University of Utah L.S. Skaggs Pharmacy Research Building

Facility Program - January 15, 2009

EDA nbbj

UNIVERSITY OF UTAH REVIEW SIGNATURES

We have reviewed the *University of Utah L.S. Skaggs Pharmacy Research Facility Program* dated January 15, 2009 and warrant that it adequately represents our request for a facility to fulfill our mission and programmatic needs. All appropriate parties representing the University have reviewed it for approval.

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DIVISION OF FACILITIES CONSTRUCTIUON & MANAGEMENT, STATE OF UTAH

I have reviewed the *L.S. Skaggs Pharmacy Research Facility Program*, jointly prepared with the University, for approval.

Rick James *DFCM Project Manager*

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Programming Procedure

The programming process for the University of Utah L.S. Skaggs Pharmacy Building was organized around a Kick-Off Meeting, a Leadership Summit and three interactive two-day workshops with design charrettes that occurred two weeks apart. This allowed for the processing and development of information for the subsequent meeting.

The Kick-off meeting was essential to setting the schedule, and identifying key project stakeholders. The Leadership Summit reviewed broader design and planning issues including the project vision, mission, goals and objectives. These broad issues inform the direction of planning and design, and ultimately the culture and identity of the new building.

The three workshops were organized around three program phases, including: Extracting Information/Understanding Program, Testing Alternatives/Confirming Direction, and Confirming Program/Finalizing Direction. An outline of each workshop and the identified tasks following the workshops are provided below:

1.1-A: Leadership Summit

Workshop 1 - Program Understanding

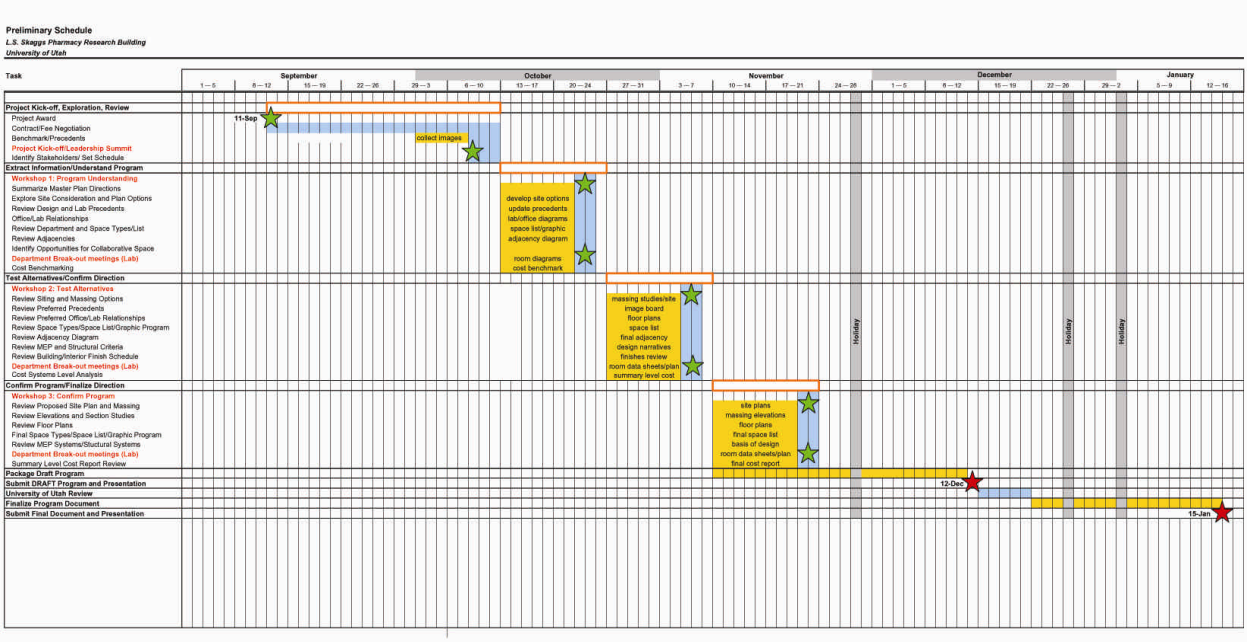
- Summarize Master Plan Directions
- Explore Site Considerations and Plan Options
- Review Design and Lab Precedents
- Review Options for Office/Lab Relationships
- Review Department and Space Types/List
- Review Adjacencies
- Identify Opportunities for Collaborative Space
- Department Break-out meetings for Lab Programming
- Review of Cost Benchmarking

Workshop 2 - Test Alternatives
Pre-Workshop Activities

- Develop Site Plan Options
- Update Lab/Office Diagrams
- Develop Space List and Graphic Program
- Develop Adjacency Diagrams
- Develop Stacking Diagrams
- Develop Lab Room Diagrams/Plans
- Develop Preliminary Equipment List
- Update Cost Benchmarking

Workshop 2 - Test Alternatives

- Review Site Plan and Building Massing Options
- Review Preferred Precedents
- Review Preferred Office/Lab Relationships
- Review Space Types/Space List/Graphic Program
- Review Adjacency Diagram
- Review MEP, Structural, Civil and Landscape Criteria



1.1-B: Programming Schedule

Workshop 3 - Confirm Program

Pre-Workshop Activities

- Refine Site and Building Massing
- Update Precedents
- Develop Concept Plans
- Update Space List
- Update Adjacency Diagrams
- Develop Room Data Sheets
- Update Lab Room Diagrams/Plans
- Update Equipment List
- Draft Design Narratives
- Code Summary Review
- Meet with Building Dept. & Fire Marshall
- Summary Level Cost Report

Workshop 3 - Confirm Program

- Review Proposed Site Plan and Building Massing
- Review Section Studies
- Review Concept Plans
- Review Space Types/Space List
- Review MEP, Structural, Civil and Landscape Systems
- Department Break-out meetings for Lab - Sign-off
- Summary Level Cost Report - Draft

Workshop 3 - Confirm Program
Post Workshop 3 Activities (Pre-Draft Program)

- Complete Concept Site Plan
- Complete Concept Sections
- Stacking Diagrams
- Complete Concept Plans
- Complete Space List
- Finalize Basis of Design (MEP/Structural/Civil/Landscape)
- Finalize Room Data Sheets
- Finalize Room Diagrams
- Finalize Equipment List
- Summary Level Cost Report

Upon completion of the workshops, the programming team assembled a draft document that was submitted to DFCM, the University of Utah, and representatives from Health Sciences and the College of Pharmacy for review and comments. Comments received were incorporated into the final document which was submitted for final approval on January 15, 2009.

2.1 Acknowledgements

Senior V.P. Health Sciences: Lorris Betz

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Joseph Harman, UofU Campus Design & Construction

Christin Robbins, UofU Campus Design & Construction

Tami Cleveland, UofU Facilities Planning

In Memoriam: Craig Forster, Director, UofU Office of Sustainability

"We must not cease from exploration and the end of all our exploring will be to arrive where we began and to know the place for the first time. ..." TS Eliot

2.2 Programming Team

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Mechanical:	Kim Harris, Van Boerum & Frank
Electrical:	David Whitton, Envision Engineering
Cost:	Ken Ament, Construction Control Corporation
	Kris Larson, Construction Control Corporation
Code:	Josh Green, RJA Group

2.3 Programming References

- University of Utah Campus Master Plan, 2008
- University of Utah Long Range Development Plan, 1997
- University of Utah College of Pharmacy Master Plan, 2006
- DFCM Programming Standards
- LEED for New Construction & Major Renovations
- LEED EB: O&M
- John D. Horel
  Professor
  University of Utah
  Department of Meteorology

The 2006 IBC references the following codes and standards among others:

- International Fire Code, 2006 edition
- International Mechanical Code, 2006 edition
- NFPA 13, Standard for the Installation of Sprinkler Systems, 2002 edition
- NFPA 14. Standard for the Installation of Standpipe and Hose Systems, 2003 edition
- NFPA 72, National Fire Alarm Code, 2002 edition

2.4 Project Justification/ Per College of Pharmacy

For the past thirty years, the College of Pharmacy has been nationally ranked among the top tier colleges for NIH-funded research. Further, the College's graduate programs are recognized nationally and internationally for their excellence.

To build on this established base of research and graduate education, we envision the College of Pharmacy becoming a national and international leader in interdisciplinary and translational science in the Health Sciences Campus. In addition, we also envision the College's graduate and post-graduate programs as being areas of growth for the future. This overarching vision requires a new research building to sustain our record of academic excellence. A new, state-of-the art research facility will also enable us to achieve even higher levels of translational science and graduate education.

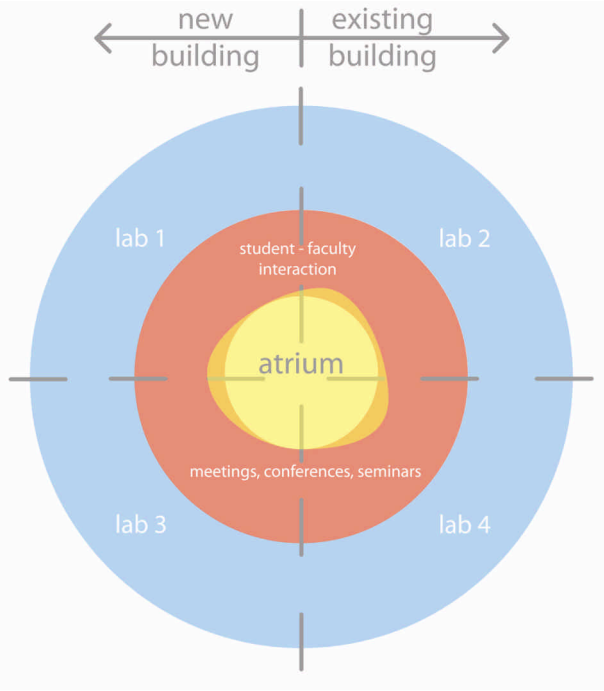
The new building will be based on the principles of: 1) bringing the faculty and students within the College into proximity for greater program coherence and collegiality, and 2) bringing interdisciplinary programs together to enhance the opportunities to address important research themes.

The fact that this new building will be built at the southern point of the education corridor will engender collaborations with programs housed in the Biomedical Polymers Research Building, the Eccles Human Genetics Building and the Emma Eccles Jones Medical Research Building and the University of Utah Hospital.

2.5 Project Vision, Goals, Needs and Concepts

Vision:

- This building will allow the College of Pharmacy to sustain and grow as the foremost translational research center, based in interdisciplinary research, in the world.
- Graduates will lead to change in Health Care and create better futures through the thinking and learning processes they have developed at this Institute.
- Its faculty will lead in discovery and innovation at all levels.



Vision, Needs, Goals and Concepts

Goals:

- Create a monument to Mr. Sam Skaggs – a magnificent building
- Bring the College together to allow them to take on bigger problems
- Teach to be lead innovators
- Rely on leadership of the four chairs
- Increase connectivity
- Increase capacity
- Practice sustainability as a research enterprise.
- Practice translational research.
- Enable an entrepreneurial environment.
- Recruitment of the best as "good citizens".
- Allow for a body of diverse faculty and students – highly trained and international.
- Promote collaboration across Health Science.
- Integrate our efforts.
- Create community.
- Produce graduates that meet the market's needs.
- Innovation to the max.
- Sell Poison Control
- Encourage cross fertilization
- Plan for flexibility in use and assignment
- Graduate Education as driver
- Show-off the science
- Maintain environment of compatibility with campus.
- Create a culture around the "bump and buzz"
- Consider flexibility around infrastructure in design of new space.

Needs:

- Design to high standards of safety and security.
- Preserve existing Skaggs Auditorium, but develop it as a more active center.
- Consider an on-site pharmacy to "dispense information"
- Allow for a gym and/or on-site showers for building users.
- Provide spontaneous writing surfaces (glass, white boards, etc)
- Vibration control (Center for Human Toxicology and Animal Research).

Programming Concepts:

- Faculty Office Clusters (with varied office sizes).
- Open Flexible Labs.
- Neighborhood Lab/office (offices adjacent to lab).
- Poison Control as part of lab.
- Shelling of space (1-2 floors) to maximize build-out but help with budget.
- Site as gateway.
- Strengthen Health Science Walk.
- Maximize views and light.
- Shared Instrument Areas.
- Atrium as Translational Center.
- Centralized computational/visualization area.
- Core facilities (cell culture, animal, imaging, computers, instrumentation)
- Consider the existing Skaggs Building in forming a 'whole" for the Skaggs Pharmacy Institute.

2.6 Site Information

Nestled in the foothills of the Wasatch Mountain Range on the University of Utah campus, the site for the new L.S. Skaggs Pharmacy Research Building occupies a seat of prominence as viewed from the Salt Lake Valley.

The site for the new L.S. Skaggs Pharmacy Research Building is located immediately adjacent to the southwest façade of the existing L.S. Skaggs hall. The close proximity of this site to Skaggs Hall provides an opportunity to connect the new and existing buildings in a meaningful way both literally and figuratively through the creation of an atrium that physically unites the two buildings.

2.7 Existing L.S. Skaggs Hall

For over forty years L.S. Skaggs Hall has served the needs of the College of Pharmacy and helped the College develop and support research programs recognized on a national and international level. Today the existing Pharmacy building can no longer, by itself, meet the growing needs of the College, researchers, and students.

While the building has been remodeled and upgraded over the years to meet the changing needs of the College, the building's infrastructure and systems are aging and limited in comparison to today's research facilities. The building is being well maintained, however, replacement of systems and equipment should be anticipated and scheduled moving forward. A building systems report was completed in July 2007.

The concept of integrating and combining the existing L.S. Skaggs Hall with the new research facility will allow the building to continue to function effectively for the College while bringing the departments together from areas around the campus. It will also maintain the legacy of the building, and provide a significant anchor for the College and the Skaggs Institute.

2.8 Space Program Summary

Space requirements for this building include lab space, office space and animal research space which support the four department groups within the College of Pharmacy.

Occupants of the new building will include four program departments that work together in translational research through discovery, testing, delivery and outreach. Of the four program departments, there are three basic science groups - Medicinal Chemistry, Pharmacology and Toxicology, and Pharmaceutics. The final program department, Pharmacotherapy, operates as a dry lab and office function with a focus on community outreach.

A detailed Space List has been provided by program group, along with a summary of program spaces by department.

The Space List provides a summary of space for a partial build-out to respond to the current budget of $50 million, and summarizes space for the ultimate goal of full build-out of 150,000 SF.

2.9 Cost Model Summary

In an effort to clearly evaluate the existing project budget and understand the probable costs for the new Pharmacy Building, the estimating team gathered cost data on similar research lab facilities. Facilities in California, Texas, Colorado, and Rhode Island were evaluated along with facilities within the State of Utah and specifically at the University of Utah.

The detailed program estimate for the L.S. Skaggs Research Building identifies the anticipated construction costs for the program requirements identified. This estimate is an update of previous estimates developed during and after the project master plan.

2.10 Project Schedule

2.11 Sustainability

The L.S. Skaggs Pharmacy Research Facility can institutionalize an essential aspect of human existence - that of sustainable human and ecological health, by integrating advanced principles and procedures into the design, construction and ongoing use of its flagship facility. Stability of climate, water resources and biological productivity are prerequisites to the sustainable environment within which individuals, communities, societies and nations can flourish.

Building projects exert more influence over the quality and stability of environment than any other activity. When executed and managed well, they can act as cornerstones of sustainability at local, regional and global scales. For this exemplary project, it is imperative that 'sustainability' be understood as a unifying institutional goal. This goal must be shared by the College of Pharmacy, the University of Utah, the State and DFCM, and constituents and stakeholders. An elusive objective, sustainability is approachable only through design team integration, rigorous methodologies, supportive institutions and cultures, and willing participants in the process. All must be prepared to develop the *ability to sustain* health and environment: the essence of 'sustainability.'

The Pharmacy Research Facility project offers a unique opportunity for sustainable planning, design, operations/management and use. Utilizing an integrative design team process, a green building certification discipline, environmental self-accounting, and ongoing organizational education, the facility can both 'teach' and 'learn' from the moment of conceptualization through its entire life cycle of use. The US Green Building Council's 'LEED' (Leadership in Energy and Environmental Design) green building certification systems, the Utah State DFCM 'High-Performance Building Rating System' (HPBRS), the DFCM Design Requirements, the DFCM Energy Efficiency Thresholds, and internationally recognized environmental management systems such as ISO 14000 can combine to create the highest attainable approaches to sustainable building design and construction.

Supported by HPBRS toward elevated attainment of whole-building energy performance, LEED-NC (New Construction) certification will guide the project to:

- Environmental accountability for site and infrastructure impacts minimization
- Water resource and water quality conservation,
- Energy efficiency and consequent atmospheric impacts restraint,
- Materials resource and environmental impacts minimization, and
- Healthful interior environments assurance, linking across categories where appropriate.

LEED-EB (Existing Buildings: Operations and Maintenance) may be utilized without certification formalities as the best available guide for facilities managers to ongoing operational and maintenance planning, including 'greening' of O&M staff and services, procurement, cleaning, waste management/recycling, and most variables affecting occupant comfort and health. Beyond LEED, the College of Pharmacy and University may wish to consider ISO 14000 certification. Such certification would bring international recognition to the sustainability efforts as defined by the institutions indices, itself.

3.1 Campus History

The University of Utah, originally named University of Deseret, was founded in Salt Lake City on February, 28, 1850 – making it the oldest State University west of the Mississippi River. The area of land set aside for the campus included 560 acres along the foothills of the Wasatch Mountains.

In 1894 the name of the school was officially established as the University of Utah, and 60 acres of Fort Douglas land was granted to the University by Congress. Over the next decade a collection of buildings were constructed around a green space, and the University moved entirely from its downtown location.

Over the years, the University of Utah continued to acquire property and today is made up of 225 buildings on a 1,500-acre campus with an enrollment of 30,347 students.

3.2 Master Plan

In September of 2008 the University of Utah published a new Campus Master Plan which set forth guiding principals for campus development for the next 20-years. The plan builds on the planning efforts outlined in the 1997 Long Range Development Plan (LRDP), the 1998 East Campus Plan (ECP), and the 2003 LRDP Supplement.

The plan and its development was driven by President Young's vision of "engagement, preparation and partnership" as stated in his inaugural address.

The plan includes analysis of land use, landscape and open space, pedestrian and vehicular circulation, parking, utility infrastructure, and design and development opportunities. In addition to the Health Science Center, areas of the campus which are addressed include The Heritage Preserve and Research Park, and the main campus – including academic, research, athletics and recreation programs.

The defining principals and identified vision of the plan relate to teaching, research, and public life and are as follows:

- A lively campus; a magnet for student, faculty, staff and public life.
- State of the Art facilities to support the University's mission for teaching, research and public life.
- A setting to foster interdisciplinary collaboration and interaction.
- Campus as a destination for the public.
- Functional and sustainable transportation systems.
- Capitalize on the natural landscape setting.
- Leaders in environmental stewardship.

In addition to the expansion of the College of Pharmacy, the master plan for the Health Science Center illustrates other major projects for this part of the campus. One of the largest projects will include a replacement building for the School of Medicine. This facility will provide a “front door” for the Health Science Center and improve access from Mario Capecchi Drive to upper parts of the Health Science Campus.

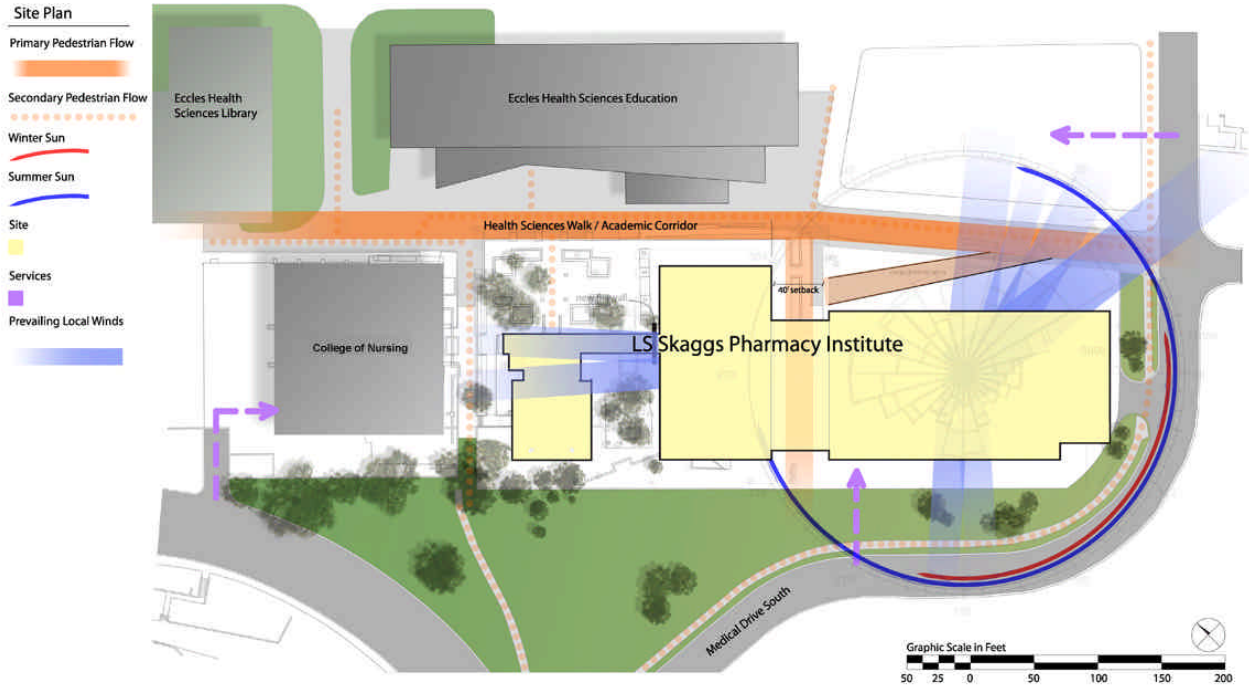
3.3 Site Location and Photos

The site for the new L.S. Skaggs Pharmacy Research Building is located along Medical Drive South in the Health Sciences Center at the University of Utah in Salt Lake City. The site currently functions as a parking lot for this area of the campus and provides service access to the College of Pharmacy.

Medical Drive South, providing access to the south part of the Health Sciences campus, borders the southwest, south and southeast edges of the site. The Health Sciences Academic Corridor borders the northeast edge of the site and provides pedestrian access to the School of Medicine, Eccles Health Sciences Library, Eccles Health Sciences Education, The College of Nursing and the College of Pharmacy. A below-grade parking garage across from the Health Sciences Academic Corridor, and to the northeast of the site, also provides service access to the Health Sciences Education Building.

The existing L.S. Skaggs Hall sits to the northwest of the proposed site. This project will provide a connection between the buildings and form the L.S. Skaggs Pharmacy Institute.

View along west edge of Existing L.S. Skaggs Hall



Existing L.S. Skaggs Hall viewed from proposed site

Courtyard at Health Sciences Academic Corridor

Existing L.S. Skaggs Hall Courtyard

Existing L.S. Skaggs Hall Courtyard

Existing L.S. Skaggs Hall viewed from the south west

Service Entrance to L.S. Skaggs Hall

3.4 Environmental Analysis

The site is located at an altitude of 4930 feet, at latitude 40.8 degrees and west longitude -111.9 degrees. It sits along the foothills of the Wasatch Mountains on what are referred to locally as a "benches" or terraces. From the southwest edge of the site to the northeast edge of the site there is a grade change of approximately twenty feet. The ground inclines approximately three feet from the southeast boundary of the site to the southeast face of the existing L.S. Skaggs Pharmacy Building.

This area receives warm to hot summer days with little rainfall and temperatures averaging around 20 to 25 degrees Celsius. Winter conditions are cold with rain, snow and temperatures averaging around 0 to 5 degrees Celsius.

Refer to attached Climate Summary for Salt Lake City, Utah.

3.4.1 Solar Orientation

The solar path runs from northeast to northwest for summer sun, and southeast to southwest for winter sun.

The site is oriented longitudinally northwest to southeast, not optimal for solar orientation on a site. Additionally, there are no buildings for some distance on all sides of this site, except to the northwest, which will allow for even greater solar exposure.

It is anticipated that the building will require sun shading control along all faces of the exterior of the building to address solar gain and glare.

Refer to attached Shading Analysis Diagrams for December 25th and June 24th.

3.4.2 Prevailing Winds

Prevailing winds for this site come out of the Wasatch Mountains from the northeast, with occasional moderate gusts from the south. The mountain winds often occur in the early morning and at night due to cooling.

Based on over a million five minute observations over the past ten years, the highest gust recorded was 84 MPH, and the highest average for a five-minute period was 52 MPH.

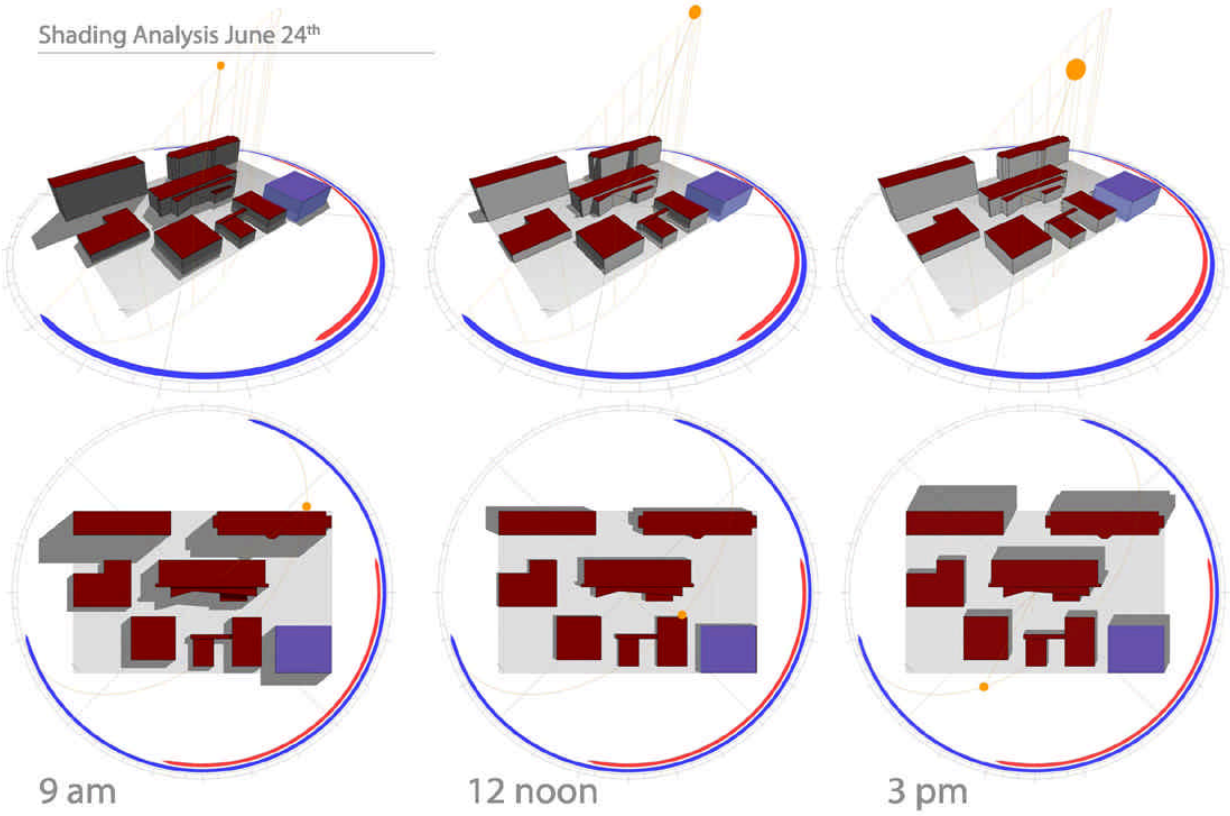
Prevailing local winds are shown on the site plan.

3.4.3 Views

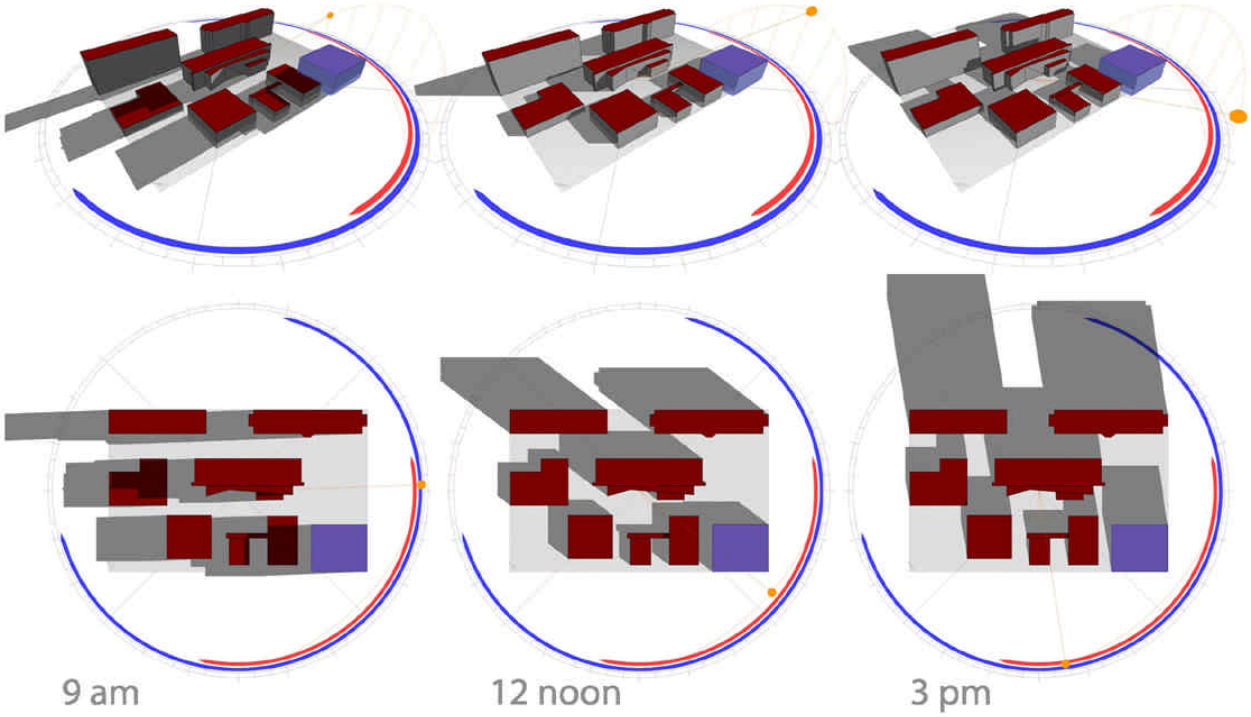
Sitting at the base of the Wasatch Range, this site has spectacular western views over the Salt Lake Valley, the Great Salt Lake and beyond to the Oquirrh Mountains at the western edge of the valley. It also has exceptional mountain views looking to the northeast and southeast.

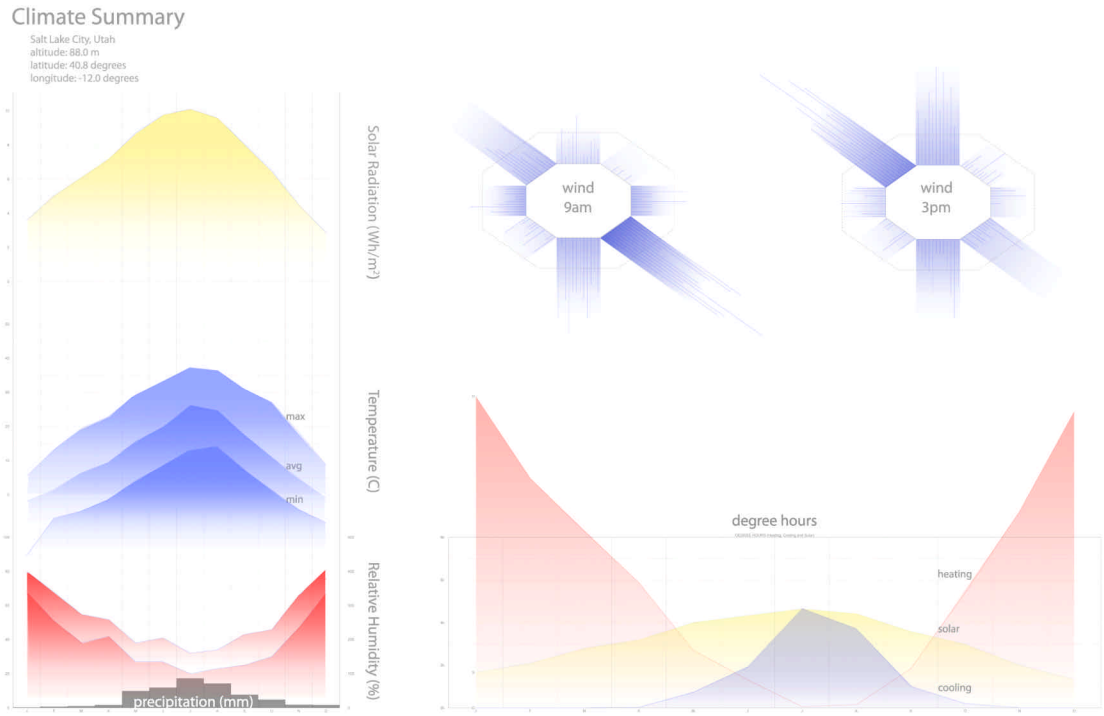
The new L.S. Skaggs Pharmacy Research Building will be visible from Downtown Salt Lake City and will be a prominent feature as one approaches the Health Science Center from Medical Drive South. Articulating the southern gateway to the Health Sciences Center, this facility will anchor the southwestern edge of the Academic Corridor at this entrance.

Shading Analysis June 24th



Shading Analysis December 25th




Climate Summary
Salt Lake City, Utah
altitude: 88.0 m
latitude: 40.8 degrees
longitude: -12.0 degrees
Solar Radiation (Wh/m²)
Temperature (C)
max
avg
min
Relative Humidity (%)
precipitation (mm)
wind
9am
wind
3pm
degree hours
heating
solar
cooling

3.5 Site Access

The site is located at the eastern terminus of the campus, with access from Medical Drive South.

3.5.1 Vehicular and Service

All vehicles and service arrive to the site via Medical Drive South from Mario Capecchi Drive.

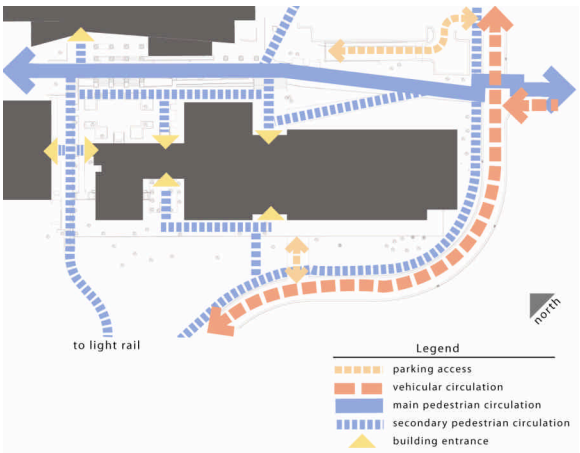
The current site provides ninety-five parking stalls for the Health Science District. Additional parking in the vicinity is located across the Academic Corridor in the HSEB below-grade parking structure, the surface lot southeast of the HSEB and the South Terrace Parking Structure to the northeast of the Biomedical Polymers Research Building. The project anticipates one level of parking below the new L.S. Skaggs Pharmacy Research Building to account for parking displaced with the construction of this new building.

Service access to buildings in this quadrant of the Health Science Center is typically located along the perimeter, and restricted along the Academic Corridor. Service to the Health Sciences Education Building occurs below grade to the southeast. Service to the School of Nursing, northwest of the existing pharmacy building, occurs on the northwest side of the building. Service to the existing Skaggs Pharmacy Building is through the existing on grade parking lot to the south.

Options were considered for service to the new building from the northeast, southeast and southwest. Service and parking access to the new building from the northeast, utilizing the existing HSEB parking garage ramp, would require extensive excavation and risk disturbance of the utility corridor under the Academic Corridor. Service to the site from the southeast competes with pedestrian access and the goal of creating a gateway facility at the south entrance to the Academic Corridor. An entry from the southwest or west provides opportunity to connect to a below-grade parking level with less excavation then the other alternatives. This option must be studied further in the design phase to coordinate parking and service access with below grade utilities in the area.

3.5.2 Light Rail and Transit Considerations

The existing Utah Transit Authority light rail and transit systems, in addition to the campus bus service, make it possible for College of Pharmacy users to take advantage of alternate transportation modes. This is consistent with the agenda of the University of Utah to encourage the use of transportation modes other than private cars. Convenient pedestrian walkways should be provided from all transit stops to the College of Pharmacy to further encourage the use of alternate transportation modes. Providing sufficient bicycle storage and locker/shower facilities will also contribute to the alternate transportation program success.



Site Access

3.5.3 Pedestrian and Bicycle

Pedestrians and bicyclist will access this site from the Academic Corridor to the northeast of the site. It is anticipated the building entry will be at the second level off of the Academic Corridor.

3.6 Site Utilities and Infrastructure

3.6.1 Civil

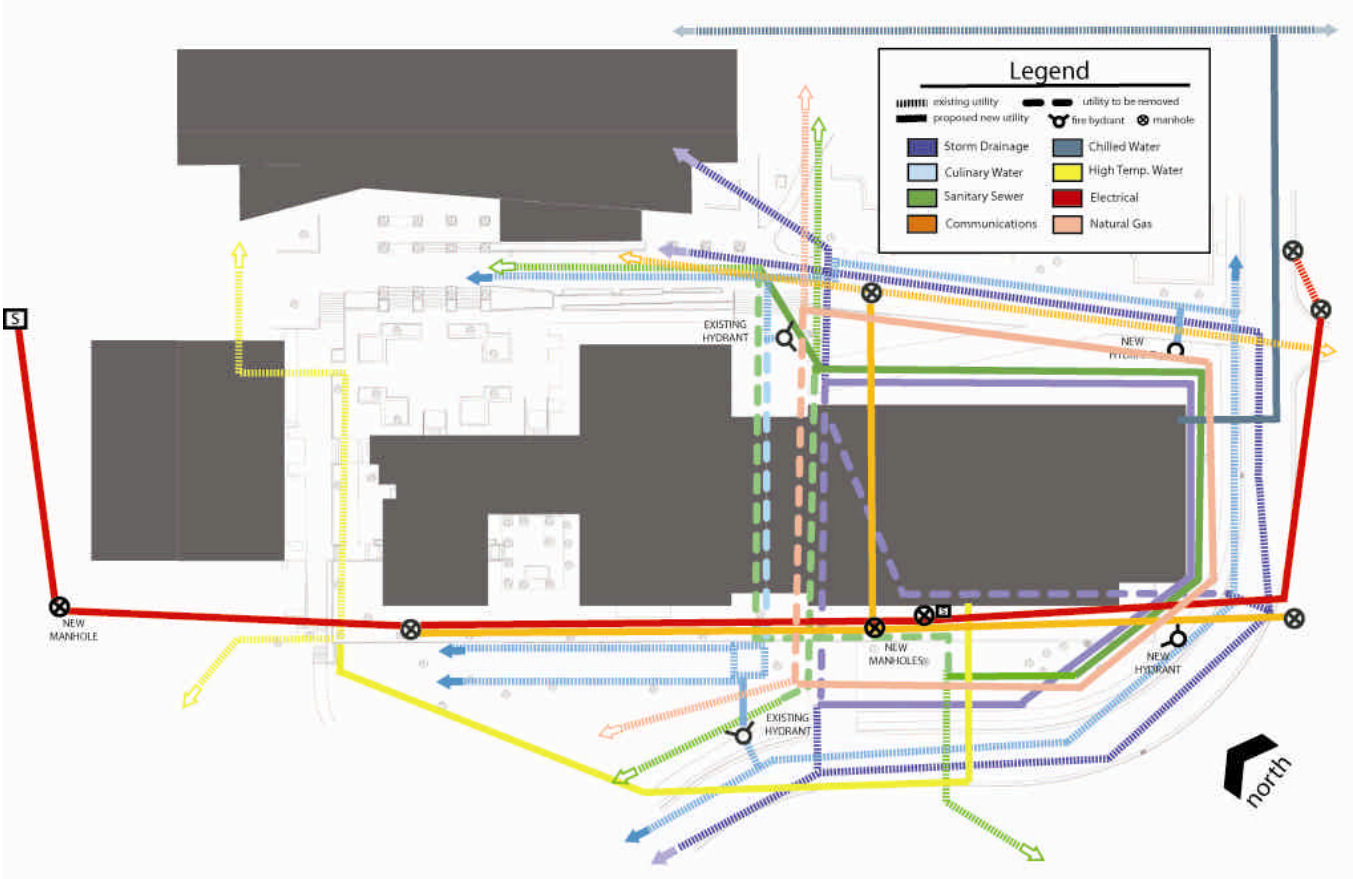
3.6.1.1 Site Demolition The existing site is occupied by an asphalt parking lot servicing the existing Pharmacy Building. This parking lot will need to be demolished along with the lighting, parking lot
storm drainage system as well as the curb and gutter and landscaping. Stairways, planters and ramps that service the existing Pharmacy building will also need to be demolished as access to the existing building will be through the atrium area of the new building.

3.6.1.2 Utility Relocation

There are several existing utilities that run along the south side of the existing Skaggs Pharmacy Building. Each of these utilities will need to be relocated in order to accommodate the new atrium and research building. Relocation of these utilities and possible alignments are discussed in their respective sections of this report.

3.6.1.3 Site Grading

The proposed Skaggs Pharmacy Research Building is fairly sloped with the overall elevation changing from about 4,937 on the east side to 4,917 on the west side. With the



overall grade change being 20 feet across the site, the overall site slope is about 5%. The site future grading will take advantage of the grade change by accessing the underground parking structure from the west side of the site.

3.6.1.4 Storm Water

The University of Utah requires that any increase in storm water runoff from existing sites must be detained or retained and released at a controlled rate. In addition, the University has a goal of becoming "water neutral" in the next 10 years, where "water neutral" means that the University is not dependent on culinary sources for irrigation water. This means that non-culinary water available to the University campus from roof drainage, site storm water, snowmelt, reverse osmosis effluent, etc. should be collected, stored and used for irrigation. For this project, the University will require at a minimum that storm water discharge from the site is not increased as a result of this project. Every effort should be made and may possibly be required to reduce or eliminate storm water discharge from the site completely through retention and recharge of the aquifer or reuse of the discharge stormwater for other non-culinary purposes.

An existing 36-inch storm drain line exists in Medical Drive South, just to the west of the site. The 36-inch line has ample capacity to handle the discharge from the site. See Exhibit 4.6.1.

An existing storm drain line runs through the site and must either be routed around the new building or implemented into the drainage system for the building. The storm drain line is very deep (approx. 18 feet) and appears to be catching roof drainage and/or floor drainage from the underground parking structure at the HSEB to the east.

The on-grade parking lot storm drainage system will need to be demolished. This system serves only the parking lot. Three inlet boxes and approximately 280 feet of pipe will need to be removed.

3.6.1.5 Sanitary Sewer

The wastewater from the site should be discharged into the sanitary sewer line that crosses Medical Drive South, just to the west of the site. This is the only line nearby that is deep enough to accommodate the lower levels of the proposed building. According to the University staff, the existing line has ample capacity to accommodate the new building. There are two existing sanitary sewer lines that run just south of the existing Pharmacy Building (see Exhibit 4.6.1). Both of these lines will need to be relocated. The northern most of these two lines collects wastewater from the Health Sciences area and then once past the Pharmacy Building turns to the south and crosses Medical Drive South. The southernmost of these two lines also collects wastewater from the Health Sciences area and once past the existing Pharmacy building, turns to the north. It is suggested that these two lines be collected together on the east side of the proposed building and routed south, around the new building and tie into the same line that the new Pharmacy Research Building sewer line will tie into.

There is also a sewer manhole located at the south east corner of the existing parking lot that appears to be left as a stub to the new building. The invert of the sewer manhole is 4923.48 so the lower levels of the new Pharmacy building cannot be serviced by this

line but this line could be used to service upper levels.

3.6.1.6 Domestic Water/Fire Supply

As part of the programming team's research, a flow test was performed on the fire hydrant at the southeast corner of the existing building, on the Hospital pressure zone. The results of the flow test indicate a pressure of 80 psi in the static condition and a residual pressure of 75 psi at 1,300 gpm. At 20 psi, a 4,980 gpm flow rate was achieved. This water pressure and volume is adequate for domestic use and fire protection. Two additional fire hydrants will be needed on the southwest and southeast corners of the new Pharmacy building.

There is an existing water line that runs just south of the existing Pharmacy Building. This line will need to be removed and a connection between the water vault on the southwest corner of the existing building and the line servicing the fire hydrant directly to the west will be needed. See Exhibit 4.6.1.

3.6.1.7 Natural Gas

The new Pharmacy Research Building will have no need for Natural Gas service within the building. An existing Natural Gas line exists just south of the existing Pharmacy Building that will need to be relocated. This line is a looped line to provide redundancy to the Health Sciences Area. The line will need to be relocated around the new Pharmacy Research Building, but it is possible that this redundant line can be abandoned temporarily during construction.

3.6.2 Mechanical Utilities

The HTW lines should tie into the existing stub outs provided west of the Nursing Building and existing L.S. Skaggs buildings.

The chilled water lines should tie into the existing 12" chilled water lines that run East of the HSEB.

3.6.3 Plumbing Utilities

See 3.6.1.2 Utility Relocation.

3.6.4 Electrical Utilities

Primary electrical service for the new Skaggs Pharmacy building will be served by the Medical substation. A medium voltage circuit will extend from the substation to serve both the Nursing Building and the new Skaggs Pharmacy Building. A collaborative effort shall be made between the Nursing project and the Skaggs Pharmacy project to design the medium voltage feed. Preliminarily, the intent is to extend a 500 kcmil copper, 15 kV medium voltage circuit from the 4-position medium voltage switch that is being provided for the Nursing Building to the Skaggs Pharmacy building. The circuit shall be routed through existing manholes MH.41 and MH.40. Because manhole MH.41 is small and very congested, a new manhole set adjacent to MH.41 may be required. An evaluation of MH.41 will be made under the Nursing project and information will be available during design to better determine whether a new manhole will be required. A new 4 x 5" concrete encased duct bank shall connect manhole MH.41 and the new proposed manhole. In addition, a new 6 x 5" concrete encased duct bank will be required between manholes MH.40, MH.F1, and the new manhole described above. This will allow for

a tie to the Red Butte substation to provide for redundancy. Because of the distance between MH.40 and MH.F1, an additional manhole may be required. Coordinate design with Campus Electrical Shop. A new pad mount, 6-position, medium voltage, load break, solid dielectric switch shall be provided for the new pharmacy building. This switch shall supply power for two transformers for the new Skaggs Pharmacy building and a minimum of one future transformer for the existing Skaggs Pharmacy building. The acceptable manufacturers are Cooper and G&W. One of the 5" conduits from the new duct bank shall loop in and out from the new medium voltage switch. Provide two 5" conduits from the medium voltage switch to feed the transformers for the new Skaggs Pharmacy building and two 5" spare conduits for future feeds to the existing Skaggs Pharmacy Building. A utility yard shall be provided on the west side of the new building to house the medium voltage switch, the two transformers for the new Skaggs Pharmacy building, space for a maximum of two future transformers, and the emergency standby generator. The exact location of the utility yard shall be determined during design. The location of the utility yard shall be selected to allow for easy accessibility by vehicular traffic.

3.6.5 Communication/Data Utilities

The communication/data utilities for this building shall consist of two pathways into the building. These pathways will allow for redundancy for the communication/data systems. One pathway will come from existing communications manhole M41A which is located directly east of the new proposed site. The second pathway shall come from existing communications manhole M40 which is located directly north of the west side of the site and currently provides telephone/data service to the exiting Skaggs Pharmacy building. From manhole M41A, a 4 x 4" concrete encased duct bank shall extend to the MDF (main distribution frame) room in the new building. From manhole M40, a 4 x 4" concrete encased duct bank shall extend south to a new communications manhole. From this manhole, a 4 x 4" concrete encased duct bank shall extend to the MDF room in the new building. In addition, a 4 x 4" concrete encased duct bank shall extend south and tie into existing communications manhole M401 which is south of the new building. These two pathways into the building will be used to run fiber and Qwest copper. The fiber optic cables and copper shall be provided by the University of Utah's IT Group – Netcom. The associated cost for this work shall be included in the total cost for the project.

3.7 Geotechnical Consideration and Impacts

In order to determine and evaluate subsurface soil and groundwater conditions Gordon Spilker Huber, geotechnical consultants, were retained to conduct a soils investigation of the building site identified for the New Skaggs Pharmacy Building. The soils report is attached in the Appendix.

The investigation included four boring locations that were drilled, logged and sampled. The samples were lab tested and an engineering analysis conducted to establish recommendations for building foundations, earthwork, subdrain systems, and geoseismic conditions.

While no ground water was encountered when drilling, the soils identified were unusual for the area based on other soils test within the Health Science Corridor. The test samples contained significant amounts of silty clays with intermittent layers of silts and fine sands. While this configuration may still allow spread footings to be used for foundations, replacement granular fill will be required below foundations to control differential settlement.

The project structural engineer will need to work closely with the soils engineer to ensure that the identified bearing pressure of the soil is compatible with the building loads and the structural systems proposed.

Site excavation will also need to be monitored closely to address appropriate sideslope conditions based on the soils identified and the depth of excavations at the various points around the site. The deepest excavations will occur on the East edge of the site and soil nailing will likely be required due to the limited area available to slope the excavation. Excavation on the North side of the site will need to address the existing Pharmacy building, its basement, and the existing footings.

3.8 Site Design

3.8.1 Overriding Principals

The design of the site should be an extension of the building design, and represents its use as an academic research facility.

3.8.2. Indoor/Outdoor Relationships

The Pharmacy Research Building goal, to create connections beyond the facility, will benefit from strengthening the indoor/outdoor relationship between the internal uses and the site/landscape. It is important to consider both the experience of the user, inside the building, perceiving the environment beyond, as well as the user outside the building looking in. Due to the significant grade changes occurring across the sit, special consideration must be given to the physical and visual relationship between interior and exterior spaces during the design phase. The opportunity to integrate the building with the landscape should not be limited to physically connecting the envelope of the building with exterior areas immediately adjacent to the building. Consider also opportunities to link the building and site with views, especially the view to the west.

3.8.3 Synergistic Spaces

The strategy of creating spaces that foster interaction should not be limited to the interior of the building. Orchestrating a series of flexible exterior spaces at the buildings perimeter for small group gatherings, team meetings, gala events, etc. can enhance and advance the human experience. Consider inspiration for users to ask big questions.

3.8.4 Hierarchy of Spaces

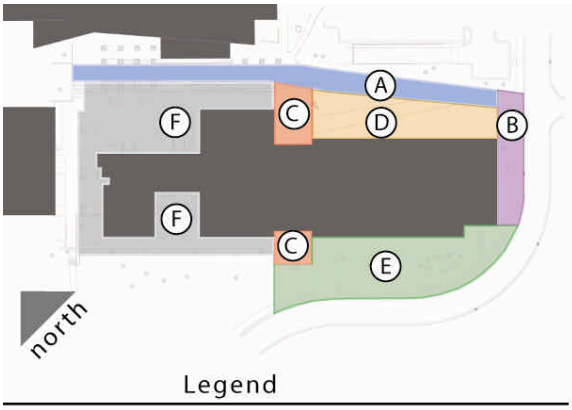
The site, like the building, needs to be designed to provide flexibility and create a variety of spaces to support the day-to-day activities as well as special events – gatherings, forums, presentations, conferences, graduation ceremonies and gala events, etc. The site should be flexible to provide areas for a comfortable, private exchange between a small group as well as a more formal, organized gathering, such as a study group, team meeting, or gala event with several participants.

3.8.5 Native Landscape

Located on the Bonneville Shoreline bench, the Pharmacy Research Building will benefit from using native plant materials to connect the facility to its vernacular landscape. Native and locally-adapted plant material can add identity to the facility, represent the grass roots side of pharmaceuticals, and perhaps provide inspiration for users.

3.9 Specific Site Zones

Several distinct site areas need to be integrated with the architectural design, the existing facilities and other project site areas for an overall experience to address Generations, Science and Connections.



A. Academic Corridor
B. Health Sciences Center South Gateway
C. Translational Space
D. East Side Accessible Route
E. District Edge
F. Existing Facilities

3.9.1 Health Sciences Center South Gateway

There is a strong pedestrian connection from the Student Village Center Core through the Health Sciences District. The intersection of Medical Drive with this corridor should be treated as a south gateway for the Health Sciences District to welcome pedestrians entering the district from the south and to provide a visual cue for vehicles on Medical Drive. Horizontal and vertical elements can be used to define this gateway zone.

3.9.2 Academic Corridor

This corridor provides a strong pedestrian link from the Student Village Center, in addition to the visual links through the corridor. Special consideration should be given to the design of this corridor to enhance the pedestrian experience throughout the corridor and to strengthen the visual connections. This corridor will interface with the site translational space and eastside accessible route, see below.

3.9.3 Translational Center Extension

The areas of the site that sit immediately adjacent to the exterior walls of the Translational Center should be an extension of this collaborative, synergistic architectural space strategically situated between the existing L.S. Skaggs Hall and the proposed Pharmacy Research Building. This space should be designed to host a variety of events, from day-to-day activities and informal meetings to organized and structured events. Views from within the building and from the exterior looking into the space, should be carefully considered, as well as access to and from the translational space.

The portion of the site on the east end of the translational space should be treated as a front porch for the main entry to the building. This space may evidence itself in a plaza-type space suitable for smaller-scale private interactions or small group gatherings. The grade change between the academic corridor steps and the building face will create an enclosed space that needs to be carefully designed to encourage interaction.

The extension of the translational space on the west must work with the elevation change and the associated District Edge (see below). This portion of the translational space could lend itself as a gala space for forums, an outdoor venue for graduation celebrations, etc. It could be like the bow of a ship, oriented to the view beyond, and protrude through the "formal edge" retaining wall. In order for this exterior space to function as an extension of the translational space within the building, the exterior façade of the building should be carefully planned to tie the interior and exterior spaces together.

3.9.4 Eastside Accessible Route

There is an estimated five to eight feet of elevation change from the main pedestrian corridor to the proposed finished elevation of the first floor on the east side of the building. An accessible route needs to be provided in this area for building access. This side of the building should strongly engage activity along the Academic Corridor.

This accessible route will likely be used daily by pedestrians arriving at the Pharmacy Research Building from the Academic Corridor. This path may be developed as a part of the main entry spatial sequence to both the College of Pharmacy and the Health Sciences District.

3.9.5 District Edge

The proposed site for the Pharmacy Research Building maintains approximately 20 feet of elevation change across the site from east to west. The existing L.S. Skaggs Pharmacy building has a retaining wall on the west side that defines the edge of the Health Sciences campus. This wall might be continued along the face of the proposed building to reinforce this edge.

Special consideration should be given to the west edge of the site as it relates to the

translational space, the existing L.S. Skaggs building and to the campus beyond the project site. Part of the space immediately adjacent to the building of the western edge could be provided as an exterior extension of the interior Translational Center (see Translational Space above). The design of this area should take advantage of the panoramic views to the West.

3.10 Site Materials

The materials used in the site design should tie this project to the existing campus, and particularly the Health Sciences district. The materials should complement the building materials and complement the facility as the gateway to the Health Sciences district. Consideration should be given to the selection of the materials and construction detailing, to contribute to the overall sustainability of the project and to minimize extensive long-term maintenance.

Site elements need to work in conjunction with the existing L.S. Skaggs Hall, with the intent that in the end, the boundaries of the project will blend together and not be evident.

3.10.1 Security

Security will be important to consider in the planning and design of this research facility. Research involving animals and research around pharmacology, toxicology and pharmaceutics are activities that draw attention.

