			
Toluene			
Tr) (Tris-[hydroxymethyl]aminomethane)			
Tr) 2,3,5-Triphenyltetrazolium Chloride Tetrazolium Red	334.8	X	LS 153 Refrigerator
Trichloroacetic Acid Solution			
Tricine	179.2	X	LS 153 Gray cabinet
Triethanolamine	185.7	X	LS 153 Gray cabinet
Triosephosphate Isomerase		X	LS 153 Refrigerator
Tris (Hydroxy Methyl) aminomethane	121.1	X	LS 153 Gray cabinet
Tris Hydrochloride	157.61	X	LS 153 Gray cabinet
Tris-Borate EDTA Buffer TBE Buffer		X	LS 153 Gray cabinet
Tris-EDTA Buffer		X	LS 153 Refrigerator
Triton X-100 (Octyl Phenoxy Polyethoxyenthanol)			
Trizma Hydrochloride			
Trypan Blue			
Trypan Blue (Direct Blue 14)		X	LS 174
Trypsin			
Uranyl Acetate			
Urdine (Glycogen) From Oysters			
Urea Anhydrous			
Urease Buff Reagent			
Urethane			
Uridine			
Uridine 5'- Monophosphate	324.2	X	LS 153 Freezer
VAL – LEU	230.3	X	LS 153 Freezer
Vasopressin (Synthetic)			
Victoria Blue B		X	LS 174
Wright's Stain			
Wright's Stain Certified		X	LS 174
Xathine Oxidase		X	LS 153 Refrigerator
Xylene Cyanole FF Acid Blue	538.6	X	LS 153 Gray cabinet
Yeast Autolysate			
Zinc Chloride			
Zinc Sulfate			

Amico Corporation console unit

specifications

The console unit shall be an Amico Alert-1 series.

The console unit has a removable front assembly for ease of mounting to the back box.

The console is supported by a galvanized steel bracket which shall be attached to the structural wall by means of four screws (not supplied by Amico).

The fascia front assembly is made from extruded, clear anodized aluminium with moulded plastic end caps, for a clean appearance. The back box is made from galvanized steel, 0.060" thick.

The medical gas piping terminates as blank capped ends 5" (127 mm) above the console back box.

All specified devices are factory installed in the console backbox. The electrical devices are separated, but they are not pre-wired.

NOTE: Exact dimensions are to be determined by the customer.

NOTE: A blank provision should be placed between Medical Gas Outlets and Vacuum Bottle Slide Holders and between 2 communication devices.

The Console is UL Listed to U.S. and Canadian safety standards.

Amico products comply with NFPA-99.

Typical hospital bed wall console

features

- Removable front fascia for ease of maintenance and installation
- Single cutout dimension for all accessories (outlets & electrical devices) are on a 2.5" (63.5 mm) centre
- Fascia is anodized aluminium with moulded plastic end caps for a clean, aesthetic appearance

project

c UL US LISTED the right **connection**

Amico Corporation overbed light

specifications

The overbed light shall be an Amico Alert-2 series.

The fixture shall be made of 20 gauge steel housing and aluminum extruded lamp housing.

It shall protrude no more than 6 3/4" (171 mm) from the wall or 11" (280 mm) in the fold down position. The (2) lamp housing shall house four T8 lamps (by others). There shall be two 2-lamp high power factor class P, CBM, "A" sound rated ballasts for separate uplight and downlight operation with 120V, 60Hz electronic ballasts (optional 240 or 277 volts).

Lenses shall be high impact resistant clear ribbed acrylic plastic with the upper lense directing light up and out for indirect room lighting and the bottom lense for directing light downward and out towards the patient area. The top lamp compartment shall swing down towards the patient at approximately 35 degrees to allow for patient examination. Handles are to be provided for this purpose at each end.

Front panels shall be clear anodized aluminum extrusion with full-length support channels for both top and bottom lenses and shall accept a replaceable plastic laminated decor panel.

Switching shall be accomplished by means of an optional four-position pull chain switch, located in the centre of the fixture. It shall allow sequential patient control of: bottom / top / both / off. Other switching options include a variety of switching applications where low voltage patient control is required. As an optional choice, this can be accomplished through the use of an Amico solid state low voltage controller.

The light shall have a Bed-Stop interlock safety system. This disconnects the power to the bedif the bed or a bed mounted I.V. Pole is raised high enough to make contact with the light.

The Overbed Light is UL Listed.