Secure barriers between public spaces and research spaces will need to be considered. Below–grade parking under the building will require restricted access.

3.10.2 Utility and Service Equipment

Utility and service equipment (e.g. mechanical vents, transformers, generators, and dumpsters) should be located on the site so as to be screened from the main flow of vehicular traffic and pedestrian zones. This may include the incorporation of screen walls to conceal the equipment, or these elements might be planned for below grade spaces where they can be more easily concealed.

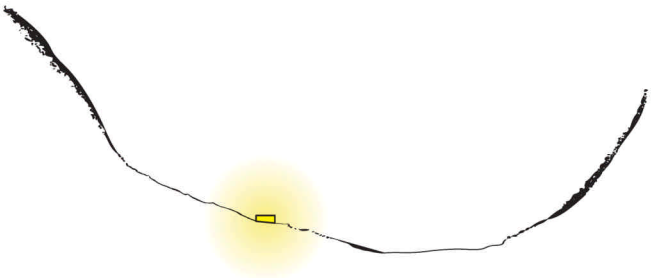
3.10.3 Plant Material

Plant material should be selected for its functional use as well as educational and aesthetic purposes. Functional uses may include framing views, providing shade to reduce heat gain, creating a pedestrian scale against the building façade, creating a ceiling of tree canopies to define a particular space and directing users to entrances and key site features. Aesthetic uses may be to provide color and texture for year-round interest, provide aromatic scents in pedestrian areas, and provide interesting patterns or rhythm to contribute to the synergy of a space or represent the native plant material in an urban setting. Educational uses may include showcasing plant material that is frequently used in pharmaceutical applications, such as digitalis, perhaps in conjunction with interpretive signage.

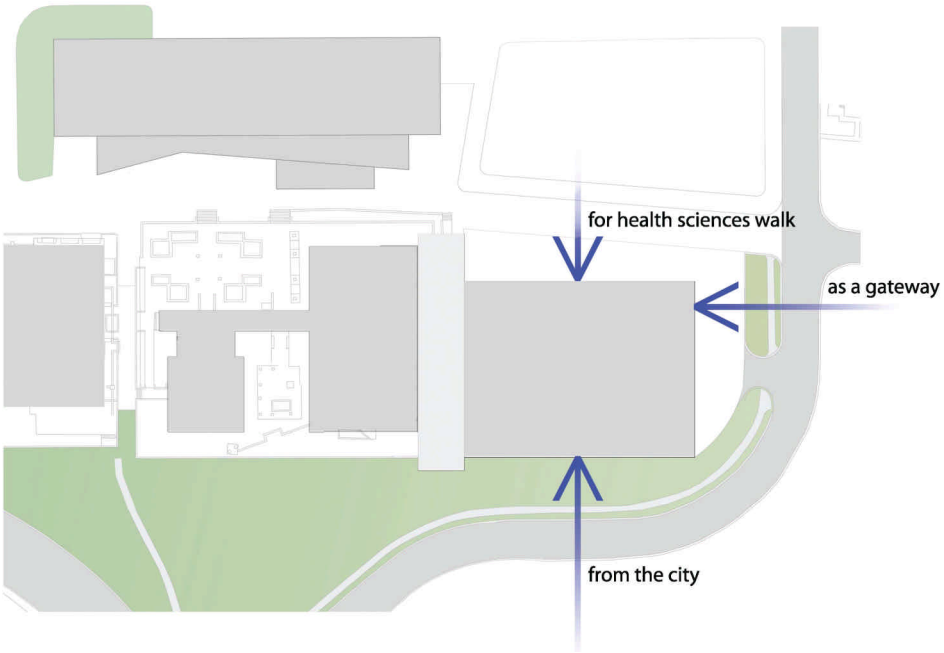
4.1 Site and Building Diagrams

Design precepts will shape both the physical and social outcomes of the site and building, and are included as diagrams in this report. Precepts identified with the College of Pharmacy include:

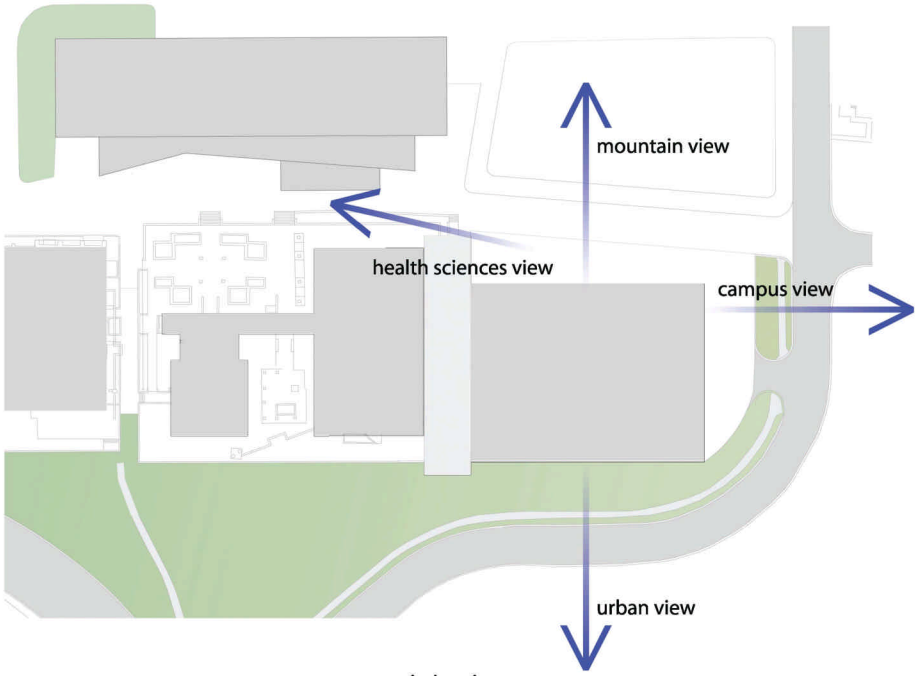
- ***The site and building as "Crown Jewel".*** In the context of the city, this building sits on a prominent site between valley and mountain. It will sit above the main campus as a gateway facility to the Health Science Center. It should stand proudly on the site and be recognized as a building that brings great value to the community and campus.



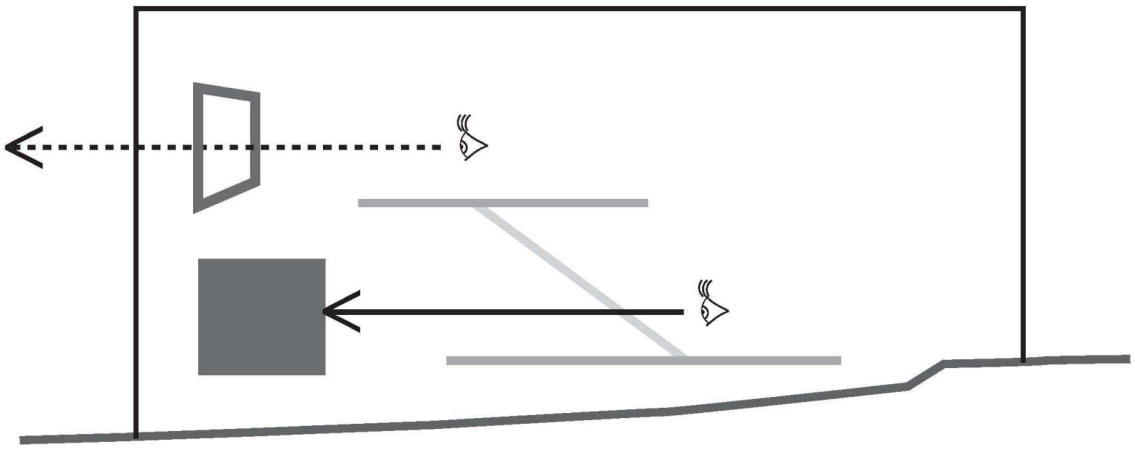
- ***Create Identity.*** This building should have a strong identity, and at different scales. Scale and identity should be considered from Salt Lake City, where it will be visible. Additionally, the building is a gateway as you enter the health science campus from the southwest, along Medical Drive South. Finally the building will form the edge of the Academic Corridor as one enters the campus. The building will need to engage the pedestrian along this face, in addition to being a friendly addition to Health Science Center.



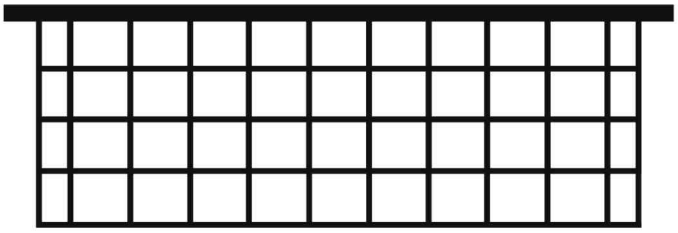
- ***Capture Views.*** The building should be sited and designed to take advantage of views in all directions – to the city, to the mountains, and along the health science walk to the immediate campus.



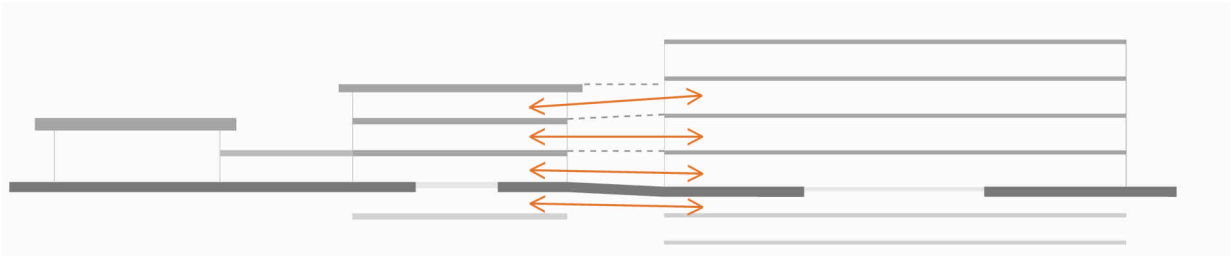
- ***Framing views to the world through the lens of pharmacy.*** On a site where views are expansive, efforts should be made to frame and capture views though the space and architecture of the building. Space should be designed to create opportunities for surprise, enlightenment, and regeneration.



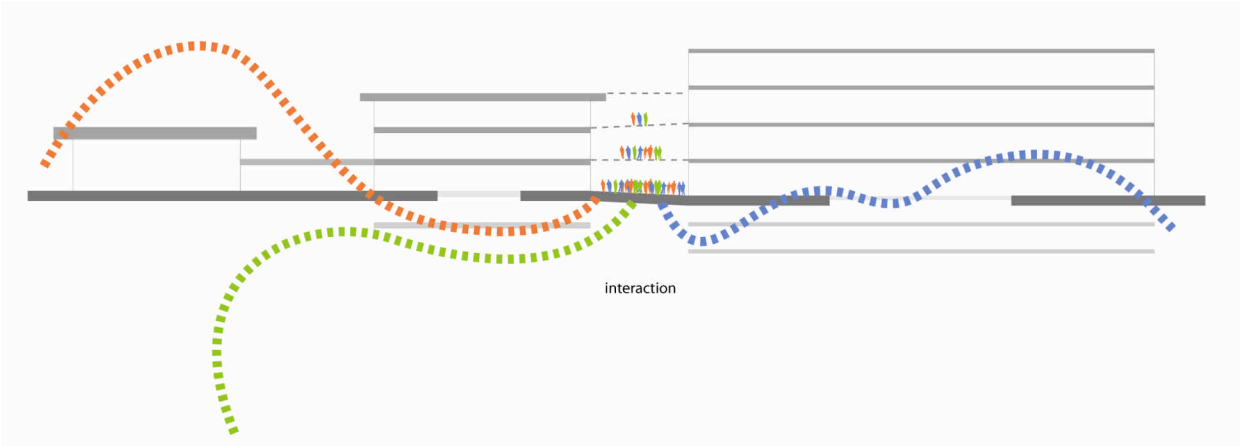
- ***Structure.*** The structural bay and main shaft in the existing Skaggs Pharmacy Building will need to be considered in planning and design of the new facility. Other planning considerations should consider a laboratory module of 11', and the parking layout in the below-grade parking garage.



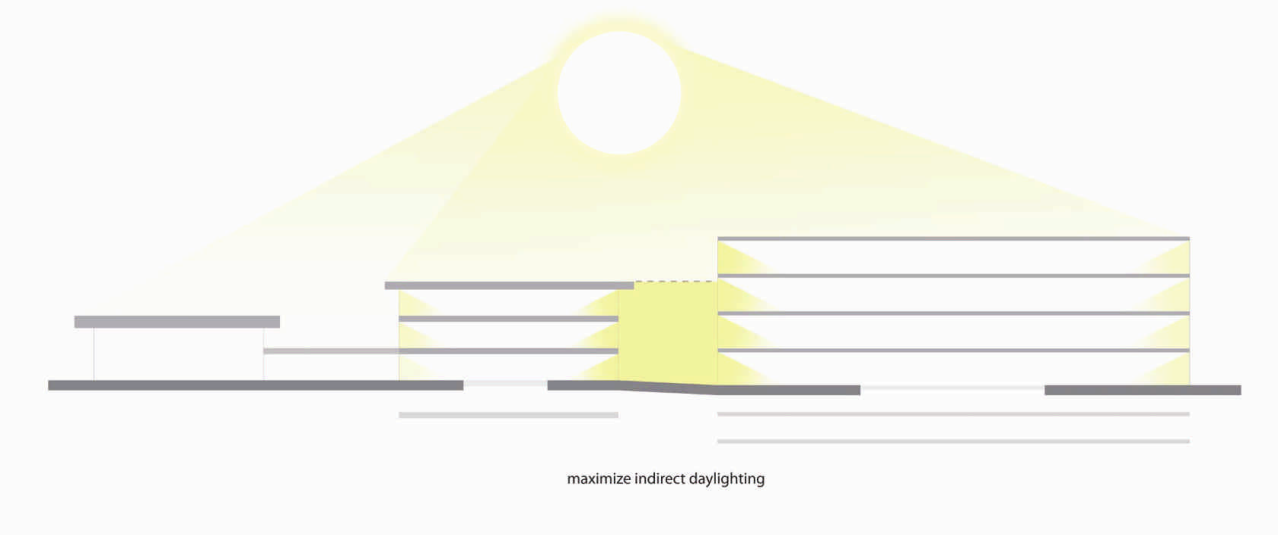
- ***Connectivity.*** In connecting to the existing pharmacy building with a new facility, this project will create the L.S. Skaggs Pharmacy Institute, allowing for greater collaboration within the College of Pharmacy, and better connectivity to the Health Science Center.



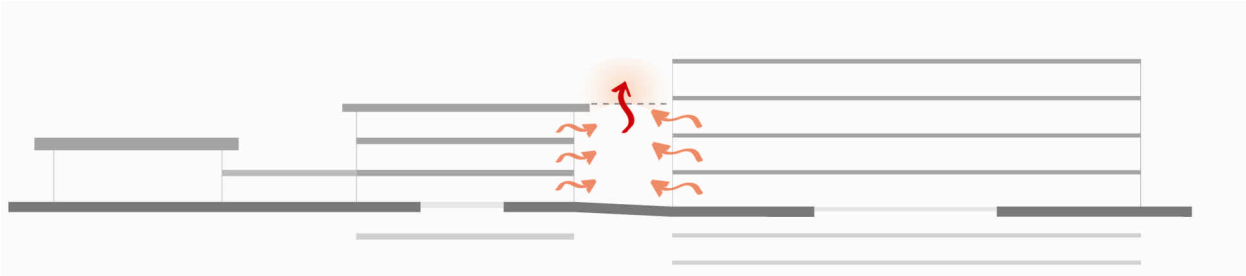
- ***Interaction.*** This building will foster greater interaction between the College of Pharmacy and the Health Science Center, in addition to bringing the College of Pharmacy together. An atrium or "Translational Center" will function as building entry, and meeting space for the College of Pharmacy. Conference Rooms, Lounge Space, along with interactive computational and virtual labs will be located in the atrium to bring the "bump and buzz".



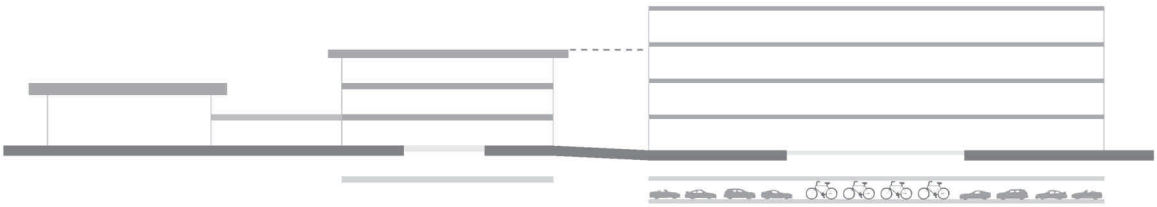
- ***Maximize Indirect Daylighting.*** This project should provide opportunities to maximize indirect daylighting to all interior spaces through windows, skylights, lightshelfs, and interior glazing.



- ***Natural Ventilation.*** The building should create opportunities for natural ventilation in non-lab spaces – including office, conference and atrium spaces.

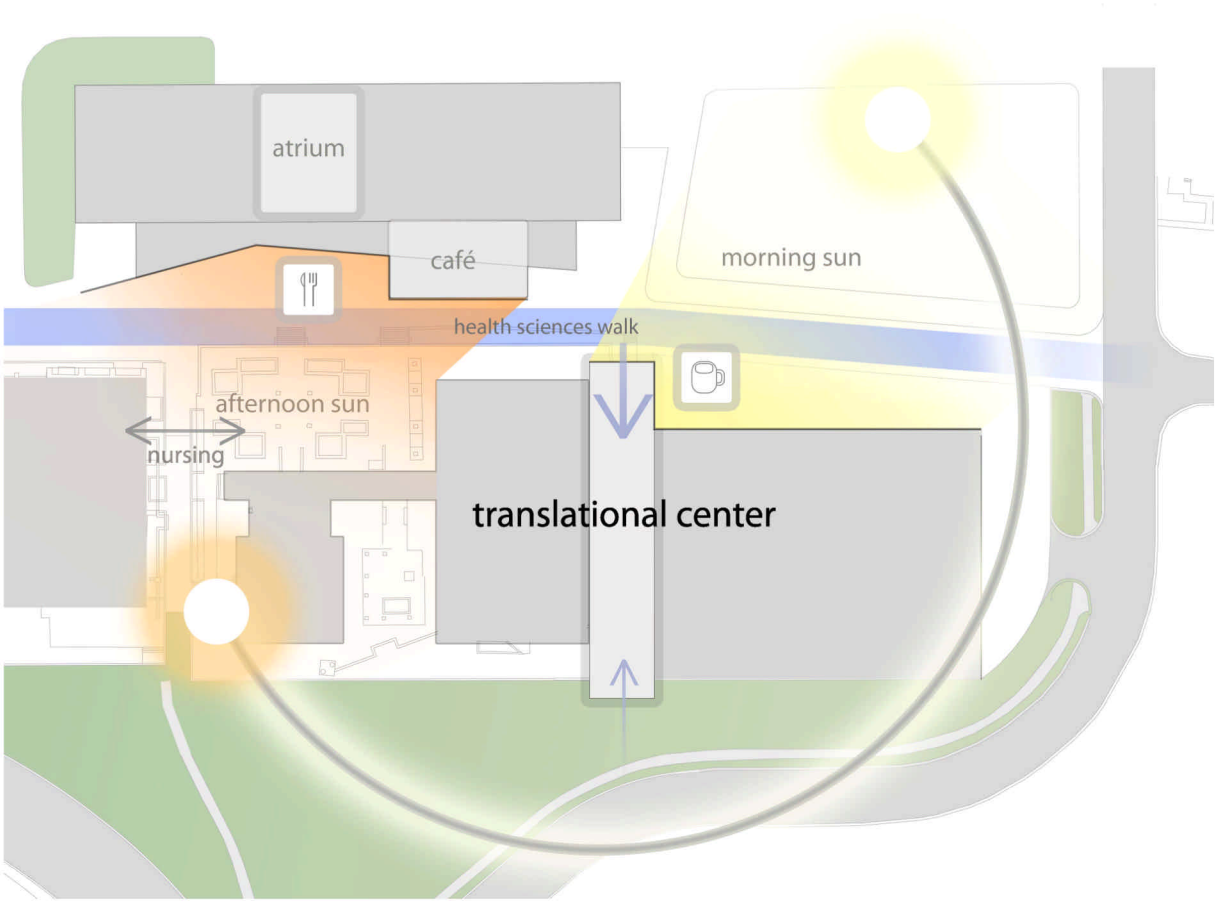


- ***Maximize Below-grade Parking.*** This project will displace current parking on the Health Science Campus. The new building will provide for below-grade parking and new loading dock functions. Parking layout should be of efficient design to make up for spaces lost with the construction on the new facility.



maximize below grade parking

- ***Outdoor Social Space.*** The site will create new opportunities for outdoor social space along the health science walk that respond to the natural environment and the new building.



- ***Science.*** This building should express itself as a preeminent academic research facility which proudly displays its focus on science and research.

4.2 Efficiency Analysis

Section 6.0 includes a Space List which summarizes all spaces required for this project.

In summarizing spaces, a 60% net to gross efficiency factor has been calculated for total building square feet.

Given this efficiency, the atrium space will be more generous in allocation of space to allow for building entry, circulation and transition between the new building and the existing building. The lab and office areas on each floor should be designed to allow for very high efficiency with equipment corridors and circulation paths that have dual purpose.

4.3 Individual Space Requirements

Space requirements for this building include lab space, office space and animal research space which support the four department groups within the College of Pharmacy.

4.3.1 Occupants

Occupant of the new building will include four program departments that work together in translational research through discovery, testing, delivery and outreach. Of the four program departments, there are three basic science groups - Medicinal Chemistry, Pharmacology and Toxicology, and Pharmaceutics. The final program department, Pharmacotherapy, operates as a dry lab and office function with a focus on community outreach.

Medicinal Chemistry

This is a growing and expanding department, with a nucleus of staff that has been recognized as the best in the country in Pharmaceutical Sciences. It has ranked second among all colleges of pharmacy for NIH peer-reviewed research, and over the last two years has received with over 7 awards in the field of science, including the 2006 and 2007 State of Utah Governor's Medal for Science and Technology.

This mission of this department is to create new knowledge for the discovery and development of new therapeutic agents for use in human medicine. This department has significant strengths in the areas of anti-cancer drugs targeted at lipid signaling, marine natural product anti-cancer agents, synthesis of drugs to treat cancer, infectious and parasitic diseases, computational modeling of bimolecular structure and dynamics, tissue engineering and scar-free wound healing.

The department includes the Center for Therapeutic Biomaterials which does research around drug discovery, tissue regeneration and wound-healing gels. It also includes The Center for Cell Signaling, The Anticonvulsant Program, and the International Drug Discovery Program which researches drug discovery for disease like Tuberculosis, cancer and malaria.

Currently located in Research Park, the Biopolymers Research Building , and L.S. Skaggs Hall, this department consists of eight tenured track or principal investigators (PI's), expanding to nine by 2013. Each PI currently has 5-6 research investigators (RI's), but will expand to 8-10 RI's by 2013.

This department is one of the heaviest users of chemicals in the College of Pharmacy.

Lab Space needs include open wet lab (chemistry-intense), cell culture, media prep, equipment rooms, instrument rooms, glasswash/autoclave rooms, microbiology/protein expression/fermentation, cold rooms and toxins storage.

Other space requirements include a computational lab space, visualization room, office space, conference, kitchen and lounge space.

Pharmacology and Toxicology

The Department of Pharmacology and Toxicology is the largest of the four departments within the College of Pharmacy. This distinction is due in large part to the dual nature of its academic and research function in the Health Science Center. The Department resides administratively in the College of Pharmacy, but is also the Pharmacology Department for the School of Medicine. The department has received high praise for the quality of its faculty in both instruction and in the conduct of funded research, and the excellence of its students.

Pharmacology and Toxicology are integrative and interdisciplinary sciences that investigate the actions of chemical agents on living systems through research and testing. Major areas of research emphasis include Neuroscience, Cancer Biology, Biochemical and Molecular Toxicology and Analytical Toxicology. Over the next several years as new positions become available, the Department aims to expand into the areas of pharmacogenetics and pharmacogenomics.

The Department consists of 30 faculty - 17 tenured/tenure track faculty and 13 full time research faculty. There are approximately 134 researchers in the department, including 21 graduate students. By 2013, tenured track faculty will remain the same with anticipated retirements and new hires. But three new wet lab spaces will be required, due to the fact that some are shared currently. New hires of five new research track faculty are expected by 2013.

Located in Research Park, the Biopolymers Research Building and L.S. Skaggs Hall, the program groups within this department include the Center for Human Toxicology (CHT) and its affiliated Sports Medicine Research and Testing Laboratory, the Anticonvulsant Drug Development Program and the Project Program Group (PPG). CHT is an internationally recognized leader in the development of assays for drugs in specimens.

The Department of Pharmacology and Toxicology has a critical need for large, state-of-the-art animal facilities, and this will be an anticipated program requirement in the new building.

In addition to animal facilities, PPG will require wet lab space, a dark room and equipment room. Other space requirements include office space, conference, kitchen and lounge space.

CHT requires secure space which includes wet labs, cold rooms, freezers, sample assessioning, glasswash alcoves, a QC prep area, and a cylinder storage room. Office space required includes a conference room, records storage, exam room and a receiving area.

Pharmaceutics

The Department of Pharmaceutics is a national leader in the area of Pharmaceutics, especially in translational research in the area of drug delivery and in the newly emphasized field of bio-defense. Four of the Department's tenured/tenure track faculty are University Distinguished Professors. Additionally, one of these four has also been elected to both the Institute of Medicine of the National Academies and to the National Academy of Engineering. The newly appointed Department Chair, Dr. David Grainger, is the first holder of the George S. and Dolores Doré Eccles Foundation Presidential Endowed Chair.

This group is a "soup-to-nuts" department, with processes and work that includes Organic Synthesis, Formulation and Device Design, In Vitro and Cell Testing, and Pre-clinical and Model Testing (which involves some animal work).

This program group currently includes 10 Tenured Track Faculty and 7 Research Faculty. The department anticipates growth to 12 Research Faculty by 2013, including new USTAR hire Hamid Ghandehari. This program groups also includes more than 40 graduate students, 12 post-docs and 10 visiting scientist. It is anticipated that student and post docs will increase by 17 by year 2013.

The Department has very close ties with Bioengineering in the College of Engineering and extensive collaborations with faculty in the Huntsman Cancer Institute and the Departments of Anesthesiology, Radiology, Obstetrics and Gynecology, Internal Medicine, Oncological Sciences, Pathology and Pediatrics. These collaborations not only make possible the translational interests of Departmental faculty, but encourage the building of teams that will ultimately secure programmatic funding to expand faculty and student recruitment within the Department.

As is the case with each of the Departments within the College, Pharmaceutics is split into three buildings, two on the HSC campus (the Biopolymers Research Building and L.S. Skaggs Hall) s and one in Research Park.

One of the first Utah Centers of Excellence, the Center for Controlled Chemical Delivery reports to the Department Chair. CCCD has a distinguished history and has been largely responsible for creation of the International Symposium in Recent Advances in Drug Delivery, a biennial meeting held in Salt Lake City. In keeping with the University's interest in the commercialization of inventions, Department faculty has patented numerous inventions and has started a large number of companies in University Research Park and elsewhere.

Space requirements for this group include open wet labs (chemistry-intense), cell culture suites, media Prep/autoclave, a cold room, an instrument room, an equipment room, DLS equipment room, microscopy rooms, and a cylinder storage room. Other space requirements include office space, conference, kitchen and lounge space.

This group will share the computer lab, visualization room, and vivarium with other departments

Pharmacotherapy

The Department of Pharmacotherapy functions around community outreach and have spaces that would be more similar to standard office program, but with more specific needs for their research and work. The vision of the Department as recently articulated by a Faculty Assessment Task Force convened by the Chair is to become "...a national leader in pharmacotherapy through innovation and integration of education, practice and scholarship..." This vision will be enhanced by the revitalization of the M. S. degree program with a focus on Outcomes Research that is offered within the Department.

Located in both Research Park and L.S. Skaggs Hall, this department includes six tenure track, thirteen core clinical track and four research track faculty. It includes four basic groups – the Clinical Education and Department Core Clinical Faculty (TTT), The Poison Control Center, The Outcomes Research Center, and Drug Regimen Review.

The Poison Control Center has a staff of 27 people which include Pharmacist, Nurses and Students. The space is high-security and all access is restricted. Communication needs include a Homeland Security Telephone System, CB-Radio, 'Q" Equipment, and Automatic Call Distribution. Pivotal to this space is a Call Center which operates 24-7.

In addition to the Call Center, this group also requires an Outreach Education Room, Conference Room and Surge Space for students.

Drug Regimen works in conjunction with the Utah Department of Health to review medication profiles for select patients – the purpose being to help clinicians optimize drug therapy and reduce drug cost without compromising patient care. Security is also important to this group, and can be collocated with Poison Control offices. Drug Regimen includes a total of 12 staff, and has office needs that include cubicles and private offices.

Outcomes Research contracts with the pharmaceutical industry, foundations, managed care organizations and the government. Their mission is to facilitate the interaction of academia and patient care systems through outcomes research, the presentation and publication of results, training of healthcare professionals and facilitating the utilization of outcomes research information to improve patient care. This group has a staff of 20 people with office space requirements that include cubicles and private offices.

TTT/Clinical Faculty has a staff of 28 with activity focused around didactic work and practice work. Space requirements include private offices and cubicles.

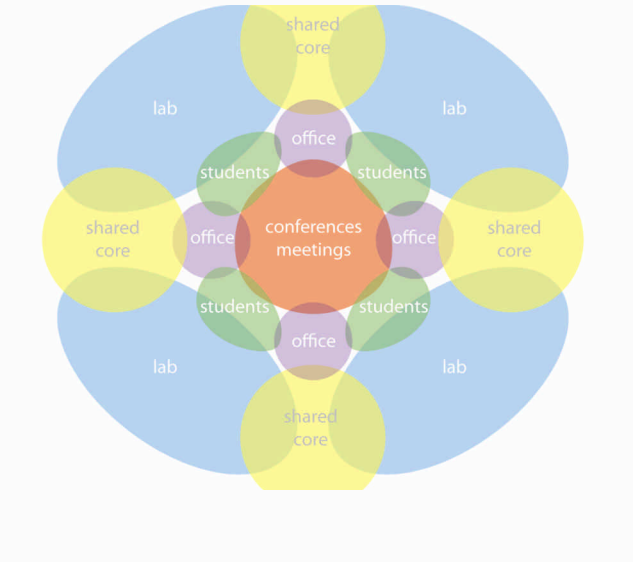
In addition to individual space needs by group, common spaces will be required which include reception, conference rooms, work rooms, library, lounge space, and storage.

4.3.2 Activity

In that this is an academic teaching and research institute, much of the program activity supports this type of facility.

Program activity includes the following basic functions:

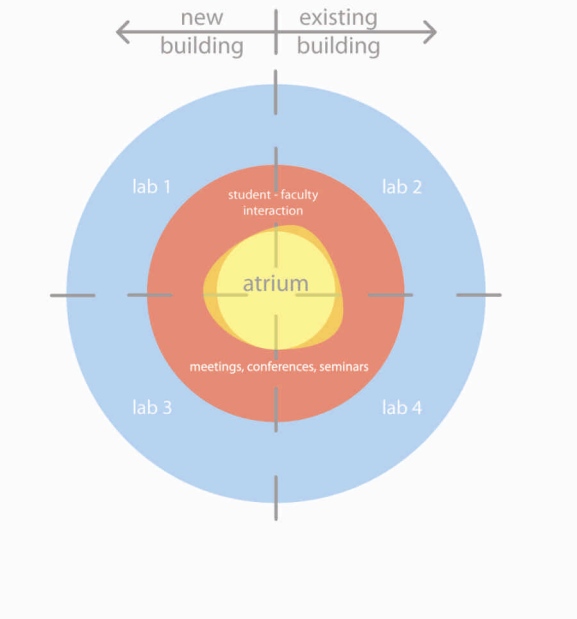
- Academic Wet Lab Research
- Academic Instruction
- Academic Grant-writing
- Administrative
- Meetings
- Animal Research



4.4 Adjacency Descriptions and Diagrams

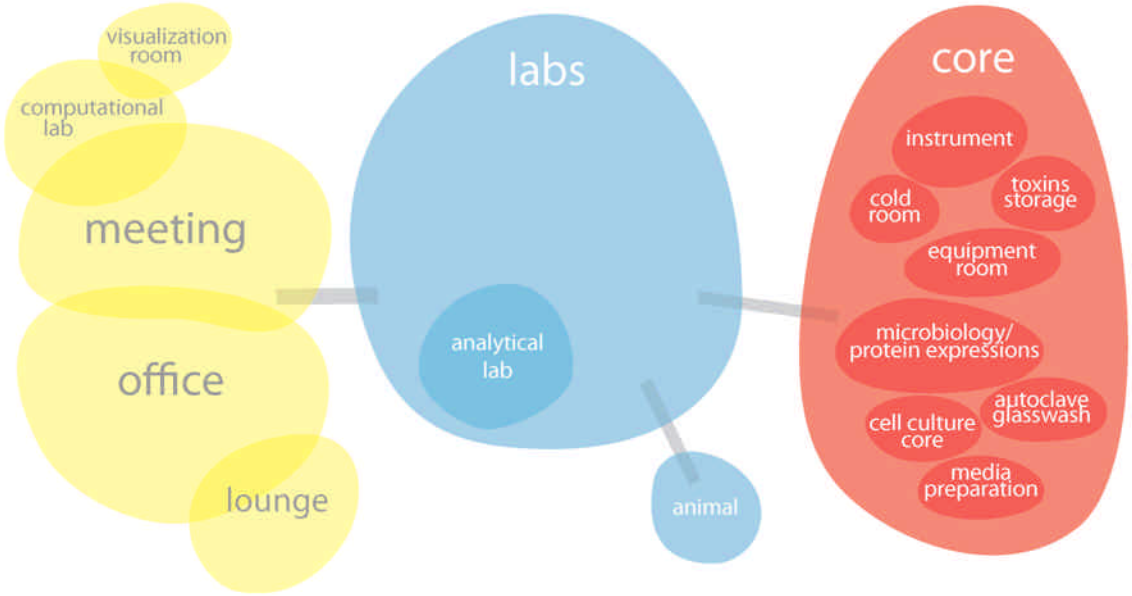
The four departments within the College of Pharmacy will operate and be located to allow for greater collaboration, interaction, and translational research. In program meetings with all the departments the following was noted as important criteria:

- Maintain close adjacency between PI office and lab.
- Maintain close relationship between student or RI's and laboratory to monitor activity in lab space.
- Maintain close adjacency between student and PI offices.
- Activate the Atrium or "Translational Center" by locating conference room, lounge space and other common spaces adjacent to this space
- Provide shared core spaces adjacent to open labs

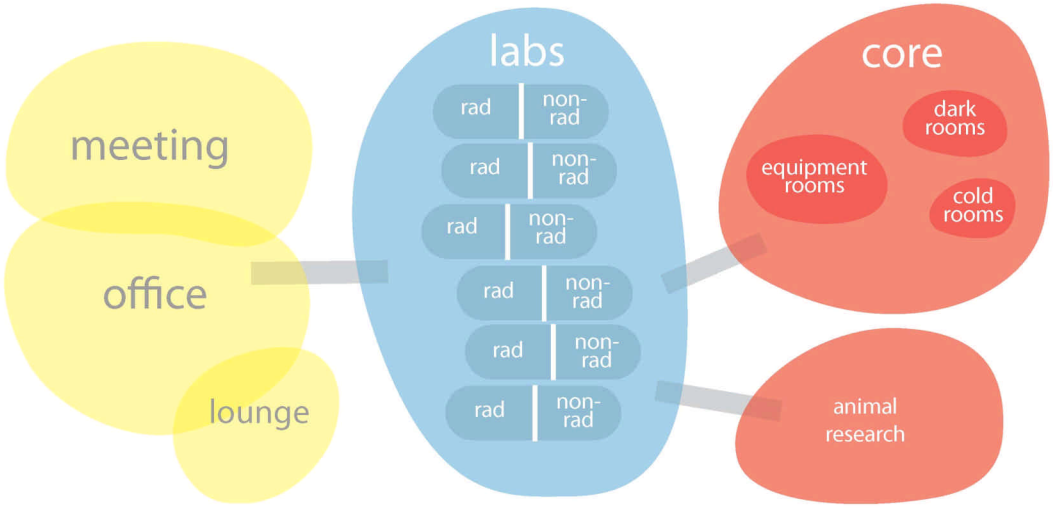


Adjacency diagrams follow which illustrated space relationships more specifically within each department.

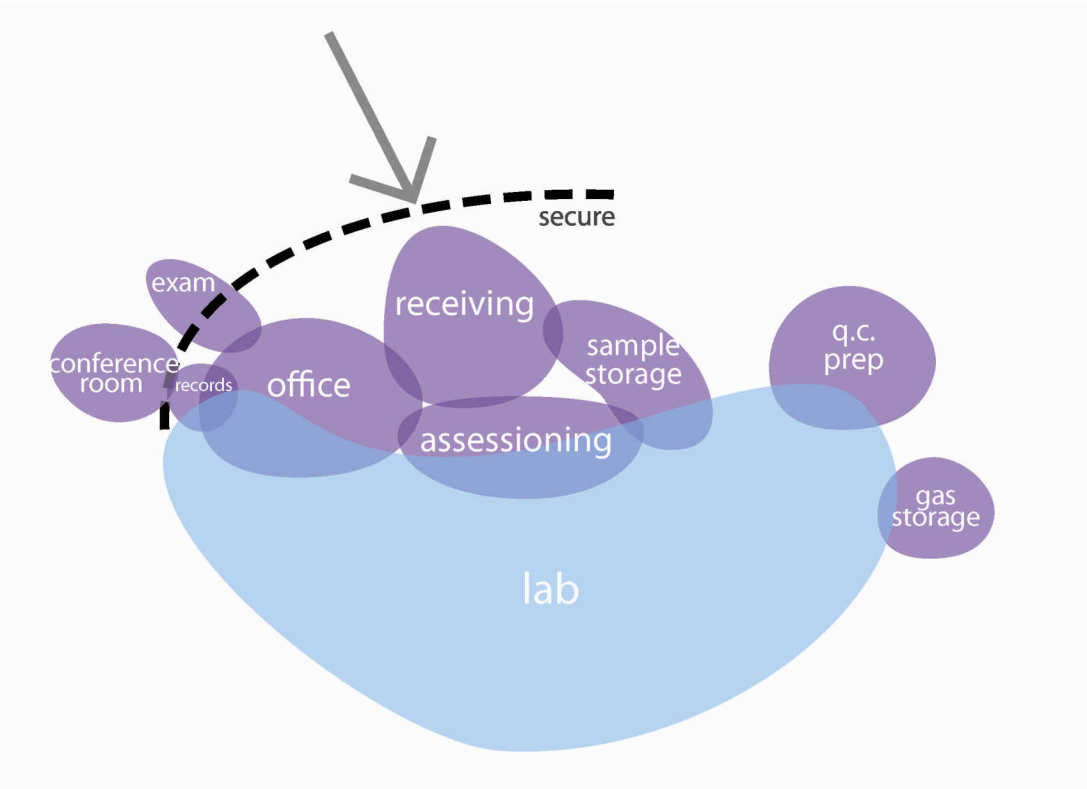
Relationship Diagram: Medicinal Chemistry



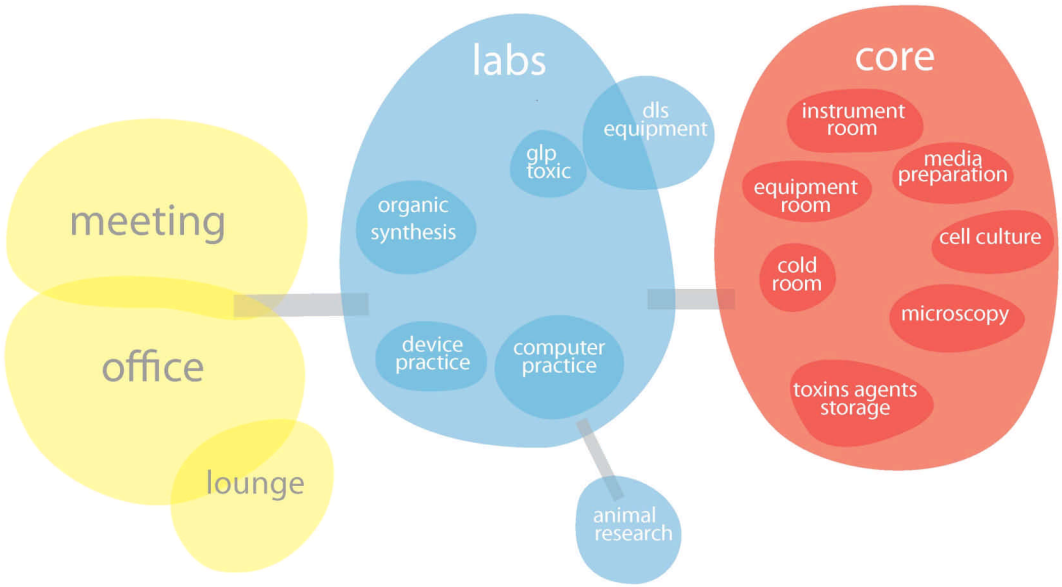
Relationship Diagram: Pharmacology & Toxicology



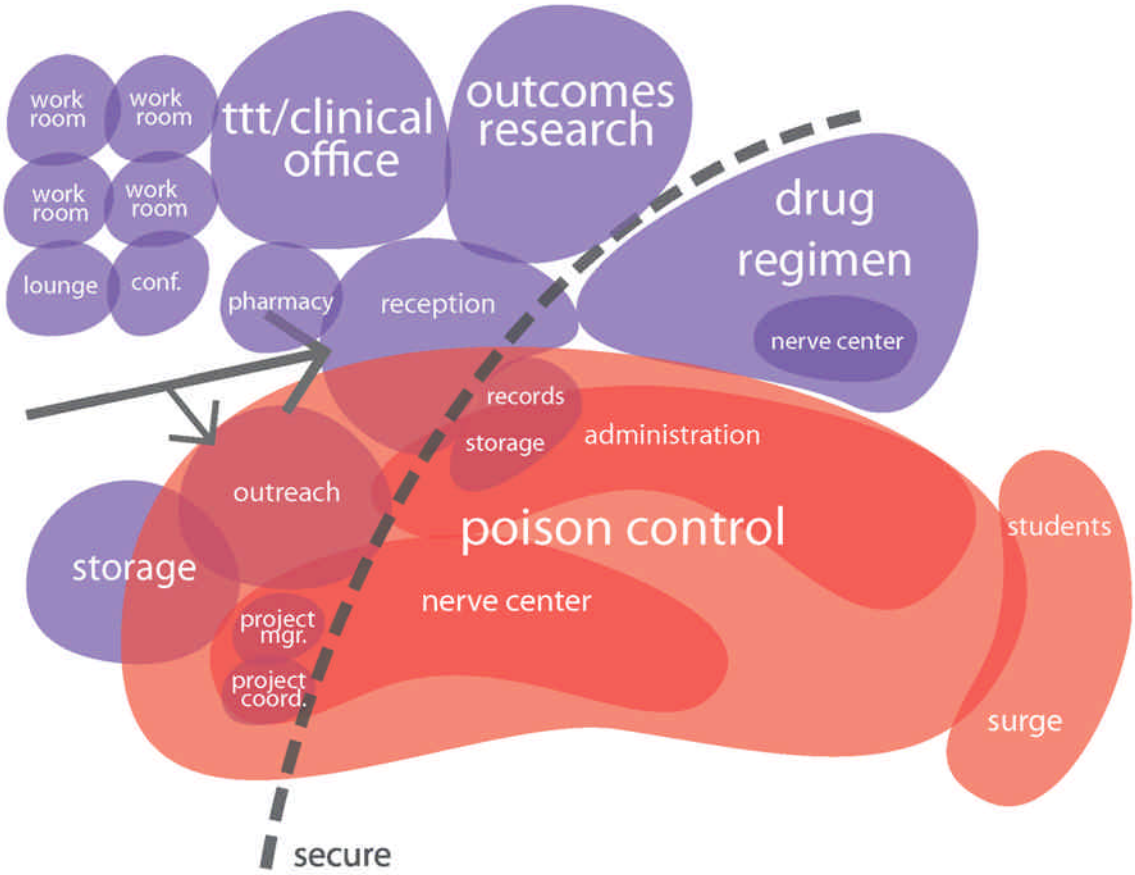
Relationship Diagram: Pharmacology & Toxicology – Center for Human Toxicology (CHT)



Relationship Diagram: Pharmaceutics



Relationship Diagram: Pharmacotherapy



4.5 Stacking Diagrams

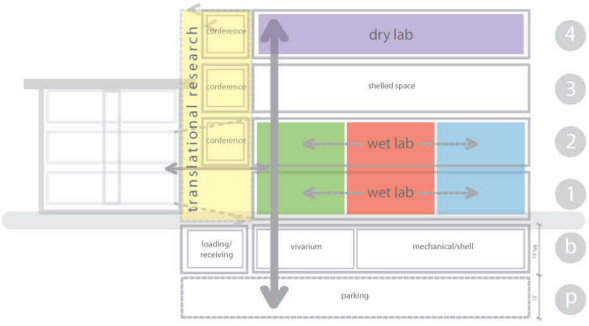
Various options were studied for stacking the program in this four-story building plus a basement and are included in the Appendix of this report.

Recognizing the goal of creating a center for Translational Research the program departments did not want to be separated by floors. Rather they want to be co-mingled on each floor to promote greater collaboration.

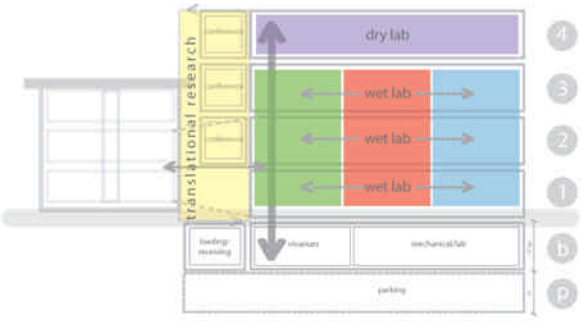
The exceptions are program spaces which require greater security. It was concluded that the Animal Research Space should be located at the ground level and Pharmacotherapy be located at the top floor level to allow for greater security for Poison Control and Animal Holding.

Other benefits of this stacking approach include easier access from the loading dock to the Animal Research Facility, and office space associated with Pharmacotherapy on the top floor where chemical use is more restricted by code.

The two options shown reflect a partial build-out to reflect the current budget of $50 million, and a full build-out as funding is achieved.



Stacking Diagram: Option 1



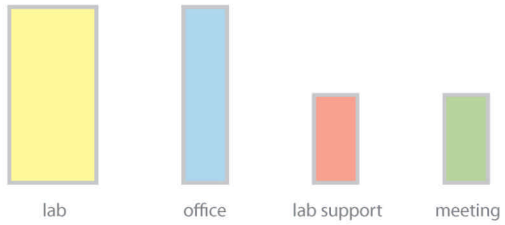
Stacking Diagram: Option 2

4.6 Building Organization

The organization of this building will consider many factors. The site precepts noted in Section 5.1, along with required adjacencies and suggested stacking will begin to inform placement of program functions through out the building.

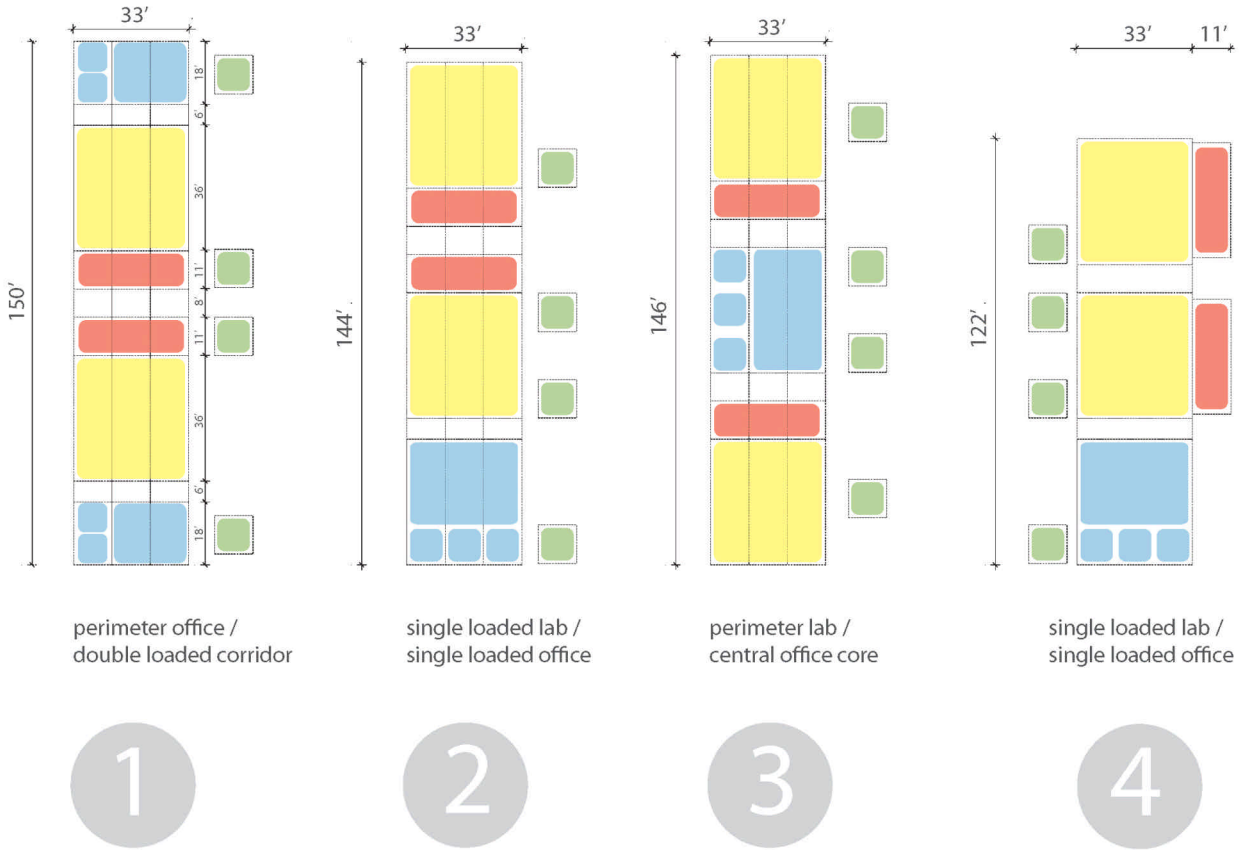
A key driver for location of labs in the building was found to be the relationship of lab to office, and access to daylight for open lab and office functions.

The lab/office relationships shown below were reviewed with the College of Pharmacy. Option 4 was seen as the most desirable



Space Layout Diagram

Lab / Office Relationships



4.6.1 Labs

To allow for maximum flexibility, infrastructure for open labs with support space should be provided on all floors. Labs should be designed as flexible, open spaces with immediate access to support spaces and desk space for students (RI's) located adjacent.

Each Lab should have the infrastructure and capacity to support 1 PI and 8-10 RI's and allow for the following metrics:

- 10 LF of bench space/RI
- 4' Fume Hood/RI
- 10 LF of common equipment bench top equipment
- 12 LF of floor-standing equipment

Lab support space – equipment rooms, instrument rooms, cell culture suites, cold rooms, media prep, glasswash and fermentation rooms should be located immediately adjacent and be integral to the design.

Secure lab space should be planned for Pharmacology and Toxicology Center for Human Toxicology (CHT).

4.6.2 Offices

Office Space should be designed to be flexible and be located as an open block in plan to take advantage of centralized MEP systems to serve this space.

RI desk space should be located close to the lab, with PI office space adjacent. All offices should have access to daylight. Open Work Areas should be provided adjoining the office space which can be flexible and reconfigurable.
Support spaces required for offices include storage, copy/fax/mail/printer. Conference rooms, the Computational Lab and Visualization Room, lounge and kitchen space should be located adjacent.

Secure office space should be provided the Pharmacotherapy Poison Control and Drug Regimen.

4.6.3 Vivarium

Animal Research Space will be required as part of the program to meet the research needs of all departments within this building.

The Vivarium should be located close to the loading dock function. In addition, this facility should be strategically placed relative to the other research program in the building to allow for maximum flexibility for the lab and office spaces. This suggests a location at the basement level. Daylighting is not desired or recommended for this function.

The Vivarium will require Procedure Rooms, Holding Rooms, Animal Receiving, Feed and Bedding, Necropsy, Quarantine, Experimental Rooms. Locker Rooms will be provided for staff.

Infrastructure and space should be planned for a Clean and Dirty Cage Wash Area which will be fit-up in the future.

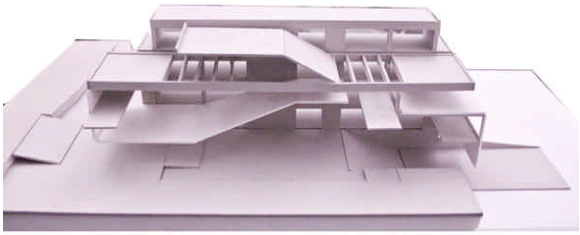
A loading dock function in associated with the vivarium should be located in close proximity with access to garbage disposal. Garbage bins must accommodate the dumping of heavy barrels. Adequate storage areas should be provided for loading and unloading cages, bedding, racks and food material. A service elevator shall be in close proximity.

4.6.4 Translational Center

The Atrium has been termed the "Translational Center" to reflect the mission of the College of Pharmacy in doing translational research. It will be the center of the L.S. Skaggs Pharmacy Institute and should be designed as a space that invites and connects with the Health Science Campus.

It should be rich in spaces that allow for collaboration and innovation – such as conference rooms, and lounge spaces.

This space will also act as a transition between the new building and the existing L.S. Skaggs Building. It is anticipated that the buildings will be connected at the first, second and third floors of the existing building with the main connection occurring at the second floor, where the Deans office is currently located.



4.7 Existing L..S. Skaggs Hall

The existing L.S. Skaggs Building was built in 1964 as a Research Facility for the College of Pharmacy. Generous donations by the Skaggs family made construction possible.

The building is a three-story structure with a basement, and is of concrete construction. It has a floor to floor height of 12'-8" – not optimal for a research facility. A central mechanical shaft space also restricts access through the building.

This building was planned with lab and office space located around a common mechanical shaft space, with circulation at the perimeter. A wing to the northwest provides access to a large auditorium. Offices have been added over the corridor that links to the auditorium. A small vivarium exists on the first floor that will be replaced with construction of the new facility.

4.8 Parking and Loading Dock

The building site currently is used for parking and service access to the existing L.S. Skaggs building. These functions will need to be replaced with construction of the new facility.

One level of below-grade structured parking is proposed under the new building. The stalls provided will meet the new demand created by the growth of the Pharmacy facility as well as supplement the existing on grade spaces displaced by new construction. The balance of the displaced stalls will be accommodated at other locations in the vicinity of the Health Sciences District.

Access to below-grade parking has been studied, and due to existing grades and utilities along the northeast face of the building the recommendation is to access along the southwest.

Loading dock functions will also need to be provided, and could be located at the ground floor to serve the vivarium or at the parking level with direct access to the service elevator. Separate loading functions should be provided for both the lab/general building and the vivarium with access to a service elevator. Options have been shown in the concept plans and massing diagrams.

4.9 Concept Plans and Massing Diagrams

A number of concept and massing diagrams have been studied with the goals as outlined in the report, which include:

- Access to Daylight and views
- Office adjacency to Lab
- Connection of the new building to existing L.S. Skaggs Hall to form an Institute for the College of Pharmacy
- Maximize efficiency to allow for more program space.

The concepts studied are included in the Appendix of this document, and may be studied further as the project moves into design phases.

The following concept plans and 3-D massing incorporate comments received from the College of Pharmacy at the final programming workshop, and might be considered for further development as the project moves into design phases.

The concept for this building allows for a four-floor facility with basement that connects to the existing L.S. Skaggs Hall at three levels. A primary connection will be provided on level two, with ramped connections at levels one and three to account for the differences in floor height. A below-grade parking garage will be provided with access from the west via an exterior ramp.

Floors one-three will provide space for wet lab and office. Offices will be located as a block on the southwest side of the building with views to the Salt Lake City Valley. Adjacent to the offices, large and open labs are suggested with support spaces to allow for central cell culture suites, equipment rooms, instrument rooms and other required spaces. The lab support spaces also help to define individual open lab spaces while providing daylight to penetrate deeper into the building and still allowing for connectivity between labs.

The fourth floor or top floor will be planned for dry lab and office space for the Pharmacotherapy Group. Because chemical quantities are restricted at upper floors, office use was determined to be the best use of space. This floor will be vertically connected to other floors via stair and elevators. A reduction of the floor to floor height at this level may also be considered to minimize costs.

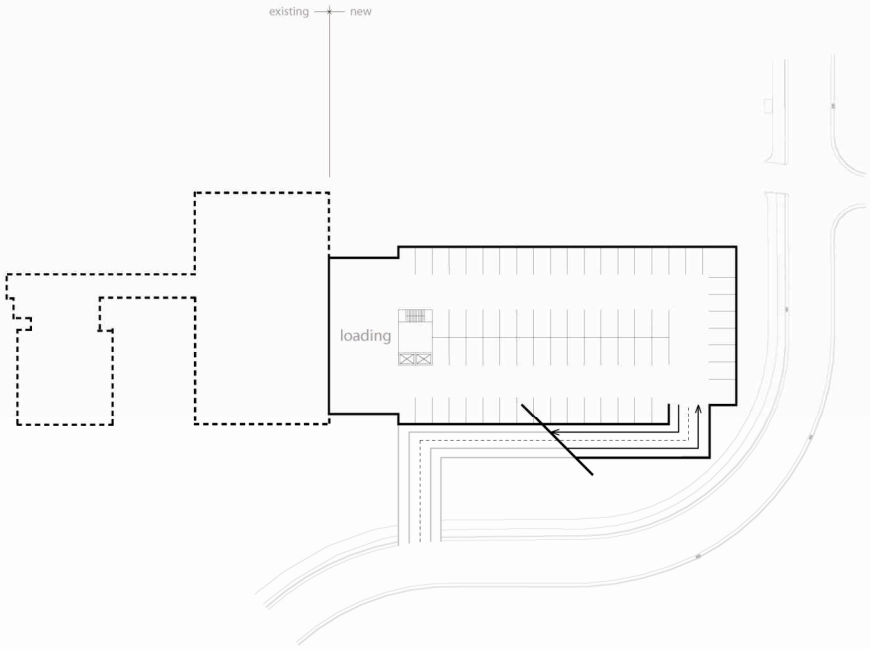
The vivarium is suggested for the basement level to allow for greater flexibility on upper wet lab floors, and because it does not have the same requirements for daylighting. Additional space at the basement will allow for mechanical, electrical, and wet lab.

The loading dock function is currently proposed for the parking level . The option of locating this service area on the basement level should be explored during the design phase.

The Atrium or “Translational Center” provides an entry to the building from the northeast, and allows for connection to the existing L.S. Skaggs Hall. Conference Rooms and Lounge space ring the atrium to provide opportunities for interaction and collaboration.

space layout diagram

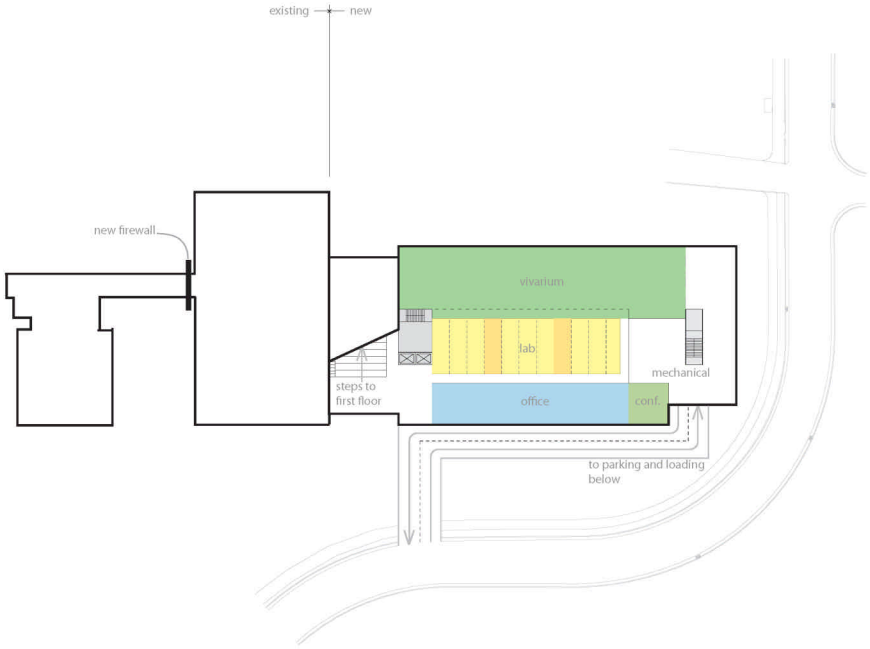
parking



space layout diagram

- lab
- lab support
- office
- meeting
- vivarium

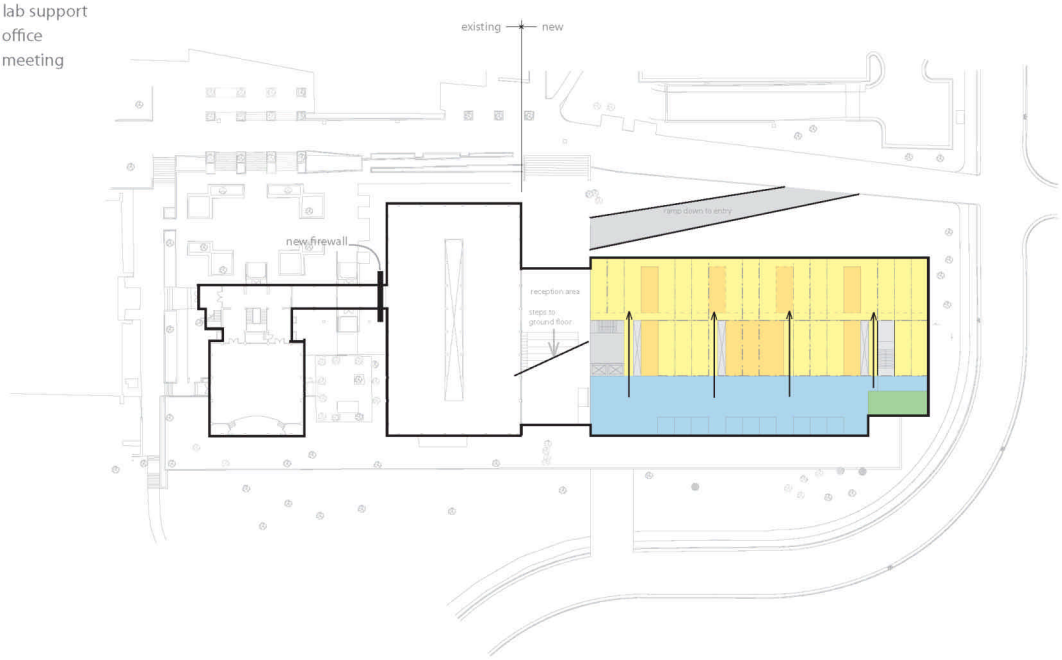
basement floor



space layout diagram

first floor

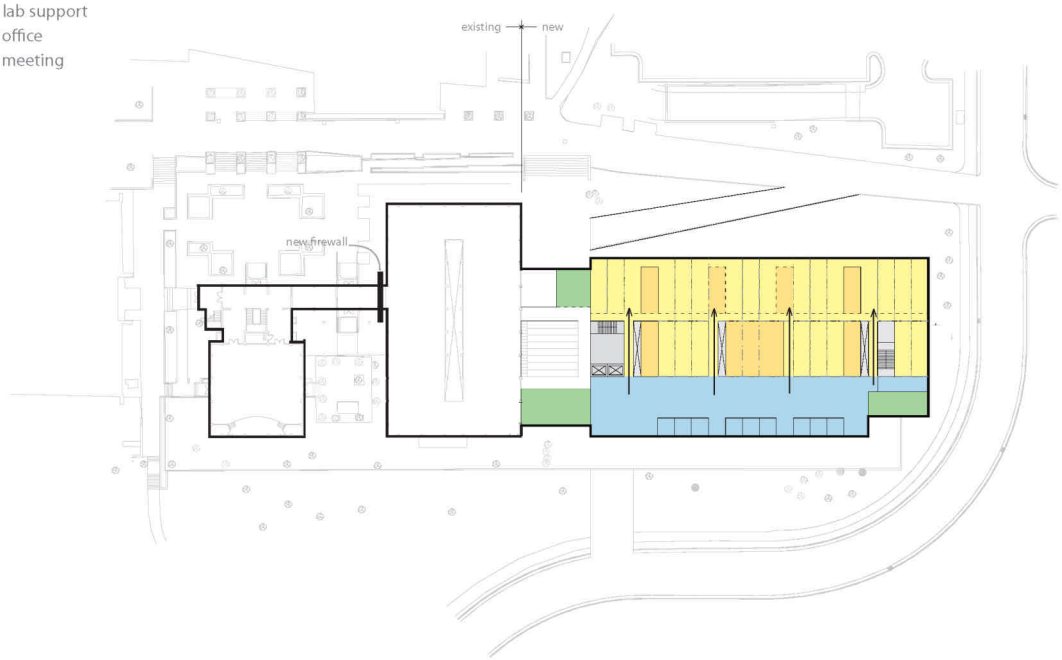
- lab
- lab support
- office
- meeting



space layout diagram

second floor

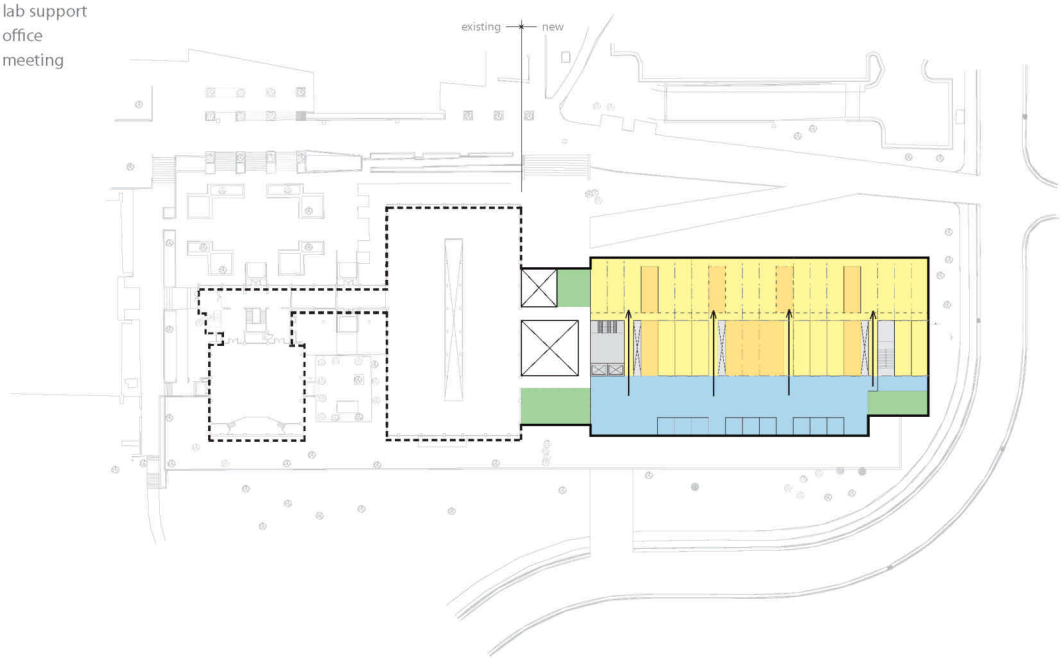
- lab
- lab support
- office
- meeting



space layout diagram

third floor

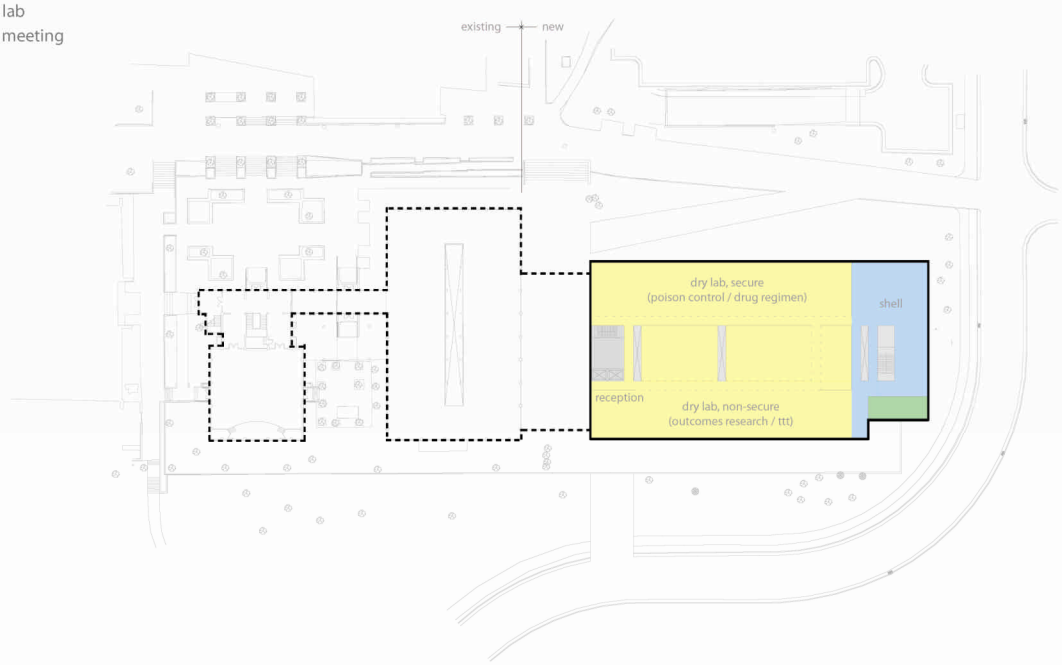
- lab
- lab support
- office
- meeting



space layout diagram

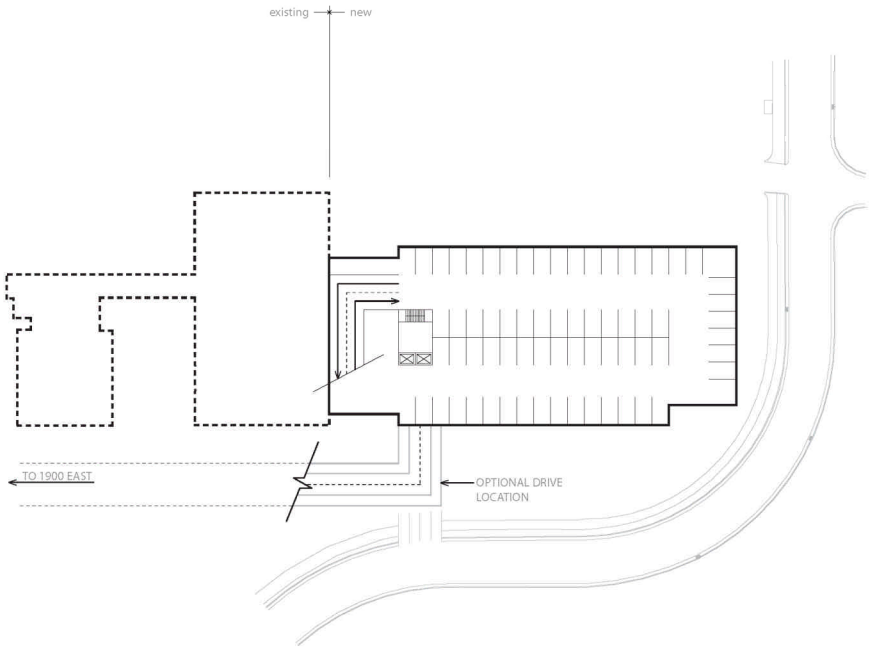
fourth floor

- shell
- lab
- meeting



space layout diagram

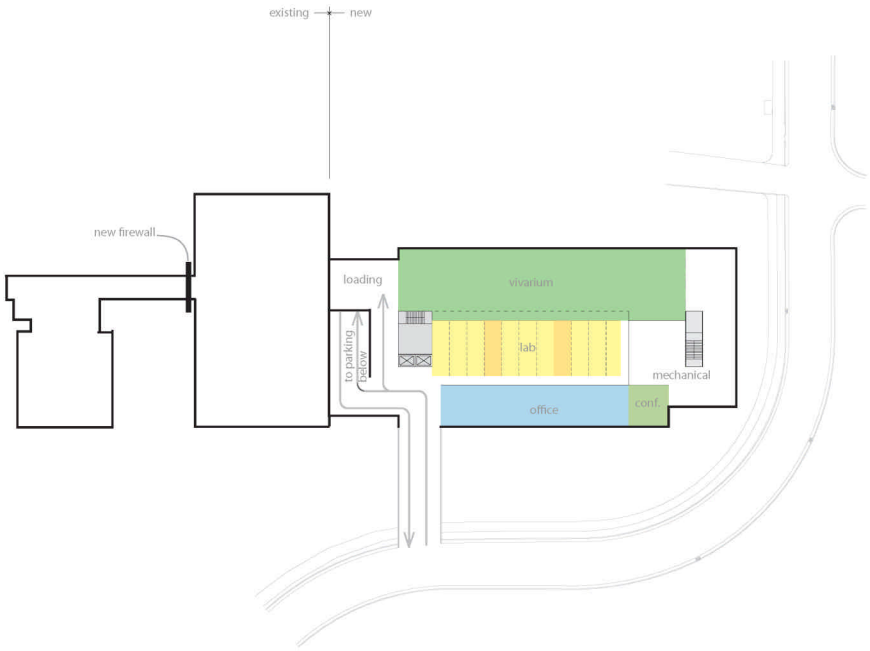
parking - option



space layout diagram

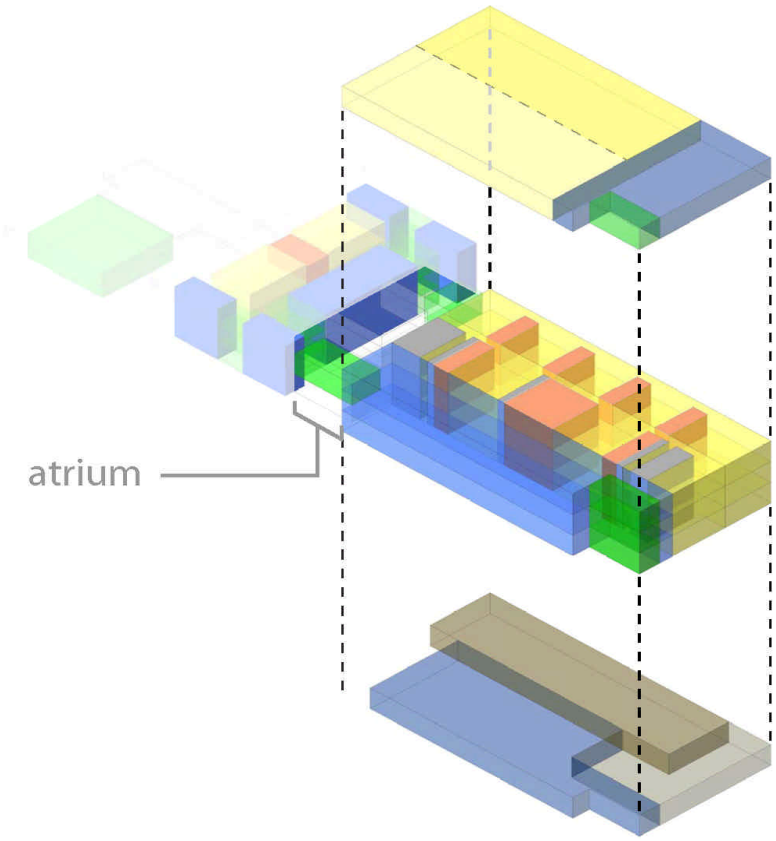
basement floor - option

- lab
- lab support
- office
- meeting
- vivarium



space layout diagram

three dimensional model



fourth floor

- dry lab, secure (poison control, drug regime
- dry lab, non-secure (clinical faculty, outcome
- shell space
- meeting

first, second, third floor

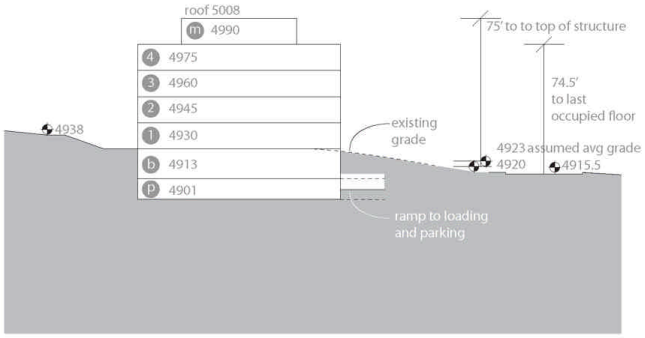
- lab
- lab support
- office
- meeting

ground floor

- vivarium
- shell space
- mechanical

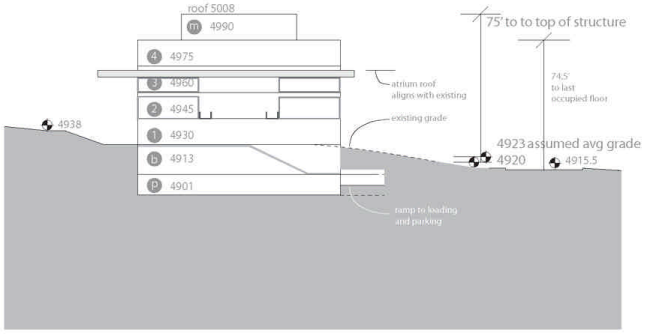
space layout diagram

east west section



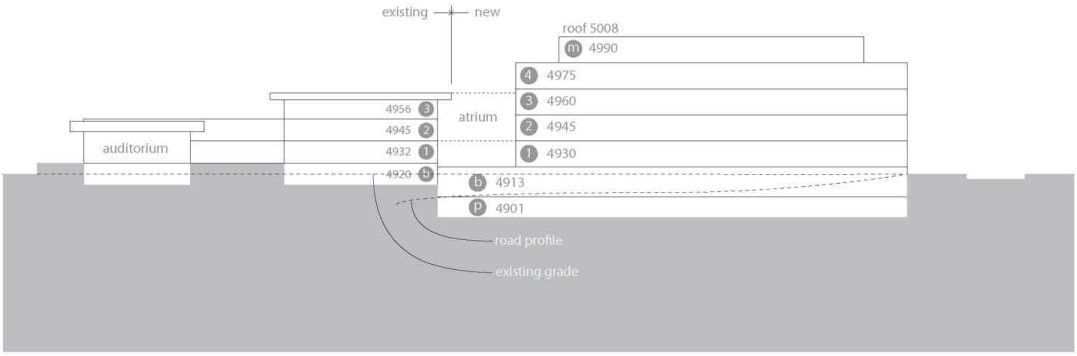
space layout diagram

section through atrium



space layout diagram

north south section



4.10 Constructability

The building will be designed around a structural bay that will be compatible with an 11-foot lab module, and a below-grade parking level. Because the building will also tie into the existing pharmacy building, building isolation at the face of the existing building will be required. A 15'-0" floor to floor height, optimal for research buildings, is planned for the wet lab floors.

Structural system options for this building are noted in Section 8.2.

4.11 Pre-Schematic Finish Schedule

Exterior finishes will relate to the finish palette on the Health Sciences Campus. Materials will include cast-in-place concrete, masonry, glass curtain wall, and metal panels. Sun shading control will be provided on three of the exterior faces of the building. These devices will not only assist in mitigating the negative effects of direct sunlight on the interior of the building, but also provide an opportunity for additional articulation of the building facades. Horizontal sunshade devices will be used on the southeastern face of the building, and vertical sunshade devices or articulated bay windows will be used on the northeastern and southwestern faces of the building.

Interior finishes will vary depending on the space function and use. In general all office spaces will receive carpet tile, rubber base and painted walls with an acoustical ceiling panels. All interior doors for office spaces will be wood with a painted metal frame.

Laboratory spaces will receive resilient floors with rubber base and painted walls. Ceilings will be acoustical ceiling panels with some exposed ceilings. Laboratory support spaces such as cell culture suites and other more clean spaces will receive sheet vinyl floors with integral base, painted walls, and a mylar faced ceiling panel. All interior doors will be wood with a painted metal frame. Light fixtures in the vivarium will be flush mounted, sealed and gasketed.

Animal Facility Spaces and Glasswash spaces will receive troweled epoxy floors and integral base, and epoxy wall surface over gypsum wall board at wall and ceiling surfaces. All interior doors will be FRP (Fiberglass Reinforced Panel) and frames will be stainless steel.

Finishes will be selected for the Atrium or "Translational Center" that help define this space as a center for the institute and a meeting space in the Health Science Center. Floor finishes will likely be polished and sealed concrete floors, with painted walls and accent walls of wood, stone and glass. Consideration will need to be given to the acoustic quality of the space.

All finishes will be selected with sustainability in mind. Carpets will be of recycled content, paints will be low VOC, and woods will be FSC-certified.

5.1 Space List Overview

A detailed Space List has been provided by Program Group, along with a summary of program spaces by department. The Space List provides a summary of space for partial build-out to respond to the current budget of $50 million, and summarizes space for the ultimate goal of full build-out of 150,000 SF.

It is important to note the following:

- The decision as to who will be relocating to the new research building has not been finalized.
- The College of Pharmacy will be retaining space holdings in BPRB and Research Park., even with the full build-out of the program.

5.2 Space Program Summary Table

Department		Office	Research Lab	Animal	Total	60% Efficiency
Medicinal Chemistry	Partial	3629	5478	NA	**9107**	**15177**
	Full	8049	13491	NA	**21540**	**35898**
	% Increase	1.22	1.46	NA	1.37	1.37
Pharmacology & Toxicology	Partial	3829	5171	NA	**9000**	**14999**
	Full	7831	14426	NA	**22257**	**37093**
	% Increase	1.05	1.79	NA	1.47	1.47
Pharmaceutics	Partial	3849	5191	NA	**9040**	**15066**
	Full	8649	12871	NA	**21520**	**35865**
	% Increase	1.25	1.48	NA	1.38	1.38
Pharmacotherapy	Partial	11204	*NA*	NA	**11204**	**18673**
	Full	17844	NA	NA	**17844**	**29739**
	% Increase	0.59	NA	NA	0.59	0.59
Animal Research	Partial	NA	NA	6252	**6252**	**10420**
	Full	NA	NA	6828	**6828**	**11380**
	% Increase	NA	NA	0	0	0
TOTAL	**Partial**	**22510**	**15840**	**6252**	**44602**	**74334**
	Full	**42372**	**40788**	**6828**	**89988**	**149975**
	% Increase	0.88	1.58	0.09	1.02	1.02

Medicinal Chemistry

Medicinal Chemistry Program

U of U L.S. Skaggs Pharmacy Research Building - Space List

Medicinal Chemistry	Partial Build-out #	Partial Build-out NSF/each	Partial Build-out Total NSF	Full Build-out #	Full Build-out NSF/each	Full Build-out Total NSF
			9107			21540
Office Space						
Faculty Offices	5	140	700	10	140	1400
Research Offices	18	60	1080	80	60	4800
Open Work Area	1	200	200	1	200	200
Medium Conference	1	360	360	1	360	360
Large Conference	0.25	600	150	0.25	600	150
Administrative Support	2	60	120	2	60	120
Visualization Room	0.33	300	99	0.33	300	99
Computational Lab	0.33	1060	350	0.33	1060	350
Storage	1	120	120	1	120	120
Copy/Fax/Mail/Printer	1	120	120	1	120	120
Kitchen/Lounge	1	330	330	1	330	330
Sub Total			***3629***			***8049***
Research Lab Space						
Open Wet Lab	3	1200	3600	8	1200	9600
Core: Cell Culture	2	176	352	4	176	704
Core: Media Prep	1	176	176	2	176	352
Core: Equipment Room	1	250	250	3	250	750
Core: Instrument Room	1	250	250	3	250	750
Glasswash/Autoclave	1	240	240	1	240	240
Microbiology/Protein Expression/Fermention	2	165	330	3	165	495
Cold Room	1	160	160	3	160	480
Toxins Storage	1	120	120	1	120	120
Sub Total			***5478***			***13491***
60% Estimated Efficiency			**15177**			**35898**

Pharmacology & Toxicology

Pharmacology & Toxicology Program

U of U L.S. Skaggs Pharmacy Research Building - Space List

Pharmacology & Toxicology	Partial Build-out #	Partial Build-out NSF/each	Partial Build-out Total NSF	Full Build-out #	Full Build-out NSF/each	Full Build-out Total NSF
			9000			22257
Office Space (PPG)						
Faculty Offices	6	140	840	6	140	840
Research Offices	20	60	1200	30	60	1800
Open Work Area	1	200	200	1	200	200
Medium Conference	1	360	360	1	360	360
Large Conference	0.25	600	150	0.25	600	150
Visualization Room	0.33	300	99	0.33	300	99
Computational Lab	0.33	1060	350	0.33	1060	350
Administrative Support	1	60	60	1	60	60
Storage	1	120	120	1	120	120
Copy/Fax/Mail/Printer	1	120	120	1	120	120
Kitchen/Lounge	1	330	330	1	330	330
Sub Total			***3829***			***4429***
Research Lab Space (PPG)						
Open Wet Lab	4	1200	4800	5	1200	6000
Core: Equipment Room	1	250	250	2	250	500
Dark Room	1	121	121	1	121	121
Sub Total			***5171***			***6621***
Office Space (CHT)						
Faculty Offices			0	5	140	700
Research Offices			0	30	60	1800
Small Conference			0	1	192	192
Administrative Support			0	2	60	120
Records Storage (secure)			0	1	240	240
Copy/Fax/Mail/Printer			0	1	120	120
Exam Room			0	1	110	110
Receiving			0	1	120	120
Sub Total			***0***			***3402***
Research Lab Space (CHT)						
Wet Lab Space			0	6	1200	7200
Cold Rooms			0	1	120	120
Freezers			0	2	120	240
Sample Assessioning			0	1	165	165
Cylinder Tank Storage			0	1	80	80
Sub Total			***0***			***7805***
60% Estimated Efficiency			**14999**			**37093**

Pharmaceutics

Pharmaceutics Program

U of U L.S. Skaggs Pharmacy Research Building - Space List

Pharmaceutics	Partial Build-out #	Partial Build-out NSF/each	Partial Build-out Total NSF	Full Build-out #	Full Build-out NSF/each	Full Build-out Total NSF
			9040			21520
Office Space						
Faculty Offices	4	140	560	10	140	1400
Research Offices	24	60	1440	90	60	5400
Open Work Area	1	200	200	1	200	200
Visualization Room	0.33	300	99	0.33	300	99
Computational Lab	0.33	1060	350	0.33	1060	350
Large Conference	0.25	600	150	0.25	600	150
Medium Conference	1	360	360	1	360	360
Administrative Support	2	60	120	2	60	120
Storage	1	120	120	1	120	120
Copy/Fax/Mail/Printer	1	120	120	1	120	120
Kitchen/Lounge	1	330	330	1	330	330
Sub Total			***3849***			***8649***
Research Lab Space						
Open Wet Lab	3	1200	3600	9	1200	10800
Core: Cell Culture	2	200	400	4	200	800
Core: Media Prep/Autoclave	1	176	176	1	176	176
Core: Equipment Room	1	250	250	1	250	250
Core: Instrument Room	1	165	200	1	165	200
DLS - Equipment	1	200	165	1	200	165
Microscopy	2	80	160	3	80	240
Cold Room	1	160	160	1	160	160
Tank Storage	1	80	80	1	80	80
Sub Total			***5191***			***12871***
60% Estimated Efficiency			**15066**			**35865**

Pharmacotherapy

Pharmacotherapy Program

U of U L.S. Skaggs Pharmacy Research Building - Space List

Pharmacotherapy	Partial Build-out #	Partial Build-out NSF/each	Partial Build-out Total NSF	Full Build-out #	Full Build-out NSF/each	Full Build-out Total NSF
			11204			17844
TTT/Clinical						
Faculty Offices (TTT, Clinical)	15	140	2100	30	140	4200
Research Offices	13	60	780	26	60	1560
Small Conference	1	192	192	1	192	192
Medium Conference	4	360	1440	4	360	1440
Large Conference	0.25	600	150	0.25	600	150
Reception (common)	1	120	120	1	120	120
Administrative Support	2	60	120	2	60	120
Copy/Fax/Mail/Printer	1	120	120	1	120	120
Kitchen/Lounge	1	330	330	1	330	330
Sub Total			***5352***			***8232***
Poison Control (UPCC)						
Offices	5	140	700	10	140	1400
Call Center	5	60	300	10	60	600
Student Surge Area	4	60	240	8	60	480
Outreach Education (shared by two people)	1	60	60	2	60	120
Administrative Support	1	60	60	2	60	120
Project Coordinator and Manager	2	60	120	4	60	240
Poison Information Providers (students)	4	60	240	8	60	480
Training	1	60	60	2	60	120
Project Work Area	4	60	240	4	60	240
Small Conference	1	192	192	1	192	192
Storage	1	240	240	1	240	240
Record Storage	1	240	240	1	240	240
Copy/Fax/Mail/Printer	1	120	120	1	120	120
Sub Total			***2812***			***4592***
Outcomes Research (ORC)						
Research Faculty Offices	8	140	1120	14	140	1960
Administrative Support	4	60	240	7	60	420
Staff	8	60	480	14	60	840
Sub Total			***1840***			***3220***
Drug Regimen Review (DRR)						
Pharmacist Offices (DRR)	6	140	840	9	140	1260
Staff	6	60	360	9	60	540
Sub Total			***1200***			***1800***
60% Estimated Efficiency			**18673**			**29739**

Animals

U of U L.S. Skaggs Pharmacy Research Building - Space List

	Animal Research Program					
	Partial Build-out			Full Build-out		
Animal Facility	#	NSF/each	Total NSF	#	NSF/each	Total NSF
			6252			6828
Animal Facility						
Loading Dock, Storage	1	1500	1500	1	1500	1500
Holding Rooms	6	252	1512	6	252	1512
Procedure Rooms	4	192	768	4	192	768
Locker Rooms	2	252	504	2	252	504
Animal Receiving	1	192	192	1	192	192
Feed/Bedding	1	288	288	1	288	288
Clean Cage Storage	1	96	96	1	96	96
Necropsy	1	192	192	1	192	192
Quarantine	1	192	192	1	192	192
Experimental Rooms	2	504	1008	2	504	1008
Clean Cage Wash (shelled w/infrastructure in place)			0	1	276	276
Dirty Cage Wash (shelled w/infrastructure in place)			0	1	300	300
Sub Total			***6252***			***6828***
60% Estimated Efficiency			**10420**			**11380**

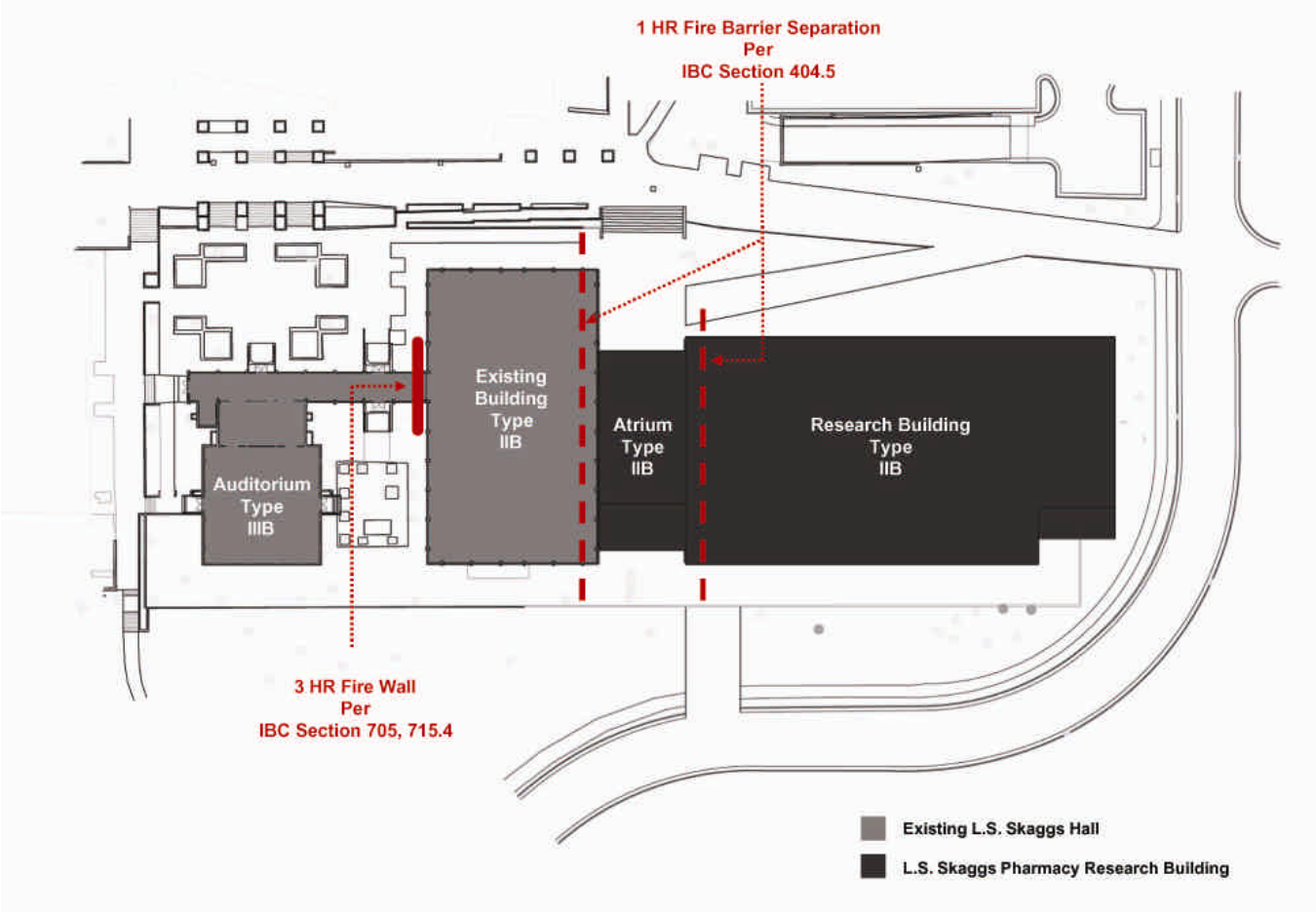
6.1 Applicable Codes

The applicable code for the new addition to Skaggs Hall is the 2006 International Building Code (IBC). During a project meeting on October 22, 2008, the state of Utah representative indicated that the state will likely be adopting the 2009 edition of the IBC in January of 2010. As long as a construction drawing package, which includes at a minimum the footing and foundation plans, is submitted to the State prior to the adoption date, Dec. 31, 2010, it will be reviewed under the 2006 IBC. It is assumed for the purposes of this document that the design team will be able to submit such that the 2006 IBC remains applicable to this project. When Skaggs Hall was originally built in 1964, the 1958 Uniform Building Code was used for review purposes.

6.2 Referenced Standards and Regulations

The 2006 IBC references the following codes and standards among others:

- International Fire Code, 2006 edition
- International Mechanical Code, 2006 edition
- NFPA 13, Standard for the Installation of Sprinkler Systems, 2002 edition
- NFPA 14. Standard for the Installation of Standpipe and Hose Systems, 2003 edition
- NFPA 72, National Fire Alarm Code, 2002 edition



6.3 Building Code Summary

The project will be considered a new addition to the existing L.S. Skaggs Hall, located on the University of Utah campus in Salt Lake City, UT. Additions or alterations to a building must comply with the requirements of the code for new construction; however, portions of a building not altered and not affected by the alteration are not required to comply with the code requirements for a new structure (IBC 3403.1). For this project, the new addition will be required to meet the requirements of the 2006 IBC for new construction. Since the existing classroom wing will be altered, it needs to meet the minimum requirements for new construction, including construction type, sprinkler protection, and fire alarm system requirements.

6.3.1 Site

The existing site consists of a single building with two wings connected by a lobby/lounge area. One wing is a lecture auditorium and the other wing is a three story classroom/research facility, with a partial basement. The building has a footprint of approximately 13,000 square feet. A new three-story atrium (footprint of approximately 6,500 square feet) will connect the existing building to the new research building (footprint of approximately 28,000 square feet). The new research building will consist of one level of underground parking, a basement (identified as Level G), 4 floors above grade level (Levels 1 through 4), and a mechanical/penthouse floor (Level 5).

Fire walls will be constructed in accordance with IBC Section 705 in order to separate both levels of the auditorium wing from the existing three story wing. The fire walls will create two separate buildings (IBC 705.1). One building will be the auditorium wing and the other building will be the existing three story wing combined with the new addition. All provisions of the code are applied individually to the building on each side of the wall. Because the auditorium wing is not being altered, it is not expected to be required to meet new code requirements as part of this project.

6.3.2 Building Occupancy

The auditorium wing is considered a Group A-3 assembly occupancy since it is a lecture hall. The existing three story research/classroom wing and the new addition will be evaluated as a non-separated mixed-use building in accordance with IBC 508.3.2. The primary occupancy classification for this building is business occupancy. The building is also expected to include secondary areas classified S-2, low-hazard storage (i.e., parking level, storage rooms, etc.).

As a non-separated mixed-use, the building will meet the most restrictive construction type requirements for the occupancies it contains (based on allowable height and area limitations). It will also meet the most restrictive fire protection system requirements for these occupancies. The building will not be required to have fire resistance rated separations between occupancies.

6.3.3 Building Type

Without an official survey, the conservative assumption is that the existing research/classroom wing (excluding the auditorium wing, which is being separated by the new fire wall) is unprotected noncombustible type II-B construction. The new addition will be designed to meet type II-B construction. Therefore, the building being formed by the existing three story research/classroom wing and the new addition is classified as type II-B construction.

Type III-B construction is assumed for the existing auditorium wing, based on

discussions and information provided by University representatives indicating that this wing has combustible framing somewhere in its roof structure.

6.3.4 Allowable Height and Area

Grade plane is defined as a reference plane representing the average of finished ground level adjoining the building at exterior walls (IBC 502.1). If the ground adjacent to the building slopes away from the building, the reference plane is established by the lowest point in the area between the building and 6 feet away (or the lot line if it is closer than 6 feet). The grade plane for the business occupancy building would consider the average of finished ground level around the new addition and the existing three story section. The final grade plane for this project has not been determined.

In accordance with IBC Table 503, a type II-B business occupancy building has a height limitation of 5 stories above grade plane when protected throughout by an automatic sprinkler system. Table 503 details that the building can have 4 stories above grade plane with an additional story added when the building is fully sprinkler protected (IBC 504.2).

The height limit for fully sprinkler protected type II-B construction is 75 feet (IBC Table 503). Table 503 details a height limit of 55 feet with an additional 20 feet added when the building is fully sprinkler protected (IBC 504.2). The building height is defined in the IBC as the vertical distance from grade plane to the average height of the highest roof surface (IBC 502.1).

The building may be considered a high rise if an occupied floor is located more than 75 feet above the lowest level of fire department vehicle access (IBC 403.1). The highest floor level will not be more than 75' above that point.

The mechanical level of this building will be considered a story because the aggregate area of the enclosed mechanical spaces currently exceeds one-third the area of the supporting roof (IBC 1509.2). The basement and parking garage levels are not required by code to contribute to the height of the building or the number of stories above grade. Parking garage levels with an automatic sprinkler system are not considered an underground building (IBC 405).

The allowable area per story for a fully sprinkler protected type II-B business occupancy is 69,000 square feet. The allowable base area per floor is 23,000 square feet (IBC Table 503) and this base area can be increased by 200% since the building is equipped throughout with an approved automatic sprinkler system (IBC 506.3). The anticipated first floor area is 47,500 square feet.

6.3.5 Sprinkler and Fire Alarm

New business occupancy buildings are required to have an approved automatic sprinkler system when they have a floor with an occupant load of 30 or more that is located 55 feet or more above the lowest level of fire department vehicle access (IBC 903.2.10.3).

A fire alarm system is required to be installed in occupancies that have an atrium connecting more than two stories (IBC 907.2.13). Manual fire alarm boxes are not required when Group B occupancies are equipped throughout with an automatic sprinkler system and the alarm notification appliances will activate upon sprinkler water flow (IBC 907.2.2). Automatic fire detectors must be connected to the building's automatic fire alarm system (IBC 907.10). Visible alarm notification appliances must be provided in

public and common areas (IBC 907.9.1.1). Audible alarm notification appliances must be provided in accordance with IBC Section 907.9.2.

The fire alarm system must be monitored by an approved supervising station in accordance with NFPA 72 (IBC 907.14). Primary and secondary power supplies for the fire alarm system must also be in accordance with NFPA 72 (IBC 907.4).

Because the new construction will be an addition to the existing research/classroom wing, that existing wing will need to be upgraded to provide complete sprinkler protection for the entire building. The wing fire alarm system will also likely need to be upgraded to include the existing research wing and the new addition, including new audible and visual notification appliances.

6.3.6 Atrium

The new three-story atrium that will connect the new and existing buildings needs to meet the following atrium requirements from IBC Section 404:

- Use: The atrium floor can be used for any approved use, as the atrium will be protected by the sprinkler system in accordance with Section 903.3.1.1 (IBC 404.2).
- Sprinkler System: An approved automatic sprinkler system is required to be installed throughout the building (IBC 404.3).
- Smoke Control: A smoke control system must be installed according to Section 909 (IBC 404.4). The smoke control equipment must be connected to a standby power system (IBC 404.6).
- Enclosure: The atrium must be separated from adjacent spaces by a 1-hour fire barrier, a horizontal assembly, or both (IBC 404.5). There are several exceptions to this requirement. Under specific conditions described in Section 404.5, a glass wall can be used to form a smoke partition. Also, a glass-block wall with a ¾ hour fire protection rating can be used. Adjacent spaces of the atrium do not need to be separated from the atrium when they are included in the design of the smoke control system.
- Interior Finish: Atrium walls and ceilings must have an interior finish of not less than Class B with no reduction in class for automatic sprinkler protection (IBC 404.7).
- Travel Distance: Exit access travel distance within the atrium space must not exceed 200 feet (IBC 404.8). This does not apply to the lowest level of the atrium where the required means of egress is through the atrium space.

6.3.7 Existing Building

The existing building consists of two wings connected by a lobby/lounge area. One wing is a lecture auditorium and the other wing is a three story classroom/research area. Currently, there is no fire rated separation between the two wings. The building was originally constructed in 1964 and had two later additions in 1971 and 1983. The first addition was to complete the basement and the next addition was a second floor over the student lounge and lobby. The partial basement is the only area protected by a sprinkler system.

As indicated previously, the auditorium wing will be separated from the research/classroom wing on two levels by a fire wall as part of this project. The fire wall will comply with the requirements of IBC Section 705. One of the requirements of this section is that the fire wall must have sufficient structural stability under fire

conditions to withstand the collapse of the construction on either side of the wall (IBC 705.2). Also, the fire wall must have a 3 hour fire-resistance rating because the auditorium building is an assembly occupancy of anticipated Type III construction (705.4). The fire wall openings must be protected in accordance with IBC Section 715.4. Fire walls are permitted to terminate at the underside of the roof (including the cantilevered portion) provided the roof meets the requirements of either Exception 3 or 4 in IBC Section 705.6.

The auditorium wing will not be modified as part of this project, but the research/classroom wing will be updated as required by code to accommodate the new addition.

6.3.8 Chemical Storage

Control areas can be established to provide an alternative method for the handling of hazardous materials without classifying the occupancy as Group H. Control areas must be separated from each other by fire barriers (IBC 706), horizontal assemblies (IBC 711), or both (IBC 414.2.1).

The allowable hazardous quantities and number of control areas vary per floor level. The following table summarizes the applicable requirements from IBC Table 414.2.2:

FLOOR LEVEL		% OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	NUMBER OF CONTROL AREAS PER FLOOR
Above grade plane	5	12.5	2
	4	12.5	2
	3	50	2
	2	75	3
	1	100	4
Below grade plane	1	75	3

The allowable percentage listed in the table above is determined from the maximum allowable quantity per control area shown in Table 307.1(1) and 307.1(2). Floors 4 and higher require a fire-resistance rating of 2 hours for the control area fire barriers. The other floors shown in the table above require a fire-resistance rating of 1 hour for the fire barriers. The floor construction of the control area and the construction supporting the floor of the control area are required to have a minimum 2 hour fire-resistance rating (IBC 414.2.4).

7.1 Civil

See Section 3.6.1 for Civil Engineering site requirements.

7.2 Structural

The characteristics of the structural framing system(s) shall complement the overall architectural footprint and contribute to the functional requirements of the programmed space. Special considerations shall be given to enable future flexibility of interior spaces such that the major structural elements do not hinder significant restrictions to future programming. Close interaction with other design professionals can result in implementing prudent economical structural decisions. Often such decisions affect other aspects of the overall building cost. Often the least expensive structural solution may not prove to be the least expensive overall building cost.

7.2.1 General

The structural opportunities which can significantly affect the overall performance and budget of this facility must be completely understood. Such opportunities include the unique site, the attaching of a new structure to an existing structure, the vertical mixed use of program spaces, flexibility of design spaces, and vibration mitigation for sensitive equipment, significant lateral design loads and the constructability on a restricted site. Additionally the site soils characteristics on site present a unique challenge when selecting the foundation system. The soils report offers alternate solutions depending upon actual column loads. Each foundation system should be carefully evaluated to help ensure the most efficient system is utilized in design. Close contact with the Owner and Owner's representative will result in meeting the expectations and user desires for the structure with respect to both vertical and lateral loads. It is important to realize that code force levels represent the absolute minimum requirements for life safety and do not necessarily meet owner needs for overall building performance. Therefore higher force levels may need to be used as design constraints in order to meet the College's performance expectations for a specific structure. The strong emphasis on sustainable design must also be incorporated into the design process. The structure should utilize materials that are readily available and can be procured in reasonable fashion for this specific location. Consideration should also be given to the availability of skilled labor in each particular material type. Seasonal characteristics can also affect material selections.

Future expansion of the building is not a design parameter for this project and is not anticipated. Interior expansion joints may be required depending upon the final configuration of the floor plan layout. A seismic expansion joint will be required at the connection between the new structure and the existing structure. Care should be given to the thermal expansion properties of the structural framing members.

Blast Protection and Progressive Collapse design measures are outside the scope of this design. Although these stringent design measures are not a program requirement it is noted that efficient sound design methods significantly increase a structure's inherent ability to resist such forces. Redundancy and sound connection design are economical methods for increasing the structures ability to resist Blast Protection and Progressive Collapse.

7.2.2 Design Criteria

The 2006 International Building Code will be used as the minimum code and standard for this project. This includes the current editions of the standards referenced by the 2006 International Building Code. This project will also have to conform to the latest DFCM Standards and the University of Utah Design Standards for Structural Engineering. (Chapter 5) The final design criteria and material strengths are to be clearly shown on the final structural documents. Listed below are some minimum required structural design criteria and material strengths. These criteria and strengths will continue to be evaluated as the design process evolves. This building is to be classified as Category III occupancy per the IBC 2006 Code.

Floor Live Loads:

Office	80 psf
Laboratories *	125 psf
Corridors and Lobbies	100 psf
Classrooms	80 psf
Partition Loads **	20 psf

* Vibration control areas (3,000 micro inches per sec.)

** Those locations where partitions are expected to be relocated.

Roof Live Loads: (Snow)

Snow Ground Load	Pg=44 psf
Snow Importance Factor	I=1.15
Exposure Factor	Ce=1.0
Thermal Factor	Ct=1.0
Rain on Snow Surcharge	5 psf

Snowdrift accumulation at valleys, parapets, offsets in roofs, and adjacent to penthouse locations shall be considered.

Wind Loads:

Equivalent Wind Speed	90 mph
Exposure Type	C
Importance Factor	1.0

Exposure C shall be used for elements and components including the exterior window/wall systems.

Seismic Loads:

Short Period Mapped Acceleration Ss =1.520

Long Period Mapped Acceleration S1 =0.595

Soil Site Class D

Short Period Site Coefficient Fa = 1.0

Long Period Site Coefficient Fv = 1.5

Spectral Response Acceleration

SDS = 2/3 * Fa * Ss

= 1.013

Spectral Response Acceleration

SD1 = 2/3 * Fv * S1

= 0.595

Seismic Importance Factor I = 1.25

Response Modification Coefficient

Shear Wall R = 6 (Frame)

Shear Wall R = 5 (Bearing)

Seismic Response Coefficient

Cs=0.253 (Frame)

Cs=0.211 (Bearing)

Dead Loads of Structure W

Seismic Design Category D

Base Shear (Strength Design)

V = Cs * W

=0.253W (Frame)

=0.211W (Bearing)

Base Shear (Working Stress Design)

V = Cs * W

=0.177W (Frame)

=0.148W (Bearing)

Miscellaneous Loads:

Blast Loading was not a required design parameter for this project. Additionally, there are no specific requirements to satisfy progressive collapse.

Working Stresses for Materials:

Concrete (28 day strength min.)

Footings	3,000 psi
Foundation Walls	4,000 psi
Slab on Grade	4,000 psi
Structural Slabs	4,000 psi
Columns	4,000 psi

Reinforcing Steel ASTM 615 Grade 60
Fy = 60 ksi

Structural Steel
- Wide Flange Shapes ASTM A992
- Other Shapes and Plates ASTM A36
- Steel Tube Columns ASTM A500 Grade B (46ksi)

Other minimum codes and standards that apply to the design of this project include current editions of the following:

- International Building Code (2006)
- AISC Code with Commentary
- ACI 318 Code
- AISI Cold Formed Steel Specifications
- ANSI/AWS D1.1 Welding Code
- SJI for Steel Joists and Girders
- SDI for Steel Decking

7.2.3 Structural System Description

The following systems description is based on a 4 story above grade structure over a single basement level. The basement footprint is essentially the same footprint as the structure above. The overall area for each floor and total building areas are described in detail in other sections of this program. The typical floor to floor heights will range between 14' – 8" to 15' – 0" for the upper 4 floors. The basement floor to floor height is 16' – 0". The connecting corridor/atrium or Translational Center will ramp as required to match existing floor to floor elevations in the existing structure.

The primary framing grid for the main building will satisfy typical laboratory modules or multiples of 11' -0". Typical grid options can be optimized with a 33' x 33' dimensions in each direction. Where vibration criteria are more stringent it is suggested that the spacing in one of the directions be limited to 22' – 0". Certain locations may incorporate a 44' – 0" x 22' – 0" grid to allow for future flexibility and column free space. It is noted that this condition may become less economical when vibration constraints govern the design.

The floor framing and column framing will be of cast in place concrete construction. Post-tension concrete would generally not be utilized for this project. Where column spacing is 33' x 33' or 33' x 22' two-way slab construction is most economical. When the spacing exceeds 33' in any one direction it may be more economical to incorporate one-way slab construction. It is assumed that a pan system will be used to minimize concrete material and provide sufficient depth to mitigate vibration. Pan systems can either be

of joist pan construction or waffle pan construction.
Concrete columns will be used to support the suspended concrete floor systems. Square columns are most efficient, however; should rectangular columns satisfy architectural constraints more efficiently, then such columns may be utilized. In general the concrete columns will be 20” x 20” square.