Typical hospital bed light

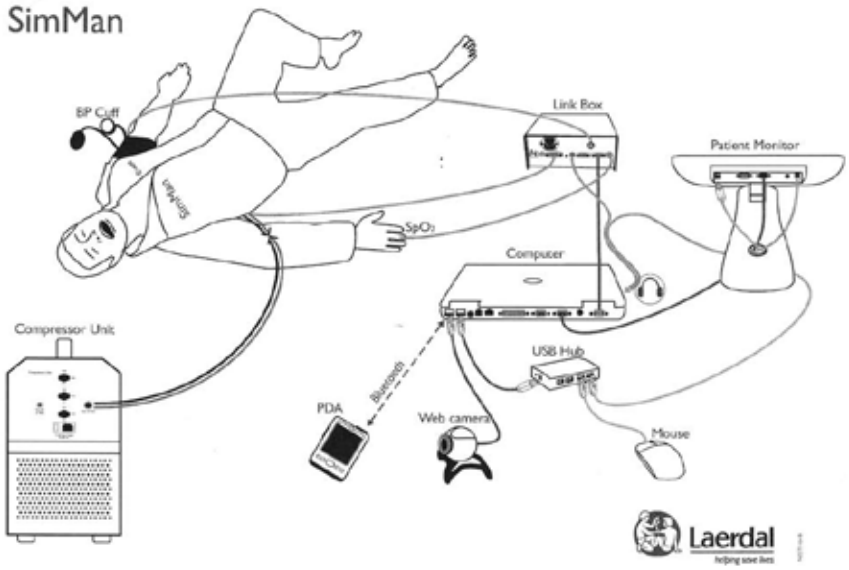
features

- Independent ballasts for up and down lights
- Independent circuits are switched according to the individual needs of the facility
- Decorator insert panels are available in standard selections of colors and patterns from Wilson Art and Formica
- Optional low-voltage solid state controller puts switching, normally controlled through the nurse handset, within easy reach
- Pull-down handles conveniently swivel the upward light down towards the patient area, directing it right where it is needed
- Automatic Bed-Stop safety feature
- Fine-textured, powder coated, beige finish with etched clear anodized trim