The roof framing can either be of similar concrete construction, as the floor systems utilizing reduced loading criteria, or be framed with steel construction. Steel wide flange or tube steel columns can support steel girders and filler beams. The steel framing can either be of open web steel girders and joists or wide-flange sections. Where roof framing is below mechanical equipment or other heavy loads wide-flange sections should be utilized. Elevator or mechanical penthouses should be of wide-flange construction and support concrete fill.

The lateral resisting system will best be satisfied with cast in place concrete shear walls. Such walls should be located in strategic locations which not only optimizes sound structural design, but also does not adversely impact the architectural footprint and flow of the enclosed spaces. Should a steel option be utilized for the roof system then steel braced frames can be used at this level in lieu of cast in place concrete shear walls. It is paramount that the lateral elements stack vertically from the roof to the foundation level. Smaller openings such as doors can be located within the shear wall elements.

The Atrium or Translational Center may be constructed out of structural steel. Large open spaces may be best satisfied with steel construction. Special care should be utilized such that the combination of steel elements and concrete elements are in harmony with respect to vertical displacement and vibration. Steel and concrete structures may behave differently with respect to story drift and the balance of these two systems must be incorporated into the lateral design. Lateral loads for this portion will be best satisfied with steel braced frames. A seismic expansion joint will be located between the new structure and the existing structure which can accommodate the building drift associated with a seismic event.
Refer to other sections of this program for special requirement with respect to fire ratings and area separations.

7.2.4 Foundation Design

The following section is based on the Geotechnical Engineer’s preliminary findings and an Interim Report dated December 5, 2008. The final report (see appendix) provides alternate foundation options depending upon the final column and wall loads.

It is anticipated that the foundation system could be of conventional spot footing and continuous footing construction. In order to support high column loads engineered structural fill will be required below the footings. The depth of the structural fill will be dependent upon the actual column loads and will be between 3 and 5 feet thick. The fill should extend outward from the bottom of the footing as per the final soils investigation report. Replacement fill will help control differential settlements and allow for higher bearing pressures. Anticipated soil bearing pressures should range between 3,500 psf and 4,000 psf.

Alternate solutions for foundation design can be met with Geo-Piers or a structural mat foundation. Geo-Piers can mitigate low bearing pressures and minimize differential settlements. Pier design and the number of piers required will be dependent upon the column and wall loads. The final soils investigation will identify the allowable bearing pressure below the Geo-Piers. Should the over-excavation and size of the spot footings warrant the use of a structural mat foundation, design values can be found in the final soils investigation. It is noted that the amount of over-excavation and replacement fill will be reduced if a mat foundation is utilized. Differential settlements are greatly reduced with a mat design.

Groundwater is not anticipated to be a factor in design. Although static groundwater has not been encountered, the area is notorious for laterally and vertically variable "perched" groundwater conditions. It is therefore strongly recommended that a perimeter foundation/chimney sub-drain be installed on the outside perimeter wall of at least the up-gradient and side-gradient sides. Water collected can be discharged to a suitable point of gravity discharge down-gradient to the west. This sub-drain would consist of a simple four-inch perforated slotted pipe encased in gravel with a chimney sub-drain extending to within two feet of final grade.

Liquefaction potential of the site should be minimal and not require special considerations for design. Additionally no active faults pass through the site area.

A unique characteristic for this structure is the opportunity to "daylight" the basement level in strategic locations along the West Elevation. The East Elevation is completely below grade. This transition is a result of the grade change across the building site. Special consideration must be implemented such that the retaining wall(s) on the East side of the structure are designed to resist any seismic surcharges as a result of a seismic event. A tieback permanent shoring system may not be possible due to the significant amount of sub-grade utilities and other conflicts to the east.

7.2.5 Alternate Sub-Grade Parking

An alternate framing option that is currently being evaluated includes the addition of an additional level of sub-grade parking below the current basement level. This level would be below grade on the West Elevation and two levels below grade on the East Elevation. The footprint of the parking garage would mirror the building above and simply extend to an additional level below. The vehicle traffic would be limited to the lowest slab on grade and not be permitted to drive on the basement level.

The structural framing utilized above, (concrete construction as identified above) would extend an additional level below. The basement floor or the parking lid would be a structural concrete slab utilizing pan construction. Special consideration at this level would be necessary to support the mechanical loads and provide a vibration sensitive floor system for the Vivarium equipment which is located at this level. The slab on grade can be a nominally reinforced 5" concrete slab. Reinforcing should be epoxy coated and be located at mid-depth. Column spacing for the parking garage must be directly below the column spacing for the superstructure above. Parking stalls and drive lanes must be planned such that

columns and shear walls minimize the impact on the parking layout.

7.2.6 Equipment and Mechanical Considerations

The majority of the mechanical equipment is to be located at the Basement Level. This provides a central location for special design requirements. It is assumed that the vertical circulation of air and other mechanical or electrical equipment will be in identified shafts. These shafts can be economically provided when identified early in design. Horizontal distribution of the utilities can be easily achieved with a concrete flat plate or pan framing system. Attachment to the underside of the concrete floor system can easily be achieved.

Areas where the mechanical equipment has motors, fans or other moving parts may cause unwanted noise and vibration. Noise levels can be achieved in wall systems as identified by the architect. Vibration concerns must be achieved by providing isolated systems between the equipment and the structural floor. Such areas must be evaluated by both the mechanical engineer and structural engineer to ensure that proper mitigation techniques have been implemented. (See Section 8.2.7 below)

Special consideration must be taken where the mechanical systems are located on a structural slab. This condition may exist if the parking option as identified above is incorporated into the design. Additionally special consideration must be taken where this equipment is adjacent to the Vivarium on a structural slab.

7.2.7 Vibration

Vibration is a nuisance and can provide a detrimental working environment for laboratory research. Different areas of the building require different levels of vibration control. Utilizing a concrete structure greatly enhances the ability for vibration mitigation. Increasing the level of vibration control can be achieved quite economically with concrete floor systems. The minimum level of vibration control is identified to be 3,000 micro-inches / second. Additionally, the anticipated foot paces per minute are expected to be 75. This provides the minimum requirements for all laboratories as identified in the Program. It is suggested that this criteria not be reduced in the office areas such that future programming is not restricted to existing laboratory areas. This issue warrants further exploration during the design phase relative to future building flexibility vs. construction costs. Should the Vivarium require increased protection, increasing the depth of the structural slab can easily achieve the desired results.

The Vivarium is scheduled to be located on the same floor as the mechanical room. When this condition occurs at grade level it is suggested that a separate slab be utilized for the Vivarium. This will help ensure that vibrations from the mechanical equipment do not transfer horizontally across the basement slab. (Where parking exists below the basement level, special care should be implemented in the structural slab to mitigate mechanical vibrations.)

7.2.8 Quality Control

Quality control can best be achieved through close coordination and communication between design professionals. All required testing and inspections for structural

materials and processes are to be clearly identified on the contract documents. Timely site observations and review of shop drawings can mitigate conflicts before they happen.

7.2.9 Sustainability Standards

The referenced standard utilized in the development of sustainable design includes current editions of the following:

* LEED-NC for New Construction Reference Guide.

The structural systems utilized can take into consideration the Credits available in the following sections:

Materials & Resources

Innovation in Design

Materials & Resources:

This section offers opportunities for the structural engineer to contribute to the sustainable design and resource management for this important project. Close coordination with the General Contractor can result in the managing of construction waste, reducing waste, and the potential re-use of material on future stages of construction. Structural sizes can be normalized and result in multiple uses during construction. An example can be the use of shoring material or forming material eventually being used as framing members. As this percentage increases the opportunity increases which benefits the environment.

The incorporation of reuse material and recycled material provides opportunities for construction savings as well as benefiting regional companies. These materials can include exterior brick, concrete masonry units, structural steel, and concrete mixes (fly ash quantities) to name a few.

Perhaps the strongest effort will be in the efficiency of design. This should result in the need for less material than found in an inefficient design. The efficient layout and use of structural materials can result in overall less structural steel, structural concrete, and impact to the existing site. Although there may not be Credit Points directly associated with this effort, the overall impact on the economy in the production of less is a very important part of Sustainable Design. Buildings designed to last well into the future are the very essence of sustainable design. This structure will be designed to meet and even exceed the latest standards in earthquake design.

Innovation in Design:

Opportunities exist in this area if our ability to exceed noted values in the Materials & Resources Section above. If a very aggressive Construction Waste program is instituted where we can divert 95%, an additional Credit can be achieved. This would be very aggressive but potentially achievable.

Additionally, reducing the overall height of the building reduces building shadow and reduces the overall material use. Reducing the amount of building damage following a seismic event also has potential for innovation credits. This may increase the overall demand capacity in the structural frame, but provide the very essence of Sustainability.

7.3 Mechanical

7.3.1 Codes and Standards

The HVAC System shall comply with the following codes and design standards:

- University of Utah Design Standards-April 2006
- DFCM Design Criteria B March 2006
- State of Utah High Performance Building Rating System
- University of Utah East Campus Central / Chilled Water Plant, Design Manual B
- August 2000
- International Building Code B 2006
- International Mechanical Code B 2006
- International Plumbing Code B 2006
- International Fire Code 2006
- Utah Energy Code, ASHRAE 90.1-2004

7.3.2 Design Criteria

Design Temperatures, Dry bulb
Summer: 97F Winter: 3F
Design Temperatures, Wet bulb
Summer: 64F Winter: -

Indoor Design Conditions:

Summer:	75F
Winter:	72F
Humidity:	Animal Areas 40%-60%
Laboratory:	100% Outside Air
Animal Area:	100% Outside Air
Occupancy:	24 hrs. /day, 7 days/wk.

7.3.3 Internal Equipment Heat Gains

In addition to people and lighting loads, heat gains in all rooms should be based on anticipated equipment to be used in each room together with appropriate diversities. The following equipment heat gain rates for certain areas should be considered for preliminary load estimates:

Research Labs	30 Btuh/sf
Tissue Culture Labs	60 Btuh/sf
Glasswash/Sterilization	480 Btuh/sf
Equipment Spaces	130 Btuh/sf
Office Areas	10 Btuh/sf

7.3.4 Heating Water

The building shall be heated with heat from the East Campus High Temperature Water Plant. High Temperature Water will be supplied at 400F and shall be returned at 250F. High Temperature Water shall be supplied to the primary side of the heat exchangers. The secondary (building side) of the heat exchangers will require building pumps for water distribution to the building mechanical systems. The maximum allowable pressure drop from the HTW mains, into the building and through the heat exchangers is 20 psig. The design of the HTW system shall conform to the University of Utah Design Standards. The piping shall be connected to the existing mains designated. The building shall be designed for a variable flow secondary heating hot water system. Control valves shall be two-way with tight shut-off. Provide a glycol hot water heating system for preheat coils with appropriate heat exchanger and pumps.

The HTW lines should tie into the existing stub outs provided west of the Nursing and existing L.S. Skaggs buildings.

Use of the Campus HTW for temporary heat during construction shall be allowed only upon approval from University Plant Operations and shall meet all University requirements.

7.3.5 Chilled Water

The building shall be air conditioned with chilled water from the East Campus Central Chilled Water System. Water will be supplied at 42F and shall be returned to the system at 54F. This central chilled water system does not have pumping capability to distribute water within the building, and therefore building chilled water pumps will be required. All building chilled water valves shall be two-way tight shut-off. See campus design manual for piping instructions.

The chilled water lines should tie into the existing 12" chilled water lines that run East of the HSEB.

7.3.6 Humidity and Sterilization

Steam for building humidity needs and sterilization will be generated with the east campus high temperature water. High temperature water will be supplied at 400 degrees F and shall be returned at 250 degrees F.

7.3.7 System Design

The Laboratory HVAC system will consist of supply air, general room exhaust, and fume hood exhaust systems. These systems will be managed and controlled by a sophisticated control system to maintain the following operation:

- Fume hood face velocity will be constant independent of sash height.
- Rooms will be maintained at negative pressure relative to the corridor or adjacent spaces by varying room supply and exhaust air in conjunction with the fume hood exhaust system.
- Laminar flow type diffusers will be used to keep room supply air turbulence to a minimum around the fume hood.
- A hydronic heating coil will be used to reheat the supply air to maintain a specified room temperature and humidity settings.
- Further consideration should be given to adding motion sensors at the fume hoods to allow for decreased air flow when the hood is not in use or the room is unoccupied. The HVAC system should be designed to have sufficient capacity to facilitate future increases in the number of fume hoods.
- Consider the possibility of remote monitoring of sash position and monitoring of face velocity (if the budget allows).

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 a system will be dependent upon the results of the engineering analysis.

7.3.8 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. (See ANSI / AIHA Z9.5 - latest edition)
- Rooms should have a minimum of 12 air changes per hour. 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. 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 occupied.

The mechanical system should be designed with the possibility that the number of fume hoods could double in the future.

The HVAC system should have features that enable control of the following:

- Supply and exhaust air volume
- Laboratory pressurization
- Hood face velocity
- Energy consumption
- Room Temperature

Laboratories will be provided with variable volume fume hoods. 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 a system will be dependent upon the results of the engineering analysis.

7.3.9 Equipment Cooling System

Provide a closed loop cooling system that will provide cooling water to cool miscellaneous laboratory equipment and provide heat rejection for laboratory cold rooms. The cooling system shall utilize chilled water from the East campus chilled water plant in conjunction with independent building plate and frame heat exchangers, pumps and controls to maintain the cooling loop at the required temperature, but generally in the range of 50-80°.

7.3.10 Vivarium

The Vivarium shall be supplied from an air handling system independent from any other air handling system in the building. The supply and exhaust air handlers shall have multiple fans that are arranged to allow one fan to operate in case the other fan is down. The air handling system shall be constant volume and shall include steam humidification.

Provide a Watchdog system for security and control functions in the Vivarium. The individual room controls shall be provided with adjustable room thermostats.

The cage area shall be under positive pressure to prevent air from one cage to enter another cage. The cages themselves shall be under negative pressure.

The supply and exhaust systems shall have terminal boxes or valves to allow the constant readjustment of pressure to maintain the pressure relationships. Each supply air handler and each exhaust air handler shall be fitted with variable frequency drives to allow for the constant monitoring and adjustment of the space pressure. The exhaust system shall be supplied with filters.

All rooms holding animals shall be positive to the corridor with the main corridor being positive to the adjacent non-vivarium areas. Vivarium air should be exhausted from internal corridors.

Steam shall be supplied for cage washing, bottle washing and sterilization.

Domestic water with reduced pressure back flow prevention shall be provided for cage

washing capability. The pure water cage watering system shall be supplied from an outside source equal to Edstrom Systems. RO water shall be provided for the watering system.

The entire air handling system for the Animal Area shall be connected to the emergency generator system.

There needs to be a redundant cooling system available if cooling from the central plant is interrupted. It is recommended that an air cooled chiller be installed to provide this backup capability.

Animal waste shall not be combined with any other waste until it exits the building.

7.3.11 Offices

Design criteria for the office space HVAC system is based on the following:

- Office areas may be served by 100%, fresh-air, central station VAV air handling units which may also service the laboratory and laboratory support areas on that floor if the office area is incidental to the area of building on that floor that is provided by the laboratory system. Otherwise:
- Office / lobby areas shall be served by re-circulating VAV air handling units provided with outdoor air economizer controls.
- It is recommended that when possible, separate re-circulating air-handling systems should be provided to serve the office areas.

7.3.12 General Exhaust

Each toilet will be exhausted to atmosphere via penthouse exhaust fans. Air will be supplied at a constant volume through the non-laboratory air system.

7.3.13 Electrical and Elevator Machine Rooms

Each room will be exhausted to atmosphere via a designated exhaust fan.

7.3.14 Special Exhaust Considerations

The selection of the fume hood and local exhaust type is critical to the design of the laboratory HVAC system.

The chemical exhaust ducting from the laboratories will be type 316 stainless steel. The minimum recommended exhaust duct velocity will be 2000 feet per minute.

To achieve acceptable concentration levels and desired concentration rates, the exhaust system will combine and mix exhaust volumes from multiple uses in a commonly ducted (or manifolded) exhaust system. Exhaust concentrations of noxious or hazardous substances would be diluted both within ducts and at roof top plenums prior to exhausting to the atmosphere.

Manifolding of laboratory exhaust ducting will be permitted on a floor by floor basis, and multiple floors may be manifolded together above the roof line only.

Laboratory exhaust fans will be roof-top mounted or housed with in the penthouse and will be resistant to corrosion from the air stream vapors.

The exhaust to atmosphere is an important design consideration. Code requires a minimum discharge height of 10 feet above the highest roof level. The discharge velocity should be a minimum of 4000 feet per minute. At a minimum, the fresh air intake should be 60 feet horizontally and 20 feet vertically from the exhaust stack position. Space should be provided in each exhaust system for the future installation of scrubbers

and filters at the point of contamination. Exhaust fan sizes should take into account the added static pressure these added filtration systems would entail.

Consideration should be given to providing additional shaft space for the future accommodation of separate ducting for special fume hood exhausts, such as those from perchloric acid and high-energy radioisotope hoods that cannot be combined on a commonly manifolded system.

7.3.15 Controls

Provide individual room temperature controls. Laboratory controls shall include volume and pressure control for each space to assure that a negative pressure relationship will exist between each laboratory and the surrounding non-laboratory spaces.

The control system will be a direct digital control (DDC) system with electric driven actuators. The direct digital control system shall monitor, control and adjust the building controls from an in building location. The following items of equipment will be monitored and / or controlled:

- All central HVAC equipment including air handling units, heat exchangers, pumps, variable speed drives and exhaust fans.
- All decentralized HVAC equipment such as variable air volume units, reheat coils, thermostats, meters, air and water temperature sensors, system pressure sensors.
-

The control system shall be connected to the campus Metasys network or to the campus telecommunications Ethernet network.

7.3.16 Energy Conservation

As laboratory buildings necessitate the use of 100% outside air for air conditioning purposes, and the resulting energy requirements are high, in order to conserve energy the following design and control methods will be evaluated for incorporation into the building:

- Window blinds, heat absorbing or reflective glazing, external shading devices and heavyweight structure.
- Energy efficient motors should be used for all items of equipment.
- Variable air volume systems should be used wherever permitted.
- Variable speed drives will be used in lieu of inlet vane control.
- A heat recovery system of the glycol runaround type, flat plate heat exchangers or molecular sieve heat wheel, should be considered.
- Radiant cooling systems in areas of high internal load concentration.
- 3-Stage Evaporative Cooling System

This project will be required to adhere to the State of Utah High Performance Building Rating System as it applies to remodel projects. See DFCM Design Requirements, High Performance Building Rating System for in depth descriptions of prerequisites and sustainability points.

7.3.17 Air Handling Systems

Air handling systems shall be designed to meet all of the above heating, cooling, and ventilation and exhaust requirements of the project. Each supply and exhaust system shall have multiple fans arranged such that if one fan is down the other fan can still supply some air to the space. Air supply systems shall be

variable volume type with hot water reheat as needed. Laboratory supply and exhaust systems shall be 100% outside air supply and 100% exhausted and shall be variable volume. Laboratory areas shall be kept at a negative pressure relative to the rest of the building at all times. All portions of the system shall be ducted.

Consideration should be given to designing the air handling systems with 3-stage evaporative cooling in all laboratory areas.

It is the general intent to locate all air-handling equipment at the roof level. All supply air-handlers should be located in an enclosed penthouse on the roof level.

7.3.18 Air Intakes and Exhaust

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 4000 fpm. If variable volume systems are employed for supply and exhaust, then design provisions must be made to assure that the 4000 fpm exhaust velocity is maintained at all times at all volume conditions.

7.3.19 Supply Air Filtration

In all air conditioned spaces pre-filters and final filters will be provided per latest codes and standards. Pre-filters should have an efficiency of 30% and final filters an efficiency of 90% based on ASHRAE Test Standard 52-76. Final filters will be installed at the point of discharge.

7.3.20 Parking Garage Ventilation

Below Grade Parking Ventilation system shall be designed to meet the latest codes.

7.3.21 Translational Center or Atrium

Provide an engineered smoke control system to meet the needs of the atrium and comply with all current code requirements.

7.3.22 Shelled Space

All central mechanical systems, including but not limited to air-handling systems, heat exchangers, pumps, exhaust systems, main piping distribution systems, etc., shall be sized to accommodate the future build out of the building shelled space.

7.3.23 Seismic Restraint

All mechanical and plumbing systems shall be provided with seismic restraints to meet current code requirements.

7.3.24 Sustainability, DFCM High Performance BRS and LEED

This project will be required to adhere to the State of Utah High Performance Building Rating System as it applies to remodel projects. See DFCM Design Requirements, High Performance Building Rating System for in depth descriptions of prerequisites and sustainability points. The design team in conjunction with the owner shall make the final determination of exactly which credits to pursue.

It is the intent of the University of Utah to pursue LEED Gold Certification for this project. The mechanical and plumbing system are crucial to the success of LEED certification, therefore careful consideration should be taken during the design process to ensure that the appropriate decisions are made to reach the desired certification level. Refer to the program section on sustainability for a preliminary LEED project checklist. The design team in conjunction with the Owner shall

make the final determination of exactly which credits to pursue.

7.3.25 Roof Access

Provide sufficient access to all roof areas including the mechanical penthouse and Atrium.

7.4 Plumbing

All plumbing and wet side laboratory equipment should be located in the mechanical rooms located on the first level.

7.4.1 Water Supply

Water meters will be installed where lines enter the building and shall interface with existing Campus distribution system.

A pressure reducing valve assembly will be provided to limit water pressure at the building to an acceptable level.

7.4.2 Domestic Water

A domestic water system shall be provided for all non-laboratory spaces in the building.

The system shall be designed to provide a minimum of 40 psig at the farthest building fixture on the highest floor of the building.

Domestic Cold Water: Domestic cold water will be connected to all laboratory and non-laboratory plumbing fittings and fixtures, including emergency eye wash and shower stations. Emergency eyewash units should be installed with a check valve and in-line back flow preventer and provided with independent control valves to regulate water pressure. Emergency shower and eyewash water is to be preheated to 70 degrees F.

Domestic Hot Water: Provide a domestic hot water system with heating being supplied from the Campus High Temperature Water System. Redundant instantaneous heat exchangers shall be provided separate from the building heating heat exchangers. Water shall be generated at 160 degrees F and be mixed

down to be supplied to the building at 120 degrees F with no storage tanks.

7.4.3 Laboratory Water

A separate laboratory cold and hot water system shall be provided with appropriate back flow prevention systems in place to prevent laboratory water from entering into the building's domestic water system. Separate instantaneous hot water heaters will be required to supply 140F water to the lab benches. All laboratory fittings will be provided with vacuum breakers.

7.4.4 Purified Water

A laboratory pure water reagent grade system shall be provided to supply 18 megohm water for all lab benches. The system shall consist of dual softener, carbon filters, primary and secondary cartridge filters and a reverse osmosis system. Polishing shall be accomplished through a separate bed deionizer, and ultraviolet sterilizer, pre and final filters and storage tanks and pumps. This piping system shall have continuous recirculation using unpigmented virgin polypropylene.

For higher purity water requirements than is generated from the central system point of use polishers shall be used and are part of user supplied equipment.

7.4.5 Emergency Showers

Emergency showers will be provided in all laboratories with adjacent floor drains with trap primers.

7.4.6 Sterilization

Glass washing, autoclaves and other steam needs shall be supplied from a central steam generator supplying steam at 90 psig. This steam shall be generated with High Temperature Water from the Campus central system.

7.4.7 Laboratory Vacuum

A central laboratory vacuum system will be provided and designed to deliver vacuum at 18.2" Hg to laboratory fittings. The distribution piping system will deliver vacuum to each laboratory. Piping shall be Sullest Type L medical grade copper with brazed joints. If deeper vacuums are required, they will be generated locally with special vacuum pumps located in the laboratories.

7.4.8 Laboratory Air

A central laboratory compressed clean, dry, oil free air system will be provided and designed to deliver compressed air to all laboratory fittings. Piping systems will be Sullest Type L medical grade copper with brazed joints.

7.4.9 Service Distribution Materials

Piped services, except for laboratory waste and vent, will be distributed in a double ended horizontal loop, which can be sectionalized for alterations and repair. Tees, valves, and caps shall be provided on a modular basis to facilitate extension of the services in the future to points of use in each laboratory module without disruption to services in adjacent modules.

7.4.10 Isolation Valves

Each laboratory shall be provided with isolation valves as the laboratory utilities enter the laboratory.

7.4.11 Sanitary Sewer and Waste

A complete sanitary waste and vent system will be provided in accordance with International Plumbing Code (IPC) throughout the building. Extend to exterior mains as

shown on site utilities plan. Provide grease, sand and or oil traps as needed.

7.4.12 Laboratory Waste

A separate drainage and vent system constructed of acid resistant materials will be provided for laboratory waste. Laboratory waste may be piped into the sanitary sewer after it exits the building. Vents will be routed up through the roof and will not connect to sanitary vent piping.

Provisions should be made in the design of the wet laboratories for storage of appropriate containers for the collection of waste materials, such as solvents, oils, greases, sediments, and other materials. A central collecting area near the loading area should be provided for collection and for pickups by contracted waste disposal firms or disposed by other methods

7.4.13 Storm Drainage

A complete roof drainage system that will tie into the existing storm drain systems will be provided. A separate overflow drain system should be provided by means of a piping system or a scupper system.

Refer to Section 4.6.1.4 Storm water for recommendations on storm water discharge.

7.4.14 Fire Protection System

The building will be protected by a hydraulically calculated class I stand pipe and automatic wet sprinkler system based upon an ordinary Hazard Group II occupancy.

Hydraulic calculations shall be based on water pressures available for design as noted in a water flow analysis report. A water flow analysis was previously competed and the results can be found in Section 4.6.1.6.

A detector check / alarm valve assembly shall be provided at the fire sprinkler system riser to protect the city water supply from contamination. The riser assembly shall meet the requirements of the Utah State Fire Marshal Department.

Each floor shall be supplied with a floor control assembly that includes a flow switch and method of testing. Sprinkler systems shall be supplied from the standpipe system.

Pre-action sprinkler systems shall be included in the sprinkler system design where requested by an owner's representative.

The building will be protected by a hydraulically calculated automatic wet sprinkler system based upon an ordinary Hazard Group II occupancy.

7.4.15 Plumbing Fixtures

Plumbing fixtures shall be provided for all laboratory and non-laboratory areas and shall include all plumbing fixtures, fixture trim specialties, drain, etc., required for the complete plumbing system. Low-flow features shall be provided when required.

7.4.16 Existing Pharmacy Building Fire Protection

The existing L.S. Skaggs Pharmacy Building will be required to be retrofitted with a complete hydraulically calculated automatic wet sprinkler system based upon an ordinary Hazard Group II occupancy, as part of the new building construction.

7.5 Electrical Systems

7.5.1 Codes and Standards

IBC 2006, International Building Code

IFC 2008, International Fire Code

NEC 2008, National Electrical Code

IECC 2006, International Energy Conservation Code

IEEE 1100-1999, Recommended Practice for Power and Grounding Electronic Equipment

IESNA, Illuminating Engineering Society of North America

University of Utah Design Standards

Division of Facilities Construction and Management Design Criteria

Utah State Fire Marshal Laws, Rules, and Regulations

UL, Underwriters Laboratories

EIA/TIA, Electronics Industries Association/Telecommunications Industry Association

ADA, Americans with Disabilities Act

For each code, standard, and guideline, adhere to the latest adopted publications.

7.5.2. Electrical Service

This building will be fed from the Medical Substation as detailed in **Section 3.6.4 Electrical Utilities**. A 600 amp padmount switch with two source switches and four interrupter switches should be installed in the new service yard to feed the transformers for this building and the existing Skaggs Pharmacy building in the future. Two interrupter switches will feed the primary of the 12470 – 480Y / 277 volt transformers that will be required for this building. The transformers should be liquid-filled using Envirotemp FR3 fluid. Each of the transformer secondary sides should supply a draw-out style main circuit breaker that supplies power to the distribution switchboards. The main circuit breakers shall be specified as electronic breaker complete with available features such as long, short, and instantaneous pick-up and ground fault provisions. Circuit breakers in the switchboards should supply the major feeders for lighting distribution switchboards, motor control centers (HVAC), transfer switches, elevators, and plug and laboratory equipment loads.

As an additional design consideration, the University prefers to deliver 120/208V power to buildings from medium voltage 12470 – 208Y/120 volt transformers rather than from 480 – 208Y/120 volt dry-type transformers in the facility. Early in the design process, provide an analysis of these two approaches providing an evaluation of the initial costs, life cycle costs, maintenance and operational issues that can be presented to the University for evaluation and discussion. A decision can them be made as to which power delivery method will be used.

It has been estimated that the total building connected load will be approximately 32 watts per square foot as detailed below:

Loads	Watts/square foot
Lights	3.5
Receptacles	4.5
HVAC	12.0
Lab Equip.	10.0
Elevators	1.0
Miscellaneous	1.0
Total	**32.0**

However, actual design loads should be used to determine the total building connected load during design. At a minimum, the medium voltage transformers and secondary switchboards shall be sized based on the connected load shown above.

7.5.3 Electrical Distribution

The building main switchboards shall be free-standing switchboards equipped with University approved multi-meters (Square D Powerlogic or equivalent) that can display the characteristics of the load on the switchboard. These meters shall be connected into the Campus Central Power Monitoring System. Transient Voltage Surge Suppression (TVSS) shall be provided for the main switchboards. These TVSS devices shall be installed external to the switchboards. Circuit breakers or fuses may be used. These switchboards shall be located in the main electrical room. Size these switchboards to provide for 50% spare capacity and breaker space. Internal bussing shall be copper with all lugs copper rated. Approved manufactures are Sq. D, GE, or Siemens. To the greatest extent possible, separate different types of loads onto different feeders such as lights, HVAC, lab equipment, computer load, etc.

277/480 volt and 120/208 volt distribution panels shall be provided to distribute electrical power through the building. These distribution panels may use circuit breakers or fuses. Distribution panels shall be located in electrical rooms or mechanical spaces. These distribution panels shall supply power to loads that are located on the same floor as the distribution panels. Like the main switchboards, these distribution panels shall be sized to provide a minimum of 50% spare capacity and breaker space. Bus bars shall be copper and all lugs shall be copper rated. Approved manufactures are Sq. D, GE, or Siemens.

277/480 volt and 120/208 volt branch panelboards shall be provided to distribute electrical power out to the branch device (lights, outlets, lab equipment, etc.). Branch panelboards shall be circuit breaker type with bolt-on breakers. Branch panelboards may be located in electrical rooms and mechanical spaces. Panelboards that serve labs spaces maybe located near each lab, either on the corridor side of the lab or if practical, within the lab space. Other locations shall be approved by the architect during design. All panelboards shall be provided with a standard ground bus as well as an insulated ground bus. Panelboards that feed computer equipment shall be furnished with transient voltage surge suppression. All branch panelboards shall be sized with a minimum of 50% spare capacity and space. Bus bars shall be copper and all lugs shall be copper rated. Approved manufactures are Sq. D, GE, or Siemens.

Dry-type transformers shall be minimum TP-1 compliant and should be specified for harmonic loads.

7.5.4 Emergency Electrical Distribution

A standby emergency diesel generator will be required to provide back-up power for life safety systems, legally required standby systems and essential standby systems of the new building. This generator shall also include provisions (an additional breaker at the generator) and capacity to supply back-up power to the existing Skaggs Pharmacy building for the following loads:

Life Safety	Verify during design
Freezer Farm	25.3 KVA

In general, the location of the generator should be installed exterior to the building in a sound-attenuated enclosure in the service yard where the medium voltage switch and transformers are located. A blast wall shall be installed between the generator and other equipment. The generator shall have a skid mounted fuel tank that is sized for 24 hours of operation at full load. It is important to locate the generator as far away from any building fresh air in-take louvers. The service yard shall be designed to provide security as well as to create an aesthetically pleasing environment. The location of the generator should be placed in a secure, low risk area to insure for maximum reliability. An evaluation should be made during the design process to determine the specific needs for emergency power, the redundancy required, and the safe keeping of the system. Based on the load that will require back-up power, the size of the generator may be large enough to warrant using paralleled generator sets. This would also allow for some additional redundancy in the system.

Consideration should be given to locating the generator/s inside the building. An evaluation should be done early in the design to determine whether there are enough reasons (initial cost, space considerations, operational considerations, security considerations, etc.) to warrant for the generator/s to be installed within the building footprint. This determination will be made during design.

Multiple automatic transfer switches shall be provided in accordance with requirements of NEC Article 700 for the different branches of the emergency system.

The following loads are required to be connected to the standby emergency generator:

1. Life Safety Systems
    a. Egress lighting
    b. Fire Alarm System
    c. Elevator cab lights
    d. Automatic doors.
2. Legally Required standby Systems
    a. Smoke control systems
    b. Elevators (only if required by code or the user)
    c. Laboratory supply and exhaust systems including the associated pumps, mechanical control systems, and other equipment required to make the system work
    d. Fume hood exhaust and make-up air systems.
3. Essential Standby Systems
    a. Vivarium areas including associated mechanical systems, lighting systems, and power (outlets serving animal rooms and other selected outlets, verify with user)
    b. Refrigerators and freezers
    c. Cold rooms
    d. Lighting other than egress lighting

e. Miscellaneous plug loads (lab spaces, etc.)

f. Card Access/CCTV systems

g. Receptacles in MDF and IDF rooms

g. UPS systems

h. Data Center equipment and mechanical systems (This is contingent upon whether there will be one included in the new building.)

Emergency distribution and branch panelboards shall be provided as necessary to provide standby emergency power to the associated systems. The distribution and branch panelboards shall meet the same requirements as the normal power system. All distribution panels and branch panelboards shall have a minimum of 50% spare capacity and breaker space. The standby emergency generator should have 25% spare capacity.

Separate normal power systems from emergency power systems as required by the NEC.

7.5.5 Uninterruptible Power System (UPS)

Provide an uninterruptible power supply system (UPS), backed up by the standby emergency power system, to supply power to critical equipment and systems. Provide battery back-up for 15 minutes at full load. Additional branch panelboards shall be provided for this system.

The following loads are required to be connected to the UPS system:

1. Poison Control Center call center and overflow area computers and other associated electronic equipment that is required to have uninterruptible power.

2. Communication room (MDF and IDF rooms) outlets feeding communication/data equipment.

3. Data Center electronic equipment (This shall only be provided if a data center is provided for the new building.)

7.5.6 Lightning Protection & Grounding Systems

Provide a building grounding system that includes the cold water pipe, building steel, UFER, and two ground rods, in accordance with NEC requirements. In addition, provide a counterpoise system with additional ground wires connected to every other steel column of the building. In each wet lab, provide a ground bus that is connected into the building grounding system.
Provide a grounding riser system located in all of the telephone rooms with grounding bus bars mounted on the wall of each room. This system shall be tied to the main building grounding system.

Provide a lightning protection system for this building. This system shall be connected to the building grounding system.

All conduits used for electrical power should include a code sized ground wire. The conduit shall not be used for the equipment ground.

Provide additional isolated grounding conductor in all 120/208 volt branch panelboards that are used for computer equipment, lab equipment, and any panels that are supplied by the UPS.

7.5.7 Power Quality

A short circuit study shall be performed to ensure that equipment supplied is rated for the available fault current. Additionally, a breaker coordination study should be performed to ensure that fuses and circuit breakers limit system power outages caused by overloads and faults. Circuit breakers with adjustable settings shall be set at levels that allow for optimum system coordination. Additionally, an arc flash study is required to ensure that equipment is properly rated for the potential hazards. Documentation containing all information relevant to system coordination for future expansions and changes should be provided to the building owner.

Because of the potentially critical nature of work conducted at this facility, conductors should be sized to limit total voltage drop to 5%. This voltage drop shall be measured from the building utility transformer to the farthest branch circuit. Wires shall be increased in size as necessary to limit the voltage drop as indicated above. When calculating voltage drop, the load shall be assumed to be 80% of the ampacity of the branch circuit.

Transient voltage surge suppression (TVSS) should be employed to limit voltage transients created outside the facility (lightning) as well as inside the facilities (internally generated transients). TVSS devices should be installed at the service entrance as well as distribution panels and branch panelboards that supply power to sensitive electronic equipment. All TVSS devices shall have disconnects to allow for the device to be taken out of service without the necessity for shutting off power to the load.

Harmonic currents are a common occurrence in most buildings that contain electronic equipment, variable frequency drives and other harmonic generating equipment. It is important to limit and manage the amount of harmonic voltage and current that is found in the electrical power system. Input filters should be used for all VFD's. Dry-type transformers should be K-20 rated or the use of harmonic mitigation transformers should be used. Electronic light fixture ballasts should be specified with <10% THD. Panelboards that serve electronic loads shall be provided with 200% neutrals.

Power factor correction capacitors should be utilized on all motors that don't use other means to maintain unity power factor. Unity power factor equates to efficient energy usage.

Nearly all buildings can experience problems with the existence of EMF or electromagnetic fields. Because of the sensitive equipment that can be present in this facility (i.e. SEM, TEM, etc.) care must be taken on how and where electrical systems are installed. Electrical equipment should be kept away from rooms and areas that have sensitive electronic equipment susceptible to EMF interference. An EMF survey should be conducted of the areas of concern. This can include areas within the facility as well as areas associated with the site. The EMF survey will help identify potential problems and allow for the use of mitigation techniques to help alleviate interference problems. Possible shielding techniques may be necessary to totally isolate sensitive equipment from EMF interference.

7.5.8 Electrical Room Requirements

The main electrical room should typically be centrally located within the building on the main level or parking structure level that would allow for the incoming service conductors to be ran underground. Due to the size of the service for this building, two entrances/exits with doors that swing out of the room and that are provided with panic hardware will be required. In addition to the main electrical room, there shall be a minimum of one additional electrical room on each occupied level of the building. All electrical rooms including the main electrical room should be located so that they may be stacked to allow for ease of power distribution. These rooms shall be located so that the length to the farthest device that is served is 150 feet or less. Consideration should be given to the ease and accessibility of getting into and out of these rooms during the initial build-out as well as future remodels when locating electrical rooms. Areas within these rooms should be dedicated for current and future vertical distribution. Some form of thermostatically controlled cooling or exhaust should be provided for these rooms. All electrical rooms should be rated 1 hour and all penetrations should be fire caulked. Electrical rooms should contain only electrical systems and no other systems should run over or through these spaces unless they serve the space.

7.5.9 Wiring Devices, Conduit, and Conductor Requirements

In general, branch circuits shall be loaded to no more than 80% of what is allowed by the NEC. Outlets that feed specific equipment shall be sized based on the nameplate rating of the equipment. No more than four convenience outlets shall be place on a branch circuits that feed lab or office spaces. Where outlets feed specific equipment, the load should be based on the nameplate rating of the equipment. The location and number of outlets for each space should be coordinated with building users to ensure that their needs are met. The following recommendations for power receptacles should be used as a general guideline, not as an exhaustive list of requirements.

<u>Offices</u>

For each work station, provide two duplex outlets dedicated to computer terminals. Also provide one additional normal duplex outlet for every 6' of wall space.

<u>Conference Rooms</u>

Provide one duplex outlet for every 6' of wall space. Provide a minimum of two dedicated duplex outlets, located on opposite walls, for computer use. Provide floor boxes under conference room tables.

<u>Lounge/Break rooms</u>

Provide dedicated GFCI duplex outlets every 4' along the counter. Provide dedicated GFCI outlets for refrigerators, freezers, microwaves, and disposals (this last appliance shall be switched at the counter). For larger equipment requiring GFCI protection, such as vending machines, GFCI breakers should be used to allow for easy reset accessibility.

<u>Counter tops (in general)</u>

One dedicated duplex outlet every 4' on counter tops

<u>General Laboratories</u>

Provide a two compartment, aluminum or stainless steel wiremold mounted above the lab bench to provide power and communication requirements. Outlets shall be spaced 24" on center in the wiremold

and those outlets that are within 6' of any sink shall be GFCI. Provide special purpose outlets for lab equipment requiring special power requirements. Provide each lab bench with one 20 amp, 120v receptacle on emergency power. The minimum wire size for lab spaces shall be #10 AWG. to allow for flexibility and changes.

Vivarium

In vivarium areas, there shall be no exposed conduit and all penetrations into those areas shall be permanently sealed using approved materials and methods. Exposed conduit should be limited as much as possible to ensure ease of cleaning the space. Wiremold with snap on covers should not be used for these spaces due to cleaning and decontamination requirements. Provide enough power and data outlets to meet the user's needs. All wiring devices shall be waterproof. Outlets shall be GFCI type. Provide two to three outlets on each wall. Receptacles for the ventilated rack system should be ceiling mounted and twist lock style.

Telecommunication rooms

Provide required outlets for telephone/data equipment. All outlets that supply telephone/data equipment shall be fed from a UPS. Provide one duplex outlet on normal power for general purpose use.

Electrical Rooms

Provide at least one duplex on emergency power and at least one duplex outlet on normal power. For large electrical rooms, such as the main electrical room, provide at least two duplex outlets on normal power.

Corridors/hallways

Provide at least one duplex outlet every 25' along the corridor.

Lobbies

Provide a least one duplex outlet every 6' on alternating sides of the lobby.

Stairs

Provide one duplex outlet at each landing of each level of the building.

Building Exterior

Provide one weatherproof GFCI outlet near each entrance/exit. Provide additional outlets at locations of student interaction.

All wiring shall be in conduit. Minimum conduit size is ¾". Type MC or AC cable is not allowed. Pull strings shall be provided for all empty conduits. Branch circuit homerun conduits shall contain a maximum of 3 branch circuits. All conductors used on this project shall be copper. No aluminum conductors are allowed. Provide spare conduits in all electrical panels that are mounted flush in walls and are not readily accessible.

7.6 Lighting Systems

7.6.1 Interior Lighting System

Interior lighting design shall comply with the illumination levels and uniformity criteria of IESNA and its recommended best practices, including RP-1-04 "Office Lighting", RP-3-00 "Lighting for Educational Facilities" (as it applies to this project and specific areas), and RP-20-98 "Lighting for Parking Facilities".

Interior lighting design shall also strive to meet State of Utah DFCM Design Requirements, the DFCM Lighting Power Density Ratios and the DFCM High Performance Building Standards. These standards included:

1. The lighting system has been designed according to the IESNA Lighting Handbook – required.

2. Monitoring of lighting system is provided – possible point.

3. Life cycle cost analysis for certain specific systems – required.

Not all of these items are required, but based on the rating that is to be achieved a certain numbers of points are required.

7.6.2 Lighting Illumination and Power Density

Adequate lighting levels should be used to ensure that there is enough lighting illumination for the specific task of the defined space. Illumination levels shouldn't be compromised for energy use reduction. With the use of sustainable practices, DFCM's High Performance Building Standards, day lighting techniques, and lighting control, energy usage can be reduced. The following table defines the required illumination levels and Ashrae 90.1, 2004 power densities for defined spaces:

Defined Space	FC Levels	W/ft^2
Private Office	50 Fc	1.1
Open Office Areas	50 Fc	1.1
Conference (meeting)	30 Fc	1.3
Conference (video)	50 Fc	1.3
Circulation & Lobbies	30 Fc	1.3
Corridors	5-30 Fc	0.5
Laboratory	75 Fc	1.4
Locker/Restrooms	30 Fc	0.9
Vivarium Areas (Red)	15 Fc	0.3
Vivarium-white low	30 Fc	1.2
Vivarium-white high	50 Fc	1.7
Parking Structure	5 Fc	0.2

It should be noted that the energy usages shown above must be substantially less in order to get points when trying to achieve LEED Gold certification. Foot candle levels for interior spaces shall provide a 4:1 maximum to minimum uniformity ratio. The illumination levels listed above may be reduced if task lighting is used. The use of task lighting should be considered during the design process.

7.6.3 Light Fixture Criteria

In general, low-glare fluorescent light fixtures with electronic ballasts should be utilized. The use of incandescent fixtures should be minimized to the greatest extent possible. Fixture efficiency is very important and should be a consideration when selecting fixtures. High efficient fixtures are desirable. Fixture quality should also be considered and selected to last for the life of the building. Pendant indirect/direct lighting is the preferred type of light fixture to be used in many of the occupied areas. The percentage of up light versus down light is dependent upon the space. Lay-in recessed fixtures of different types can be used for other spaces. Recommended fixture types for each building area type are listed below:

Fixture type	Area
Private Office direct/indirect	Pendant
Open Office Areas direct/indirect	Pendant
Conference Rm. direct/indirect with	Pendant recess can lights

Corridors parabolic	Lay-in basket or
Laboratories direct/indirect	Pendant
Restrooms	Recessed
Lab support	Lay-in acrylic
Mechanical/Elec. guard	Channel strip w/wire
Vivarium	Recessed acrylic, sealed and gasketed, with red light capability in certain areas.

Work with the architect to select the light fixtures that are most esthetically pleasing, complement the architecture, and provide for the best value to the project.

7.6.4 Lamp and Ballast Criteria

Low energy consumption lamp and ballast combinations should be used if possible. Ballast with a low ballast factor (.71) in combination with high lumen lamps (3100 lumens) is an example. However, it is important to specify a ballast that meets Campus standards. Lamp and ballast combinations should provide for an efficacy of 75% or higher. Fluorescent lamps should have a minimum color rendering index (CRI) of 86. Lamp color should be specified for 3500 Kelvin. Differing lamp types shall be kept to a minimum for ease of maintenance. Fluorescent lamps should be specified to comply with the EPA TCLP requirements. If fluorescent lamps are used for dimming, provide lamps that are specifically made for that purpose to reduce pre-mature lamp failure.

7.6.5 Vivarium Lighting

Special consideration should be taken when designing lighting for vivarium spaces. Lighting in the vivarium environment is important because it has the potential to directly impact both the quality and validity of research, for, as it has been well-established, light can affect the physiology, morphology, reproductive cycle, and behavior of animals. Thus, multiple levels of light are required and the intensity, photoperiod, and spectral content of vivarium lighting need to be checked for compatibility with both the specific animal housed, and nature of research conducted, in the space. For this vivarium, red light capability is essential and must be planned for. It is the desire of the user that the Edstrom Watchdog system be used. This system provides for automated watering, environmental monitoring and alarm, lighting control, and secure accessibility into the space.

A light intensity of 30 fc is generally considered the necessary level for vivarium spaces that are housing animals. However, spaces containing stacked cages may prove to be problematic, as cages can be subject to uneven levels of light intensity based upon the position of each cage in the stack. In this situation, the light fixture layout for vivarium spaces should be based upon the content and layout of the cages they house. To ensure accurate data gathering, all vivarium lighting shall be backed up with emergency power so the environment is not affected by power outages.

Additional thought should be put into the design of lighting controls for vivariums, as lights installed in these spaces may need to be adjusted for research purposes. The lighting controls should address the needs of research in two ways: first, by controlling the photoperiod and second, by employing

light sensors to monitor and adjust light levels. If precise control is wanted, the use of dimming can be employed. Furthermore, higher light levels will be needed for cleaning purposes. To achieve this, manual override controls should be installed to allow users to increase lighting levels in the space. However, the lighting control system shall not allow the night cycle to be overridden. It is very important to work with the users to ensure that all needs are met for this space.

Sealed, gasketed, flush mounted fixtures with fiberglass or stainless steel housings should be used for the vivarium.

7.6.6 Lighting Control

To meet the requirements of the International Energy Conservation Code (IECC 2006), a method to automatically shut-off all lighting in the building is required. All interior lighting shall be connected to some system or device that will meet the requirements of the energy code. The system/s used shall provide for precise control while allowing for simplicity, flexibility (multiple users and departments), and low maintenance. As a minimum, controls shall include an occupancy sensor and local switch/s for each space to allow for automatic switching and manual override of the space. A building wide lighting control system complete with manual switches for override capability, could be used for building areas such as, corridors, open office, and laboratory areas. Smaller walled in areas could utilize occupancy sensors for control. In addition, offices or other spaces that are adjacent to the exterior shall use dimming ballast and light level sensors to allow for day lighting techniques.

Conference rooms shall be provided with dimming provisions to allow for the light levels to be reduced during power point presentations, note taking, etc.

Daylight harvesting controls, used in conjunction with the lighting control system, shall be provided, where practical, to decrease energy consumption and shall be in compliance with the International Energy Conservation Code, except that overall energy target requirements shall be exceeded by 10% to 20%. To achieve the goals of effective daylight harvesting, light level sensors should be used with dimmable ballasts to decrease the light output of a fixture when daylight levels are high. These sensors shall be integral to the fixtures to allow for accurate and precise control of lighting. Fixtures that are located within the first 15' of the building perimeter should be controlled in this manner.

7.6.7 Exterior Lighting

All exterior lighting should be designed in compliance with RP-33-99. As an additional requirement, University of Utah standard light fixtures shall be used for parking lots, walkways, and plaza areas. For parking lot lights, full cut-off, metal halide light fixtures shall be used with a minimum of 1 Fc and a maximum uniformity ratio of 20:1.

Care should be taken when designing the illumination levels and type for the outside of the building. As there shall be no up-lighting of the building, exterior, building-mounted lights must be full cut-off fixtures. Furthermore, the number of exterior building mounted fixtures shall be kept to a minimum, near entrance and exit locations only, to ensure that the perceived brightness of the building is low. However, care should be taken to ensure that there are adequate light levels around the perimeter of the building to allow the proper use and operation of closed circuit television

cameras (CCTV) and provide a level of security.

Exterior lighting shall be controlled by a lighting control system the uses a photocell and hands-off auto switch. Exterior security lighting shall be programmed to be switched on at dusk and timed off as directed by the University of Utah.

It is very important to design the exterior lighting to control the amount of light trespass. For LEED Gold certification, limiting light trespass from the site is critical.

7.7 Communication/Data Systems

7.7.1 Communication/Data Rooms

There shall be one main communication room (MDF) that is located on the ground level, located central to the building. It shall be sized as a minimum per University of Utah design standards. However, during design, exact size requirements should be determined. This room shall house the main computer and phone equipment that serves the building. Extending out from this room, there shall be two separate pathways that tie into the University of Utah's communication/data network. Each pathway shall have four (4) 4" conduits that run to existing and or new communication vaults (manholes).

Each additional floor shall contain at least one communication room (IDF) that shall be sized as a minimum per University of Utah design standards. However, during design, exact size requirements should be determined. These rooms shall be central to the building and stacked to allow for ease of communication/data distribution. A minimum of six 4" conduits shall be run between each level. A minimum of three 2" conduits should be run to the roof for roof-mounted external wireless communications. It is important to ensure that cable lengths do not exceed 100 meters. Additional IDF rooms should be provided as necessary. Additionally, there shall be at least three 4" conduits that extend back to the existing Skaggs Pharmacy building to connect the two buildings together from a communications/data standpoint.

MDF and IDF rooms should be separated from electrical rooms by a minimum of 6'-0" to ensure no interference from electromagnetic fields (EMF).

Each MDF and IDF rooms shall have a minimum of three 8'-0" high, 19" floor standing racks. Plywood terminal boards should be installed on all walls. Cable tray should be installed around the perimeter of the room for cable management. Provide dedicated power outlets on UPS for all data equipment located in the room.

Consideration should be given as the whether there is a need for a Data Center. At this time, the need is not fully understood and further discussion will be required. Early in the design process, this issue should be addresses and a determination as to whether a local data center is required and/or whether the University's data center can meet the needs of the College of Pharmacy.

7.7.2 Wire Management

Each floor shall a dedicated cable tray system. This system shall connect to the communication room(s) located on the same floor. Generally, the cable tray shall be routed in corridors/hallways and coordinated with ducts, piping, and electrical conduits to ensure easy access. It is anticipated that a 18" wide by 6" deep tray should be sufficient; however, this should be carefully evaluated during design.

The tray shall be trapeze-hung and seismically braced; center-hung trays are not allowed. Mechanical fire stop systems should be utilized where the cable tray passes through fire-rated partitions so as to allow for moving, additions, and changes in a flexible and easy manner.

This tray may be used for the following systems:

1. Communication/data
2. Card Access System
3. CCTV System
4. Building Management system

All cables that use the cable tray shall be properly labeled and identified.

7.7.3 Communication/ Data Raceway Requirements

Each telephone/data outlet shall utilize a 4" square by a minimum 2-1/8" deep junction box with a single-gang or double-gang mudring. One (1) 1" conduit with nylon pull rope shall be run from each junction box to the nearest cable tray and a protective bushing and strap should be provided to secure the conduit to the cable tray. Conduit to tray clamps shall be employed. This system should be designed to allow for flexibility and changes in the future. Minimum conduit size shall be ¾”.
In office locations, provide a minimum of two (2) telephone/data jack locations. During the design, this should be closely coordinated with the users to make sure that their needs are met. Where telephone/data or power is needed in open areas of suspended floors, provide floor boxes only; poke-through devices are not allowed.

Provide telephone outlets for payphones, elevator panels, fire alarm panels, building automation system, security system, wall phones, and other required equipment. Each telephone outlet shall have one Category 6 RJ-45 4-pair ports with a dedicated horizontal Category 6 cable run from the floor communication room to each port.

In the vivarium, provide several telephone locations in the corridor. No telephone lines are wanted in any room that houses animals. Data lines are required in rooms housing animals.

Provide data jacks in key areas of the building to support a wireless network. Design wireless access points with one category 6, RJ-45 data jack mounted in a 4" X 4" X 2-1/8" deep junction box with cover plate, to be located typically in a corridor. Some additional locations may be specified for exterior wireless capability.

Due to the nature of the building, the communication/network systems should be secured. Provisions and procedures should be implemented to ensure security of the information contained within the system.

7.7.4 Structured Cabling System

The structured cabling system will be provided by the University of Utah’s IT division Netcom. They will provide all fiber optic cabling (Communication/data) and copper (Qwest) to the building. Fiber optic cable will run from the MDF room to each IDF room for communication/data distribution. Fiber optic cable shall also run to specific spaces including the visualization lab, computational lab, and others. The exact location shall be determined during the design.

The structured cabling system shall be designed to support both present high-speed voice/data/video transmission and future high bandwidth applications. The system should be designed per the University of Utah's design standards.

Horizontal cabling will consist of using Cat 6 data cabling. These cables shall not exceed 100 meters in length. A minimum of two (2) cables shall run to each device location.

7.8 Auxiliary Systems

7.8.1 Fire Alarm System

The fire alarm system shall be designed in compliance with the Utah State Fire Marshal's "Rules and Regulations" and the University of Utah's design standards. The approved fire alarm manufacturer is Fire Control Instruments per Campus Standards. Coordinate the location of the building fire alarm control panel and annunciator panel with the campus fire marshal.

A non-coded, addressable fire alarm system shall be provided with the capability of being tied into the University of Utah's system at building 301. Horn/strobes shall be installed in all public spaces, conference rooms, restrooms, large open office areas, laboratory spaces, and mechanical and electrical control rooms. Install additional notification appliance circuit panels on each floor to provide power to the horn/strobes devices associated with that floor. In vivarium areas associated with animal holding, provide silent tone or flashing strobes – audible alarms should not be used. Every level of the building shall have a fire alarm junction box in which all cabling going to the particular level shall be routed through prior to extending out to pick-up fire alarm devices for that level.

Smoke detectors shall be installed in all public corridors and hallways. Pull stations shall be installed at all building exits in the direct path of egress. Pull stations shall also be provide on individual floors at the entrance to the exit stair. Provide duct smoke detectors and fan shutdown where required by the NFPA and the IMC, including detection of smoke at all return air shafts that serve multiple floors. The fire alarm wiring shall be installed in a Class A loop configuration in metal conduit.

The fire alarm system for the existing Skaggs Pharmacy building will be upgraded to meet current and local codes. It will be tied into the main fire alarm panel located in the new building. Based on the size of both buildings, the existing building should have its own fire alarm panel that would act as a sub panel to the panel in the new building. Provide new initiation and annunciation devices throughout the existing building. Replace the existing fire alarm wiring as required.

7.8.2 Card Access System

A building wide card access system shall be provided to control access in and out of the building. The system shall have total flexibility to allow for multiple users, to add and subtract doors at any time, and to program the system to permit or prevent access by the public or other building users. The approved card access system for this project is the University of Utah's approved system. Verify with the end user and the University of Utah how and who shall monitor the system. Regardless of the specific nature of the card access/security system designed, it should adhere to the University of Utah's standards. Considerations should be taken to design the security system to be as inconspicuous as possible especially on the exterior of the

building to ensure that the security concerns are not advertised unnecessarily.

The card access equipment needed for this system shall be installed at all entrances/exits of the building, with the exception of emergency-only access doors, where such equipment is not required. Each exterior door shall be equipped with a contact switch to allow for the system to monitor doors that are accessed illegally or left ajar. Furthermore, the card access system shall interface with the fire alarm system so that, on alarm, doors that are in the path of egress are bypassed and allowed to open.

For the vivarium area, biometric (finger) readers should be used at all entrances into the vivarium facility and proximity readers requiring University ID cards are required to egress the facility. Interior to the facility, the Watchdog system shall control access to interior spaces. During emergencies, all main entrance doors should lock down. Egress in these situations is by push-buttons located beside entrance doors. Security system should be connected to and controlled by OCM security servers.

7.8.3 Closed Circuit Television System (CCTV)

Due to the specific nature of this facility and the need for enhanced security, a CCTV system shall be provided to monitor entrances/exits and the perimeter of the building. Additional cameras can be added to monitor parking lots or pathways leading away from the building. The system shall consist of cameras, video displays, and digital video recording devices with internal storage capability. The system shall record events when motion is sensed at a camera location. This CCTV should also be integrated with the card access system to allow for a flexible, user-friendly setup. All University of Utah standards should be followed when designing CCTV systems.

CCTV cameras should also be used in the vivarium to observe and monitor all corridors and entrances/exits of the vivarium facility. Cameras are preferred to be PTZ style cameras. As with the security system, the CCTV system shall be connected to and controlled by OCM security servers.

7.8.4 Alarm Indicating System

Due to the inherent cost and risks associated with this type of facility, an alarm annunciation system must be in place to alert personnel of an impending possible incident or system mal-function. This alarm system shall monitor freezers, equipment, and other spaces that may contain critical research material and ongoing processes. The alarm system should interface with the building automation system to allow for greater flexibility and use. Coordinate with the mechanical engineer during the design process to fully develop this system and ensure that all systems that require monitoring are included.

7.8.5 Audio and Video Systems

Audio and video systems shall be specified as part of the building construction work. Audio and video systems in large meeting and conference rooms shall be specified in full compliance with established campus standards. To assure that their needs will be met, it is important to work with the end users during the design of these systems.

7.9 Sustainability and LEED

The University desires that the new Skaggs Pharmacy building demonstrates sustainable design, construction, and operation principals. High performance electrical systems are central to this vision, not only because they directly affect energy consumption, but because they also influence indoor air quality, work performance, and thermal comfort. DFCM's High Performance Building Standards shall be followed to ensure sustainable design is achieved and is a requirement of this project. Additionally, those systems, in order to function at their highest level, require commissioning in addition to on-going measurement and verification.

There are many strategies that can be employed in the design of electrical systems to ensure that sustainability is achieved. One such strategy is the use of high energy efficient light fixtures, which employ lamp and ballast combinations that achieve the highest efficacy possible (lumens/watt). The energy-saving properties that these fixtures provide are further enhanced by the installation of controls that use energy only when it is required (i.e. when a space is occupied). When these controls are put into use during normal business hours and are combined with daylight harvesting, energy usage will be lowered even more. To encourage the use of this control system and thus maximize its benefits, controls should be easy to understand and operate, while also providing visual comfort to the end user – a comfort that can be made even more flexible through the use of step-switching or dimming in high-use areas.

Another important strategy that can be used to increase sustainability is the use of the most efficient transformers for installation in the building. The federal government currently requires transformers that meet TP-1 energy efficiencies; however, transformers with higher efficiencies should be considered. Transformers should be loaded to the greatest extent possible to further increase the efficiency of the transformer.

The use of dedicated neutrals should be limited as much as possible to further conserve energy.

Variable frequency drives (VFD's), capacitors, and other types of electrical equipment should be used to ensure that mechanical systems utilize only the power that is required and the power that they use is used efficiently.

Beyond a desire to create a design marked by general sustainability, it is a goal of this project to achieve USGBC LEED Gold Level certification. In order to obtain this certification, the following strategies should be incorporated into the building design as it pertains to electrical systems:

<u>Sustainable Sites - Credit 8. Light Pollution:</u>

Under this strategy, interior lighting shall be located so that the maximum candela from each fixture does not exit through the windows. Furthermore, all non-emergency interior light fixtures shall turn off during non-business hours, with manual override.

Exterior area, landscaping, and building lighting should be selected and employed so as not to exceed 80% of the lighting power densities for the exterior area and 50% for the building facades and landscaping features, as defined in ASHRAE/IESNA Standard 90.1-2004. Light trespass from the site shall be controlled as required by LEED.

Energy & Atmosphere - Prereq. 1. Fundamental Building System Commissioning:

The electrical systems of the building shall be commissioned to ensure that the systems are operating and performing as designed.

Energy & Atmosphere - Prereq. 2. Minimum Energy Performance:

The electrical systems shall comply with the minimum requirements of ASHRAE 90.1-2004.

Energy & Atmosphere - Credit 1. Optimize Energy Performance:

By using lighting control systems, occupancy sensors, dimming, the amount of electrical energy usage can be reduced. Dimming of light fixtures can also help reduce the overall heating load into the building so that energy used by the mechanical systems will also be reduced.

Energy & Atmosphere - Credit 2. On-site Renewable Energy:

Under this strategy, the use of alternative energy sources should be explored. There are a couple of technologies available, including wind and photovoltaic (PV cells) electrical production systems. Although these systems can be cost prohibitive, they should be considered, as one or more may be required in order to achieve the goal of LEED Gold certification. Considerations should be given to installing infrastructure now in order to allow for these technologies to be installed in the future as they become more accessible. The use of one or more of these technologies may, in fact, enhance the acceptance and use of this facility. The use of photovoltaic cells integrated into the building glazing system is becoming more and more popular and can really enhances and define a building.

Energy & Atmosphere - Credit 5. Measurement & Verification:

This credit provides for ongoing accountability and optimization of building energy and water consumption performance over time. Caution should be taken when pursuing this credit. If the measured energy and water consumptions fall short of the expected goal, changes to building system are required to bring those system into compliance. Lighting control systems are available with provisions to allow for energy measurements. If this credit is pursued, systems of that type should be considered.

Energy & Atmosphere - Credit 6. Green Power:

Encourage the development and use of grid-source energy technologies on a net-zero pollution basis, 35% of the building's "regulated" electricity for two years. Rocky Mountain Power's Blue Sky program offers wind power at a relatively low cost of $.0195/kWh above the standard rate. An additional option would be participating in the University of Utah's Wind Power Program.

Indoor Environmental Quality - Credit 6. Controllability of Systems (Perimeter & Non-Perimeter):

Provide lighting controls for 90% of occupants and controllability for all shared spaces that meets group needs or preferences both for perimeter spaces as well as non-perimeter spaces.

Indoor Environmental Quality - Credit 8.
Daylight & Views:

Lighting control systems should be designed to work together with daylight strategies to reduce lighting when daylight is available. As daylight diminishes, lighting levels should be increased. All light fixtures that are within 15 feet of exterior windows should be dimmed or controlled in some fashion. Work closely with the Architect for this credit.

8.1 Research Space

Room Data Sheets follow which describe spaces and indicate adjacency (also refer to adjacency diagrams). Additionally, data is provided which describe architectural systems, equipment and furnishings, mechanical systems, plumbing systems, electrical systems, communication systems and other special requirements which are specific to the room. In most cases, a room diagram follows which suggest a room layout – showing equipment, bench space, and other requirements. The NSF listed corresponds to the Detail Space Program Summary in Section 5.

8.1.1 Open Wet Lab, Chemistry

Research Lab Space **1,200 NSF**

Description

The large open lab studios are intended to host multiple experiments and the Medicinal Chemistry and Pharmaceutics departments. Bench, instrument and equipment space will be layed out in a modular manner and the use of a flexible casework system is encouraged so as to make most efficient use of the space. Space and systems should be sized to accomodate (4) 8' chemical fumehoods and have full coverage of compressed air, nitorgen, vacuum, and wired utilities.

Adjacency/Support Areas

Paperwork space for lab techs and students is to be located directly adjacent to labs with good visibility to benches

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	7	***Exits:***	2
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9' min	***Casework Finish:***	Metal	***Countertops:***	Epoxy at bench/Plastic Laminate at desks		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Notes

Sound Attenuation to be N.C. 45 or less. Provide Natural Daylighting. All doors, 8' high

EQUIPMENT & FURNISHINGS					
Fume Hood:	4 (8')	***BSC:***			
Desk:		***Table:***		***Files:***	***Casesgoods:***

Notes

Consider a flexible casework system. Provide chemical storage cabinets below CFH. Refrigerators, benchtop equipment, 1 of 4 CFH to be Radioisotope.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	Y	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	Y				
Gases:	Y	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable. Fume Hoods to have CA, V and N2.

ELECTRICAL					
Voltage/Phase:	120v20/208v30a 1 phase at equipment			***Est.Load:***	6W to 10W
Lighting Levels:	50fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect

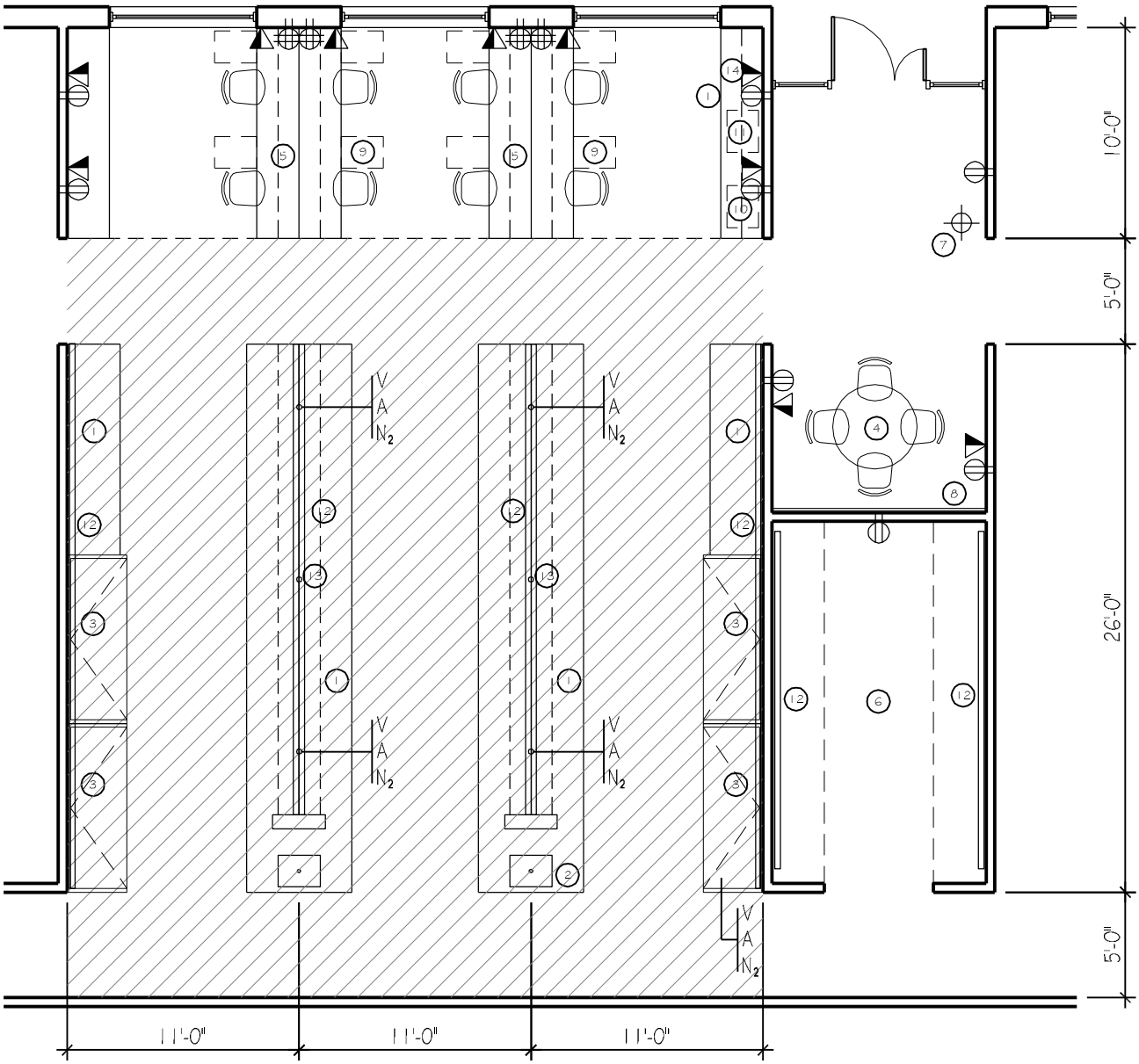
Notes:

Surface plug mold w/ 1 ER outlet/bench.

COMMUNICATIONS					
Telephone:	Y	***Data:***	Y	***Security:***	Prox Card

Notes:

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



1 P.I. / 8 R.I. (1 P.I. / 10 R.I., Future)

4' Hood / R.I.
10' Bench / R.I.
Bench Space For Common Equip.

Open Wet Lab, Chemistry (Shown Shaded)

0' 1' 5'

1. Fixed Bench
2. Sink
3. Fume Hood
4. Table w/ Chairs
5. Workstation w/ Chairs & O.H. Shelves (R.I. Offices)
6. Equipment Room or Support Lab (12 LF / Lab)
7. Floor Drain / Emergency Shower
8. White Board
9. Pedestal (typ.)
10. Printer
11. Fax
12. Wiremold / Plugmold
13. Cup Sink
14. Overhead Shelves

8.1.2	Open Wet Lab, Biology	Research Lab Space	1,200	NSF

Description

The large open lab studios are intended to host multiple experiments and the Pharmacology & Toxicology and Pharmaceutics departments. Bench, instrument and equipment space will be layed out in a modular manner and the use of a flexible casework system is encouraged so as to make most efficient use of the space. Space and systems should be sized to accomodate (1) 8" chemical fumehoods and have full coverage of compressed air, nitorgen, vacuum, and wired utilities.

Adjacency/Support Areas

Paperwork space for lab techs and students is to be located directly adjacent to labs with grood visibility to benches

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	7	***Exits:***	2
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9' min	***Casework Finish:***	Metal	***Countertops:***	Epoxy at bench/Plastic Laminate at desks		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Notes

Sound Attenuation to be N.C. 45 or less. Provide Natural Daylighting. All doors, 8' high

EQUIPMENT & FURNISHINGS					
Fume Hood:	1 (8')	***BSC:***			
Desk:		***Table:***		***Files:***	***Casesgoods:***

Notes

Consider a flexible casework system. Provide chemical storage cabinets below CFH. Refrigerators, benchtop equipment

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Neg				

Notes: Provide infrastructure for (4) 8' CFH

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	Y	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	Y				
Gases:	Y	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable. Fume Hoods to have CA, V and N2.

ELECTRICAL							
Voltage/Phase:	120v20/208v30a 1 phase at equipment			***Est.Load:***	6W to 10W		
Lighting Levels:	50fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

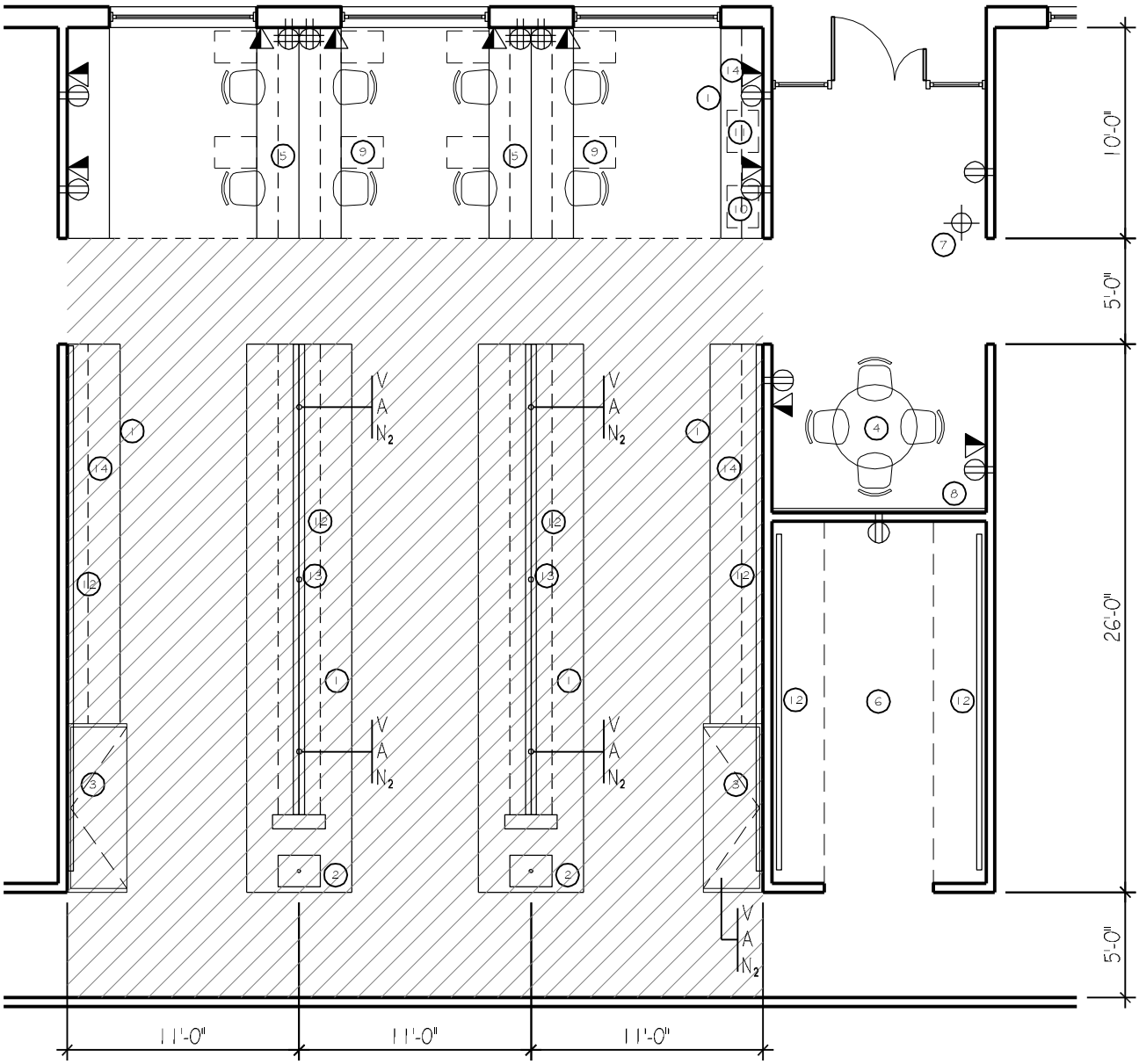
Notes:

Surface plug mold w/ (1) ER outlet/bench

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	Prox Card		

Notes:

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



1 P.I. / 8 R.I. (1 P.I. / 10 R.I., Future)

4' Hood / R.I.
10' Bench / R.I.
Bench Space For Common Equip.

Open Wet Lab, Biology (Shown Shaded)

0' 1' 5'

1. Fixed Bench
2. Sink
3. Fume Hood
4. Table w/ Chairs
5. Workstation w/ Chairs & O.H. Shelves (R.I. Offices)
6. Equipment Room or Support Lab (12 LF / Lab)
7. Floor Drain / Emergency Shower
8. White Board
9. Pedestal (typ.)
10. Printer
11. Fax
12. Wiremold / Plugmold
13. Cup Sink
14. Overhead Shelves

8.1.3	**Open Wet Lab,** Center for Human Toxicology (CHT)	Research Lab Space	**1,200**	**NSF**

Description

The large open lab studios are intended to host multiple experiments and the PharmTox CHT. Bench, instrument and equipment space will be layed out in a modular manner and the use of a flexible casework system is encouraged so as to make most efficient use of the space. Space and systems should be sized to accomodate (4) 8' chemical fumehoods and have full coverage of compressed air, nitrogen, vacuum, and wired utilities.

Adjacency/Support Areas

Paperwork space for lab techs and students is to be located directly adjacent to labs with good visibility to benches

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	7	***Exits:***	2
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9' min	***Casework Finish:***	Metal	***Countertops:***	Epoxy at bench/Plastic Laminate at desks		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Notes

Sound Attenuation to be N.C. 45 or less. Provide Natural Daylighting. All doors, 8' high

EQUIPMENT & FURNISHINGS					
Fume Hood:	4 (8')	***BSC:***			
Desk:		***Table:***		***Files:***	***Casesgoods:***

Notes

Consider a flexible casework system. Provide chemical storage cabinets below CFH. HPLC, Mass Specs, Flowcytomentry, Tissue Homogenizers, Spectrometers, Freezers

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	Y	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	Y				
Gases:	Y	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable. Fume Hoods to have CA, V and N2. Provide overhead service carrier at equipment areas (w? G,A,V).

ELECTRICAL							
Voltage/Phase:	120v20/208v30a 1 phase at equipment			***Est.Load:***	6W to 10W		
Lighting Levels:	50fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

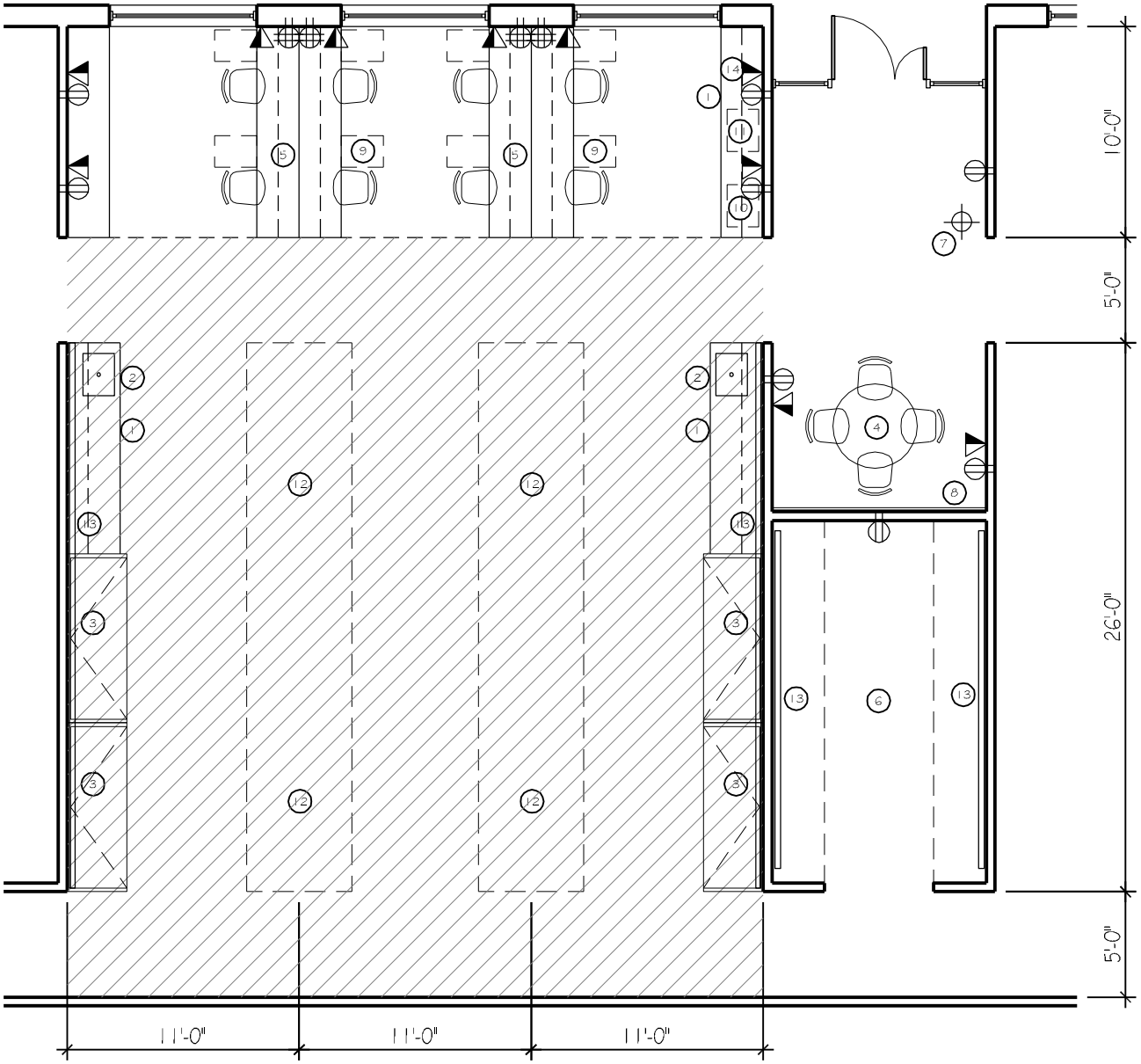
Notes:

Surface plug mold w/ 1 ER outlet/bench.

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	Prox Card		

Notes:

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



1 P.I. / 8 R.I. (1 P.I. / 10 R.I., Future)

Open Wet Lab, Center for Human Toxicology (CHT)

0' 1' 5'

1. Fixed Bench
2. Sink
3. Fume Hood
4. Table w/ Chairs
5. Workstation w/ Chairs & O.H. Shelves (R.I. Offices)
6. Equipment Room or Support Lab (12 LF / Lab)
7. Floor Drain / Emergency Shower
8. White Board
9. Pedestal (typ.)
10. Printer
11. Fax
12. Equipment Space w/ Overhead Service (Mass Specs, HPLC, Carts, and Centrifuge)
13. Wiremold / Plugmold
14. Overhead Shelves

8.1.4	Cell Culture	Research Lab Space	176	NSF

Description

Cell Culture Rooms (Suite) to be used as a core space for facility. The rooms will contain a Type II A BSC, a stacked, upright incubator (either air or CO2 type), a counter, microscope and mobile cart. No agents above a CDC/NIH BSL 2 rating will be used in the building. Vestibule to be provided outside of room as part of suite to include counter with sink and refrigerators.

Adjacency/Support Areas

Access to Labs and other core spaces. Adjacent to glasswash and autoclave.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	2	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	Integral	***Floor Finish:***	Resilient, Sheet	***Ceiling Finish:***	Mylar ACT
Ceiling Height:	9'	***Casework Finish:***	Metal	***Countertops:***	Epoxy		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***	(2) 6' Type IIA	
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Provide flexibility for (3) BSC w/ (3) inc./ Cell Culture Room

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Positive				

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable. If incubators in rooms are CO2 type then local manifold will supply from adjacent incubator room. If N2 is required at BSC's then also manifold from adjacent incubator room.

ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct*		

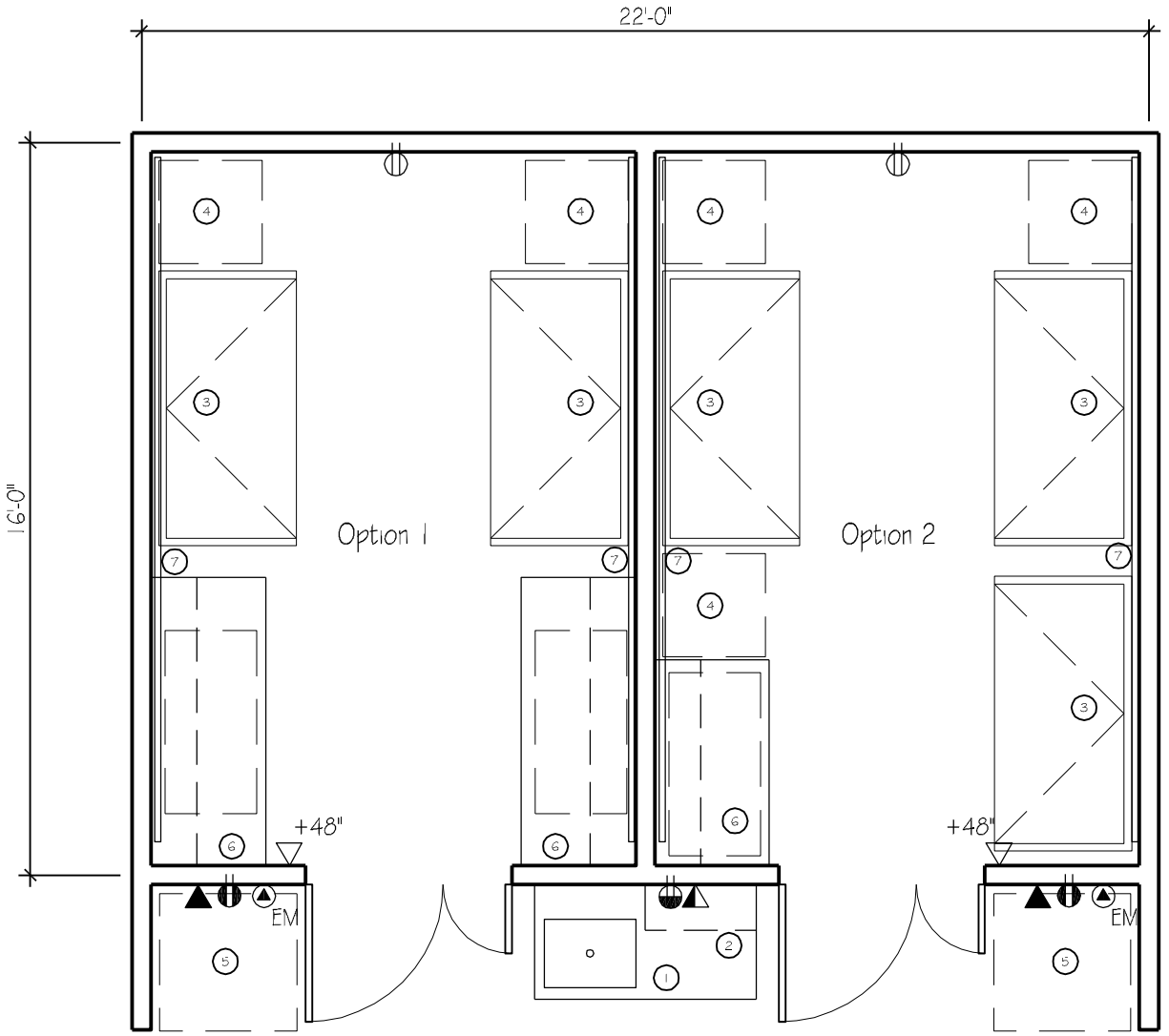
Notes

Standby power, *2x4 Acrylic Recessed

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



Cell Culture

0' 1' 5'

1. Fixed Bench w/ Sink
2. Upper Cabinets, Glass Doors
3. 6' Bio-Safety Cabinet, Type IIA
4. Stacked Incubator
5. Refrigerator
6. Fixed Bench w/ Shelving Above and Mobile Cart Below
7. Wiremold / Plugmold

8.1.5	Media Prep	Research Lab Space	176	NSF

Description

Media Prep to be used as a core space for facility. The rooms will contain 6' laminar flow hoods, autoclave and refrigeration.

Adjacency/Support Areas

Access to Labs and other core spaces. Adjacent to glasswash and autoclave.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	2	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	Integral	***Floor Finish:***	Resilient, Sheet	***Ceiling Finish:***	Mylar ACT
Ceiling Height:	9'	***Casework Finish:***	Metal	***Countertops:***	Epoxy		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***	(2) 6' Laminar Flow	
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Consider a flexible casework system like FisherHamilton Maxlab, (2) 6' laminar flow hoods, autoclave (24x36x36 chamber) and refrigerator.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Positive			

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	Y	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N2	***Vacuum:***	Y		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable.

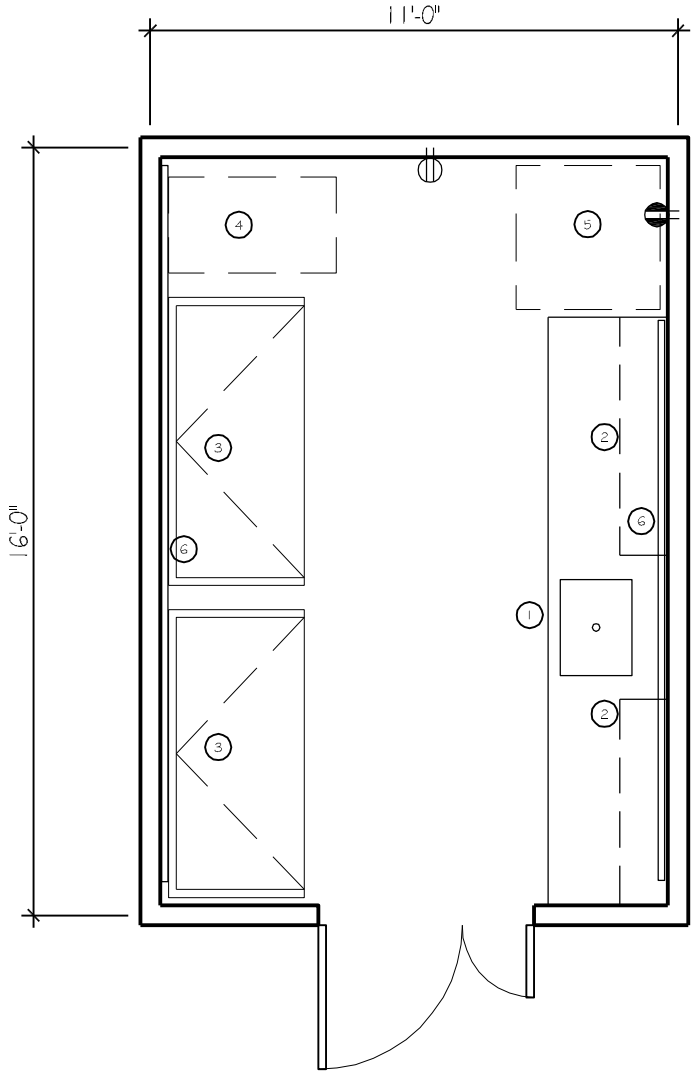
ELECTRICAL					
Voltage/Phase:	120v20/208v30a single phase			***Est.Load:***	10W/SF
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect

Notes

COMMUNICATIONS					
Telephone:	Y	***Data:***	Y	***Security:***	N

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



Media Prep.

1. Fixed Bench w/ Sink
2. Upper Cabinets w/ Glass Doors
3. 6' Laminar Flow Hoods
4. Autoclave (24"x36"x36" Chamber)
5. Refrigerator
6. Wiremold / Plugmold

8.1.6	Equipment Room	Research Lab Space	250	NSF

Description

The equipment rooms will be a core spaced spares by all departments and housing shared refrigetors and freezers, isolated from their adjacent open lab spaces because of noise and heat gain. These refrigerators and refrigerators are central to the labs' functions and should be directly accessible.

Adjacency/Support Areas

Direct access from open labs

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	3	***Exits:***	1
Live load:	150	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***		***Countertops:***			
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Sound attenuation of N.C. 50 or less.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Equipment includes -20 and -80 Freezers, Refrigerators and Dewars

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Neutral				

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL							
Voltage/Phase:	120v20/208v30a Single Phase			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

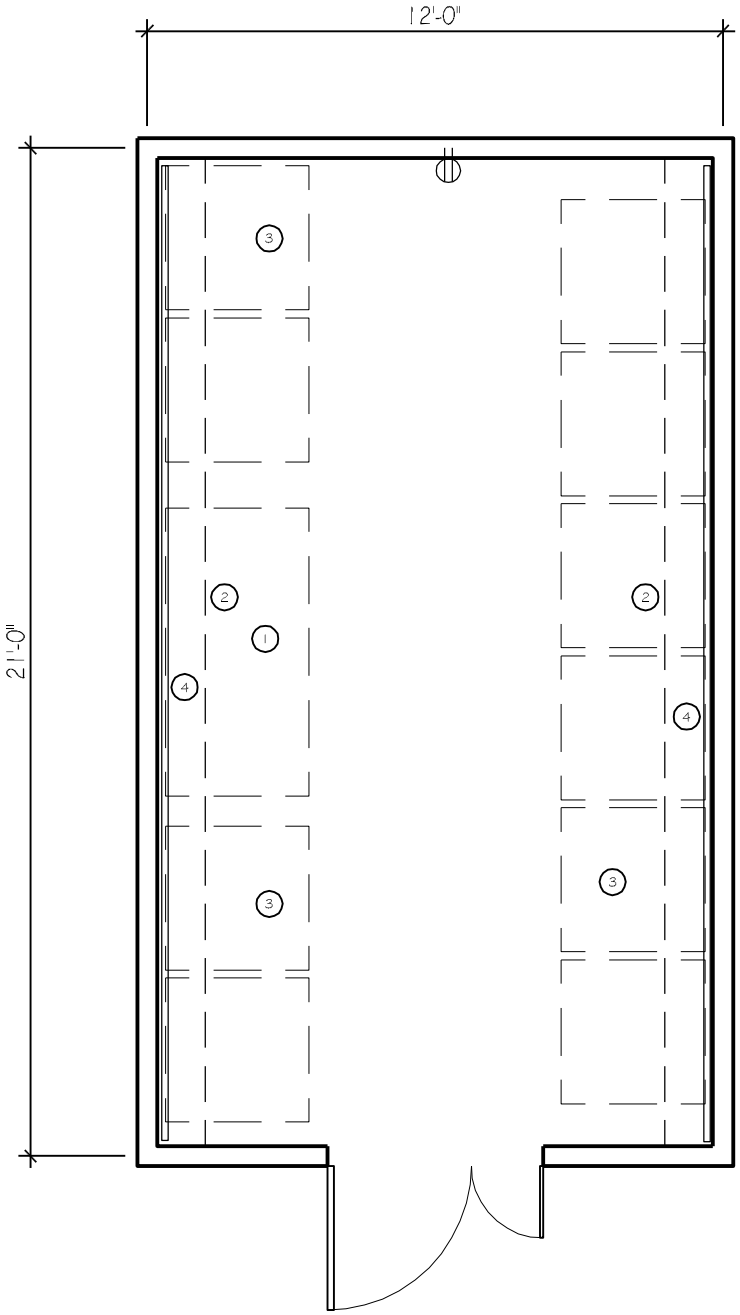
Notes

Data port connections to freezers for monitoring and alarm. All -80 & 020 Freezers on Emergency Power.

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS			



Equipment Room

1. Moveable Lab Bench (36"x72")
2. Fixed Shelves
3. -80° and -20° Freezers / Refrigerators
4. Plugmold / Wiremold - Em. Power

8.1.7	Instrumentation Rooms	Research Lab Space	250	NSF

Description

Common Instrumentation Rooms are used to house sophisticated instrumentation that is to be shared. Equipment is located in these rooms so that all have easier access to them and so that their heat, noise, exhaust and utility hook-ups are more easily isolated and accomodated.

Adjacency/Support Areas

Direct access to the open labs.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	3	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Metal	***Countertops:***	Epoxy		
Door Width:	3' 6"	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Consider a flexible casework system like FisherHamilton Maxlab. 4' mobile carts and cylinders with seismic restraint.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	local, N2	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

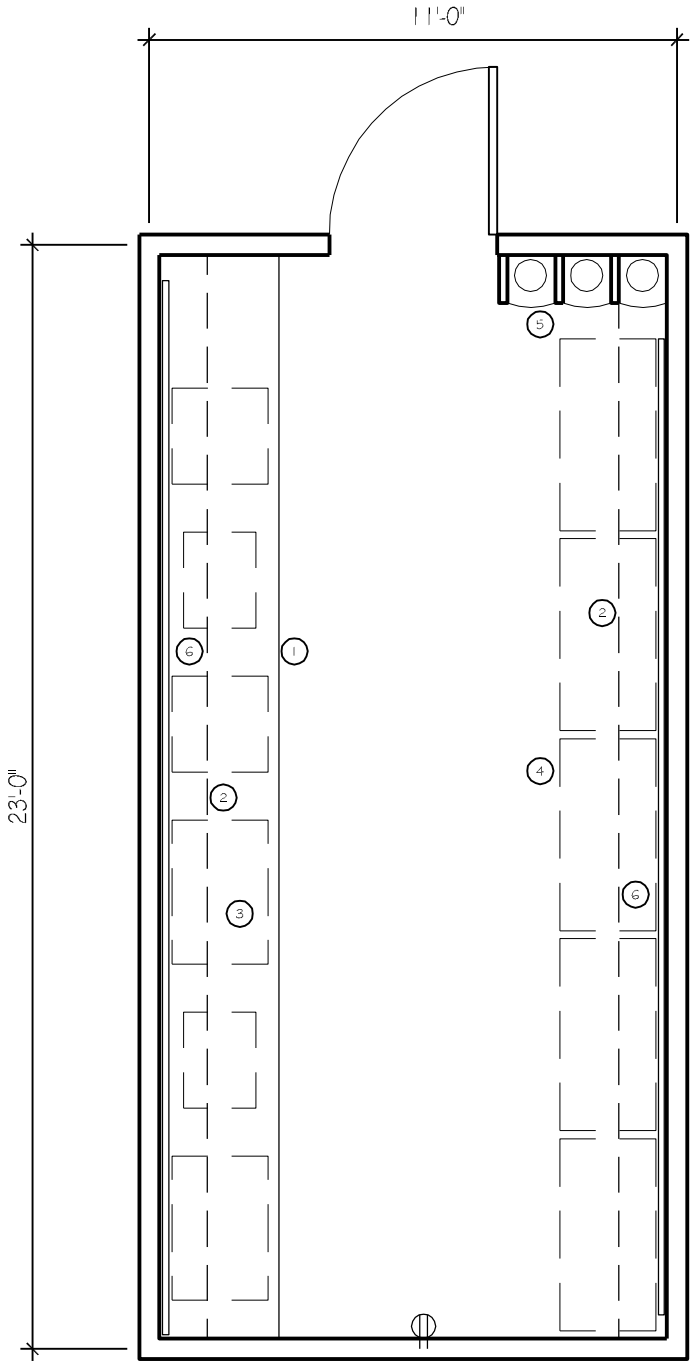
ELECTRICAL						
Voltage/Phase:	120v20a, 208v30a1 phase			***Est.Load:***	10W/SF	
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect	

Notes

COMMUNICATIONS						
Telephone:	Y	***Data:***	Y	***Security:***	N	

Notes

SPECIAL REQUIREMENTS			



Instrumentation Room

0' 1' 5'

1. Fixed Bench
2. Upper Shelving (Adjustable)
3. Analytical Equipment
4. 4' Mobile Carts
5. Cylinders w/ Seismic Restraint
6. Wiremold / Plugmold

8.1.8	Dark Room	Research Lab Space	121	NSF

Description
Dark Room for processing film.

Adjacency/Support Areas
Adjacent to open lab space for Pharmacology & Toxicology

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	2	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	Integral	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Metal	***Countertops:***	Epoxy		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS					
Fume Hood:		***BSC:***	(2) 6' Type IIA		
Desk:		***Table:***		***Files:***	***Casesgoods:***

Notes
Provide bench with sink. Floor mounted film processor.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

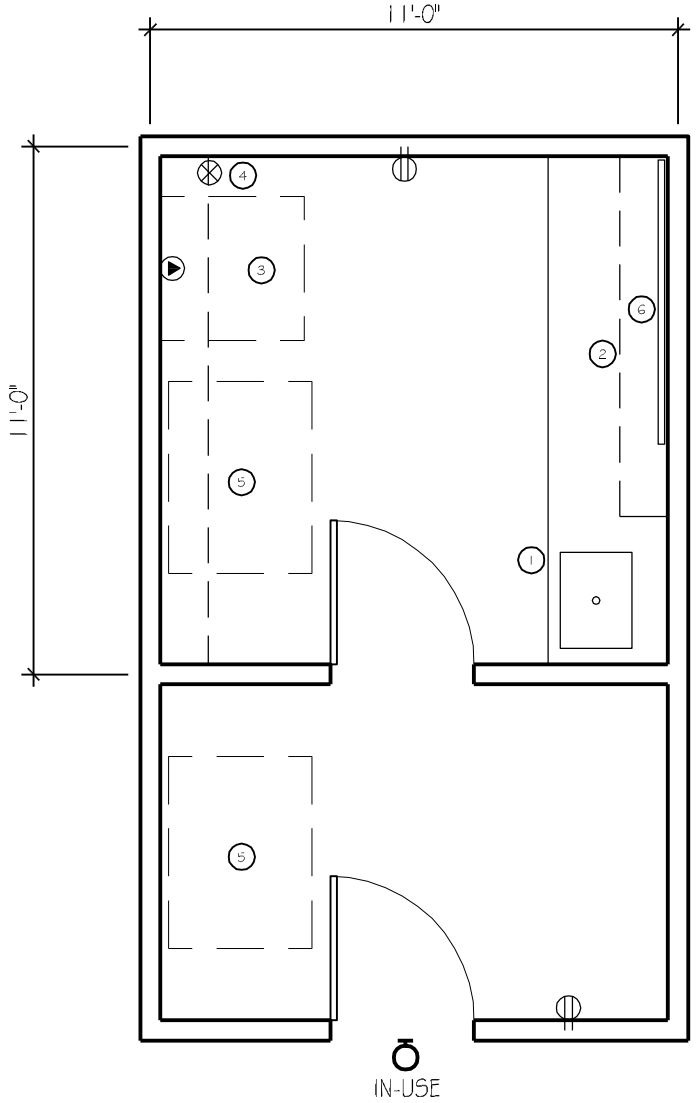
ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes
Standby power

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



Dark Room

1. Fixed Bench w/ Sink
2. Wall Cabinets
3. Film Processing Equipment
4. Floor Drain
5. Cart
6. Wiremold / Plugmold

8.1.9	Sample Assessioning	Research Lab Space	165	NSF

Description

Located within the Pharmacology & Toxicology Department and or part of Center for Human Toxicology. Provide an alcove space for sample assessioning or preparing samples for for teating and processing.

Adjacency/Support Areas

Adjacent to sample storage and Open Lab (secure).

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	3-Feb	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	Integral	***Floor Finish:***	Resilient, Sheet	***Ceiling Finish:***	LAT
Ceiling Height:	9'	***Casework Finish:***	Metal	***Countertops:***	Epoxy		
Door Width:	N/A	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Consider a flexible casework system like FisherHamilton Maxlab for budgeting purposes. Provide Snorkle hood over bench.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

Snorkle exhaust may be required in some spaces

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	Y	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	Y				
Gases:	local	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable.

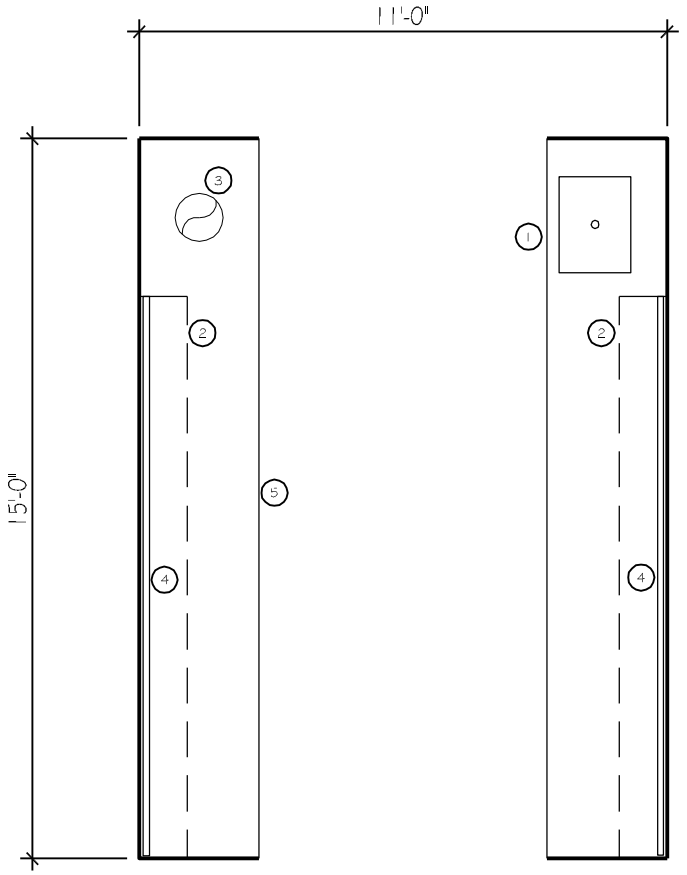
ELECTRICAL							
Voltage/Phase:	120v20a, 208v30a1 phase			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



Sample Assessioning

1. Fixed Bench w/ Sink
2. Upper Cabinets
3. Snorkel
4. Wiremold / Plugmold
5. Fixed Bench

8.1.10	Glasswash/Autoclave	Lab Research Space	240	NSF

Description

Glasswash/Autoclave to be used as core space for the College.

Adjacency/Support Areas

Access to Labs, Cell Culture and Fermentation

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted epoxy	***Baseboard:***	Integral	***Floor Finish:***	epoxy	***Ceiling Finish:***	Mylar ACT
Ceiling Height:	10'	***Casework Finish:***	SS	***Countertops:***	Stainless Steel		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Sound attenuation: N.C. 50 or less.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Provide (1) medium chamber autoclave, (2) washers/dryers, and supply carts

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

Provide steam dam/canopy

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***	N				
Steam:	Y	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	Y				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable.

ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase/480V			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Vapor Proof		

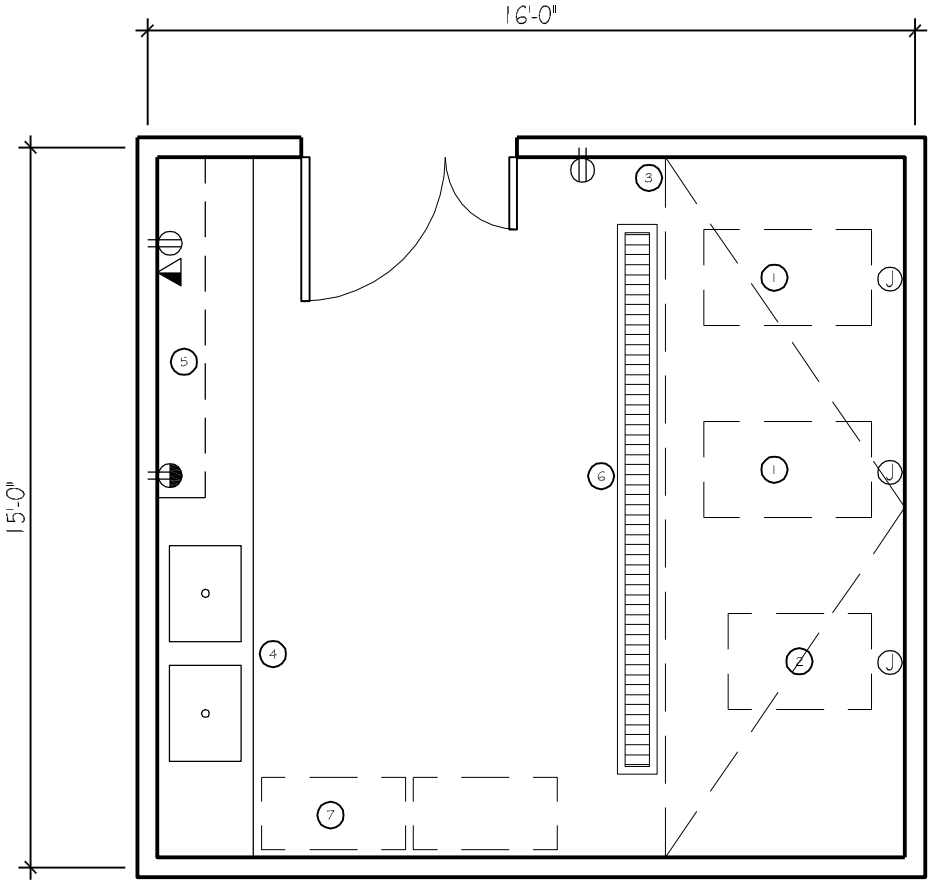
Notes

Standby power

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS			



Glasswash / Autoclave

1. Glass Wash
2. Autoclave (24"x36"x36" Chamber)
3. Canopy Hood
4. Fixed Bench w/ Sinks
5. Upper Cabinets
6. Trench Drain
7. Carts

8.1.11	Microbiology / Protein Expressions / Fermentation	Research Lab Space	165	NSF

Description

Fermentation Room to be used as support space for Medicinal Chemistry.

Adjacency/Support Areas

Access to Labs, Glasswash and Autoclave.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	Integral	***Floor Finish:***	Resilient, Sheet	***Ceiling Finish:***	Mylar ACT
Ceiling Height:	9'	***Casework Finish:***	Metal	***Countertops:***	Epoxy		
Door Width:	3' active, 1.5'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***	(1) 4' Type IIA	
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Provide (4) shakers, (4) 30 liter fermenters & BSC.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Positive			

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N2	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable.

ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

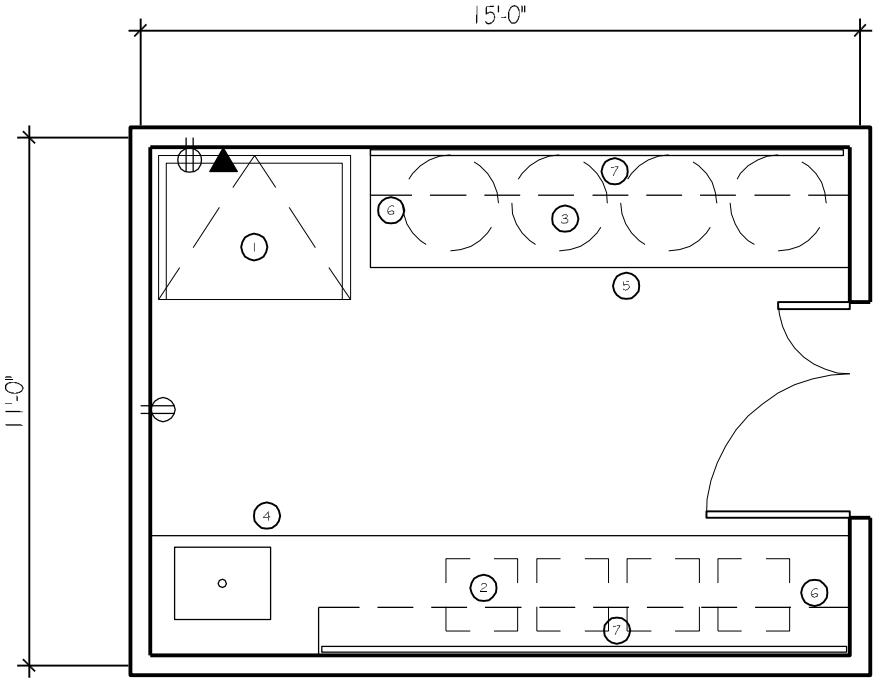
Notes

Standby power

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



Microbiology / Protein Expression / Fermentation

0' 1' 5'

1. 4' Bio-Safety Cabinet
2. Shakers
3. Fermentation Racks
4. Fixed Bench w/ Sink
5. Fixed Bench
6. Overhead Shelving
7. Wiremold / Plugmold

8.1.12	Cold Room	Research Lab Space	160	NSF

Description

The Cold Storage Controlled Temperature Room (4 degrees C) is a prefabricated unit that will be located in the building core, and shared by the College of Pharmacy.