project

UL the right **connection**

Typical hospital bed wall transformer

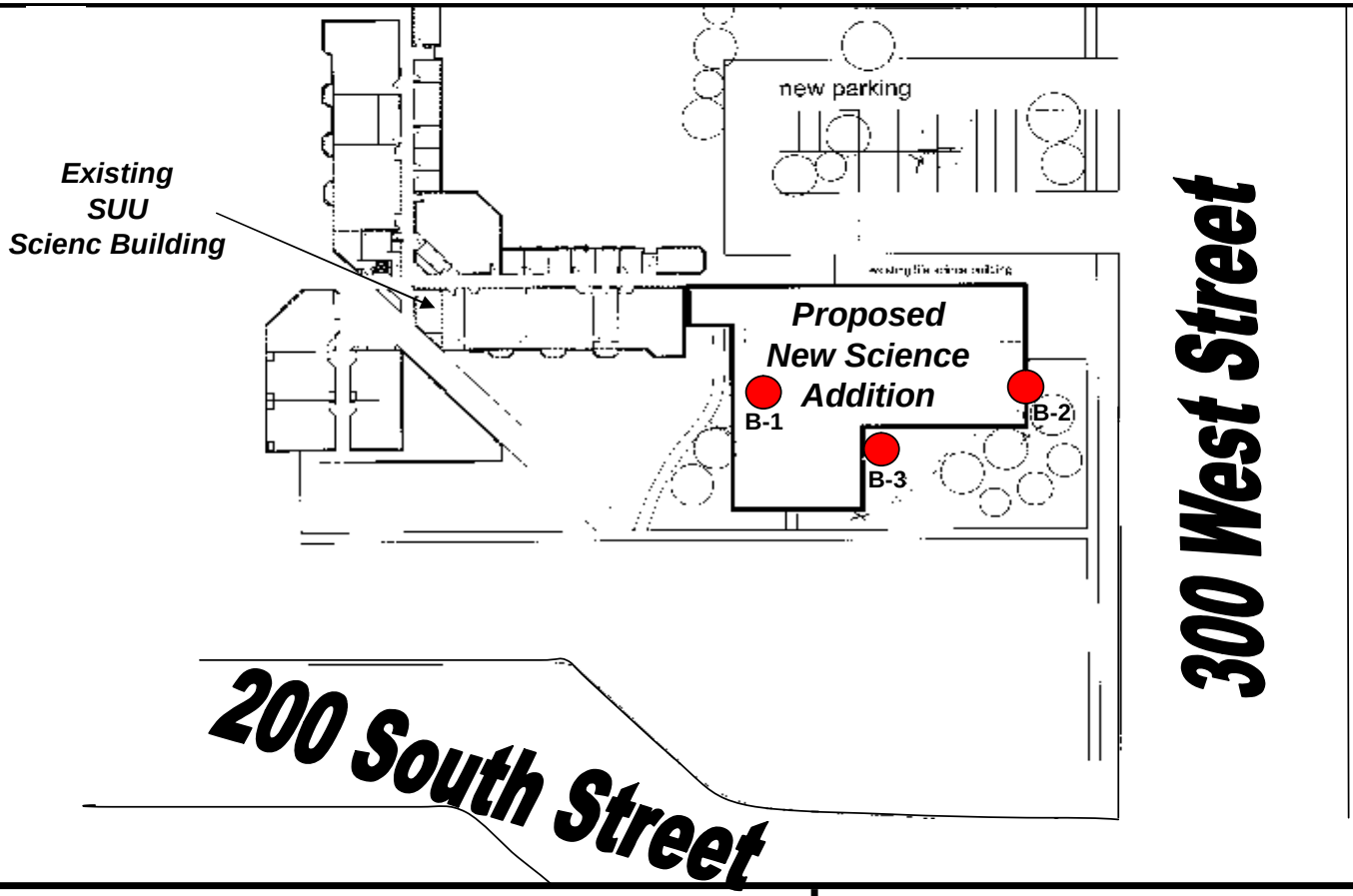


Key
- Approximate Boring Location

Site Plan

North

Not to Scale



GEM Engineering, Inc.
369 North 100 West, #8
Cedar City, Utah 84720
Phone (435) 867-6478
Fax (435) 867-4372

Site Plan
SUU Science Building Addition,
200 South and 300 West,
Cedar City, Iron County, Utah

Plate
1

Date Excavated: 11/19/2007 Elev: Not Measured

Location: see plate 1

BORING NO. B-1

Rammer Weight: 140 lbs

Depth (ft.)	Field Moisture %	Dry Density (pcf)	BLOW COUNT	Other Tests *	Samples	SYMBOL +	SOIL DESCRIPTION	MOISTURE	CONSISTENCY
0						CL	(CL) - Sandy Clay - Some roots observed. - Dark Red Brown	Very Moist	Soft
	18.2	104.6	12	AT, C	■				Soft to Medium Stiff
5	18.4	107.5	12	SOL AT	■	CL-ML	(CL-ML) - Silty Clay - Some roots observed. - Dark Red Brown		
	26.8	94.2	23	SOL C	■	CL	(CL) - Sandy Clay with Gravel - Abundant evaporites present. - Light Red Gray	Moist	Medium Stiff
10									
15	6.6	92.6	120	AT	■	GM	(GM) - Sandy Gravel with Clay - Red Brown		Very Dense
							Refusal at 17 feet.		
20									

* Other Tests: C = Consolidation, AT = Atterberg, S = Shear, G = G. Size, E = Expansion, SOL = Solubility, DS = Direction Shear

\+ Sample Type: ■ = Drive Sample; ▦ = Bulk Sample; ⊠ = No Recovery

Notes:
- No groundwater encountered.

GEM Engineering, Inc.
369 North 100 West # 8
Cedar City, UT

Project:
SUU Science Building Addition,
200 South and 300 West,
Cedar City, Iron County, Utah

Plate: 2

Date Excavated: 11/19/2007 | Elev: Not Measured

Location: see plate 1

BORING NO. B-2

Rammer Weight: 140 lbs

Depth (ft.)	Field Moisture %	Dry Density (pcf)	BLOW COUNT	Other Tests *	Samples	SYMBOL +	SOIL DESCRIPTION	MOISTURE	CONSISTENCY
0						CL	(CL) - Sandy Clay - Brown	Slightly Moist	Soft
	7.6	100.8	41	AT			- Red Brown		Stiff
	5.0	102.7	38	AT, C		SC	(SC) - Clayey Sand		Medium Dense
5							- Trace evaporites present.		
							- Red Brown		
	7.9	102.1	27			CL	(CL) - Sandy Clay with trace Gravel		Medium Stiff
							- Red Brown		
10									
	7.2	114.8	31	SOL		SC	(SC) - Clayey Sand		Medium Dense
15							- Abundant gypsum stringers observed.		
							- Red Brown		
	9.1	116.8	59	C		SC	(SC) - Clayey Sandy with trace Gravel - Light Red Brown		Dense
20									

* Other Tests: C = Consolidation, AT = Atterberg, S = Shear, G = G. Size, E = Expansion, SOL = Solubility, DS = Direction Shear

\+ Sample Type: ■ = Drive Sample; ▦ = Bulk Sample; ⊠ = No Recovery

Notes:
- No groundwater encountered.