Adjacency/Support Areas

Direct Access to open labs.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	2	***Exits:***	1
Live load:	N/A	***Vibration:***	N/A				
Wall Finish:	Factory Fin.	***Baseboard:***		***Floor Finish:***	Factory Finish	***Ceiling Finish:***	Factory fin.
Ceiling Height:	9'	***Casework Finish:***		***Countertops:***			
Door Width:	3'	***Vision panel:***	Yes	***Seals:***	Yes	***Threshold:***	No

Notes: Controls, alarm and recording thermometer mounted to box face, additional visual dial thermometer, foot pedal opener, emergency exit lever inside, vapor proof lights

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Stainless Steel benches, sinks and metro shelves. Provide columns as required.

MECHANICAL						
Temperature (F):	4 dC +/-1 dC	***Rel. Humidity:***	Ambient	***Air Changes:***	N/A	
Exhaust Air:	N/A	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	N/A	***Pressurization:***	N/A			

Notes:

Notes: Assume remote air cooled compressors, run condensate to local drain

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	Y	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	Y				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Hot and cold water at lab benches considered to be non-potable. Floor drain and sinks with sediment trap

ELECTRICAL						
Voltage/Phase:	120v20			***Est.Load:***	10W/SF	
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Vapor Proof	

Notes

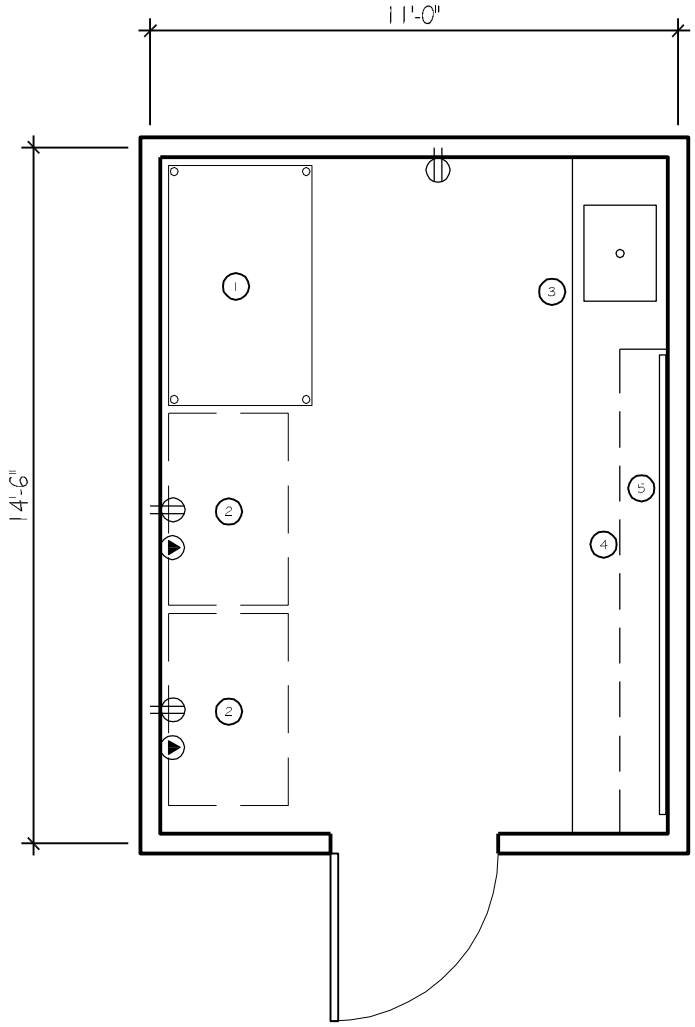
Standby power

COMMUNICATIONS						
Telephone:	N	***Data:***	N	***Security:***	N	

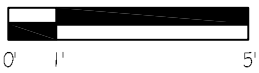
Notes

Temperature monitor and alarm to CST Master Control Panel

SPECIAL REQUIREMENTS			



Cold Room



1. "Metro" Shelving Unit
2. Equipment
3. Benchtop (S.S.) w/ Sink
4. Upper Cabinets and/or Columns
5. Wiremold / Plugmold

8.1.13	Tank Storage	Research Lab Space	80	NSF

Description

This 80 nsf storage space is for storage of tanks, and dewars

Adjacency/Support Areas

Direct Access from open lab, close to core lab spaces

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	2	***Exits:***	1
Live load:	N/A	***Vibration:***	N/A				
Wall Finish:	Painted-GWB	***Baseboard:***	RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	GWB
Ceiling Height:	9'	***Casework Finish:***	no	***Countertops:***	No		
Door Width:	3' pair	***Vision panel:***	No	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casegoods:***

Notes

Cylinders, Dewars with seismic restraint.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	None						
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

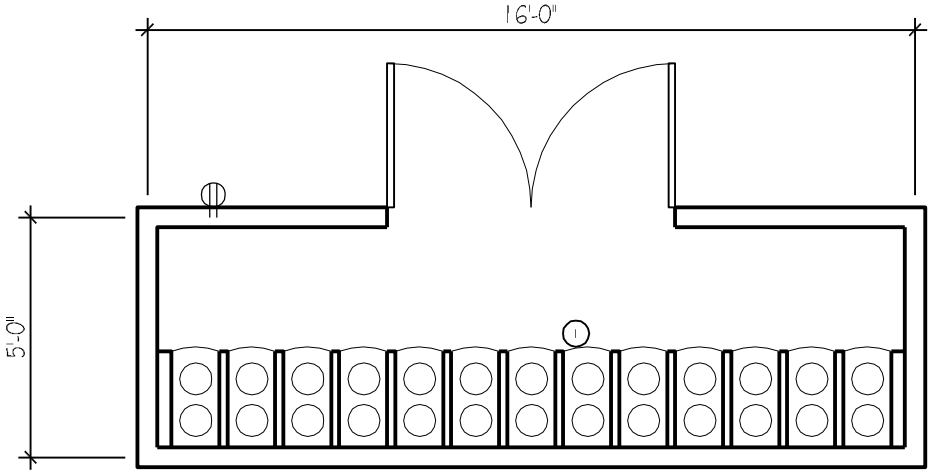
ELECTRICAL						
Voltage/Phase:	120/1			***Est.Load:***	2 W/SF	
Lighting Levels:	30fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct	

Notes

COMMUNICATIONS						
Telephone:	N	***Data:***	N	***Security:***	N	

Notes

SPECIAL REQUIREMENTS			



Tank Storage

1 Tanks w/ Seismic Restraint

8.1.14	Toxins Storage	Research Lab Space	120	NSF

Description

This 165 nsf toxins storage space is for secure storage of select agents.

Adjacency/Support Areas

Direct Access from open lab, and close to Med. Chem. and Pharmaceutics.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	2	***Exits:***	1
Live load:	N/A	***Vibration:***	N/A				
Wall Finish:	Painted-GWB	***Baseboard:***	Integral	***Floor Finish:***	Resilient, Sheet	***Ceiling Finish:***	GWB
Ceiling Height:	9'	***Casework Finish:***	no	***Countertops:***	No		
Door Width:	3'-6"	***Vision panel:***	No	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS							
Fume Hood:	4' hood	***BSC:***					
Desk:		***Table:***	5' SS table	***Files:***		***Casegoods:***	

Notes

Provide space for (2) -20 freezers and (2) -80 freezers on emergency power. Provide space for small safe.

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Neg				

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	None						
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

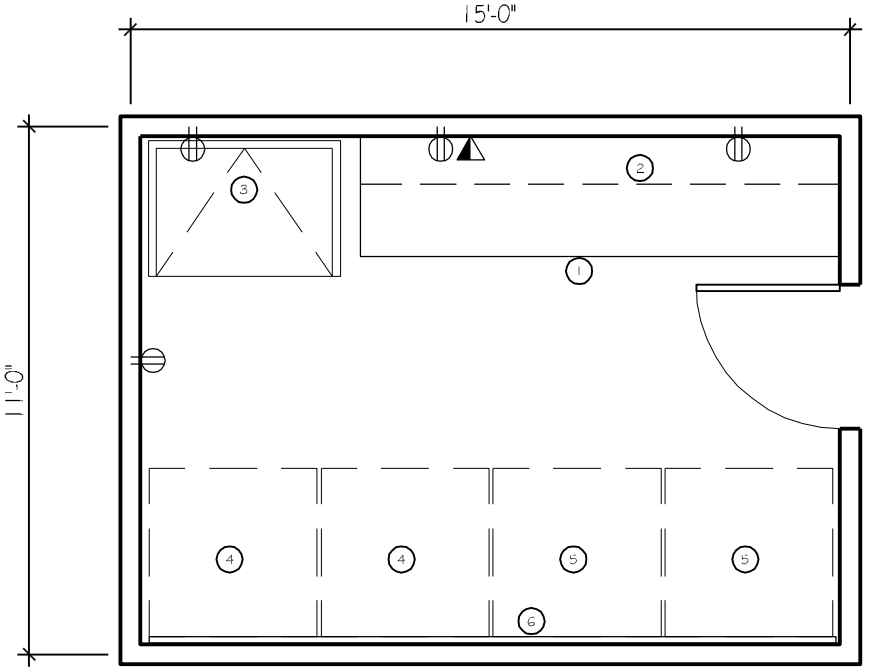
ELECTRICAL							
Voltage/Phase:	120/1			***Est.Load:***	4 W/SF		
Lighting Levels:	540fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct		

Notes

COMMUNICATIONS							
Telephone:	Y	***Data:***	N	***Security:***	Prox Card		

Notes

SPECIAL REQUIREMENTS			



Toxins Storage

1. Fixed Bench (24"x120")
2. Wall Cabinets (36"Hx12"Dx120"W)
3. Fume Hood
4. -80 Freezer
5. -20 Freezer
6. Wiremold / Plugmold - Em Power

8.1.15	Glasswash Alcove	Lab Research Space	-	NSF

Description

Located within the Pharmacology & Toxicology Department and part of the Center for Human Toxicology. Provide an alcove space with sink, under counter dishwasher and drying oven adjacent to Open Lab and QC Prep. This is alcove is part of the open lab space for Pharmacology Toxicology CHT

Adjacency/Support Areas

Located within CHT secure space.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted epoxy	***Baseboard:***	Integral	***Floor Finish:***	Resilient, Sheet	***Ceiling Finish:***	ACT
Ceiling Height:	10'	***Casework Finish:***	SS	***Countertops:***	Stainless Steel		
Door Width:	N/A	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Sound attenuation: N.C. 50 or less.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

(1) under bench dishwasher, (1) under bench drying oven.

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Neg				

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***	N				
Steam:	Y	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	Y				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Hot and cold water at eyewashes and safety showers to be potable and tempered. Hot and cold water at lab benches considered to be non-potable.

ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase/480V			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

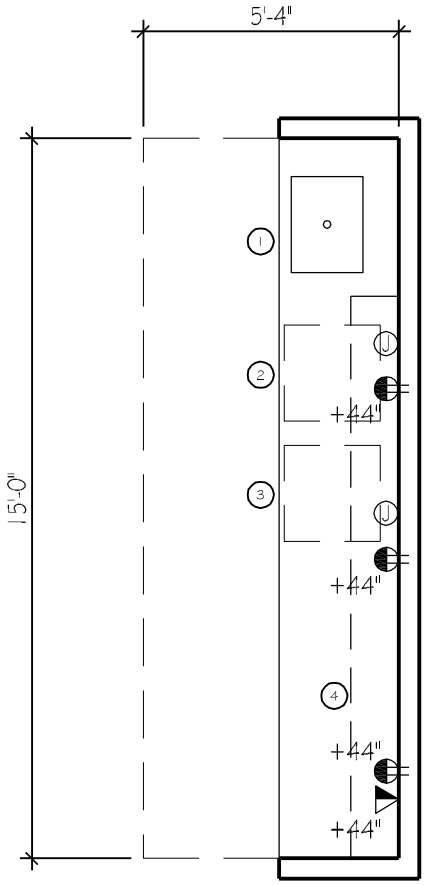
Notes

Standby power

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS			



Glasswash Alcove

1. Fixed Bench w/ Sink
2. Under Bench Dishwasher (w/ DI Rinse)
3. Under Bench Drying Oven
4. Glass-Faced Upper Cabinets For Glassware Storage

8.1.16	QC Prep	Research Lab Space	-	NSF

Description

Located within the Pharmacology & Toxicology Department and part of the Center for Human Toxicology. Provide an alcove space with bench, sink, freezer, refrigerator and balance. This is alcove is part of the open lab space for Pharmacology Toxicology CHT

Adjacency/Support Areas

Adjacent to Open Lab.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Painted GWB	***Baseboard:***	Integral	***Floor Finish:***	Resilient, Sheet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Metal	***Countertops:***	Epoxy		
Door Width:	N/A	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Provide bench with ss sink, freezer, refrigerator, balance and mobile carts.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N2	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

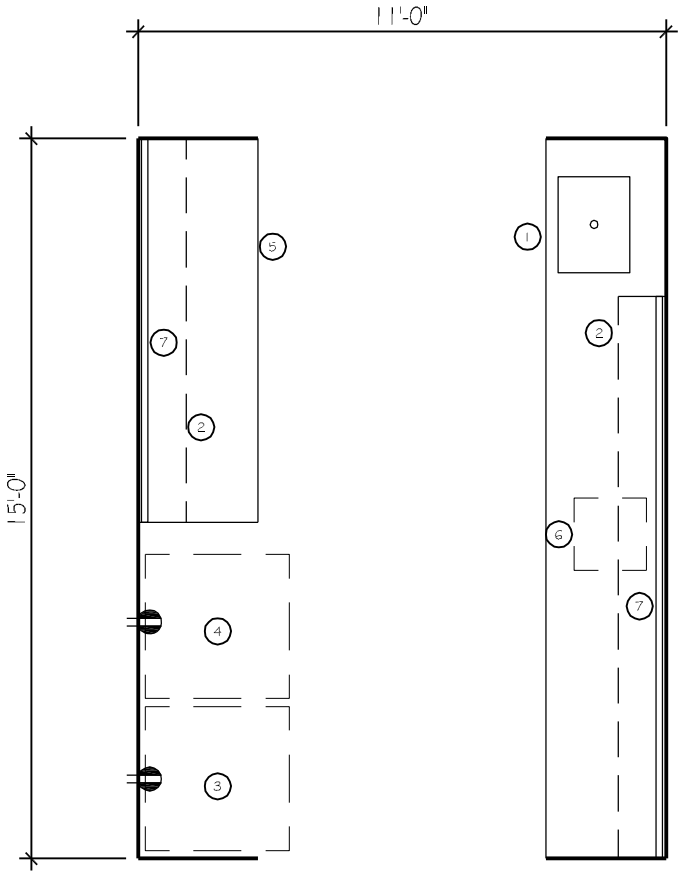
Notes

Standby power

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible casework.		



QC Prep

0' 1' 5'

1. Fixed Bench w/ Sink
2. Upper Cabinets
3. Freezer
4. Refrigerator
5. Fixed Bench
6. Balance
7. Wiremold / Plugmold

8.2 Office Space

Room Data Sheets follow which describe spaces and indicate adjacency (also refer to adjacency diagrams). Additionally, data is provided which describe architectural systems, equipment and furnishings, mechanical systems, plumbing systems, electrical systems, communication systems and other special requirements which are specific to the room. In most cases, a room diagram follows which suggest a room layout – showing equipment, furniture, and other requirements. The NSF listed corresponds to the Detail Space Program Summary in Section 5.

8.2.1	Atrium / Translational Center	Office Spaces	NSF

Description

This space acts as entry and center for the Skaggs Pharmacy Institute, as well as the translation space between the new Skaggs Pharmacy Research Building , the existing LS Skaggs Hall and the nearby BPRP.

Adjacency/Support Areas

Adjacent to Conference Rooms, Computational Lab, Visualization Lab, Lounge and Kitchen.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	15	***Occup. Load:***	400	***Exits:***	2
Live load:	75	***Vibration:***					
Wall Finish:	Variable	***Baseboard:***	Varies	***Floor Finish:***	Variable	***Ceiling Finish:***	Variable
Ceiling Height:	Variable	***Casework Finish:***	Plam	***Countertops:***	Plam		
Door Width:	(2) 3'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	Yes

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***	N				
Desk:	N	***Table:***	N	***Files:***	N	***Casesgoods:***	N
Notes	N						

MECHANICAL						
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr	
Exhaust Air:		***Return Air:***		***Make-up:***		
Filtration (%):		***Pressurization:***				

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL						
Voltage/Phase:	120/1			***Est.Load:***	4 W/SF	
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect	

Notes

COMMUNICATIONS						
Telephone:	Y	***Data:***	Y	***Security:***	Prox Card	

Notes

SPECIAL REQUIREMENTS			

8.2.2 Faculty Offices

Office Space **140 NSF**

Description

These offices will house the usual array of office furniture. The geometry of the spaces should allow for options in furniture layout. Bookshelves should line one long wall and a guest chair should also be included in the space.

Adjacency/Support Areas

Clustered with Post Doc, Grad Student non lab workstations and adminstrative support spaces.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	100	***Occup. Load:***	2	***Exits:***	2
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9' min.	***Casework Finish:***	wood	***Countertops:***	N/A		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	Y	***Threshold:***	Y

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	Y	***Table:***	Y	***Files:***	Y	***Casesgoods:***	N

Notes:

Equipment: markerboard, coathook, overhead shelving

Equipment (NIC): computer monitor, computer CPU, desk, credenza, chair

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr	
Exhaust Air:		***Return Air:***		***Make-up:***		
Filtration (%):		***Pressurization:***				

Notes:

Typical Office System

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

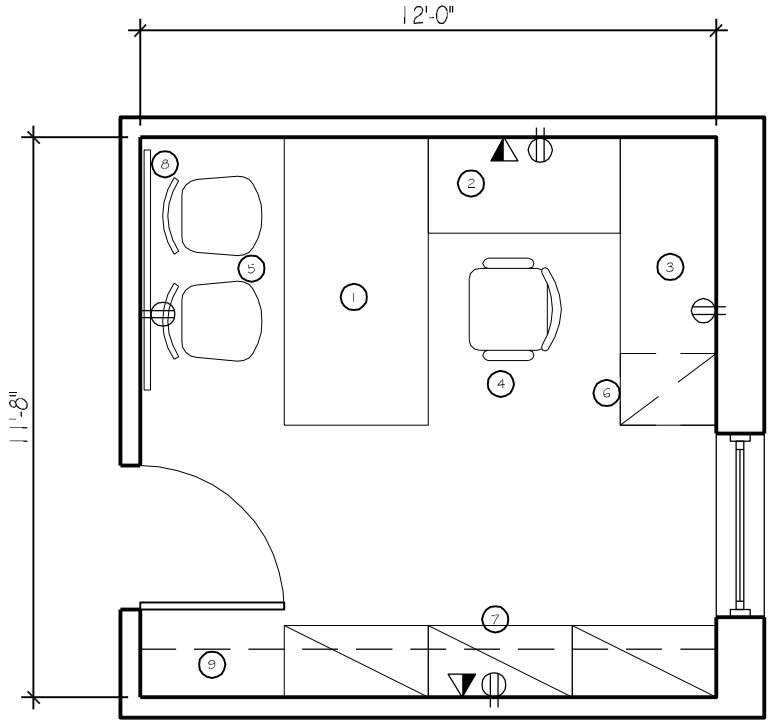
ELECTRICAL							
Voltage/Phase:	110v/60Hz/1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	75 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1	***Data:***	2 ports	***Security:***	Prox Card		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Faculty Offices

1. Desk -Single Pedestal (36"x72")
2. Desk Return (24"x48")
3. Credenza (24"x72")
4. Chair -Task w/ Arms
5. Chairs -Guest
6. Pedestal File (18"x24")
7. Lateral Files (19" Dx36"W)
8. Marker Board (36"x60")
9. Shelves: Overhead Wall-Mounted (12"x156")

8.2.3	Research Offices	Office Space	60	NSF

Description

Worksatations for graduate students and postdocs.

Adjacency/Support Areas

Locate adjacent to labs to monitor lab benches. Locate adjacent to faculty offices.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	N/A	***Countertops:***	N		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	N	***Threshold:***	N

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	Y	***Table:***	N	***Files:***	Y	***Casesgoods:***	N

Notes

Use a flexible furniture system **Equipment:**

Equipment (NIC): (1) computer monitor, (1) computer CPUs

Furnishings (NIC): (1) workstation, 30" deep with return and 12" deep overhead shelving.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr	
Exhaust Air:		***Return Air:***		***Make-up:***		
Filtration (%):		***Pressurization:***				

Notes: Typical Office system

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

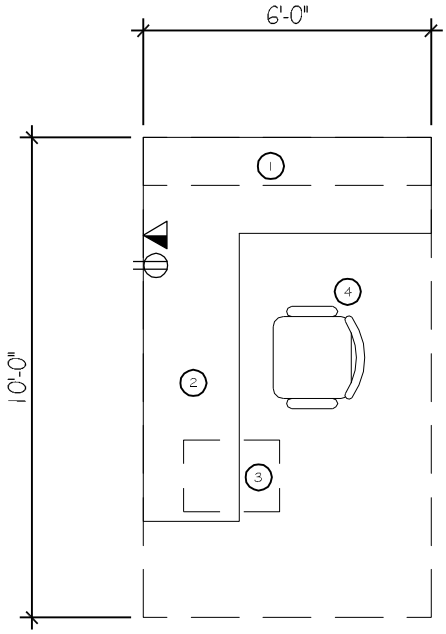
ELECTRICAL							
Voltage/Phase:	120v/60Hz/1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	3	***Data:***	3 ports	***Security:***	Prox Card		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Research Offices

0' 1' 5'

1. Shelves: Overhead Wall-Mounted (12"x60")
2. Work Surface (24" Wide)
3. Pedestal, Mobile (18"x24")
4. Chair, Task w/ Arms

8.2.4	NerveCenter	Office Space	300	NSF

Description
Call Center for Poison Control

Adjacency/Support Areas
Secure area close to UPCC Admin., Copy/Fax/Printer and Records Storage.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	3	***Exits:***	1
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	N/A	***Countertops:***	N		
Door Width:	3'	***Vision panel:***	N/A	***Seals:***	N	***Threshold:***	N

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	Y	***Table:***	N	***Files:***	Y	***Casesgoods:***	N

Notes
Use a flexible furniture system **Furniture:**
(1) white board, (4) coat hooks, book shelves.

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes: Typical Office system

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

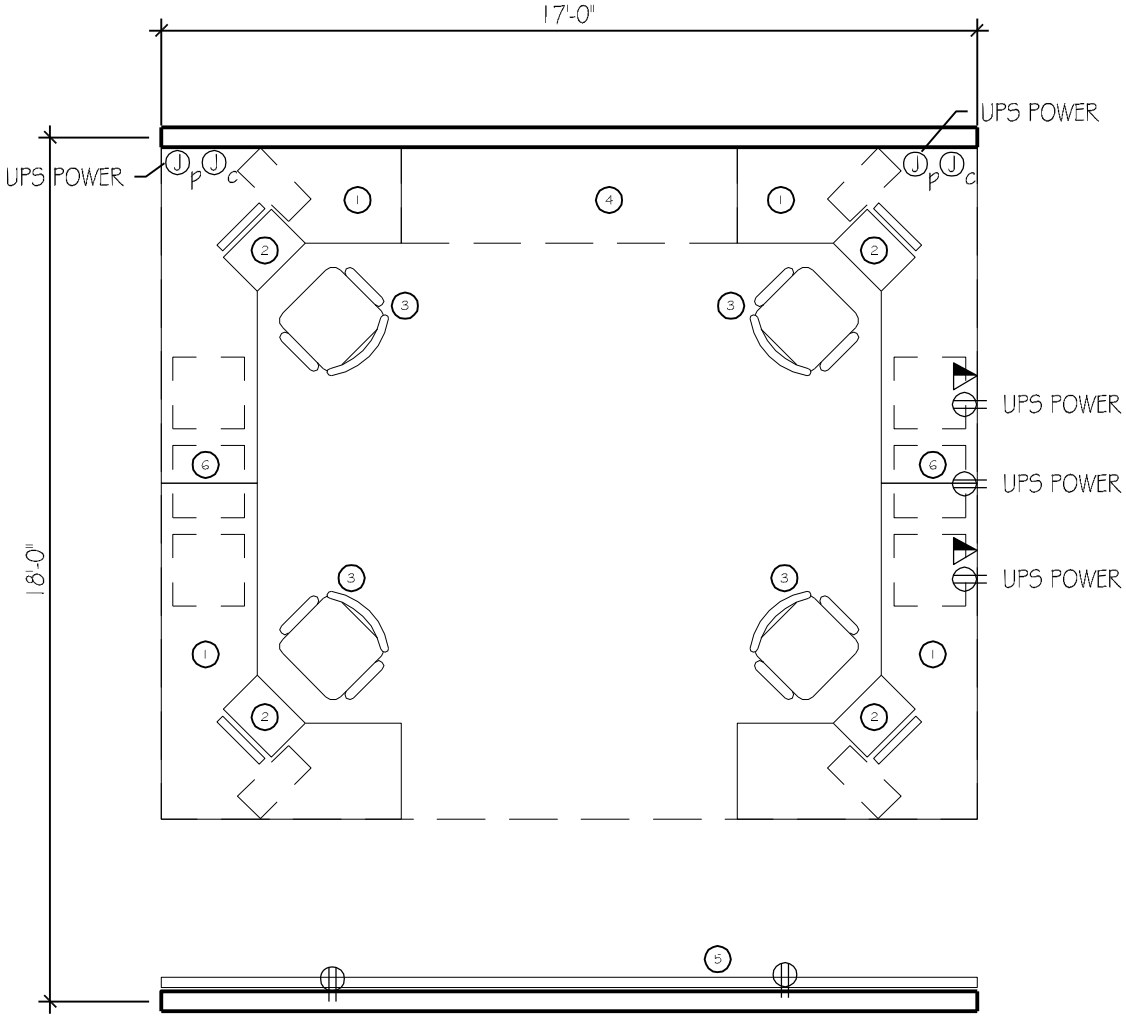
ELECTRICAL							
Voltage/Phase:	120v/60Hz/1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes
UPS required for all equipment.

COMMUNICATIONS							
Telephone:	3	***Data:***	3 ports	***Security:***	Prox Card		

Notes
Homeland Security telephone system, CB Radio (800 MegaHZ), "Q"- Equipment, Automatic Call Distribution,
Provide Secure Data Room Nearby

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Nerve Center

1. Work Surface (24" Wide)
2. Computer w/ Keyboard Tray
3. Mobile Chair, w/ Arms
4. Bookshelf
5. Marker Board
6. Communications Equipment

8.2.5	Open Work Area	Office Space	200	NSF

Description

Open area for general office use and team meetings.

Adjacency/Support Areas

Offices

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	2	***Exits:***	1
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	N/A	***Countertops:***	N		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	N	***Threshold:***	N

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	N	***Table:***	Y	***Files:***	Y	***Casesgoods:***	N

Notes

Furnishings (NIC): Lateral File Cabinets, 48"x30" mobile tables, armless chairs.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr	
Exhaust Air:		***Return Air:***		***Make-up:***		
Filtration (%):		***Pressurization:***				

Notes: Typical Office system

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

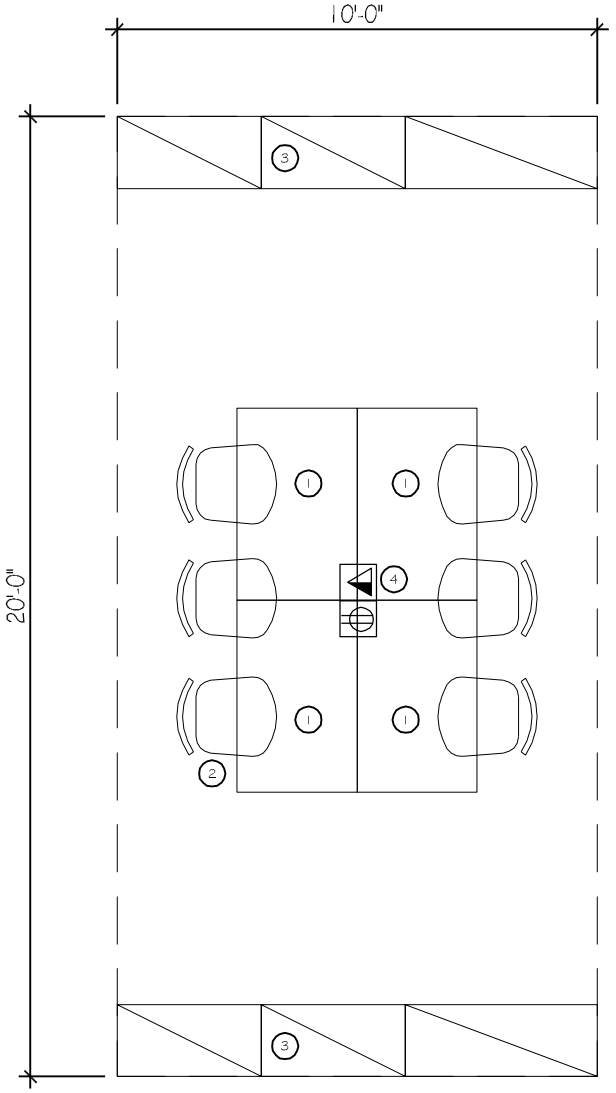
ELECTRICAL							
Voltage/Phase:	120v/60Hz/1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	3	***Data:***	3 ports	***Security:***			

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Open Work Area

0' 1' 5'

1. Table (48"x30")
2. Armless Chair (typ.)
3. Lateral File Cabinets (4 Drawer, 36"W & 48"W)
4. Floor Box

8.2.6 Visualization Room

Office Space **300 NSF**

Description

For future virtual learning amd immersion reality. Interim use as a Conference Room.

Adjacency/Support Areas

Adjacent to Computational Lab and Atrium. Provide adjoining computer closet.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	3	***Exits:***	2
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9' min.	***Casework Finish:***	wood	***Countertops:***	N/A		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	Y	***Threshold:***	Y

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	Y	***Table:***	Y	***Files:***	Y	***Casesgoods:***	N

Notes:

Equipment:

Equipment (NIC):

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

Typical Office System

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL							
Voltage/Phase:	110v/60Hz/1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	75 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1	***Data:***	2 ports	***Security:***	Prox Card		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		

8.2.7	Computational Lab	Office Space	1,060	NSF

Description

Computer Lab for 6 students and 6 visitors with work areas for 1-2 and 2 screens per desk.

Adjacency/Support Areas

Close to Visualization Room & Atrium

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	Jan-50	***Occup. Load:***	21	***Exits:***	2
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9' min.	***Casework Finish:***	NA	***Countertops:***	N/A		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	Y	***Threshold:***	Y

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	Y	***Table:***	Y	***Files:***	Y	***Casesgoods:***	N

Notes:

Equipment:

Equipment (NIC): (1) LCD Projectors, (2) LCD Screens/Desk, (2) computers/desk, White Boards

Furnishings (NIC):

MECHANICAL							
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

Typical Office System

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

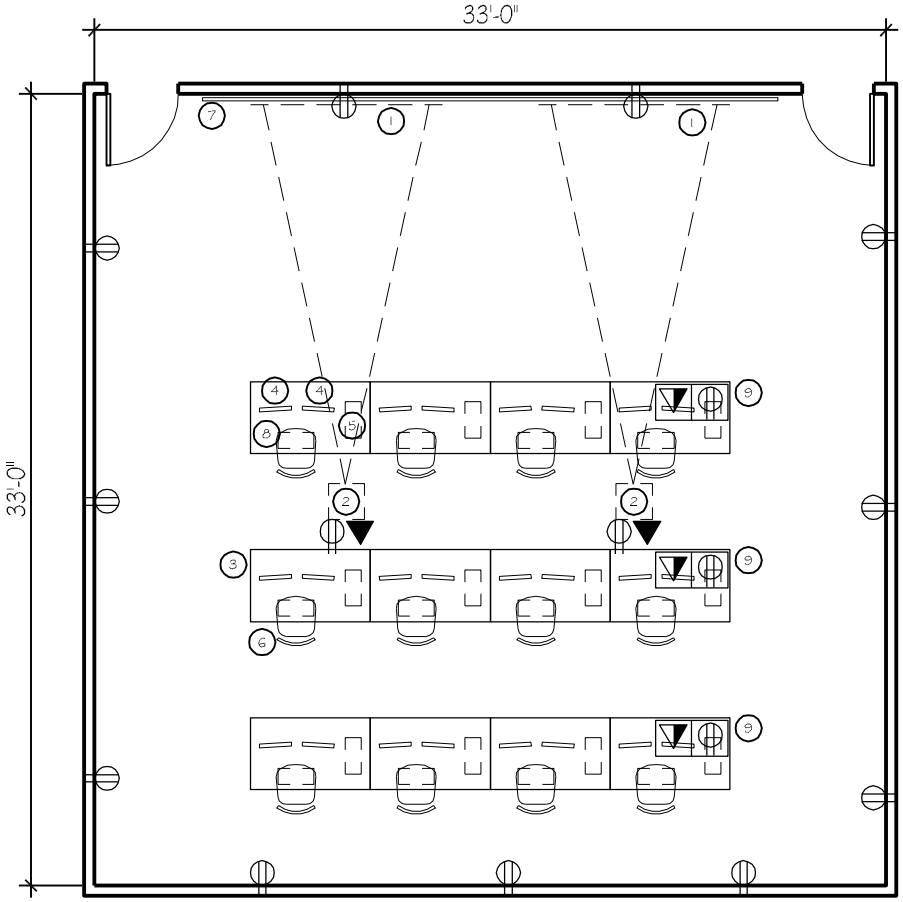
ELECTRICAL							
Voltage/Phase:	110v/60Hz/1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	75 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1	***Data:***	2 ports	***Security:***	Prox Card		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Computational Lab

0' 1' 5'

1. Projection Screen (96" Wide)
2. Ceiling Projector Mount
3. 5' x 3' Table (typ.)
4. LCD Monitor
5. Computer
6. Armless Chair (typ.)
7. Marker Board
8. Keyboard Tray
9. Floor Box w/ Power and Comm.

8.2.8 Small Conference Room — Office Space — 192 NSF

Description

These small conference rooms should accommodate 6 persons at a single table with chairs and have a white board and pin up space.

Adjacency/Support Areas

Distributed evenly around office areas. Adjacent to the Atrium / Translational Center

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	15	***Occup. Load:***	13	***Exits:***	1
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	N/A	***Countertops:***	N		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	Y	***Threshold:***	Y

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***	N				
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	N

Notes

Equipment: markerboard, 96" manual projection screen

Furnishings (NIC): (2) - marker boards , (6) - armless chairs, (2) - side chairs, (2) - modular conference tables (48"x48")

MECHANICAL						
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4	
Exhaust Air:		***Return Air:***		***Make-up:***		
Filtration (%):		***Pressurization:***	Neutral			

Notes:

Typical Office System

PLUMBING							
Cold Water:	N/A	***Hot Water:***	N/A	***Pure Water:***	N/A	***Chilled Water:***	N/A
Fixtures:	N/A						
Floor Drain:	N/A	***Waste Treatment:***	N/A				
Steam:	N/A	***Cooling Water:***	N/A	***Condensate:***	N/A		
Safety Shower:	N/A	***Eyewash:***	N/A				
Gases:	N/A	***Compressed Air:***	N/A	***Vacuum:***	N/A		

Notes

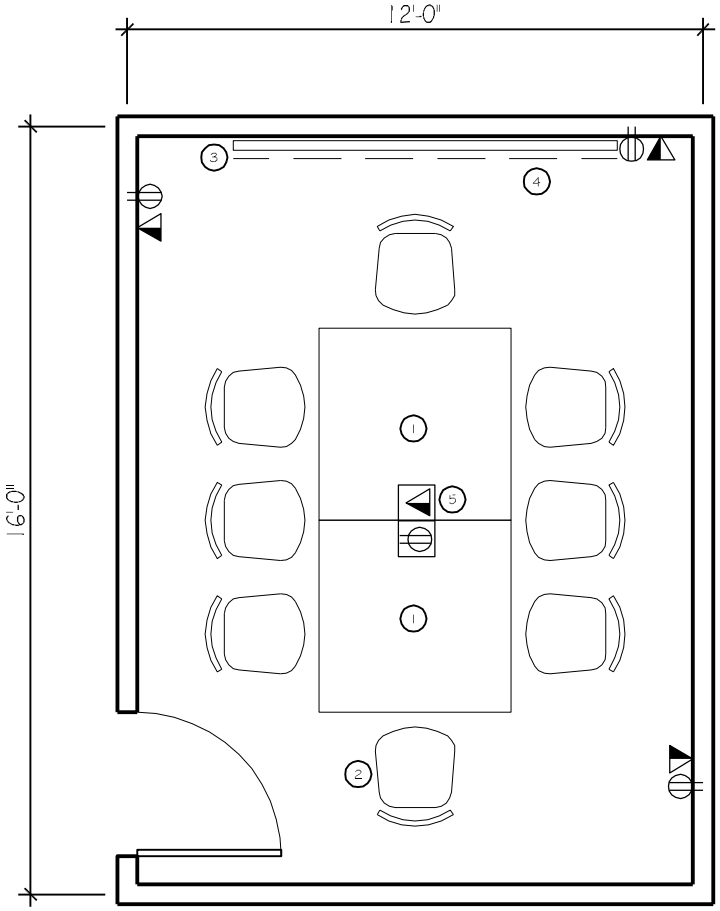
ELECTRICAL						
Voltage/Phase:	110v/60Hz/1 phase			***Est.Load:***	4W/SF	
Lighting Levels:	50 fc @ work plane, dim. to 5 fc	***Type:***	Fl	***Fixtures:***	Direct/Indirect	

Notes

COMMUNICATIONS						
Telephone:	2	***Data:***	3 ports	***Security:***	Prox Card	

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Small Conference Room

0' 1' 5'

1. Conference Table (48"x48")
2. Armless Chair (typ.)
3. Marker Board
4. Projection Screen (96" wide)
5. Floor Box

8.2.9 Medium Conference Room — Office Space — 360 NSF

Description

This space should accommodate up to 14 people.

Adjacency/Support Areas

Close to scientists' offices. Adjacent to the Atrium / Translational Center

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	15	***Occup. Load:***	24	***Exits:***	1
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Acoustic	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	N/A	***Countertops:***	N		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	Y	***Threshold:***	Y

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	N

Notes

Use a flexible office/technology furniture system for budgeting purposes.

Equipment: (1) - 4 track marker board , flip-down slide projector shelf, 96" manual projection screen

Equipment (NIC): ceiling mounted video projector

Furnishings (NIC): (20) - conference room chairs, (2) - modular conference tables (48"x84"), (1) - media storage cabinet (18"x72"x30")

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***	Neutral				

Notes:

Typical office system

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL							
Voltage/Phase:	110v/60 Hz/1 phase			***Est.Load:***	2W/SF		
Lighting Levels:	50 fc @ work plane, dim. to 5 fc	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

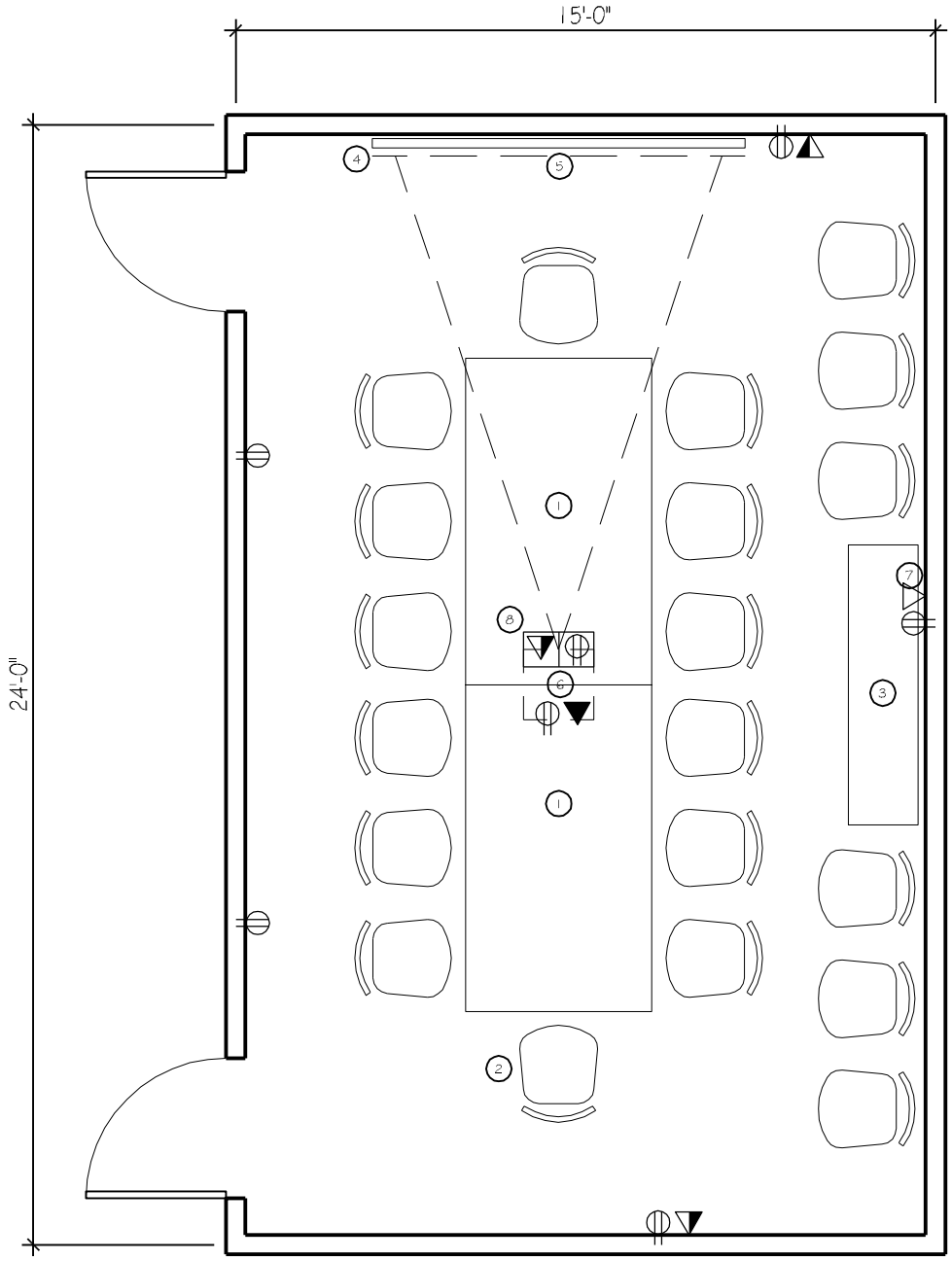
Lighting may be custom to support optimal use of technology

COMMUNICATIONS							
Telephone:	2	***Data:***	5 ports*	***Security:***	Prox Card		

Notes

***Data:** (5) data ports (1 @ screen, 1 @ rear wall, 1 @ side wall, 2 @ central floor boxes) **AV:**

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Medium Conference Room

0' 1' 5'

1. Conference Table (48"x84")
2. Armless Chair (typ.)
3. Storage Cabinet (18"x72"x30")
4. Marker Board
5. Projection Screen (96" wide)
6. Ceiling Projector Mount
7. Telephone Jack
8. Floor Box

8.2.10	Large Conference Room	Office Space	600	NSF

Description

This space should accommodate people actively participating in a video conference with others in remote locations. As such, special attention will be paid to light and acoustic characteristics and the inclusion of digital technology for both generating and participating in digitally based conferences.

Adjacency/Support Areas

Close to scientists' offices. Adjacent to Atrium / Translational Center.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	15	***Occup. Load:***	40	***Exits:***	1
Live load:	75	***Vibration:***	N/A				
Wall Finish:	Acoustic	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	N/A	***Countertops:***	N		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	Y	***Threshold:***	Y

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	N

Notes

Use a flexible office/technology furniture system for budgeting purposes.

Equipment: (1) - 4 track marker board, flip-down slide projector shelf, 96" manual projection screen

Equipment (NIC): ceiling mounted video projector **Furnishings (NIC):** (20) - conference room chairs, (2) - modular conference tables (48"x84"), (1) - media storage cabinet (18"x72"x30")

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***	Neutral				

Notes:

Typical office system

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL							
Voltage/Phase:	110v/60 Hz/1 phase			***Est.Load:***	2W/SF		
Lighting Levels:	50 fc @ work plane, dim. to 5 fc	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

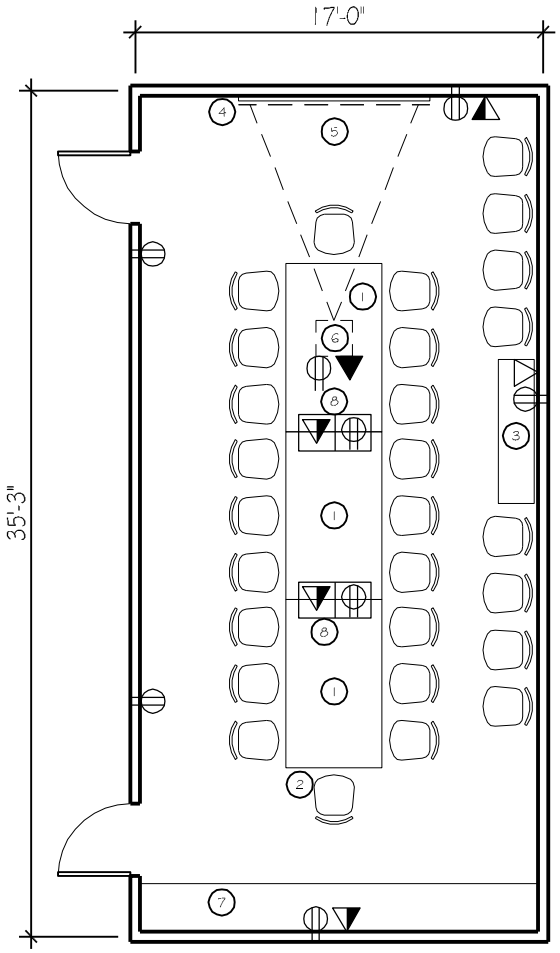
Lighting may be custom to support optimal use of technology

COMMUNICATIONS							
Telephone:	2	***Data:***	5 ports*	***Security:***	N		

Notes

***Data:** (5) data ports (1 @ screen, 1 @ rear wall, 1 @ side wall, 2 @ central floor boxes) **AV:**

SPECIAL REQUIREMENTS			
Provide capability of using flexible furniture.			



Large Conference Room

0' 1' 5'

1. Conference Table (48"x84")
2. Armless Chair (typ.)
3. Storage Cabinet (18"x72"x30")
4. Marker Board (4 Track Sliding System)
5. Projection Screen (96" wide)
6. Ceiling Projector Mount
7. Cabinets w/ Counter Top
8. Floor Box

8.2.11	Reception	Office Space	120	NSF

Description

Reception Area as part of Pharmacotherapy, central to TTT/Clinical, Poison Control, Outcomes Research, Drug Regimen

Adjacency/Support Areas

TTT/Clinical, Poison Control, Outcomes Research, Drug Regimen

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1 or 2	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Wood	***Countertops:***	PLAM		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	N	***Threshold:***	N

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***	N				
Desk:	Y	***Table:***	N	***Files:***	Y	***Casesgoods:***	N

Notes

Reception Desk

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

Typical Office System

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

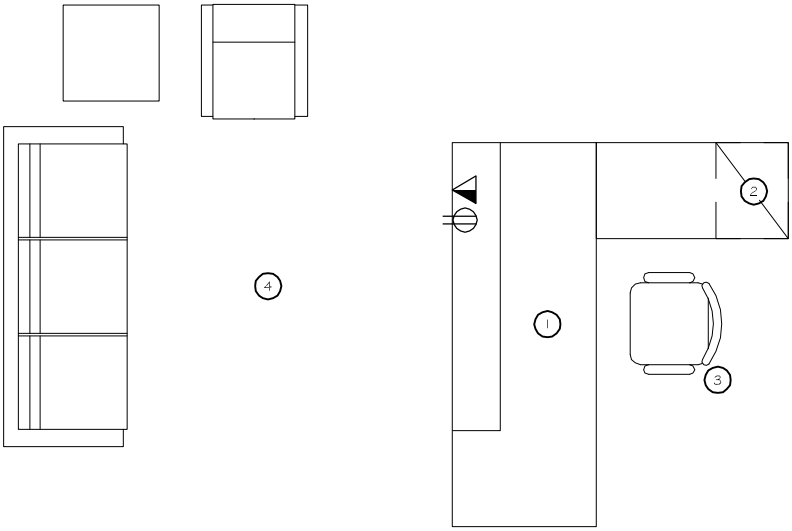
ELECTRICAL							
Voltage/Phase:	120/60 Hz/1phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS			



Reception

1. Reception Desk
2. Pedestal
3. Chair w/ Arms
4. Seating Area

8.2.12 Administrative Support

Office Space **60** **NSF**

Description

This open office workstationspaces accommodates an office administartive staff's basic workstations and associated files, printers and other supporting equipment and storage cabinets. The 60 nsf size is to accommodate a single person with guest chair. Where appropriate, open office workstataions to be grouped in a 2 or more station configuration.

Adjacency/Support Areas

Proximate to senior faculty, faculty, graduate student and post doc offices, conference rooms. Close access to Shared workrooms and mail/copy/fax rooms.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1 or 2	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	N/A	***Countertops:***	N		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	N	***Threshold:***	N

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***	N				
Desk:	Y	***Table:***	N	***Files:***	Y	***Casesgoods:***	N

Notes

Use a flexible furniture system for budgeting purposes.

Equipment: none

Equipment (NIC): Computer Monitor, Computer CPU

Furnishings (NIC): (1) 24"x60" desk w/ return, (1) 24"x42" side return, (1) 24"x48" worksurface, (1) 36" worksurface, (1) task chair w/ arms, (1) side chair, (1) 18" pedastal file

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

Typical Office System

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

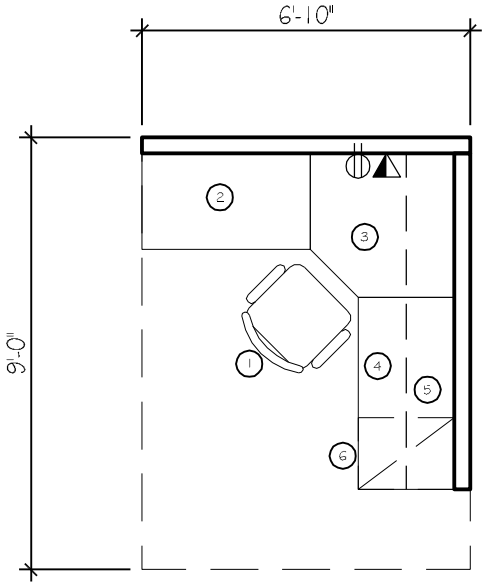
ELECTRICAL							
Voltage/Phase:	120/60 Hz/1phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	Y	***Data:***	Y	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Administrative Support

1. Chair -Task w/ Arms
2. Return (24"x42")
3. Corner Work Surface (36"x36")
4. Work Surface (24"x48")
5. Overhead Storage Unit (14"x84")
6. Pedestal File (18"x24")

8.2.13	Copy/Fax/Mail/Printer	Office Space	120	NSF

Description

These Copy/Fax/Mail/Printer spaces are to be evenly distributed by floor and closely associated with the administrative support staff. They are used by all occupants and will house a medium sized collating copier and fax. Mail supplies, a paper cutter, paper to restock the machines and other common office supplies should be stored in this room.

Adjacency/Support Areas

Proximate to all office areas, most closely associated with administrative support staff. Adjacent to Open Work Area.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4' RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Plam	***Countertops:***	Plam		
Door Width:	3'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	Y

Notes

Use a flexible furniture system for budgeting purposes. **Equipment:**

12 LF of 12"d wall cabinets, 9.5 LF of 24" base cabinets, 10 LF of 30"d worksurface, (2) tackboards

Equipment (NIC): (1) large copier, (1) printer, (1) fax, (2) recycle bins **Furnishings**

(NIC): none

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	N						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

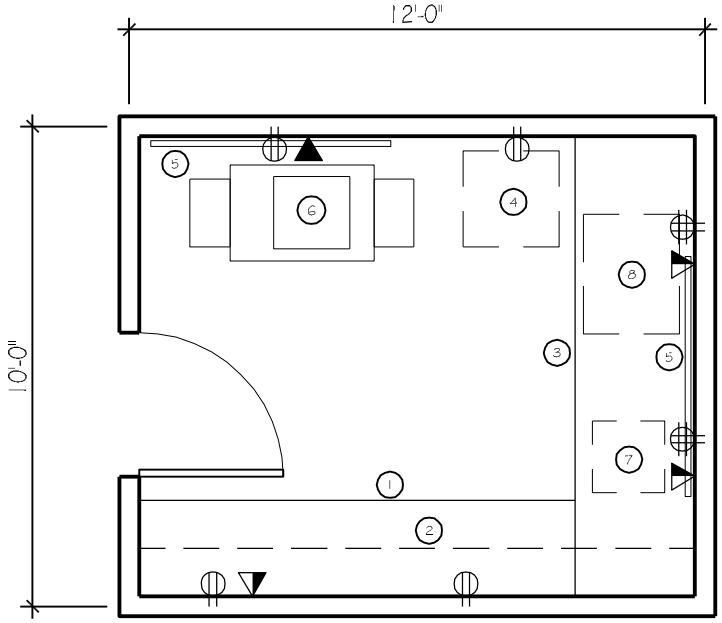
ELECTRICAL	N						
Voltage/Phase:	120 v/60 Hz//1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1	***Data:***	3 ports	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Copy / Fax / Mail / Printer

1. Base Cabinet / Counter (24"x114")
2. Wall Cabinets (36"Hx12"Dx144"W)
3. Work Counter (30"x120")
4. Recycling Bins
5. Tack Board (36"x60")
6. Copier
7. Fax Machine
8. Printer

8.2.14	Storage	Office Space	120	NSF

Description

This department file room will house adjustable shelving and file cabinets, but will be flexible in use

Adjacency/Support Areas

Proximate to all office areas, most closely associated with administrative support staff.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4' RB	***Floor Finish:***	VCT	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Plam	***Countertops:***	Plam		
Door Width:	3'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	Y

Notes

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	N						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

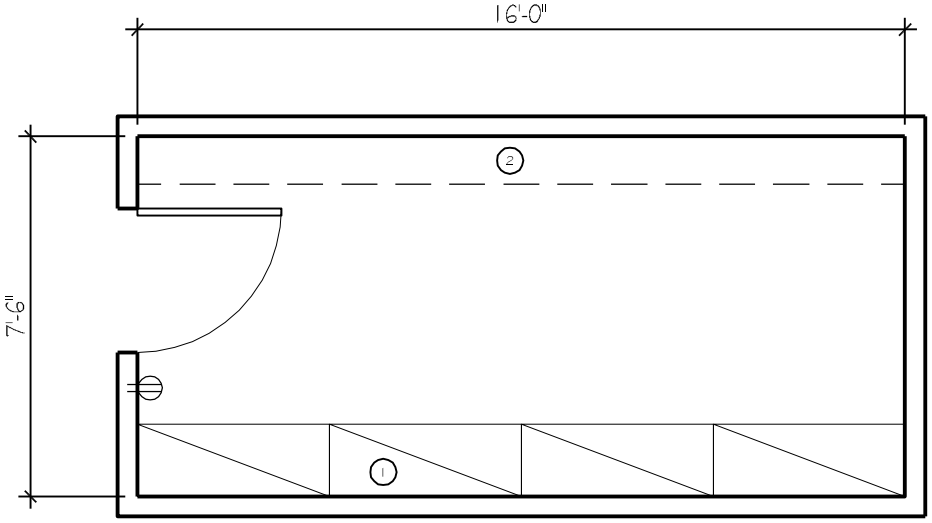
ELECTRICAL	N						
Voltage/Phase:	120 v/60 Hz//1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1	***Data:***	3 ports	***Security:***	N		

Notes

SPECIAL REQUIREMENTS			



Storage

1. Lateral File (4-drawer, 48"W), (typ).
2. Shelving, 12" Deep

8.2.15	Record Storage (Secure)	Office Space	240	NSF

Description

RECORDS Storage required for Pharmacotherapy Poison Control (Secure) and for Pharn Tox CHT (Secure)

Adjacency/Support Areas

Refer to adjacency diagrams.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4' RB	***Floor Finish:***	Carpet	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	No	***Countertops:***	No		
Door Width:	3'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	Y

Notes

Provide 4-drawer, 48" wide file cabinets.

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	N						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

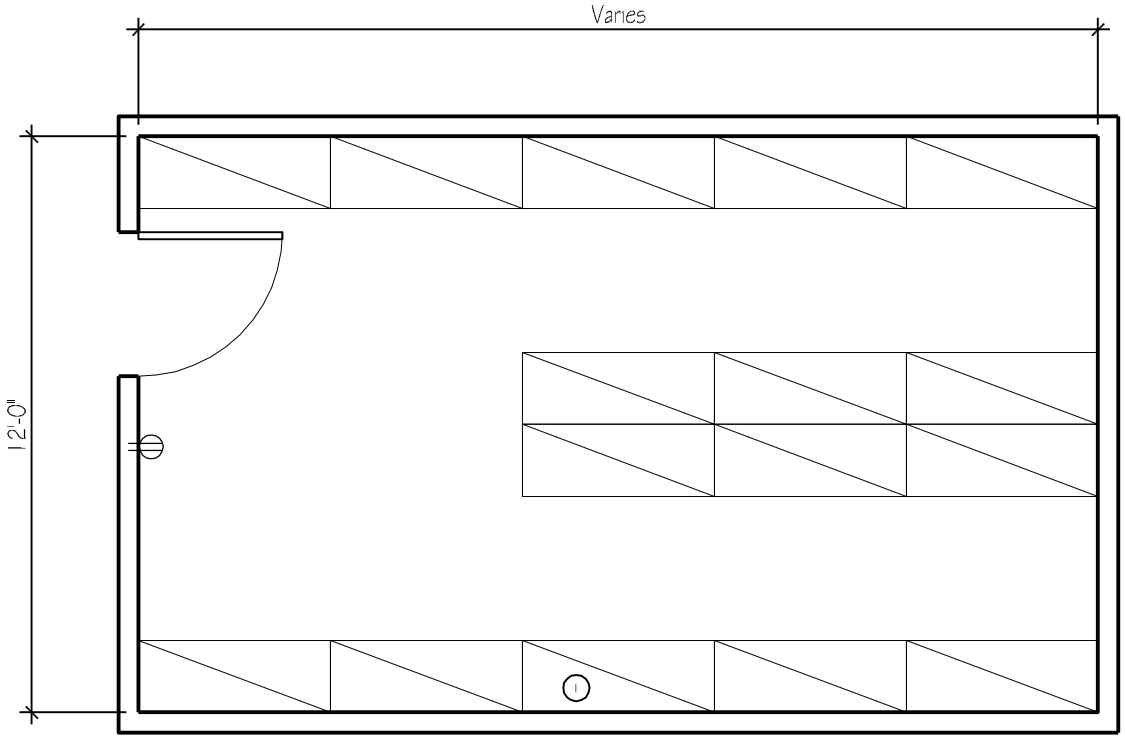
ELECTRICAL	N						
Voltage/Phase:	120 v/60 Hz//1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1	***Data:***	3 ports	***Security:***	Prox Card		

Notes

SPECIAL REQUIREMENTS			



Records Storage (Secure)

1 Lateral File (4-drawer, 48"W), (typ).

8.2.16	Kitchen / Lounge	Office Space	240 / 90	NSF

Description

Lounge / Kitchen space to be distributed on each floor, close to Conference Rooms

Adjacency/Support Areas

Adjacent to Conference Rooms, Offices.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	4	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4" RB	***Floor Finish:***	Rubber	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Wood	***Countertops:***	Plam		
Door Width:	3'	***Vision panel:***	Y	***Seals:***	N	***Threshold:***	N

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***	N				
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	Y

Notes

Use a flexible furniture system for budgeting purposes.

Equipment:

Equipment (NIC): Refrigerator, Microwave, Coffeee Maker.

Furnishings (NIC):

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***					
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

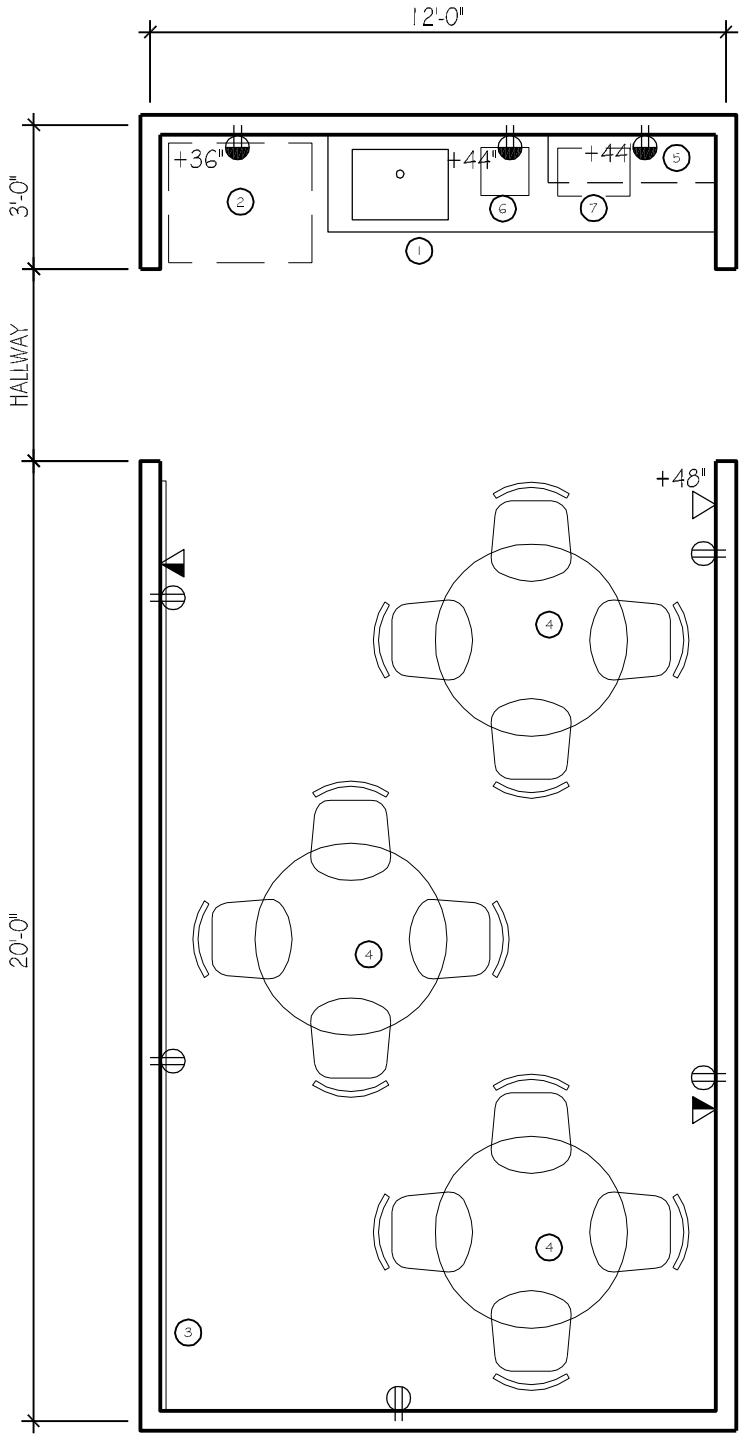
ELECTRICAL							
Voltage/Phase:	110v/60Hz/1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1 phone	***Data:***	2 ports	***Security:***	N		

Notes

SPECIAL REQUIREMENTS		
Provide capability of using flexible furniture.		



Kitchen / Lounge

0' 1' 5'

1. Counter Top w/ Sink
2. Refrigerator
3. Marker / Tack Board
4. Table w/ Chairs
5. Overhead Cabinets
6. Coffee Maker
7. Microwave

9.2.17	Exam Room	Office Space	110	NSF

Description

Located within the Pharmacology & Toxicology Department and part of the Center for Human Toxicology. Provide Exam Room.

Adjacency/Support Areas

Used by Pharmaceutics.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4' RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Plam	***Countertops:***	Plam		
Door Width:	3'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	Y	***Table:***	Y	***Files:***	N	***Casesgoods:***	Y

Notes

Equipment (NIC): Exam table, stool, chair w/ arms, trash container, sharps.

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr		
Exhaust Air:		***Return Air:***		***Make-up:***			
Filtration (%):		***Pressurization:***					

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	N						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

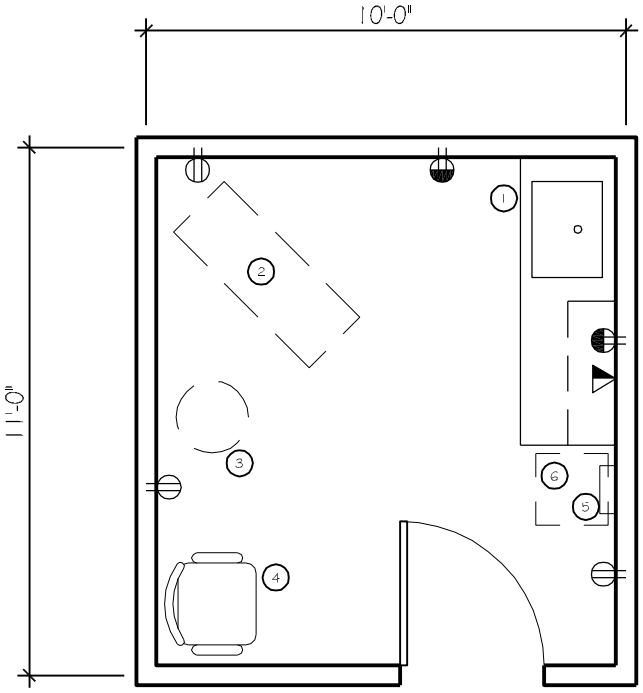
ELECTRICAL	N						
Voltage/Phase:	120 v/60 Hz//1 phase			***Est.Load:***	4 W/SF		
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect		

Notes

COMMUNICATIONS							
Telephone:	1	***Data:***	3 ports	***Security:***	N		

Notes

SPECIAL REQUIREMENTS			



Exam Room

1. Plastic Laminate Countertop w/ Sink, Base Cabinet, and Upper Cabinet
2. Exam Table
3. Stool
4. Chair w/ Arms
5. Sharps Container
6. Trash Container

8.2.18	Receiving	Office Space	120	NSF

Description

Located within the Pharmacology & Toxicology Department and part of the Center for Human Toxicology. Provide Receiving area for tagging samples and reception desk with space for "send-outs".

Adjacency/Support Areas

Adjacent to Assessioning.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	75	***Vibration:***					
Wall Finish:	Painted GWB	***Baseboard:***	4' RB	***Floor Finish:***	Resilient	***Ceiling Finish:***	ACT
Ceiling Height:	9'	***Casework Finish:***	Plam	***Countertops:***	Plam		
Door Width:	3'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS							
Fume Hood:	N	***BSC:***					
Desk:	N	***Table:***	Y	***Files:***	N	***Casesgoods:***	Y

Notes

Provide reception counter and casework for storing "send-outs".

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	4 AC/Hr	
Exhaust Air:		***Return Air:***		***Make-up:***		
Filtration (%):		***Pressurization:***				

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	N						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

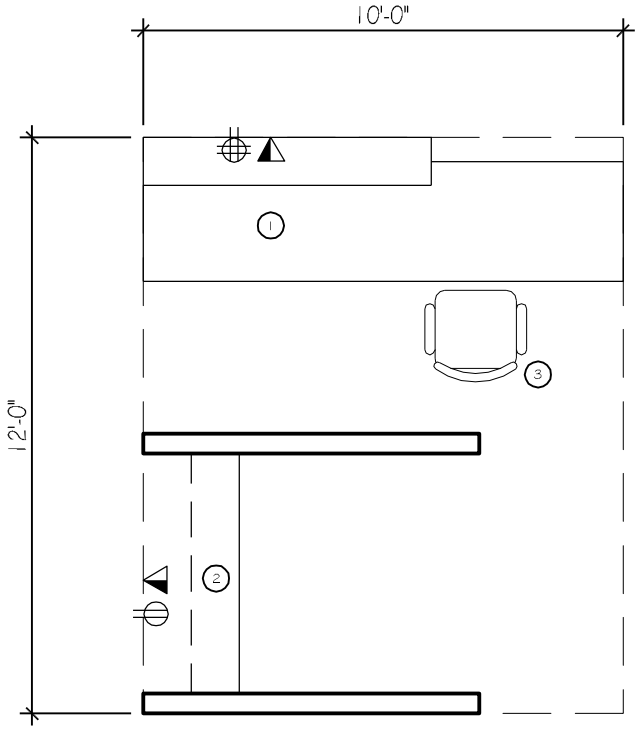
ELECTRICAL	N					
Voltage/Phase:	120 v/60 Hz//1 phase			***Est.Load:***	4 W/SF	
Lighting Levels:	50 fc @ work plane	***Type:***	Fl	***Fixtures:***	Direct/Indirect	

Notes

COMMUNICATIONS						
Telephone:	1	***Data:***	3 ports	***Security:***	N	

Notes

SPECIAL REQUIREMENTS			



Receiving

0' 1' 5'

1. Plastic Laminate Countertop w/ Transaction Counter
2. Plastic Laminate Countertop w/ Base Cabinet and Overhead Shelving
3. Chair w/ Arms

8.3 Animal Facility

Room Data Sheets follow which describe spaces and indicate adjacency (also refer to adjacency diagrams). Additionally, data is provided which describe architectural systems, equipment and furnishings, mechanical systems, plumbing systems, electrical systems, communication systems and other special requirements which are specific to the room. In most cases, a room diagram follows which suggest a room layout – showing equipment, racks, and other requirements. The NSF listed corresponds to the Detail Space Program Summary in Section 5.

8.3.1 Loading Dock/Storage

Animal Space **1,500** **NSF**

Description

Loading Function for the building. Animal loading area to be separated from the general loading for building (supplies, etc).

Adjacency/Support Areas

Close to service elevator, trash and recycle area, and optimally the vivarium.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	15	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Paint	***Baseboard:***	Rubber	***Floor Finish:***	Concrete	***Ceiling Finish:***	Paint
Ceiling Height:	10'	***Casework Finish:***	Plastic Lam	***Countertops:***	Plastic Lam.		
Door Width:	3' pair	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casegoods:***

Notes

Metro shelving, trash containers, recycling containers

MECHANICAL							
Temperature (F):	68dF+/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12-15 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Negative				

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	NA	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	Y	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct		

Notes

COMMUNICATIONS							
Telephone:	Y	***Data:***	N	***Security:***	Y		

Notes

SPECIAL REQUIREMENTS			

8.3.2 Holding Rooms

Animal Space **252 NSF**

Description

Holding Rooms for rodents as part of the Vivarium Program

Adjacency/Support Areas

Adjacent to Procedure Rooms

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	NA	***Countertops:***	NA		
Door Width:	4'	***Vision panel:***	Yes	***Seals:***	Yes	***Threshold:***	No

Notes:

Sound Attenuation to be N.C. 40 or less.

FRP doors with stainless steel frames, armor plate, and automatic door bottom. Provide red glass at door lite.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:*** (1) 4' BSC		
Desk:	***Table:***	***Files:***	***Casegoods:***

Notes

Ventilated Cage Racks

Hangers for mops and brooms over mop sink.

MECHANICAL						
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	Steam	***Air Changes:***	12-15 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Negative or positive depending on use.			

Notes:

Environmental monitoring controls (temperature, humidity, lighting and air change rate). Design for 30%-70% humidity.

Provide mechanical for future ventilated cage racks.

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Plumb for future automatic watering system, provide hose bib for spray hose, wall-mounted sink, and mop sink.

ELECTRICAL						
Voltage/Phase:	110v20	2-3 GFI/waterproof/wall		***Est.Load:***	10W/SF	
Lighting Levels:	80fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct	

Notes

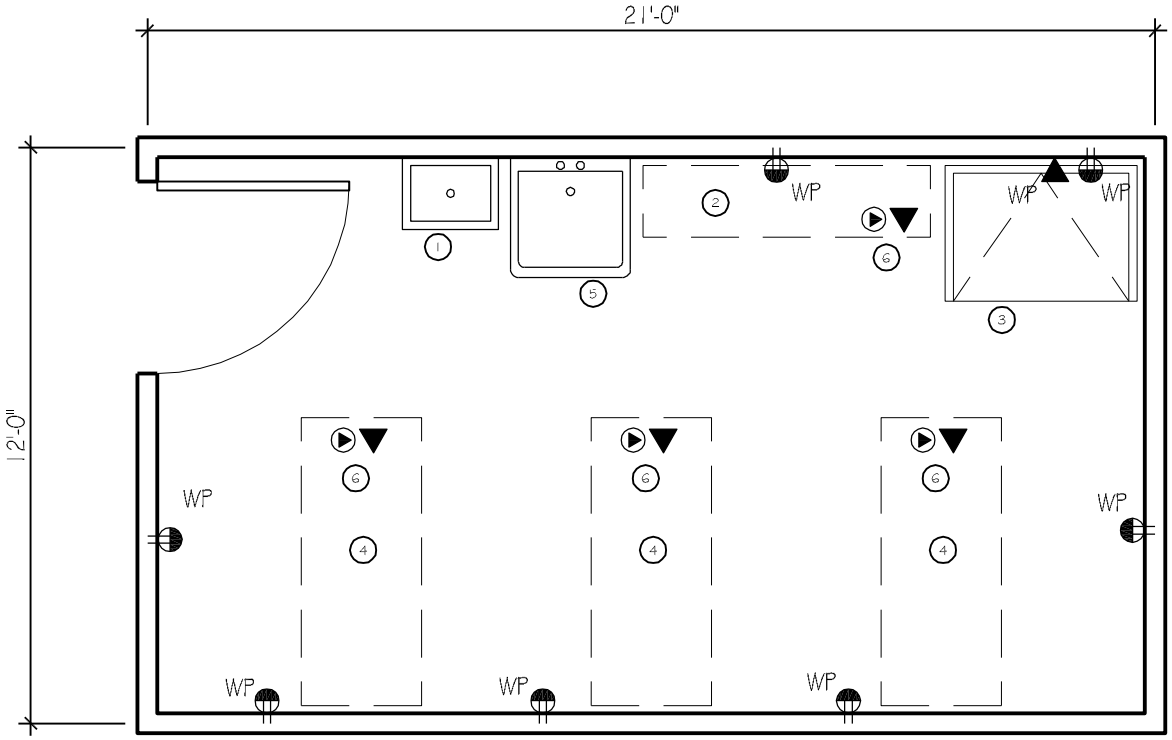
Emergency power. Gasketed light fixtures. Lighting control for corridor at door and other other switches to be waterproof. Provide High/Low level lighting with watchdog system. Receptacles for ventilated racks to be ceiling mounted twist-lock.

COMMUNICATIONS						
Telephone:	N	***Data:***	Y	***Security:***	Y	

Notes

Watchdog system

SPECIAL REQUIREMENTS	
Provide Bumper Rails and Coved Base throughout facility. Provide Emergency Showers in hallways.	



Holding Rooms

1. Wall Mounted Sink
2. Single Sided Cage Rack
3. 4' Bio-Safety Cabinet
4. Cage Rack
5. Mop Sink w/ Hangers Above
6. Ceiling Mtd. Power (Twist Lock on Emergency) & Data

8.3.3 Procedure Rooms

Animal Space **192 NSF**

Description

Procedure Rooms for rodents as part of the Vivarium Program.

Adjacency/Support Areas

Adjacent to Holding Rooms

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	SS	***Countertops:***	Epoxy		
Door Width:	4'	***Vision panel:***	Yes	***Seals:***	Yes	***Threshold:***	No

Sound Attenuation to be N.C. 40 or less.
FRP doors with stainless steel frames, armor plate, and automatic door bottom. Provide red glass at door lite.

EQUIPMENT & FURNISHINGS					
Fume Hood:	5' CFH	***BSC:***			
Desk:		***Table:***		***Files:***	***Casegoods:***

Notes

Fixed epoxy top bench and overhead stainless cabinets with glass doors, and mobile carts below bench.
Hangers for mops and brooms over mop sink.

MECHANICAL						
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	30%-70%	***Air Changes:***	12-15 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	100%	***Pressurization:***	Negative or positive depending on use.			

Notes:

Environmental monitoring controls (temperature, humidity, lighting and air change rate).

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N2	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

Provide hose bib for spray hose, wall-mounted sink, and mop sink.

ELECTRICAL						
Voltage/Phase:	110v20			***Est.Load:***	10W/SF	
Lighting Levels:	30fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct	

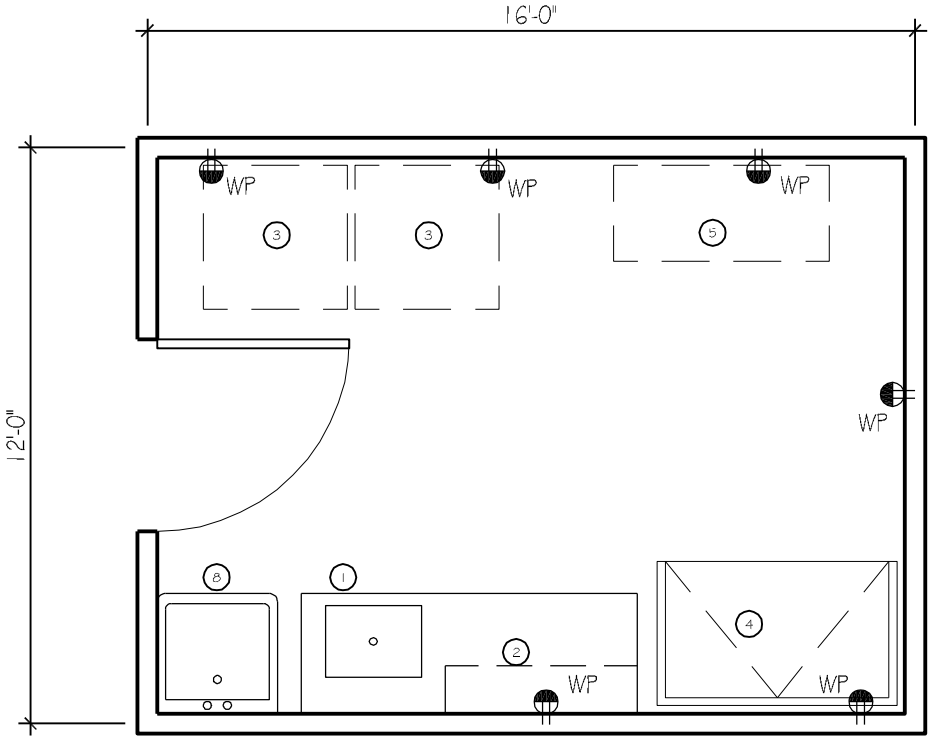
Notes

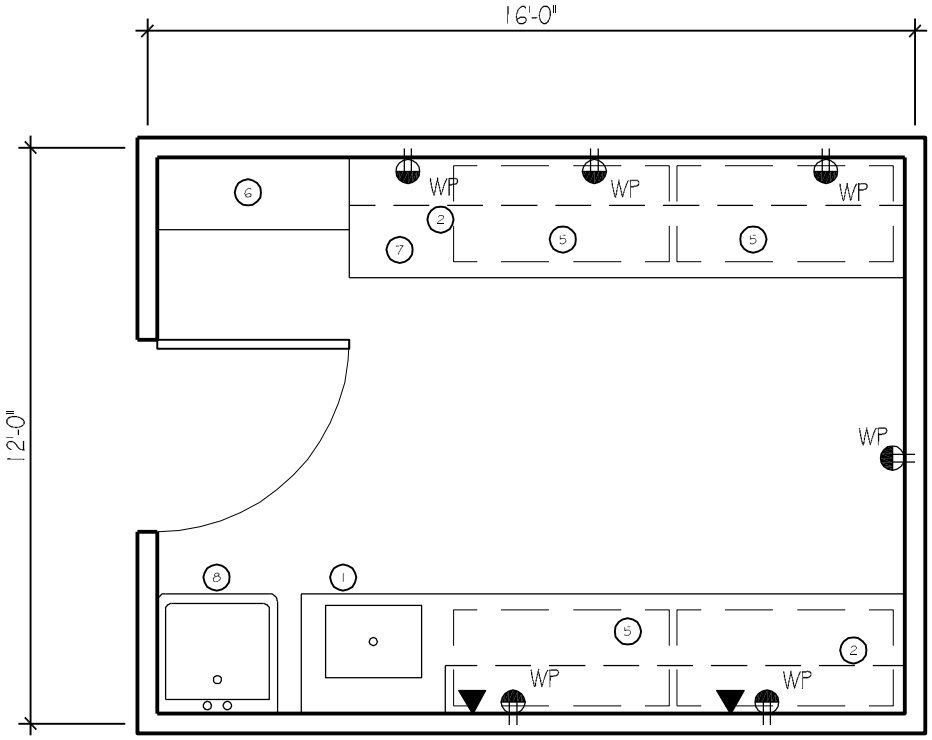
Emergency power. Gasketed light fixtures. Lighting control for corridor at door.

COMMUNICATIONS						
Telephone:	N	***Data:***	Y	***Security:***	Y	

Notes

SPECIAL REQUIREMENTS	
Provide Bumper Rails and Coved Base throughout facility. Provide Emergency Showers in hallways.	





Procedure Rooms

1. Fixed Bench w/ Sink
2. Wall Cabinets w/ Glass Doors
3. Equipment
4. Chemical Fume Hood
5. Mobile Cart (Below Countertop Where Noted)
6. Lockable Cabinet, Full Height
7. Fixed Bench
8. Mop Sink w/ Hangers Above

8.3.4 Locker Rooms

Animal Space **252 NSF**

Description

Lockers for Vivarium staff - Mens and Womens.

Adjacency/Support Areas

Access to Holding Rooms and Procedure Rooms and close to facility entry.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Resilient	***Ceiling Finish:***	GWB
Ceiling Height:	9'	***Casework Finish:***	NA	***Countertops:***	Solid Surface		
Door Width:	3'	***Vision panel:***	No	***Seals:***	No	***Threshold:***	No

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Fixed countertop with sink, composite lockers and storage cabinets, and low composite bench. Lockers to be individually keyed with master.

MECHANICAL						
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	8-10 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	N/A	***Pressurization:***	Neg			

Notes:

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:							
Floor Drain:	Y	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	Y				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Potable hot/cold water at sinks. Floor drain with cap. Provide showers in both locker rooms. Provide Urinal in Mens Locker Room.

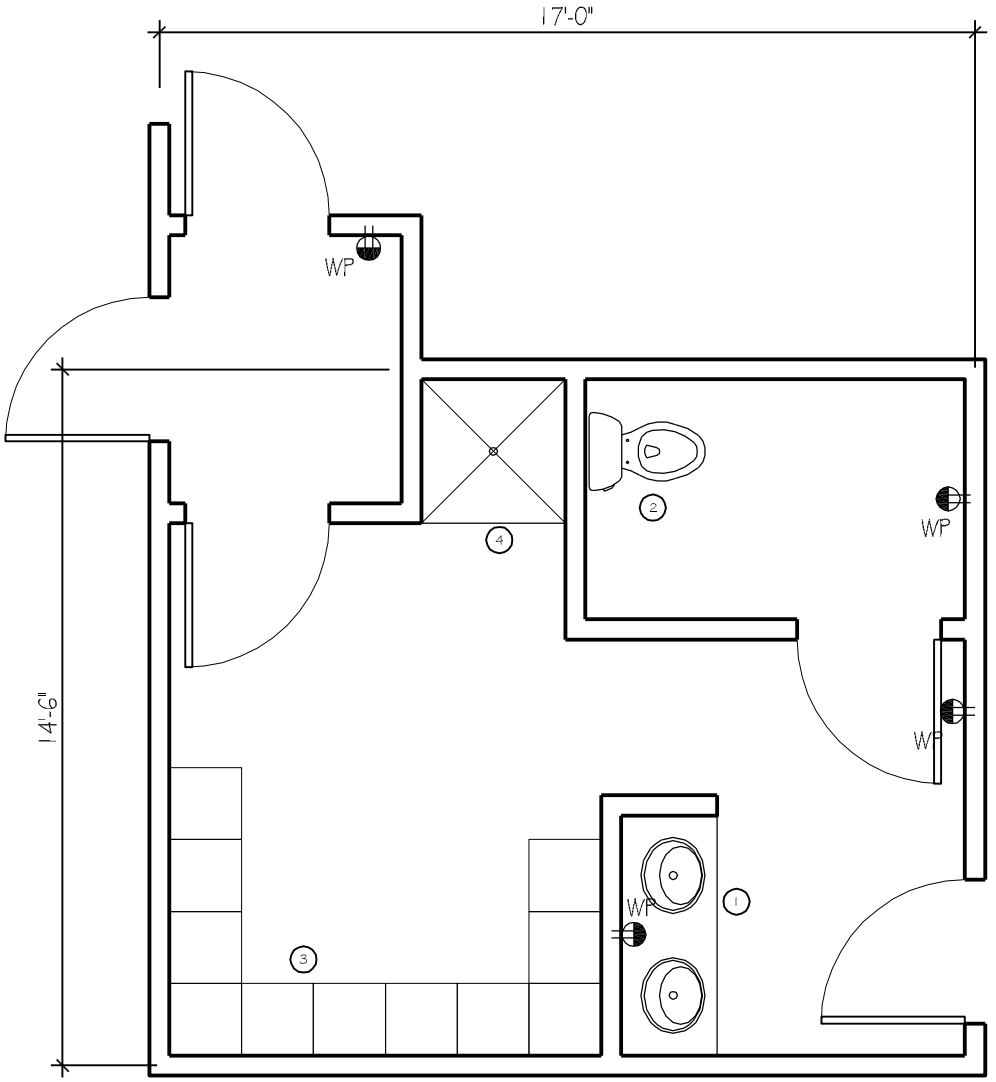
ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***			
Lighting Levels:	80fc at 3'AFF	***Type:***	Fl	***Fixtures:***	Direct		

Notes

COMMUNICATIONS							
Telephone:	N	***Data:***	N	***Security:***	N		

Notes

SPECIAL REQUIREMENTS			



Locker Rooms

1. Fixed Bench w/ Sinks
2. Toilet
3. Lockers
4. Shower

8.3.5 Animal Receiving

Animal Space **192** **NSF**

Description

Receiving Room for rodents as part of the Vivarium Program.

Adjacency/Support Areas

Adjacent to Loading Dock

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	SS	***Countertops:***	Epoxy		
Door Width:	4'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Sound Attenuation to be N.C. 40 or less.
FRP doors with stainless steel frames, armor plate, and automatic door bottom. Provide red glass at door lite.

EQUIPMENT & FURNISHINGS					
Fume Hood:		***BSC:***	6' Type IIA		
Desk:		***Table:***		***Files:***	***Casegoods:***

Notes

Fixed stainless steel bench with sink. Cage Racks and Supply Carts
Hangers for mops and brooms over mop sink.

MECHANICAL						
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	30%-70%	***Air Changes:***	15 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Negative			

Notes:

Environmental monitoring controls (temperature, humidity, lighting and air change rate).

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Provide hose bib for spray hose, wall-mounted sink, and mop sink.

ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***	10W/SF		
Lighting Levels:	30fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct		

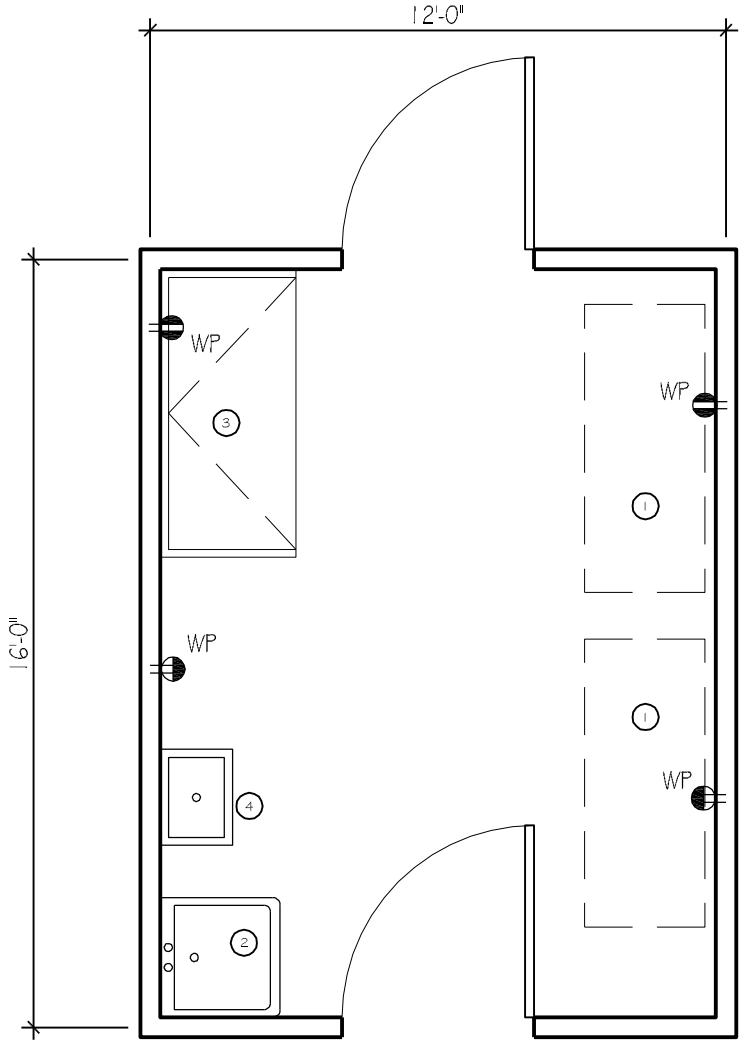
Notes

Emergency power. Gasketed light fixtures. Lighting control for corridor at door.

COMMUNICATIONS							
Telephone:	N	***Data:***	N	***Security:***	Y		

Notes

SPECIAL REQUIREMENTS	
Provide Bumper Rails and Coved Base throughout facility. Provide Emergency Showers in hallways.	



Animal Receiving

1. Cage Racks
2. Mop Sink w/ Hangers Above
3. 6' Bio-Safety Cabinet, Type IIA
4. S.S. Wall Mounted Sink

8.3.6	Feed/Bedding	Animal Space	288	NSF

Description

Feed Bedding Rooms for Animal Rooms as part of the Vivarium Program

Adjacency/Support Areas

Adjacent to Loading Dock, and Clean Cagewash

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	NA	***Countertops:***	NA		
Door Width:	3' pair	***Vision panel:***	No	***Seals:***	No	***Threshold:***	No

Sound Attenuation to be N.C. 40 or less.

FRP doors with stainless steel frames, armor plate, and automatic door bottom. Provide red glass at door lite.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casegoods:***

Notes

Metro Shelving Units (mobile) and Pallets

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	30%-70%	***Air Changes:***	12 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Negative				

Notes:

High/Low exhaust and vent

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	NA	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct		

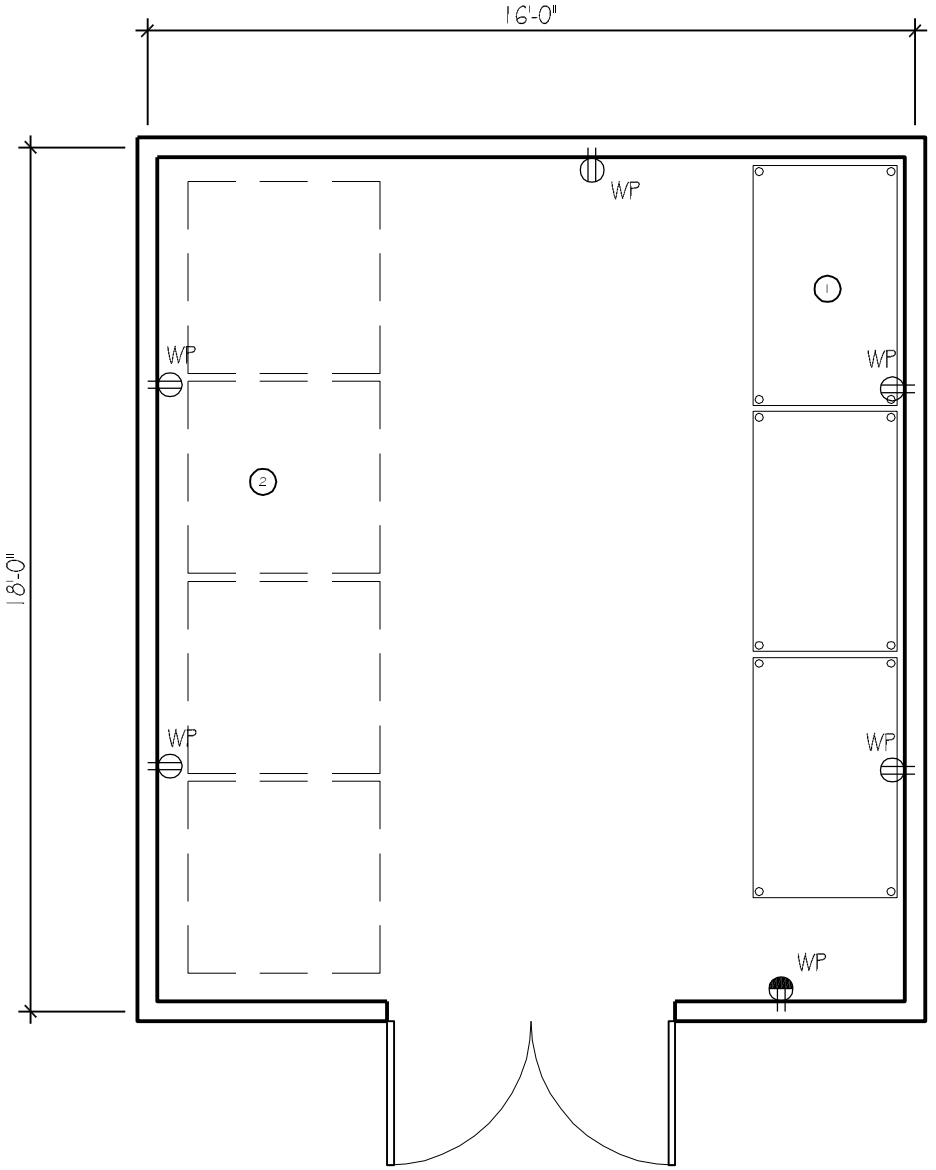
Notes

Gasketed light fixtures.

COMMUNICATIONS							
Telephone:	N	***Data:***	N	***Security:***	Y		

Notes

SPECIAL REQUIREMENTS		
Provide Bumper Rails and Coved Base throughout facility		



Feed / Bedding

0' 1' 5'

1 "Metro" Shelving Units

2 Pallets

8.3.7 Clean Cage Storage

Animal Space **96 NSF**

Description

Storage Room for clean cages as part of the Vivarium Program

Adjacency/Support Areas

Adjacent to Loading Dock, and Clean Cagewash

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	NA	***Countertops:***	NA		
Door Width:	3' pair	***Vision panel:***	No	***Seals:***	No	***Threshold:***	No

Sound Attenuation to be N.C. 40 or less.

FRP doors with stainless steel frames, armor plate, and automatic door bottom. Provide red glass at door lite.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casegoods:***

Notes

Clean Cage Racks

MECHANICAL							
Temperature (F):	72dF+/- 2	***Rel. Humidity:***	30%-70%	***Air Changes:***	12 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Negative				

Notes:

PLUMBING							
Cold Water:	N	***Hot Water:***	N	***Pure Water:***	NA	***Chilled Water:***	N
Fixtures:							
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***	10W/SF		
Lighting Levels:	80fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct		

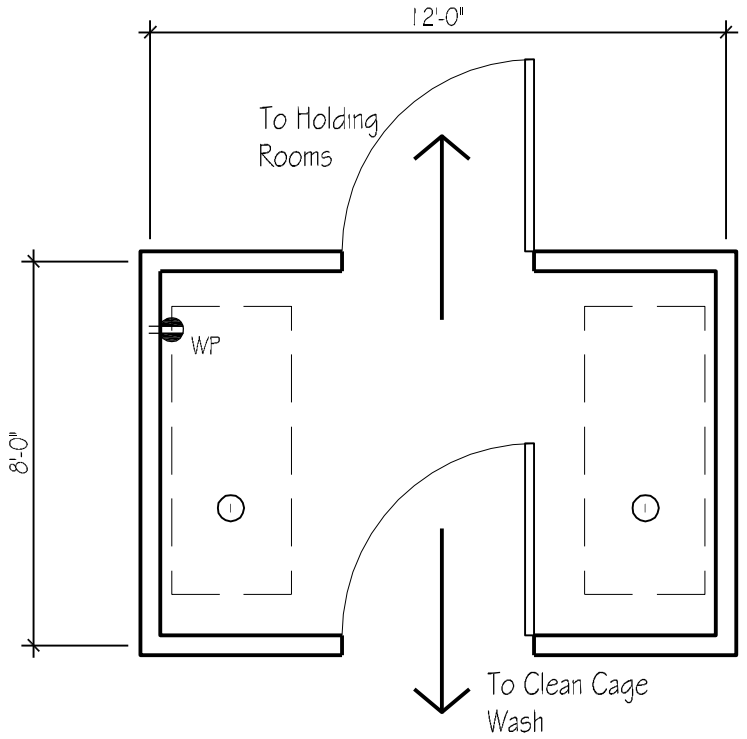
Notes

Gasketed light fixtures.

COMMUNICATIONS							
Telephone:	N	***Data:***	N	***Security:***	Y		

Notes

SPECIAL REQUIREMENTS		
Provide Bumper Rails and Coved Base throughout facility		



Clean Cage Storage

1 Cage Racks

8.3.8 Necropsy Room

Animal Space **192 NSF**

Description

Necropsy Room for Animals as part of the Vivarium Program

Adjacency/Support Areas

Adjacent to Holding Rooms, and Loading Dock.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	SS	***Countertops:***	Epoxy		
Door Width:	4'	***Vision panel:***	No	***Seals:***	No	***Threshold:***	No

Sound Attenuation to be N.C. 40 or less.
FRP doors with stainless steel frames, armor plate, and automatic door bottom.

EQUIPMENT & FURNISHINGS							
Fume Hood:	5'	***BSC:***					
Desk:		***Table:***	5' SS	***Files:***		***Casegoods:***	

Notes

Fixed stainless steel bench with sink and overhead stainless cabinets with glass doors, Necropsy bench with downdraft exhaust, exam light, movable lab table, cylinder restraint. Hangers to be provided over mop sink.

MECHANICAL							
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	30%-70%	***Air Changes:***	12-15 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Negative				

Notes:

Environmental monitoring controls (temperature, humidity, lighting and air change rate).
Motion Sensors for lighting and HVAC. Necropsy bench to have MOPEC downdraft.

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	Y				
Gases:	N2	***Compressed Air:***	Y	***Vacuum:***	Y		

Notes

Hot and cold water at sink, purified water at sink, Vacuum and N2 at bench, CW, N2 and vacuum and CFH. CO2 provided locally. Provide Mop Sink.

ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***	10W/SF		
Lighting Levels:	30fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct		

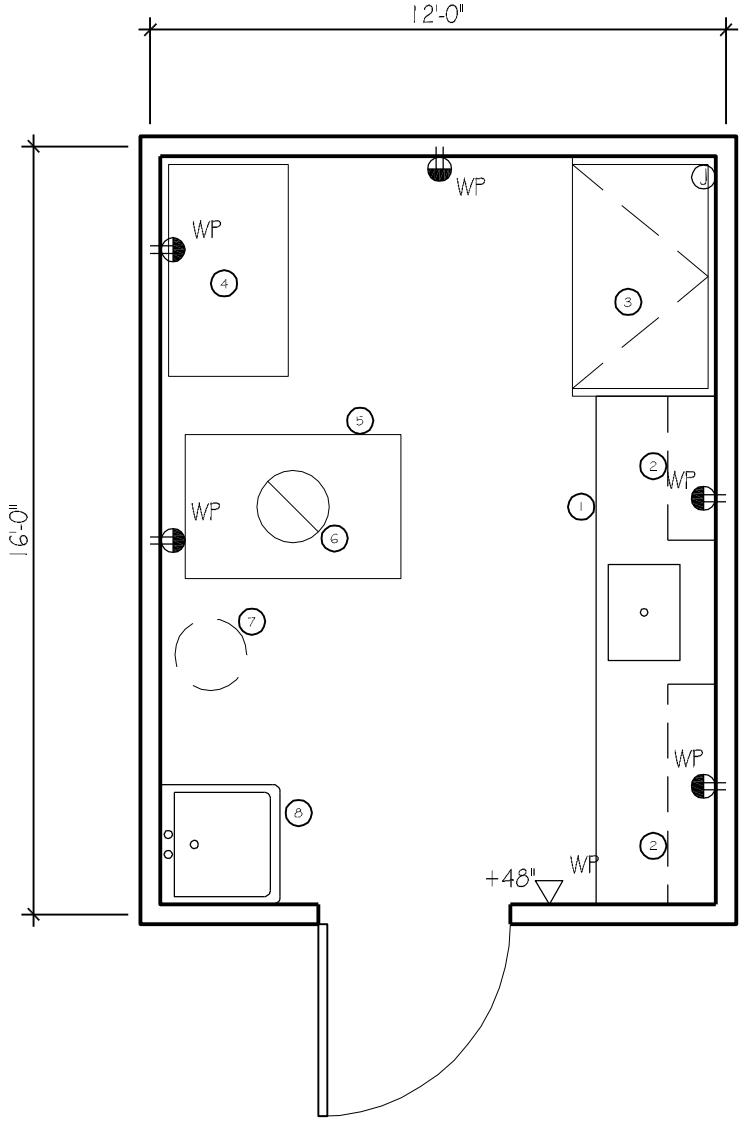
Notes

Emergency power. Gasketed light fixtures.
Exam Light. Lighting control for switches to be waterproof, in addition to all receptacles.

COMMUNICATIONS							
Telephone:	Y, wall	***Data:***	Y	***Security:***	Y		

Notes

SPECIAL REQUIREMENTS	
Provide Bumper Rails and Coved Base throughout facility. Provide Emergency Showers in hallways.	



Necropsy Room

0' 1' 5'

1. Fixed Bench w/ Sink
2. Wall Cabinet (36"Hx12"Dx36"W)
3. Chemical Fume Hood
4. Moveable Lab Table
5. "Downdraft" Bench
6. Surgery Light
7. N_2 Dewar
8. Mop Sink w/ Hangers Above

8.3.9 Quarantine Rooms

Animal Space **192 NSF**

Description

Quarantine Room to isolate sick animals as part of the Vivarium Program.

Adjacency/Support Areas

Adjacent to Holding Rooms, Loading Dock

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	NA	***Countertops:***	NA		
Door Width:	4'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Sound Attenuation to be N.C. 40 or less. Room designed for wash down with spray hose.
FRP doors with stainless steel frames, armor plate, and automatic door bottom. Provide red glass at door lite.

EQUIPMENT & FURNISHINGS							
Fume Hood:		***BSC:***	6', Type IIA				
Desk:		***Table:***		***Files:***		***Casegoods:***	

Notes

Stainless steel wall mounted sink , cage racks, and BSC.
Hangers for mops and brooms over mop sink.

MECHANICAL							
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	30%-70%	***Air Changes:***	12-15 AC/Hr		
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A		
Filtration (%):	90%	***Pressurization:***	Negative				

Notes:

Environmental monitoring controls (temperature, humidity, lighting and air change rate).
HEPA filtration for exhaust.

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	N	***Chilled Water:***	N
Fixtures:	Wall Sink						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Provide hose bib for spray hose, wall-mounted sink, and mop sink.

ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***	10W/SF		
Lighting Levels:	30fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct		

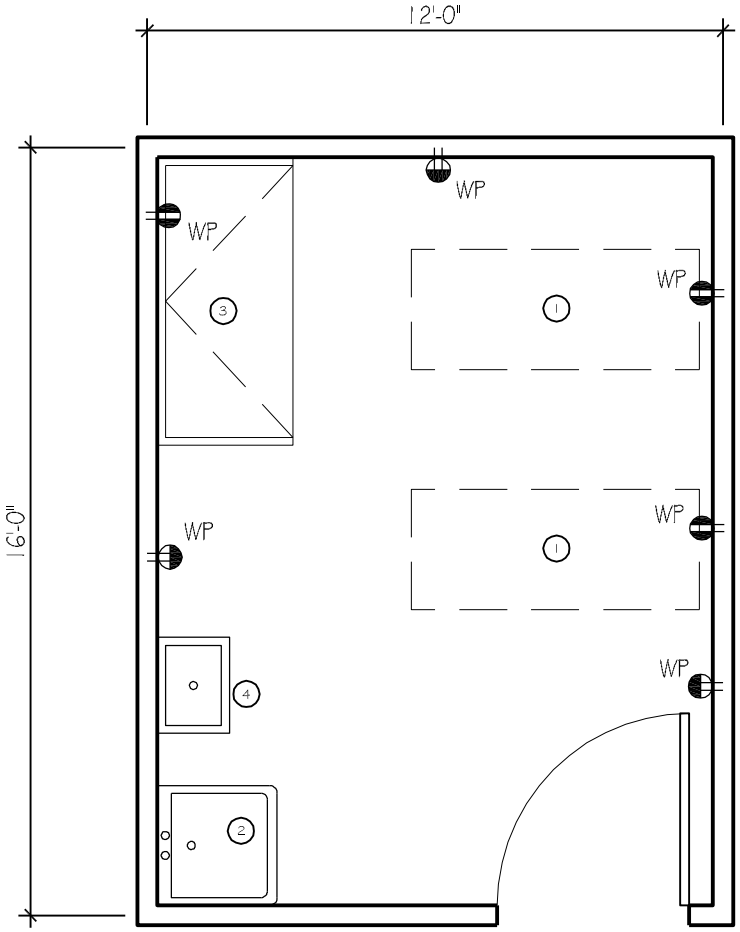
Notes

Emergency power. Gasketed light fixtures.
Lighting control for switches to be waterproof, in addition to all receptacles.

COMMUNICATIONS							
Telephone:	N	***Data:***	N	***Security:***	Y		

Notes

SPECIAL REQUIREMENTS	
Provide Bumper Rails and Coved Base throughout facility. Provide Emergency Showers in hallways.	



Quarantine Room

1. Cage Rack
2. Mop Sink w/ Hangers Above
3. 6' Bio-Safety Cabinet, Type IIA
4. S.S. Wall Mounted Sink

8.3.10	Experimental Rooms	Animal Space	504	NSF

Description

Experiment Rooms for observing self-injecting mice/rats.

Adjacency/Support Areas

Adjacent to Procedure Rooms

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	9'	***Casework Finish:***	SS	***Countertops:***	Epoxy		
Door Width:	4'	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Sound Attenuation to be N.C. 40 or less. Room designed for wash down with spray hose.
FRP doors with stainless steel frames, armor plate, and automatic door bottom. Provide red glass at door lite.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casegoods:***

Notes

Ventilated Cage Racks allow for 60 cages
Hangers for mops and brooms over mop sink.

MECHANICAL						
Temperature (F):	72-86dF +/- 2	***Rel. Humidity:***	30%-70%	***Air Changes:***	12-15 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Negative			

Notes:

Environmental monitoring controls (temperature, humidity, lighting and air change rate).

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	N	***Waste Treatment:***	N				
Steam:	N	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Provide hose bib for spray hose, sink, and mop sink.

ELECTRICAL							
Voltage/Phase:	110v20			***Est.Load:***	10W/SF		
Lighting Levels:	30fc at 3'AFF	***Type:***	Gasketed	***Fixtures:***	Direct		

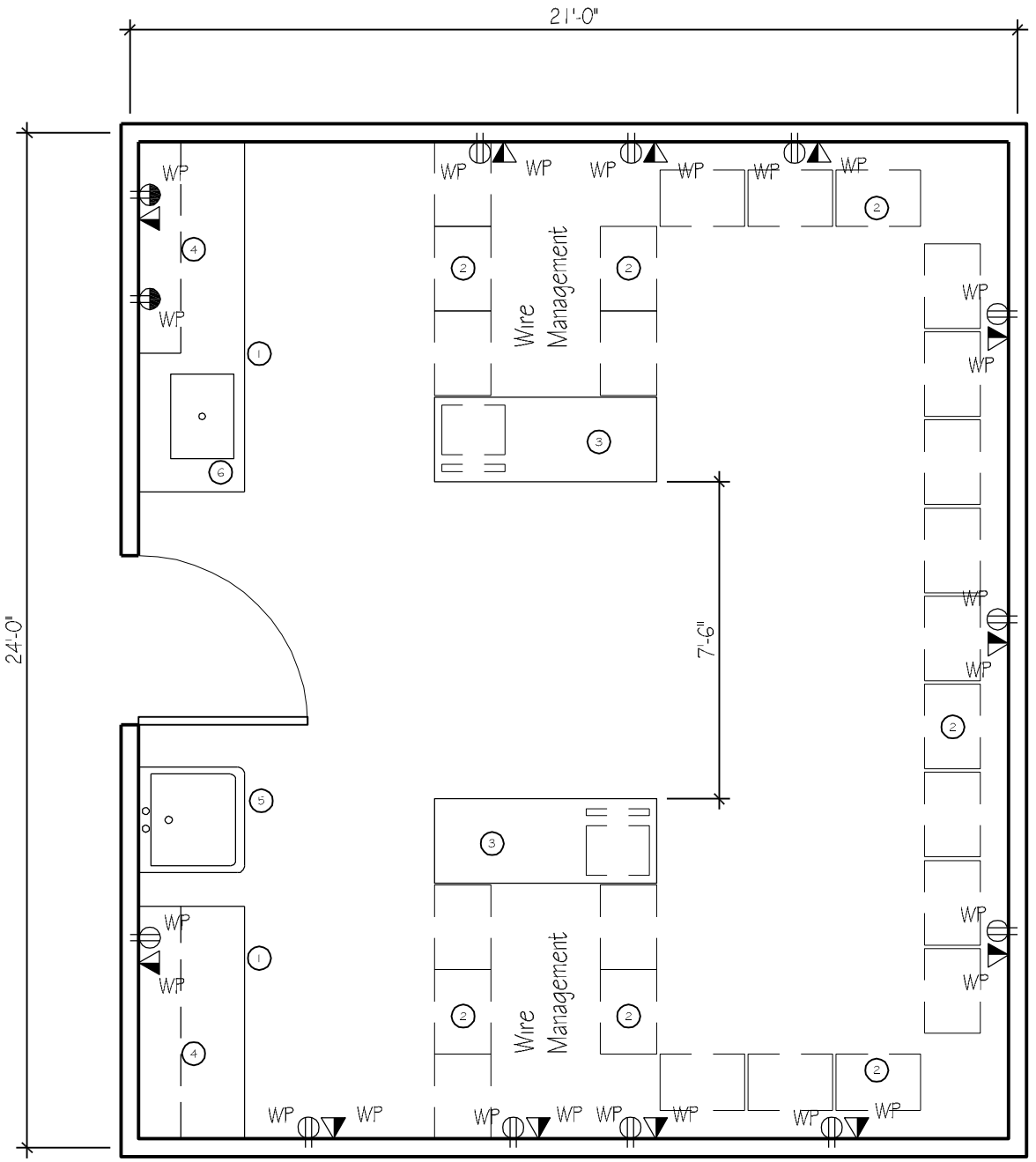
Notes

Emergency power. Gasketed light fixtures. Lighting control for corridor at door.
Lighting control for switches to be waterproof, in addition to all receptacles.

COMMUNICATIONS							
Telephone:	N	***Data:***	N	***Security:***	Y		

Notes

SPECIAL REQUIREMENTS	
Provide Bumper Rails and Coved Base throughout facility. Provide Emergency Showers in hallways.	