GEM Engineering, Inc.
369 North 100 West # 8
Cedar City, UT

Project:
SUU Science Building Addition,
200 South and 300 West,
Cedar City, Iron County, Utah

Plate: 3a

Date Excavated: 11/19/2007 | Elev: Not Measured

Location: see plate 1

BORING NO. B-2 cont.

Rammer Weight: 140 lbs

Depth (ft.)	Field Moisture %	Dry Density (pcf)	BLOW COUNT	Other Tests *	Samples	SYMBOL +	SOIL DESCRIPTION	MOISTURE	CONSISTENCY
20	9.1	116.8	59	C		SC	(SC) - Clayey Sand with some Gravel	Slightly Moist to Moist	Dense
							- Abundant Gypsum		
							-Light Red Brown		
							Refusal at 23 feet		
25									
30									
35									
40									

* Other Tests: C = Consolidation, AT = Atterberg, S = Shear, G = G. Size, E = Expansion, SOL = Solubility, DS = Direction Shear

\+ Sample Type: ■ = Drive Sample; ▦ = Bulk Sample; ⊠ = No Recovery

Notes:
- No groundwater encountered.

GEM Engineering, Inc.
369 North 100 West # 8
Cedar City, UT

Project:
SUU Science Building Addition,
200 South and 300 West,
Cedar City, Iron County, Utah

Plate:3b

Date Excavated: 11/19/2007 Elev: Not Measured

Location: see plate 1

BORING NO. B-3

Rammer Weight: 140

Depth (ft.)	Field Moisture %	Dry Density (pcf)	BLOW COUNT	Other Tests *	Samples	SYMBOL +	SOIL DESCRIPTION	MOISTURE	CONSISTENCY
0						CL	(CL) - Sandy Clay -Red Brown	Slightly Moist to Moist	Soft / Medium Stiff
	11.3	96.6	21	AT, C					
5	14.6	114.2	17	AT		CL-ML	(CL-ML) - Silty Clay with Sand - Dark Red Brown	Moist	
	16.7	111.7	15	SOL		CL	(CL) - Sandy Clay - Dark Red Brown	Moist to Very Moist	
10						CL	(CL) - Sandy Clay with some Gravel. - Dark Red Brown		
15			120						Hard
20				AT, SOL		GM	(GM) Sandy Gravel with Clay -Red & Yellow Brown	Moist	Dense

* Other Tests: C = Consolidation, AT = Atterberg, S = Shear, G = G. Size, E = Expansion, SOL = Solubility, DS = Direction Shear

\+ Sample Type: = Drive Sample; = Bulk Sample; = No Recovery

Notes:
- No groundwater encountered.

GEM Engineering, Inc.
369 North 100 West # 8
Cedar City, UT

Project:
SUU Science Building Addition,
200 South and 300 West,
Cedar City, Iron County, Utah

Plate:4a

Date Excavated: 11/19/2007 Elev: Not Measured

Location: see plate 1

BORING NO. B-3 cont.

Rammer Weight: 140

Depth (ft.)	Field Moisture %	Dry Density (pcf)	BLOW COUNT	Other Tests *	Samples	SYMBOL +	SOIL DESCRIPTION	MOISTURE	CONSISTENCY
20						GM	(GM) - Sandy Gravel with some Clay. -Red Brown	Slightly Moist to Moist	Dense
							Refusal @ 22 feet.		
25									
30									
35									
40									

* Other Tests: C = Consolidation, AT = Atterberg, S = Shear, G = G. Size, E = Expansion, SOL = Solubility, DS = Direction Shear

\+ Sample Type: = Drive Sample; = Bulk Sample; = No Recovery

Notes:
- No groundwater encountered.

GEM Engineering, Inc.
369 North 100 West # 8
Cedar City, UT

Project:
SUU Science Building Addition,
200 South and 300 West,
Cedar City, Iron County, Utah

Plate:4b

Southern Utah University Science Building Addition,
200 South and 300 West,
Cedar City, Iron County, Utah

Table # 1: Solubility Analysis

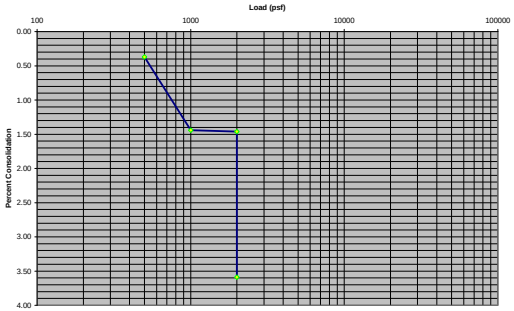
Sample Location	Soil Classification	Percent Soluble by Weight
B-1 @ 6 feet	**Clay-Silt**	**1.31**
B-1 @ 9 feet	**Sandy Clay**	**< 1**
B-2 @ 15 feet	**Clayey Sand**	**2.36**
B-3 @ 10 feet	**Sandy Clay**	**1.88**
B-3 @ 20 feet	**Sandy Gravel**	**< 1**

Table # 2 Atterberg Limits

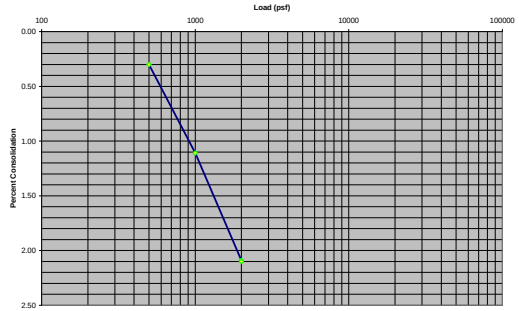
Sample Location	UCS Type	Percent Passing # 4 Sieve	Percent Passing # 10 Sieve	Percent Passing # 40 Sieve	Percent Passing # 200 Sieve	Liquid Limit	Plastic Limit	Plasticity Index
B-1 @ 3'	CL	99.1	98.1	93.7	70.1	29	16	13
B-1 @ 6'	CL-ML	96.0	93.2	91.4	63.2	22	16	6
B-1 @ 15'	SM	58.8	53.1	46.7	14.6	--	--	Non-Plastic
B-2 @ 2'	CL	100	100	96.7	65.5	23	14	9
B-2 @ 6'	SC	97.2	96.9	93.6	46.2	19	15	4
B-3 @ 3'	CL	100	99.9	98.7	69.4	25	14	11
B-3 @ 6'	CL-ML	100	99.9	97.8	58.1	21	15	6
B-3 @ 20'	GM	47.7	36.7	26.6	14.8	--	--	Non-Plastic

Plate: 6

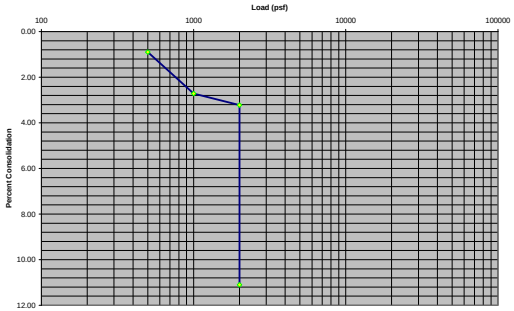
CONSOLIDATION TEST DATA



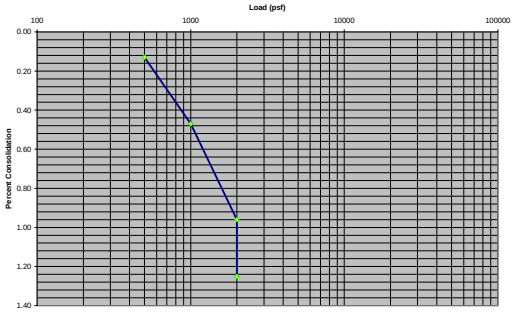
SAMPLE LOCATION B-1 @ 3', Water added at 2000 psf



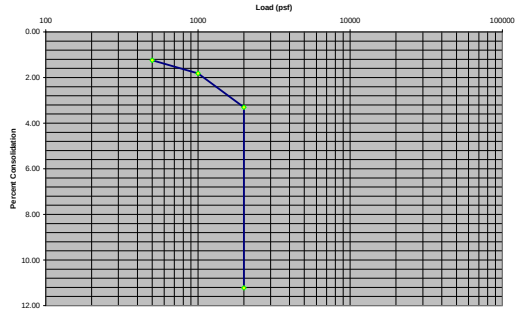
SAMPLE LOCATION B-1 @ 9', Water added at 2000 psf



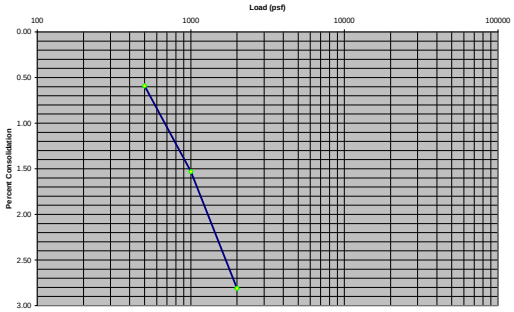
SAMPLE LOCATION B-2 @ 6', Water added at 2000 psf



SAMPLE LOCATION B-2 @ 20', Water added at 2000 psf



SAMPLE LOCATION B-3 @ 3', Water added at 2000 psf



SAMPLE LOCATION B-3 @ 6', Water added at 2000 psf

INTRODUCTION

This report presents the results of a geotechnical investigation performed for the proposed SUU science building addition at 200 South and 300 West Streets, Cedar City, Iron County, Utah. The study was conducted in accordance with the client's authorization.

The purposes of this investigation were to evaluate the nature and engineering properties of the subsurface soils and to provide recommendations for general site grading and the design and construction of foundations, floor slabs, exterior concrete flatwork, and pavements. The investigation included subsurface explorations, soil sampling, laboratory testing, engineering analyses, and preparation of this report.

We understand that a multi-story university science building will be constructed at the subject site. Structural loads are expected to be moderate.

The recommendations contained in this report are subject to the limitations presented in the Limitations section. We recommend that all individuals reading this report read the Limitations section.

FIELD INVESTIGATION

The subsurface soil conditions were explored by drilling with an auger three exploratory boreholes to depths of approximately 17 to 23 feet below the existing site grade. The approximate locations of these explorations are shown on Plate 1. Soils and subsurface conditions encountered in the explorations were classified, logged, and recorded at the time of excavation by our field geologist. The results of the explorations are presented on the enclosed Plates 2 through 4b. A key to soil symbols and terms is found on Plate 5.

LABORATORY INVESTIGATION

Representative soil samples from the explorations were tested in the laboratory for solubility, Atterberg limits, and consolidation behavior. Results are presented on Plates 6 through 12.

Soil samples are normally discarded 30 days after submittal of the report unless this office receives a specific request to retain the samples for a longer period.

GENERALIZED SITE CONDITIONS

SURFACE CONDITIONS

The site is located at the northwest corner of 200 South and 300 West Streets in Cedar City, Iron County, Utah, as shown on Plate 1. There are several other University structures nearby. The surface is relatively flat.

SUBSURFACE CONDITIONS

Based on the explorations performed for this investigation, the on-site soils generally consisted of soft sandy clay extending to depths of approximately 1 to 2 feet below the existing site grade. This material was underlain by layers of soft to hard or medium-dense to very dense sandy clay, silty clay, sandy gravel, and clayey sand extending to the bottoms of the holes.

Groundwater was not encountered during the explorations. The soils were in a slightly moist to very moist condition throughout the depths explored.

The encountered subsurface conditions are described in detail on the enclosed boring logs, Plates 2 through 4b. Due to the nature and depositional characteristics of the native soils, care should be taken in extrapolating subsurface conditions beyond or interpolating them between the exploration locations.

ENGINEERING ANALYSIS AND RECOMMENDATIONS

GENERAL

Based on the subsurface conditions encountered at the site, our laboratory analysis, and our geotechnical experience in the area, it is our opinion that the subject site is suitable

for the proposed construction provided that the recommendations contained in this report are followed.

Specifically, the unsuitable surface materials should first be removed as explained in the following sections of this report. Overexcavations should extend down to the sandy gravel layer at approximately 20 feet below the ground surface. Structural fill can then be placed and compacted in accordance the structural fill section of this report to footing depth with Type 1 pit run gravel. Excavations may be terminated if competent, medium-dense sandy gravel soils are encountered.

Slabs-on-grade, exterior concrete flatwork, and pavements should be supported by a zone of properly placed and compacted structural fill. Overexcavations on the order of 30 inches below the supportive gravel layer or 30 inches below the existing site grade, whichever is greater, will be required. As an alternative to the above, 20 inches of Type 1 pit run gravel can be substituted for the 30 inches of recompacted native soils. The majority of the on-site soils should be suitable for use as compacted structural fill, although approximately 20% shrinkage can be expected.

Retaining walls will be required on slopes greater than 2:1 horizontal to vertical. An equivalent fluid weight of 40 pcf may be utilized for design of retaining walls.

The following sections of this report present our recommendations for general site grading, design of foundations and slabs-on-grade, soil corrosion characteristics, and moisture protection.

SITE PREPARATION AND GRADING

Within the areas to be graded, existing vegetation, loose soils, and debris should be removed and hauled off the site. Any undocumented fill soils and soft, loose, collapsible and/or disturbed native soils should also be excavated to expose competent, dense or medium-dense native soils. Excavations may be terminated if competent, medium-dense granular soils are encountered. A representative of this office should observe the site grading operations to verify that unsuitable soils are identified and treated as recommended below.

Overexcavations down to the sandy gravel at a depth of approximately 20 feet below that the site grade. The site can then brought to rough pad grade with Type 1 pit run gravel as structural fill. Slabs-on-grade, exterior concrete flatwork, and pavements should be supported by a zone of properly placed and compacted structural fill. Overexcavations on the order of 30 inches below the supportive gravel layer or 30 inches below the existing site grade, whichever is greater, will be required. Excavations may be terminated if competent, medium-dense granular soils are encountered. As an alternative to the above, 20 inches of Type 1 pit run gravel can be substituted for the 20 inches of recompacted native soils. The majority of the on-site soils should be suitable for use as compacted structural fill, although approximately 20% shrinkage can be expected.

Excavations should extend laterally at least 5 feet beyond the building area, or to a distance equal to the depth of structural fill, whichever is greater. The excavations should extend laterally at least 2 feet beyond exterior flatwork and pavement areas. The majority of the on-site soils should be reusable for compacted structural fill, although approximately 20% shrinkage can be expected.

Following excavation of the unsuitable soils as described above, a representative of this office should observe the excavation bottoms prior to the continuance of grading to verify that unsuitable materials have been removed and that competent soils have been exposed. The native soils exposed after overexcavation should be scarified to a depth of 6 inches, brought to within 2 percent of the optimum moisture content for granular soils and slightly above optimum for fine-grained soils, and compacted to at least 90 percent of the maximum dry density as determined by ASTM D-1557. The site should then be brought to rough pad grade with structural fill as described in the following section.

Subgrade materials supporting slabs-on-grade, exterior concrete flatwork, and pavements should be kept moist and not be allowed to dry out and crack. If the subgrade has been disturbed or dried out prior to placement of aggregate base, the exposed soils should be moisture-conditioned and recompacted as outlined in the Structural Fill section of this report.

We recommend that a representative of this office be allowed to review the grading plans when prepared to evaluate their compatibility with our recommendations.

STRUCTURAL FILL

All fill placed for the support of footings, slabs-on-grade, exterior concrete flatwork, and pavements should be structural fill, which may consist of excavated on-site or approved imported low plasticity soils (having a remolded swell potential less than 4% under a 60 psf surcharge). Structural fill below the footings shall consist of approved Type 1 pit run gravel and should have a solubility of less than 3 percent, be free of vegetation and debris, and contain no inert materials larger than 4 inches in nominal size. It is our opinion that the majority of the on-site soils are suitable for reuse as structural fill with the exception of below the footings, although approximately 20% shrinkage can be expected for native soils.

The structural fill should be placed in maximum 8-inch loose lifts and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer. Soils in compacted fills should be compacted to at least 95 percent of the maximum dry density, in accordance with ASTM D-1557. The moisture content should be within 2 percent of

optimum for granular soils and at least 2 percent above optimum for fine-grained soils. Any imported fill materials should be approved prior to importing. Also, prior to placing any fill, the excavations should be observed by the Geotechnical Engineer to verify that unsuitable materials have been removed.

A soil sample was taken from the hill north of the proposed structure and analyzed in our laboratory. It is not suitable for use as structural fill due to "fat" clay content.

FOUNDATIONS

The proposed structure should receive adequate support from conventional strip and/or spread footings founded on dense or medium-dense native granular soils or on a zone of properly placed and compacted structural fill as described previously. All structural fill should be placed and compacted as described in the Structural Fill section of this report.

The footings should be a minimum of 18 inches wide and embedded a minimum of 30 inches below the lowest adjacent final grade for frost protection. Footings may be proportioned for a maximum net allowable bearing pressure of 850 psf. A one-third increase may be used for transient wind or seismic loads. It is our opinion that steel reinforcement should be used in the foundations as per the Structural Engineer's design.

The net allowable bearing pressure can be increased to 2000 psf if pit run gravel is utilized beneath the structure instead of the native soils. The pit run gravel must have a maximum dry density of at least 135 pcf utilizing ASTM D1557 and also meet all of the requirements contained in the structural fill section of this report. Prior to constructing the foundations, the footing excavations should be observed by the Geotechnical Engineer to verify that the specified removals have been accomplished.

SETTLEMENTS

Settlements of properly designed and constructed foundations as described in the previous section are anticipated to be less than 1½ inches. Differential settlements should be on the order of one-half of the total settlements. It is expected that the majority of the anticipated settlement will occur during construction.

CONCRETE SLABS-ON-GRADE

Satisfactory support for concrete slabs-on-grade and exterior concrete flatwork may be provided by a 4-inch layer of compacted gravel overlying a zone of properly placed and compacted structural fill. As previously stated, approximately 30 inches of overexcavation is recommended. Excavations may be terminated if competent, medium-dense granular soils are encountered. The layer of compacted gravel may consist of Type I or Type II Aggregate Base, or pit-run gravel with a 2-inch maximum particle size and no more than 12 percent fines passing a No. 200 sieve. All concrete slabs should be designed to minimize cracking as a result of shrinkage. We agree that concrete floor slabs be reinforced as recommended by the Structural Engineer. Reinforcement should be installed at mid-height in the slab unless directed otherwise by the Structural Engineer. Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (high water/cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking, or curling in the slabs. We recommend that all concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) Manual.

SOIL CORROSION

Soils on this site may contain salts in sufficient concentration to be considered corrosive to concrete and metal. Therefore all concrete in contact with the on-site soils and used in footings and stem walls should contain Type V or equivalent sulfate-resistant cement and should be placed with a 4-inch slump. Special protection of buried metal pipes and water lines will be essential for long-term performance of these underground utilities. Consideration should be given to cathodic protection or to the use of PVC pipe where permitted by local building codes.

MOISTURE PROTECTION AND SURFACE DRAINAGE

It is imperative that precautions are taken during and after construction to eliminate, or at least minimize, saturation of foundation soils due to the moisture sensitivity of soils that

exist beneath the proposed structure. If these moisture protection recommendations are not strictly followed, settlements large enough to cause cracking could still occur.

Overwetting the soils prior to or during construction may result in softening and pumping, causing equipment mobility problems and difficulty in achieving compaction. Saturation of the soils after construction may cause distress to the foundations and flatwork. Positive drainage should be established away from the exterior walls of the structure. The recommended minimum slope is five percent (5%) in landscape areas and two percent (2%) in pavement areas for a minimum distance of 10 feet from the structure. Watering adjacent to the structure should be kept to a minimum and properly maintained to prevent overwatering. Roof runoff should be collected into drains and along with other sources of moisture should not be allowed to infiltrate the soils in the vicinity of, or upslope from, the structure.

All utility trenches leading into the structure should be backfilled with compacted non-pervious fill. Special care should be taken during installation of subfloor sewer and water lines to reduce the possibility of future subsurface saturation.

PAVEMENTS

Support for asphalt pavement in non-dedicated areas may be provided by a minimum 20-inch thickness of Type 1 gravel (3-inch minus pit run). Pavement section recommendations are based upon visual soil classification of the on-site soils, an assumed traffic index of 6.5 (passenger car and truck traffic), an assumed minimum resistance value (R-Value) of 35, and the site grading recommendations contained in this report. The recommended minimum asphalt concrete pavement sections are presented below:

Recommended Minimum Asphalt Pavement Sections

Traffic Condition	Assumed Traffic Index	Asphalt Thickness (Inches)	Compacted Road Base Thickness (Inches)	Compacted Type 1 Gravel Thickness (Inches)
Moderate Traffic/Parking	6.5	2.5	10	20

Asphalt and aggregate base material should conform to local requirements. All base material should be compacted to at least 95 percent of the maximum dry density (ASTM D-1557). Asphalt should be compacted to a minimum of 97 percent of the Marshall maximum density. Field and laboratory testing should be performed to determine whether applicable requirements have been met.

It is important that parking area grades be set to provide positive drainage to suitable drainage structures. A desirable slope for drainage in paved areas is two percent (2%).

CLOSURE

LIMITATIONS

The recommendations contained in this report are based on the field explorations, laboratory tests, and our understanding of the proposed construction. The subsurface data used in the preparation of this report were obtained from the explorations made during this investigation. It is possible that variations in the soil and groundwater conditions could exist elsewhere on the site. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at the site which are different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should likewise be notified.

This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, express or implied, is made. It is the Client's responsibility to see that all parties to the project, including the Designer, Contractor, Subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

ADDITIONAL SERVICES

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during the construction to verify compliance with the recommendations. These tests and observations should include, but not necessarily be limited to, the following:

- Observations and testing during site preparation, earthwork and structural fill placement
- Observations of footing excavations
- Consultation as may be required during construction

We also recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

CLOSING

We appreciate the opportunity to be of service on this project. Should you have any questions regarding the report or wish to discuss additional services, please contact us at your convenience.

Respectfully submitted,

GEM ENGINEERING, INC.

Joel A. Myers, P.E.
Engineering Manager

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