Experimental Room

0' 1' 5'

1. Fixed Bench
2. Cage Racks (3 High)
3. Computer Station
4. Upper Cabinets
5. Mop Sink w/ Hangers Above
6. Sink

8.3.11 Clean Cage Wash

Animal Space **276 NSF**

Description

Clean Cage Wash for cages and other equipment as part of the Vivarium Program. Note that infrastructure is to be provided for this space for build-out in the future.

Adjacency/Support Areas

Access to Holding Rooms, Equipment Area, Dirty Cage Wash and Food and Bedding Storage Room.

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	Epoxy Paint	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	10'	***Casework Finish:***	NA	***Countertops:***	NA		
Door Width:	3' pair	***Vision panel:***	Yes	***Seals:***	Yes	***Threshold:***	Yes

Sound attenuation: N.C. 50 or less. Room to be designed for wash down with spray hose.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Water Bottle Station, Pass-through Autoclave.
Space for Supply Carts and Cage Racks

MECHANICAL						
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12-15 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Positive			

Notes:

Provide canopy hood outside of the equipment area to collect steam from washers.

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:							
Floor Drain:	Y	***Waste Treatment:***	N				
Steam:	Y	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	N				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Provide for trench drain close to washers and autoclave, wall-mounted hose reel.

ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase/480V60amp 3 phase			***Est.Load:***			
Lighting Levels:	80fc at 3'AFF	***Type:***	gasketed	***Fixtures:***	Direct		

Notes

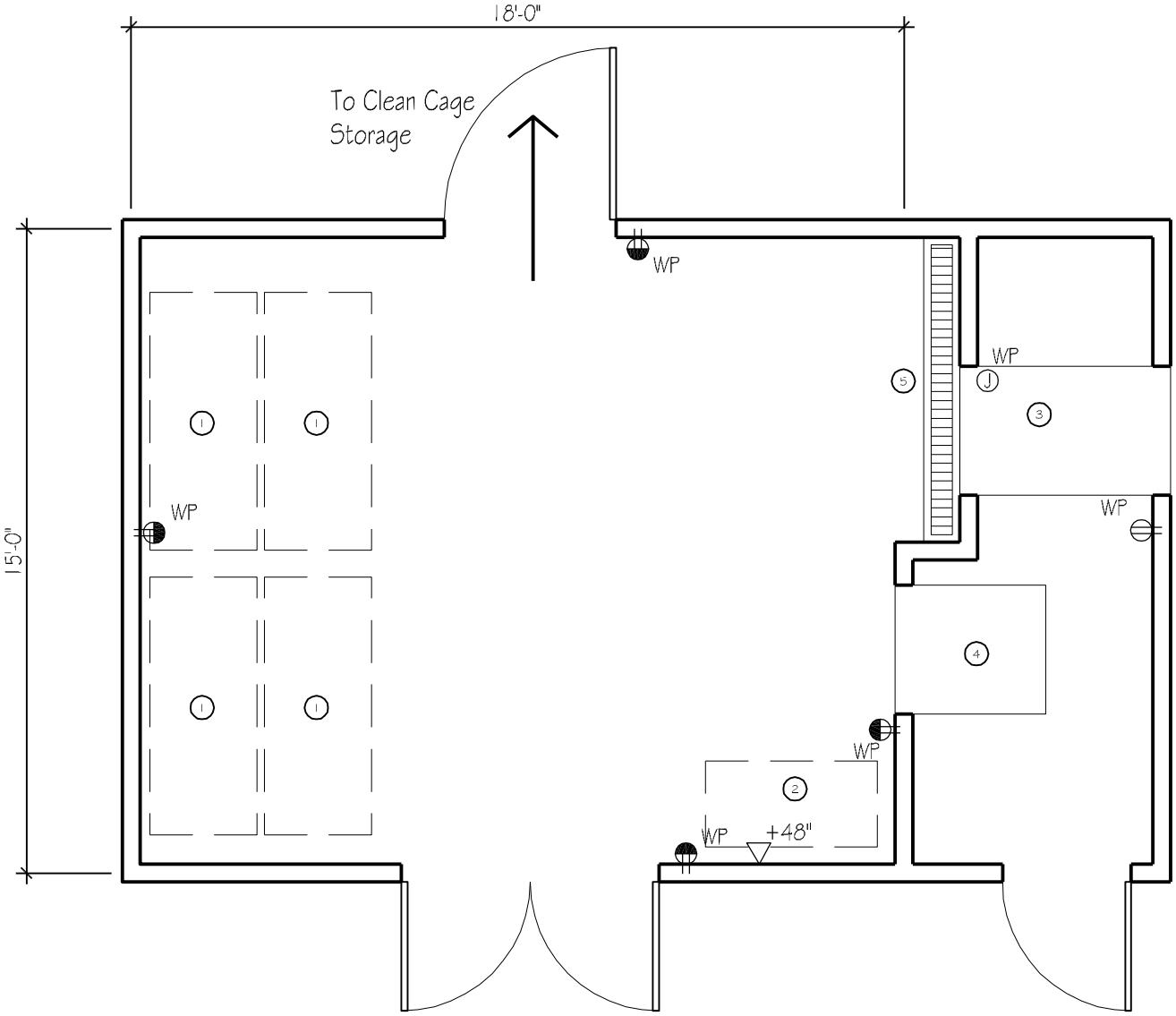
Emergency power. Gasketed light fixtures.
Lighting control for switches to be waterproof, in addition to all receptacles.

COMMUNICATIONS							
Telephone:	Y	***Data:***	N	***Security:***	Y		

Notes

Provide Watchdog panel for access control.

SPECIAL REQUIREMENTS			



Clean Cage Wash

0' 1' 5'

1. Rack Storage
2. Water Bottle Station
3. Cage Wash, Pass-Through
4. Autoclave
5. Trench Drain

8.3.12 Dirty Cage Wash

Animal Space **300 NSF**

Description

Dirty Cage Wash for cages and other equipment as part of the Vivarium Program. Note that infrastructure is to be provided for this space for build-out in the future.

Adjacency/Support Areas

Access to Holding Rooms, Equipment Area and Clean Cage Wash

ARCHITECTURAL							
Occupancy Type:	B	***Load Factor:***	1/100	***Occup. Load:***	1	***Exits:***	1
Live load:	125	***Vibration:***	3000 micro inches/sec or less				
Wall Finish:	Epoxy Paint	***Baseboard:***	Integral	***Floor Finish:***	epoxy	***Ceiling Finish:***	Epoxy Paint
Ceiling Height:	10'	***Casework Finish:***	SS	***Countertops:***	Stainless Steel		
Door Width:	3' pair	***Vision panel:***	Yes	***Seals:***	No	***Threshold:***	No

Sound attenuation: N.C. 50 or less. Room to be designed for wash down with spray hose.

EQUIPMENT & FURNISHINGS			
Fume Hood:	***BSC:***		
Desk:	***Table:***	***Files:***	***Casesgoods:***

Notes

Fixed stainless steel bench with two sinks, one of those a deep sink, cabinets with glass fronts, autoclave, cage rack washers. Space for supply carts and cage racks

MECHANICAL						
Temperature (F):	72dF +/- 2	***Rel. Humidity:***	Ambient	***Air Changes:***	12 AC/Hr	
Exhaust Air:	100%	***Return Air:***	0%	***Make-up:***	N/A	
Filtration (%):	90%	***Pressurization:***	Neg			

Notes:

Provide canopy hood outside of the equipment area to collect steam from washers.

PLUMBING							
Cold Water:	Y	***Hot Water:***	Y	***Pure Water:***	DeIonized	***Chilled Water:***	N
Fixtures:	Wristblades, goose neck with vacuum breaker at sinks for LHCW, Inert plastic for Deion Water						
Floor Drain:	Y	***Waste Treatment:***	N				
Steam:	Y	***Cooling Water:***	N	***Condensate:***	N		
Safety Shower:	N	***Eyewash:***	Y				
Gases:	N	***Compressed Air:***	N	***Vacuum:***	N		

Notes

Provide for trench drain close to washers and autoclave, wall-mounted hose reel.

ELECTRICAL							
Voltage/Phase:	120v20/208v30a single phase/480V60amp 3 phase			***Est.Load:***			
Lighting Levels:	80fc at 3'AFF	***Type:***	gasketed	***Fixtures:***	Direct		

Notes

Emergency power. Gasketed light fixtures.

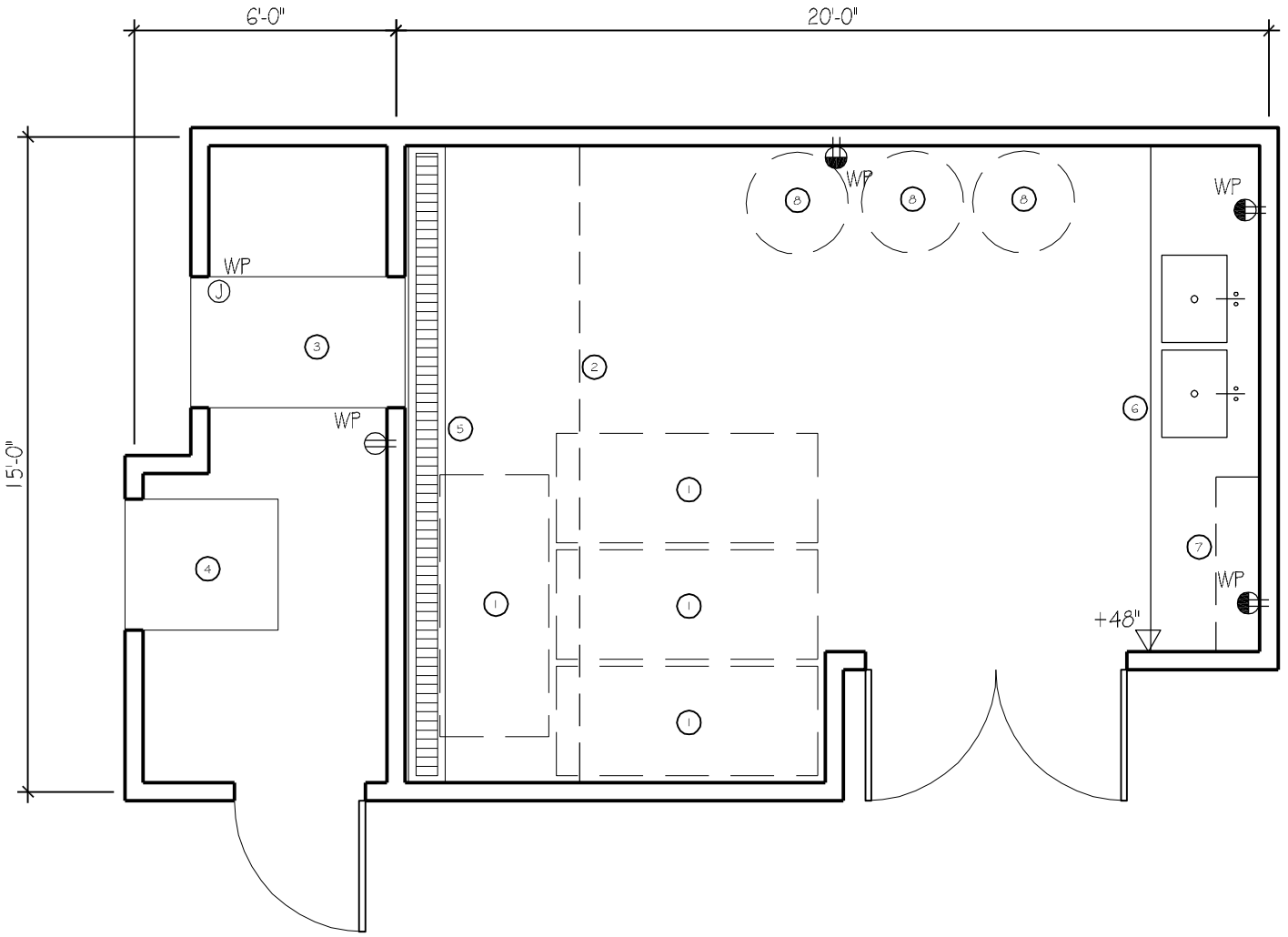
Lighting control for switches to be waterproof, in addition to all receptacles.

COMMUNICATIONS							
Telephone:	Y	***Data:***	N	***Security:***	Y		

Notes

Provide Watchdog panel for access control.

SPECIAL REQUIREMENTS			



Dirty Cage Wash

1. Rack Storage
2. Steam Dam / Canopy
3. Cage Wash, Pass-Through
4. Autoclave
5. Trench Drain
6. Fixed Bench w/ Sink
7. Upper Cabinets
8. Trash Containers

9.1 Site

University of Utah's President Michael K. Young recently signed the American College & University Presidents Climate Commitment, which commits the university to reduce its carbon footprint and integrate sustainable initiatives into its curriculum. This project will be one of the first University projects to follow this commitment. Consultants should consider sustainable materials and implementation in an effort to achieve Gold Level Leadership in Energy and Environmental Design (LEED) Certification through the United States Green Building Council (USGBC). Several considerations for a sustainable site design are listed below.

9.1.1 Stormwater

The University of Utah requires that any increase in storm water runoff from existing sites must be detained or retained and released at a controlled rate (see Section 4.6). This also aligns with sustainable design concepts and LEED requirements. Since the site impervious area will likely be decreased or only slightly increased, this goal can very likely be achieved.

Improving the quality of the stormwater released from the site is also a sustainable option. Through the use of best management practices such as sand/oil separators, siltation basins and "Snouts" (or similar) improved storm water quality can easily be achieved.

9.1.2 Site Materials Selection

Consider the following sustainable site possibilities:

- Alternate forms of energy: solar, geo-thermal, etc.
- Re-use of existing parking lot pavement as base course under pavement or fill material
- Use of porous pavement materials
- Specify high albedo materials – lighter and textured materials diffuse reflected heat and reduce heat gain
- Utilize high fly-ash concrete
- Provide bicycle facilities
- Utilize local materials, where feasible
- Select materials with life cycle in mind

9.1.3 Landscape

A sustainable landscape will consider the following:

- Heat-island reduction
- Shading on south/west sides to reduce heat gain
- Incorporation of native and water-wise plant material
- Grouping plant materials with similar water requirements

9.1.4 Irrigation

The overall goal of the irrigation system is to reduce the overall amount of water, both used and wasted, to the extent possible. This can be accomplished through the following means:

- Efficient irrigation system design
- Irrigation system zoned for plant material type
- Use of Secondary
- Implement alternate irrigation means and/or methods to reduce the overall amount of water consumed (e.g. use disposed chiller water as water source)

9.2 Building Systems

Primary building systems have life cycle impacts on the environment and ramifications for facility sustainability, in order to create effective habitats for human activities. The sustainability of the facility restrains those that are negative in effect while optimizing those that create positive benefits. Structures require resources and contain 'embodied energy' in their production and transportation, as well as operational energy for thermal inertia. Mechanical and electrical systems stabilize and direct energy in various forms strategically to areas where light, fresh air and connection with outdoor environments are needed within a controlled temperature range. Plumbing systems create loops of culinary water and human byproducts into and from a building. A laboratory-research facility needs systems for specialized purposes, including specially conditioned water and gases for scientific experiments controlled to exacting standards. Building interior infrastructures are provided to accommodate human movement and needs. The provision of all of these systems within a framework of sustainability principles and measures requires rigorous discipline, to assure the attainment of consensus objectives, whether based on prescriptions under the DFCM HPBRS or the USGBC LEED certification program.

9.3 Utah DFCM 'High-Performance Building Rating System'

According to the Utah Governor's Energy Policy summary on Energy Efficiency, the High-Performance Building Rating System (HPBRS) is "... a program that promotes energy efficiency, water conservation, indoor environment improvements, and sustainability through market transformation in new construction and major renovations." Unlike LEED, the HPBRS is not 'certified' by independent, third-parties, but it is required for all State-funded projects receiving funds dedicated to this program. The HPBRS relative emphases on energy efficiency and water conservation are intended as region-specific adaptations of sustainable design and construction principles and procedures. HPBRS does not conflict with LEED, but rather, can be used to reinforce LEED intent and process. Alternatively, HPBRS may be used independently from LEED.

9.4 LEED Checklist

The US Green Building Council's 'LEED' certification system (Leadership in Energy and Environmental Design) was created in the late 1990s, and made available in the building marketplace in 2000 as a thoroughgoing instrument for assurance through certification of compliance with a system of environmental principles. 'LEED for New Construction and Major Renovations' (LEED-NC) was the only initial system, and remains the cornerstone of several proliferating alternative systems under the LEED program. These include multiple revisions of LEED-NC, with the LEED-NC 2.2 current version promising to be replaced by LEED-NC 2009 in the first quarter of 2009. Other variations on LEED apply basic principles to differing building project types. Many of these systems are intended to be complementary, while some are dedicated to limited categories of use: Core & Shell, Commercial Interiors, Schools, Retail, Homes, Healthcare and Neighborhood Development. LEED-EB: O&M (Existing Buildings: Operations & Maintenance), particularly, is intended to assist facility managers in the planning and

implementation of 'greening' ongoing activities in facilities, whether designed/constructed to other LEED standards, or not.

As stated by USGBC, "LEED is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality."

LEED can contribute best to facility sustainability when employed as a toolkit encompassing a major set of the concerns of sustainability, in conjunction with complementary disciplines that create a whole-facility approach for the life of the facility. Market-based and voluntary, rigorous and accountable, LEED is thereby credible in its claims of sustainability achievement. No one LEED certification system, however, addresses all aspects of sustainability. It follows that a sustainable design team can extend a facility vision beyond LEED-NC by actualizing awareness of the strengths and deficiencies of the LEED system being utilized as the preferred sustainability tool for a given project. LEED-NC focuses on the design and construction process and its impacts on a site, on the resources of that place, on the other places from which resources are imported, on climate and atmosphere, and on the health of humans who occupy and use the facility. LEED-NC does not, for example, attend deeply to connection with community, to building longevity, or to the operation and maintenance activities to assure long-term utility of the facility.

The L.S. Skaggs Pharmacy Research Building may be elevated to the highest degree of sustainability by a sequential application of the following:

- LEED-NC, certified to 'Gold' level for the initial design-construction process;
- LEED-EB: O&M for thorough guidance in preparing and implementing the catalog of management plans necessary for responsible building management, with or without USGBC certification; and
- ISO-14000 for ongoing environmental accounting according to baselines and measures created by the institution, itself, credible in the international forum of sustainability efforts.

LEED-NC

LEED-NC Version 2.2 Registered Project Checklist

L.S. SKAGGS PHARMACY RESEARCH INSTITUTE	NBBJ - EDA

UNIVERSITY OF UTAH, SALT LAKE CITY

Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points

Yes	?	No				
9	4	1	**Sustainable Sites**		14 Points Possible	Documentation Responsibility & Coordination
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required	General Contractor
1			Credit 1	**Site Selection**	1	Architect
1			Credit 2	**Development Density & Community Connectivity**	1	Architect
		1	Credit 3	**Brownfield Redevelopment**	1	N.A.
1			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1	Architect
1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1	Architect
	1		Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1	Architect
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1	Architect
1			Credit 5.1	**Site Development**, Protect or Restore Habitat	1	Landscape Architect
	1		Credit 5.2	**Site Development**, Maximize Open Space	1	Landscape Architect
1			Credit 6.1	**Stormwater Design**, Quantity Control	1	Civil Engineer
1			Credit 6.2	**Stormwater Design**, Quality Control	1	Civil Engineer
	1		Credit 7.1	**Heat Island Effect**, Non-Roof	1	Landscape Architect
1			Credit 7.2	**Heat Island Effect**, Roof	1	Architect
	1		Credit 8	**Light Pollution Reduction**	1	Lighting
9	4	1	subtotals			
3	1	1	**Water Efficiency**		5 Points	Documentation Responsibility & Coordination
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1	Landscape Architect
		1	Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1	
	1		Credit 2	**Innovative Wastewater Technologies**	1	Mechanical Engineer
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1	Mechanical Engineer
1			Credit 3.2	**Water Use Reduction**, 30% Reduction	1	Mechanical Engineer
3	1	1	subtotals			
8	3	6	**Energy & Atmosphere**		17 Points Possible	Documentation Responsibility & Coordination
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required	CxA, Team
Y			Prereq 2	**Minimum Energy Performance**	Required	Mechanical & Electrical Engineers, Team
Y			Prereq 3	**Fundamental Refrigerant Management**	Required	Mechanical Engineer
4	2	4	Credit 1	**Optimize Energy Performance** ***ESTIMATED***	1 to 10	Team, Mech. & Elect. Engineers
	1	2	Credit 2	**On-Site Renewable Energy**	1 to 3	
1			Credit 3	**Enhanced Commissioning**	1	Owner's CxA
1			Credit 4	**Enhanced Refrigerant Management**	1	Mechanical Engineer
1			Credit 5	**Measurement & Verification**	1	MEP Engineers
1			Credit 6	**Green Power**	1	Owner
8	3	6	subtotals			
Yes	?	No				
5	5	3	**Materials & Resources**		13 Points Possible	Documentation Responsibility & Coordination

Y			Prereq 1	**Storage & Collection of Recyclables**	Required	Architect
		1	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1	
		1	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1	
		1	Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1	
1			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1	
	1		Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1	
1			Credit 3.1	**Materials Reuse**, 5%	1	
	1		Credit 3.2	**Materials Reuse**,10%	1	
1			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1	
	1		Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1	
1			Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regionally	1	
1			Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regionally	1	
	1		Credit 6	**Rapidly Renewable Materials**	1	
	1		Credit 7	**Certified Wood**	1	
5	5	3	**subtotals**			
11	2	2	**Indoor Environmental Quality**		15 Points Possible	**Documentation Responsibility & Coordination**
Y			Prereq 1	**Minimum IAQ Performance**	Required	Team, Mech. Engineer
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required	Owner
1			Credit 1	**Outdoor Air Delivery Monitoring**	1	Mechanical Engineer
	1		Credit 2	**Increased Ventilation**	1	Mechanical Engineer
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1	General Contractor
1			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1	General Contractor
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1	Architect, General Contractor
1			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1	Architect, General Contractor
1			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1	Architect, General Contractor
1			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1	Architect, General Contractor
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1	Architect, Mechanical Engineer
1			Credit 6.1	**Controllability of Systems**, Lighting	1	Electrical Engineer
		1	Credit 6.2	**Controllability of Systems**, Thermal Comfort	1	N.A.
1			Credit 7.1	**Thermal Comfort**, Design	1	Mechanical Engineer
1			Credit 7.2	**Thermal Comfort**, Verification	1	Owner
	1		Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1	Architect
		1	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1	
11	2	2	**subtotals**			
5			**Innovation & Design Process**		5 Points Possible	**Documentation Responsibility & Coordination**
1			Credit 1.1	**Innovation in Design:** Building as Educational Tool	1	Team
1			Credit 1.2	**Innovation in Design:** (to be designated)	1	Team
1			Credit 1.3	**Innovation in Design:** (to be designated)	1	Team
1			Credit 1.4	**Innovation in Design:** (to be designated)	1	Team
1			Credit 2	**LEED® Accredited Professional**	1	Architect
5			**subtotals**			
Yes	?	No				
41	15	13	Project Totals (pre-certification estimates)		69 Points Possible	

Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points

10.1 Benchmarking

In an effort to clearly evaluate the existing project budget and understand the probable costs for the new Pharmacy Building, the estimating team gathered cost data on similar research lab facilities. Facilities in California, Texas, Colorado, and Rhode Island were evaluated along with facilities within the State of Utah and specifically at the University of Utah.

The data clearly shows, as assumed, that local Utah construction costs for lab facilities are considerably less then national averages. When evaluating lab facilities in Utah that have been bid recently, the results were more reflective of the current construction pricing. However, these projects were not necessarily pure research facilities reflective of the new L.S. Skaggs research building.

The team also evaluated existing research lab buildings at the University of Utah, specifically the Emma Eccles Jones research building. While this building was built in 2005 the actual construction cost was escalated to represent today's dollars. The costs were also adjusted to take into account design concepts for the L.S. Skaggs research Building that have been identified in this programming effort.

Based on this benchmarking analysis, the team agreed to adjust the cost per square foot for construction which had been previously represented in the Master Plan document. These costs are reflected in the detailed estimate.

RESEARCH / WET LABORATORY FACILITIES

Comparable Construction Costs **31-Oct-08**

Description	SF	Oct-08 $/GSF (Utah)
New Construction		
San Francisco Wet Lab	75,000	$674
San Francisco Wet Lab	230,000	$533
Berkley, CA Wet Lab	205,000	$581
Berkley, CA Research Lab	160,000	$555
Berkley, CA Research Lab	115,000	$485
San Francisco Research Lab	65,000	$536
AVERAGE		**$561 /gsf**
Remodel Construction		
Seattle Research Lab	25,830	$445
Seattle Research Lab	13,100	$611
Seattle Research Lab	12,300	$564
AVERAGE		**$540 /gsf**

10.2 Detailed Estimate

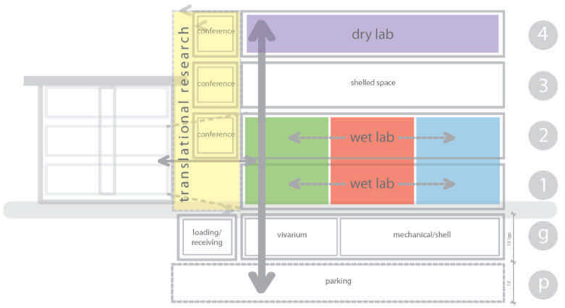
Two detailed cost estimates are included in this program document. The first cost estimate is based on a suggested project construction budget of $50,000,000. This dollar amount was established by the University of Utah Campus Design and Construction as the minimal budget for fundraising efforts. This budget amount was reduced from the $53,000,000 construction estimate established in the master plan addendum in July of 2007.

The first cost estimate reflects a five story research facility with atrium and shelled space as identified in the building stacking diagrams; Option 1.

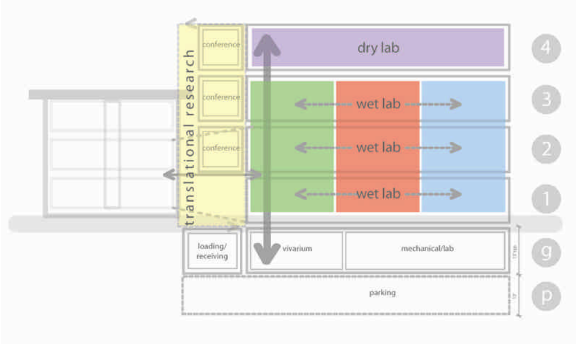
The second cost estimate reflects a five story research facility with atrium and a full build out of all floors as identified in the building stacking diagrams; Option 2.

Both cost estimates break out the anticipated construction costs for the atrium, the laboratory building and the below grade parking level.

ESCALATION – *currently the estimate does not reflect an escalation factor. DFCM is evaluating the appropriate escalation for this project and it will be applied prior to the release of the program document.



Stacking Diagram: Partial Buildout



Stacking Diagram: Full Buildout

Partial Buildout

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BLDG **PARTIAL BUILDOUT PROJECT TOTALS**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	ATRIUM	LAB BLDG	TOTAL
A	**SUBSTRUCTURES**	**$ 176,178**	**$ 971,185**	**$ 1,147,363**
B	**SHELL**	**$ 1,700,859**	**$ 9,103,644**	**$ 10,804,503**
C	**INTERIORS**	**$ 1,518,015**	**$ 5,457,883**	**$ 6,975,898**
D	**SERVICES**	**$ 1,053,000**	**$ 16,397,336**	**$ 17,450,336**
E	**EQUIPMENT & FURNISHINGS**	**$ 167,116**	**$ 763,755**	**$ 930,871**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**	**$ 993,625**	**$ -**	**$ 993,625**
G	**SITEWORK**	**$ 183,900**	**$ 1,403,000**	**$ 1,586,900**
	SUBTOTAL	**$ 5,792,692**	**$ 34,096,803**	**39,889,495**
	GENERAL CONDITIONS	**$ 347,562**	**$ 2,045,808**	**$ 2,393,370**
	OVERHEAD & PROFIT	**$ 289,635**	**$ 1,704,840**	**$ 1,994,475**
	DESIGN CONTINGENCY	**$ 868,904**	**$ 4,807,649**	**$ 5,676,553**
	TOTAL ESTIMATED COST	**$ 7,298,792**	**$ 42,655,101**	**$ 49,953,893**
	PARKING STRUCTURE COST			**$ 3,642,477**

COSTS OF EXISTING PHARMACY BUILDING IMPROVEMENTS ARE INCLUDED

****ESCALATION OF CONSTRUCTION COSTS HAVE NOT BEEN INCLUDED IN THIS ESTIMATE****

*****PROJECT SOFT COSTS ARE NOT INCLUDED IN THIS ESTIMATE. PROJECT OWNER IS CARRYING THESE COSTS IN SEPARATE BUDGET*****

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**		**$ 17.62**	**$ 176,178**
B	**SHELL**		**$ 170.09**	**$ 1,700,859**
C	**INTERIORS**		**$ 151.80**	**$ 1,518,015**
D	**SERVICES**		**$ 105.30**	**$ 1,053,000**
E	**EQUIPMENT & FURNISHINGS**		**$ 16.71**	**$ 167,116**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**		**$ 99.36**	**$ 993,625**
G	**SITEWORK**		**$ 18.39**	**$ 183,900**
	SUBTOTAL		**$ 579.27**	**5,792,692**
	GENERAL CONDITIONS	**6%**	**$ 34.76**	**$ 347,562**
	OVERHEAD & PROFIT	**5%**	**$ 28.96**	**289,635**
	DESIGN CONTINGENCY	**15%**	**$ 86.89**	**868,904**
	TOTAL ESTIMATED COST		**$ 729.88**	**$ 7,298,792**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**			
	Continuous Footings	16 CY	$ 325.00	$ 5,305
	Spot Footings	30 CY	$ 345.00	$ 10,350
	Below Grade Foundation Wall	1,440 SF	$ 22.36	$ 32,204
	Slab on Grade	6,500 SF	$ 3.75	$ 24,375
	Foundation Damproofing	1,296 LF	$ 1.65	$ 2,138
	Building Area Site Clearing	6,500 SF	$ 0.39	$ 2,535
	Shoring	720 SF	$ 59.00	$ 42,480
	Building Excavation	3,184 CY	$ 6.00	$ 19,103
	Backfill & Compaction w/ imported fills	796 CY	$ 20.65	$ 16,437
	Remove Spoil	3,184 CY	$ 5.00	$ 15,919
	Building Grading	6,500 SF	$ 0.39	$ 2,535
	Gravel Under Slab	127 TN	$ 22.00	$ 2,796
	TOTAL SUBSTRUCTURES			**$ 176,178**
B	**SHELL**			
B10	**Superstructure**			
	Roof Structure CIP Concrete	6,500 SF	$ 21.75	$ 141,375
	Concrete Shearwalls	5,000 SF	$ 29.65	$ 148,250
	CIP Suspended Slab	3,500 SF	$ 24.65	$ 86,275
	CIP Concrete Columns	114 CY	$ 580.00	$ 66,163
B20	**Exterior Enclosure**			
	Exterior Wall Framing	5,400 SF	$ 5.00	$ 27,000
	Rigid Roof Insulation	6,500 SF	$ 2.55	$ 16,575
	Roofing	6,500 SF	$ 2.75	$ 17,875
	Skylight	3,000 SF	$ 155.00	$ 465,000

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Exterior Wall Sheathing w/ vapor barrier	5,400 SF	$ 1.99	$ 10,746
	Exterior Wall Finish-	1,350 SF	$ 55.00	$ 74,250
	Building Fireproofing	10,000 SF	$ 1.65	$ 16,500
	Curtainwall	4,050 SF	$ 130.00	$ 526,500
	Fire Stopping/ Caulking	10,000 SF	$ 0.95	$ 9,500
	Exterior Doors	4 EA	$ 10,000.00	$ 40,000
	Roof Expansion Joint	130 LF	$ 80.00	$ 10,400
	Floor Expansion Joint	260 LF	$ 95.00	$ 24,700
	Metal Flashings	1,500 SF	$ 6.50	$ 9,750
	Caulking & Sealants	1 LS	$ 10,000.00	$ 10,000
	TOTAL SHELL			**$ 1,700,859**
C	**<u>INTERIORS</u>**			
	Stud Frame Partitions	10,000 SF	$ 6.00	$ 60,000
	Interior Doors	10,000 SF	$ 2.65	$ 26,500
	Fire Curtains	10,000 SF	$ 5.00	$ 50,000
	Interior Glazing	1,000 SF	$ 65.00	$ 65,000
	Identifying Devices	1 LS	$ 10,000.00	$ 10,000
	Millwork	10,000 SF	$ 14.00	$ 140,000
	Mirrors	100 SF	$ 11.65	$ 1,165
	Restroom Flooring	640 SF	$ 20.00	$ 12,800
	Wall tile	1,709 SF	$ 19.50	$ 33,322
	Stairs	960 SF	$ 200.00	$ 192,000
	Free Standing Railing	1,080 LF	$ 300.00	$ 324,000
	Carpet	2,892 SF	$ 4.00	$ 11,568
	Commons area flooring	7,108 SF	$ 20.00	$ 142,160

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	wall base	10,000 SF	$ 0.95	$ 9,500
	Ceiling	10,000 SF	$ 20.00	$ 200,000
	Wall Coverings	10,000 SF	$ 22.00	$ 220,000
	Specialties	10,000 SF	$ 2.00	$ 20,000
	TOTAL FINISHES			**$ 1,518,015**
D	**SERVICES**			
	Plumbing	10,000 SF	$ 5.00	$ 50,000
	HVAC	10,000 SF	$ 35.00	$ 350,000
	Smoke Evac System	1 LS	$ 250,000.00	$ 250,000
	Fire Protection	10,000 SF	$ 4.00	$ 40,000
	Electrical Service & Distribution	10,000 SF	$ 6.00	$ 60,000
	Electrical- Power	10,000 SF	$ 3.00	$ 30,000
	Electrical Lighting	10,000 SF	$ 20.00	$ 200,000
	Special Systems	10,000 SF	$ 3.00	$ 30,000
	Fire Alarm	10,000 SF	$ 1.65	$ 16,500
	Telecommunication	10,000 SF	$ 2.65	$ 26,500
	TOTAL SERVICES			**$ 1,053,000**
E	**EQUIPMENT & FURNISHINGS**			
	Entrance Mats	240 SF	$ 29.65	$ 7,116
	Passenger Elevator 3500 #-5 stop	1 EA	$ 160,000.00	$ 160,000
	TOTAL EQUIPMENT & FURNISHINGS			**$ 167,116**
F	**SPECIAL CONSTRUCTION & DEMOLITION**			
	Modifications at existing Building	3,900 LF	$ 150.00	$ 585,000
	Install Fire Sprinkler at existing building	54,400 SF	$ 6.00	$ 326,400
	Demolish Existing Building Façade	6,500 SF	$ 12.65	$ 82,225

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	TOTAL SPECIAL CONSTRUCTION & DEMOLTION			**$ 993,625**
G	**SITEWORK**			
	Site Grading	10,000 SF	$ 0.39	$ 3,900
	Site Improvements	10,000 SF	$ 12.00	$ 120,000
	Site Utilities	1 LS	$ 25,000.00	$ 25,000
	Site Lighting	1 LS	$ 25,000.00	$ 25,000
	Site Specialties	1 LS	$ 10,000.00	$ 10,000
	TOTAL SITEWORK			**$ 183,900**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY PARTIAL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**		**$ 6.94**	**$ 971,185**
B	**SHELL**		**$ 65.03**	**$ 9,103,644**
C	**INTERIORS**		**$ 38.98**	**$ 5,457,883**
D	**SERVICES**		**$ 117.12**	**$ 16,397,336**
E	**EQUIPMENT & FURNISHINGS**		**$ 5.46**	**$ 763,755**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**		**$ -**	**$ -**
G	**SITEWORK**		**$ 10.02**	**$ 1,403,000**
	SUBTOTAL		**$ 243.55**	**34,096,803**
	GENERAL CONDITIONS	**6%**	**$ 14.61**	**$ 2,045,808**
	OVERHEAD & PROFIT	**5%**	**$ 12.18**	**1,704,840**
	DESIGN CONTINGENCY	**14%**	**$ 34.34**	**4,807,649**
	TOTAL ESTIMATED COST		**$ 304.68**	**$ 42,655,101**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY PARTIAL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**			
	Continuous Footings	229 CY	$ 325.00	$ 74,265
	Spot Footings	157 CY	$ 345.00	$ 54,294
	Below Grade Foundation Wall	11,200 SF	$ 22.68	$ 254,016
	Slab on Grade	35,100 SF	$ 3.75	$ 131,625
	Foundation Damproofing	10,080 LF	$ 1.65	$ 16,632
	Building Area Site Clearing	35,100 SF	$ 0.39	$ 13,689
	Shoring	6,000 SF	$ 20.00	$ 120,000
	Building Excavation	17,193 CY	$ 6.00	$ 103,155
	Backfill & Compaction w/ Imported fills	4,298 CY	$ 20.65	$ 88,757
	Remove Excess	17,193 CY	$ 5.00	$ 85,963
	Building Grading	35,100 SF	$ 0.39	$ 13,689
	Gravel Under Slab	686 TN	$ 22.00	$ 15,101
	TOTAL SUBSTRUCTURES			**$ 971,185**
B	**SHELL**			
B10	**Superstructure**			
	Roof Structure CIP Concrete	35,100 SF	$ 21.65	$ 759,915
	Penthouse Structure	22,000 SF	$ 79.00	$ 1,738,000
	Concrete Shearwalls	25,410 SF	$ 29.65	$ 753,407
	CIP Suspended Slab	104,900 SF	$ 21.65	$ 2,271,085
	CIP Concrete Columns 33' Span	628 CY	$ 580.00	$ 364,426
B20	**Exterior Enclosure**			
	Exterior Wall Framing	65,928 SF	$ 4.40	$ 290,083
	Rigid Roof Insulation	35,100 SF	$ 2.55	$ 89,505
	Roofing	35,100 SF	$ 2.75	$ 96,525

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY PARTIAL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Exterior Wall Sheathing w/ vapor barrier	65,928 SF	$ 1.99	$ 131,197
	Exterior Wall Finish- Masonry	19,778 SF	$ 20.00	$ 395,568
	Exterior Wall Finish- Metal Panel	6,593 SF	$ 55.00	$ 362,604
	Exterior Wall Finish- Concrete	6,593 SF	$ 35.00	$ 230,748
	Building Fireproofing	140,000 SF	$ 1.65	$ 231,000
	Exterior Glazing	32,964 SF	$ 38.00	$ 1,252,632
	Fire Stopping/ Caulking	140,000 SF	$ 0.25	$ 35,000
	Exterior Doors	8 EA	$ 3,650.00	$ 29,200
	Metal Flashings	3,500 SF	$ 6.50	$ 22,750
	Caulking & Sealants	1 LS	$ 50,000.00	$ 50,000
	TOTAL SHELL			**$ 9,103,644**
C	**INTERIORS**			
	Stud Frame Partitions	140,000 SF	$ 3.55	$ 497,000
	Interior Doors	140,000 SF	$ 2.65	$ 371,000
	Interior Glazing	2,200 SF	$ 34.50	$ 75,900
	Identifying Devices	1 LS	$ 50,000.00	$ 50,000
	Lab Base Cabinet with epoxy Top	1,224 LF	$ 365.00	$ 446,760
	Lab island with epoxy top	520 LF	$ 595.00	$ 309,400
	Plam Base Cabinet	813 LF	$ 225.00	$ 182,925
	Bio Safety Cabinet 6'	15 EA	$ 10,950.00	$ 164,250
	Bio Safety Cabinet 4'	12 EA	$ 9,200.00	$ 110,400
	Wall Hung Cabinets w/ Glass	155 LF	$ 225.00	$ 34,875
	Wall Hung Cabinets	135 LF	$ 165.00	$ 22,275
	Base Cabinet w/ Stainless Steel top	12 LF	$ 265.00	$ 3,180
	Adjustable Shelving	236 LF	$ 59.00	$ 13,924

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY PARTIAL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Office Shelving	874 LF	$ 95.00	$ 83,030
	Call Center Bookshelves	50 LF	$ 125.00	$ 6,250
	Other Millwork	140,000 SF	$ 5.25	$ 735,000
	Mirrors	1,640 SF	$ 11.65	$ 19,106
	Stairs	2,000 SF	$ 79.00	$ 158,000
	Free Standing Railing	720 LF	$ 300.00	$ 216,000
	Sealed Concrete	66,882 SF	$ 0.39	$ 26,084
	Carpet	21,931 SF	$ 3.33	$ 73,103
	Resilient flooring	15,474 SF	$ 4.00	$ 61,896
	Epoxy Flooring	5,394 SF	$ 5.50	$ 29,667
	Ceramic Tile	504 SF	$ 10.65	$ 5,368
	Commons Area Flooring	29,245 SF	$ 15.00	$ 438,675
	Base	140,000 SF	$ 1.65	$ 231,000
	Ceiling	140,000 SF	$ 2.75	$ 385,000
	Wall Coverings	140,000 SF	$ 4.05	$ 567,000
	Lockers	10 EA	$ 368.00	$ 3,680
	Locker Bench	8 LF	$ 65.00	$ 520
	Markerboard	1,014 SF	$ 14.65	$ 14,855
	Tackable Wall Surface	400 SF	$ 4.65	$ 1,860
	Projection Screen	12 EA	$ 950.00	$ 11,400
	Projector Mounts	10 EA	$ 350.00	$ 3,500
	Specialties	140,000 SF	$ 0.75	$ 105,000
	TOTAL FINISHES			**$ 5,457,883**
D	**SERVICES**			
	Plumbing	140,000 SF	$ 11.65	$ 1,631,000

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY PARTIAL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Lab Gases	140,000 SF	$ 2.15	$ 301,000
	HVAC Finished Area	73,118 SF	$ 80.00	$ 5,849,440
	Vivarium Watchdog System	1 LS	$ 65,000.00	$ 65,000
	HVAC Shelled Area	66,882 SF	$ 28.00	$ 1,872,696
	Fume Hoods- 5'	5 EA	$ 11,000.00	$ 55,000
	Fune Hoods- 8'	28 EA	$ 14,800.00	$ 414,400
	Fume Hoods- 4'	1 EA	$ 8,800.00	$ 8,800
	Canopy Hood	15 LF	$ 2,200.00	$ 33,000
	Fire Protection	140,000 SF	$ 4.00	$ 560,000
	Electrical Service & Distribution	140,000 SF	$ 9.35	$ 1,309,000
	Electrical- Power	140,000 SF	$ 6.75	$ 945,000
	Electrical Lighting	140,000 SF	$ 12.00	$ 1,680,000
	Special Systems	140,000 SF	$ 6.65	$ 931,000
	Fire Alarm	140,000 SF	$ 1.65	$ 231,000
	Telecommunication	140,000 SF	$ 3.65	$ 511,000
	TOTAL SERVICES			**$ 16,397,336**
E	**EQUIPMENT & FURNISHINGS**			
	Mechoshades	28,019 SF	$ 9.65	$ 270,387
	Cold Rooms	570 SF	$ 166.00	$ 94,620
	Autoclaves	3 EA	$ 25,000.00	$ 75,000
	Glass Washer	3 EA	$ 6,600.00	$ 19,800
	Drying Oven	1 EA	$ 2,500.00	$ 2,500
	Equipment	140,000 SF	$ 1.05	$ 147,000
	Entrance Mats	150 SF	$ 29.65	$ 4,448
	Passenger Elevator-5 stop	1 EA	$ 150,000.00	$ 150,000

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY PARTIAL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	TOTAL EQUIPMENT & FURNISHINGS			**$ 763,755**
F	**SPECIAL CONSTRUCTION & DEMOLITION**			
	TOTAL SPECIAL CONSTRUCTION & DEMOLTION			**$ -**
G	**SITEWORK**			
	Site Grading	100,000 SF	$ 0.59	$ 59,000
	Site Improvements	64,900 SF	$ 10.00	$ 649,000
	Site Utilities	1 LS	$ 250,000.00	$ 250,000
	Campus Electrical Feed	1 LS	$ 275,000.00	$ 275,000
	Site Lighting	1 LS	$ 120,000.00	$ 120,000
	Site Specialties	1 LS	$ 50,000.00	$ 50,000
	TOTAL SITEWORK			**$ 1,403,000**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**		**$ 25.74**	**$ 836,422**
B	**SHELL**		**$ 28.15**	**$ 914,908**
C	**INTERIORS**		**$ 2.82**	**$ 91,775**
D	**SERVICES**		**$ 20.40**	**$ 663,000**
E	**EQUIPMENT & FURNISHINGS**		**$ 2.15**	**$ 70,000**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**		**$ -**	**$ -**
G	**SITEWORK**		**$ 9.68**	**$ 314,750**
	SUBTOTAL		**$ 88.95**	**2,890,855**
	GENERAL CONDITIONS	**6%**	**$ 5.34**	**$ 173,451**
	OVERHEAD & PROFIT	**5%**	**$ 4.45**	**144,543**
	DESIGN CONTINGENCY	**15%**	**$ 13.34**	**433,628**
	TOTAL ESTIMATED COST		**$ 112.08**	**$ 3,642,477**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**			
	Continuous Footings	80 CY	$ 325.00	$ 26,122
	Spot Footings	80 CY	$ 345.00	$ 27,729
	Below Grade Foundation Wall	9,120 SF	$ 22.68	$ 206,842
	Slab on Grade	32,500 SF	$ 4.25	$ 138,125
	Foundation Damproofing	9,120 LF	$ 1.65	$ 15,048
	Building Area Site Clearing	32,500 SF	$ 0.39	$ 12,675
	Shoring	3,500 SF	$ 20.00	$ 70,000
	Building Excavation	19,380 CY	$ 6.00	$ 116,278
	Backfill & Compaction w/ Imported fills	4,845 CY	$ 20.65	$ 100,048
	Remove Excess	19,380 CY	$ 5.00	$ 96,898
	Building Grading	32,500 SF	$ 0.39	$ 12,675
	Gravel Under Slab	636 TN	$ 22.00	$ 13,982
	TOTAL SUBSTRUCTURES			**$ 836,422**
B	**SHELL**			
B10	**Superstructure**			
	Concrete Shearwalls	2,592 SF	$ 29.65	$ 76,853
	CIP Suspended Slab	32,500 SF	$ 21.65	$ 703,625
	CIP Concrete Columns 33' Span	96 CY	$ 580.00	$ 55,680
B20	**Exterior Enclosure**			
	Building Fireproofing	32,500 SF	$ 1.65	$ 53,625
	Fire Stopping/ Caulking	32,500 SF	$ 0.25	$ 8,125
	Exterior Doors	8 EA	$ 1,500.00	$ 12,000
	Caulking & Sealants	1 LS	$ 5,000.00	$ 5,000
	TOTAL SHELL			**$ 914,908**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
C	**INTERIORS**			
	Interior Doors	4 EA	$ 1,050.00	$ 4,200
	Identifying Devices	1 LS	$ 5,000.00	$ 5,000
	Stairs	400 SF	$ 79.00	$ 31,600
	Free Standing Railing	296 LF	$ 125.00	$ 37,000
	Sealed Concrete	32,500 SF	$ 0.39	$ 12,675
	Parking Striping	32,500 SF	$ 0.04	$ 1,300
	TOTAL FINISHES			**$ 91,775**
D	**SERVICES**			
	Plumbing	32,500 SF	$ 1.95	$ 63,375
	Parking Ventilation	32,500 SF	$ 3.25	$ 105,625
	Fire Protection	32,500 SF	$ 3.35	$ 108,875
	Electrical Service & Distribution	32,500 SF	$ 2.65	$ 86,125
	Electrical- Power	32,500 SF	$ 1.95	$ 63,375
	Electrical Lighting	32,500 SF	$ 3.00	$ 97,500
	Special Systems	32,500 SF	$ 1.65	$ 53,625
	Fire Alarm	32,500 SF	$ 1.65	$ 53,625
	Telecommunication	32,500 SF	$ 0.95	$ 30,875
	TOTAL SERVICES			**$ 663,000**
E	**EQUIPMENT & FURNISHINGS**			
	Parking Equipment	1 LS	$ 50,000.00	$ 50,000
	Passenger Elevator- Additional Stop	2 EA	$ 10,000.00	$ 20,000
	TOTAL EQUIPMENT & FURNISHINGS			**$ 70,000**
F	**SPECIAL CONSTRUCTION & DEMOLITION**			
	TOTAL SPECIAL CONSTRUCTION & DEMOLTION			**$ -**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
G	**SITEWORK**			
	Site Grading	25,000 SF	$ 0.59	$ 14,750
	Site Improvements	25,000 SF	$ 12.00	$ 300,000
	Site Utilities- Inc. In lab building			
	Site Lighting- Inc. In Lab Building			
	Site Specialties- Inc. in Lab Building			
	TOTAL SITEWORK			**$ 314,750**

Full Buildout

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **FULL BUILDOUT PROJECT TOTALS**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	ATRIUM	LAB FULL BUILDOUT	TOTAL
A	**SUBSTRUCTURES**	**$ 176,178**	**$ 971,185**	**$ 1,147,363**
B	**SHELL**	**$ 1,700,859**	**$ 9,128,644**	**$ 10,829,503**
C	**INTERIORS**	**$ 1,518,015**	**$ 10,879,482**	**$ 12,397,497**
D	**SERVICES**	**$ 1,053,000**	**$ 25,375,098**	**$ 26,428,098**
E	**EQUIPMENT & FURNISHINGS**	**$ 167,116**	**$ 984,375**	**$ 1,151,491**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**	**$ 993,625**	**$ -**	**$ 993,625**
G	**SITEWORK**	**$ 183,900**	**$ 1,403,000**	**$ 1,586,900**
	SUBTOTAL	**$ 5,792,692**	**$ 48,741,784**	**54,534,477**
	GENERAL CONDITIONS	**$ 347,562**	**$ 2,924,507**	**$ 3,272,069**
	OVERHEAD & PROFIT	**$ 289,635**	**$ 2,437,089**	**$ 2,726,724**
	DESIGN CONTINGENCY	**$ 868,904**	**$ 7,067,559**	**$ 7,936,463**
	TOTAL ESTIMATED COST	**$ 7,298,792**	**$ 61,170,939**	**$ 68,469,732**
	PARKING STRUCTURE COST			**$ 3,642,477**

COSTS OF EXISTING PHARMACY BUILDING IMPROVEMENTS ARE INCLUDED

****ESCALATION OF CONSTRUCTION COSTS HAVE NOT BEEN INCLUDED IN THIS ESTIMATE****

*****PROJECT SOFT COSTS ARE NOT INCLUDED IN THIS ESTIMATE. PROJECT OWNER IS CARRYING THESE COSTS IN SEPARATE BUDGET*****

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**		**$ 17.62**	**$ 176,178**
B	**SHELL**		**$ 170.09**	**$ 1,700,859**
C	**INTERIORS**		**$ 151.80**	**$ 1,518,015**
D	**SERVICES**		**$ 105.30**	**$ 1,053,000**
E	**EQUIPMENT & FURNISHINGS**		**$ 16.71**	**$ 167,116**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**		**$ 99.36**	**$ 993,625**
G	**SITEWORK**		**$ 18.39**	**$ 183,900**
	SUBTOTAL		**$ 579.27**	**5,792,692**
	GENERAL CONDITIONS	**6%**	**$ 34.76**	**$ 347,562**
	OVERHEAD & PROFIT	**5%**	**$ 28.96**	**289,635**
	DESIGN CONTINGENCY	**15%**	**$ 86.89**	**868,904**
	TOTAL ESTIMATED COST		**$ 729.88**	**$ 7,298,792**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**			
	Continuous Footings	16 CY	$ 325.00	$ 5,305
	Spot Footings	30 CY	$ 345.00	$ 10,350
	Below Grade Foundation Wall	1,440 SF	$ 22.36	$ 32,204
	Slab on Grade	6,500 SF	$ 3.75	$ 24,375
	Foundation Damproofing	1,296 LF	$ 1.65	$ 2,138
	Building Area Site Clearing	6,500 SF	$ 0.39	$ 2,535
	Shoring	720 SF	$ 59.00	$ 42,480
	Building Excavation	3,184 CY	$ 6.00	$ 19,103
	Backfill & Compaction w/ imported fills	796 CY	$ 20.65	$ 16,437
	Remove Spoil	3,184 CY	$ 5.00	$ 15,919
	Building Grading	6,500 SF	$ 0.39	$ 2,535
	Gravel Under Slab	127 TN	$ 22.00	$ 2,796
	TOTAL SUBSTRUCTURES			**$ 176,178**
B	**SHELL**			
B10	**Superstructure**			
	Roof Structure CIP Concrete	6,500 SF	$ 21.75	$ 141,375
	Concrete Shearwalls	5,000 SF	$ 29.65	$ 148,250
	CIP Suspended Slab	3,500 SF	$ 24.65	$ 86,275
	CIP Concrete Columns	114 CY	$ 580.00	$ 66,163
B20	**Exterior Enclosure**			
	Exterior Wall Framing	5,400 SF	$ 5.00	$ 27,000
	Rigid Roof Insulation	6,500 SF	$ 2.55	$ 16,575
	Roofing	6,500 SF	$ 2.75	$ 17,875
	Skylight	3,000 SF	$ 155.00	$ 465,000

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Exterior Wall Sheathing w/ vapor barrier	5,400 SF	$ 1.99	$ 10,746
	Exterior Wall Finish-	1,350 SF	$ 55.00	$ 74,250
	Building Fireproofing	10,000 SF	$ 1.65	$ 16,500
	Curtainwall	4,050 SF	$ 130.00	$ 526,500
	Fire Stopping/ Caulking	10,000 SF	$ 0.95	$ 9,500
	Exterior Doors	4 EA	$ 10,000.00	$ 40,000
	Roof Expansion Joint	130 LF	$ 80.00	$ 10,400
	Floor Expansion Joint	260 LF	$ 95.00	$ 24,700
	Metal Flashings	1,500 SF	$ 6.50	$ 9,750
	Caulking & Sealants	1 LS	$ 10,000.00	$ 10,000
	TOTAL SHELL			**$ 1,700,859**
C	**<u>INTERIORS</u>**			
	Stud Frame Partitions	10,000 SF	$ 6.00	$ 60,000
	Interior Doors	10,000 SF	$ 2.65	$ 26,500
	Fire Curtains	10,000 SF	$ 5.00	$ 50,000
	Interior Glazing	1,000 SF	$ 65.00	$ 65,000
	Identifying Devices	1 LS	$ 10,000.00	$ 10,000
	Millwork	10,000 SF	$ 14.00	$ 140,000
	Mirrors	100 SF	$ 11.65	$ 1,165
	Restroom Flooring	640 SF	$ 20.00	$ 12,800
	Wall tile	1,709 SF	$ 19.50	$ 33,322
	Stairs	960 SF	$ 200.00	$ 192,000
	Free Standing Railing	1,080 LF	$ 300.00	$ 324,000
	Carpet	2,892 SF	$ 4.00	$ 11,568
	Commons area flooring	7,108 SF	$ 20.00	$ 142,160

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	wall base	10,000 SF	$ 0.95	$ 9,500
	Ceiling	10,000 SF	$ 20.00	$ 200,000
	Wall Coverings	10,000 SF	$ 22.00	$ 220,000
	Specialties	10,000 SF	$ 2.00	$ 20,000
	TOTAL FINISHES			**$ 1,518,015**
D	**SERVICES**			
	Plumbing	10,000 SF	$ 5.00	$ 50,000
	HVAC	10,000 SF	$ 35.00	$ 350,000
	Smoke Evac System	1 LS	$ 250,000.00	$ 250,000
	Fire Protection	10,000 SF	$ 4.00	$ 40,000
	Electrical Service & Distribution	10,000 SF	$ 6.00	$ 60,000
	Electrical- Power	10,000 SF	$ 3.00	$ 30,000
	Electrical Lighting	10,000 SF	$ 20.00	$ 200,000
	Special Systems	10,000 SF	$ 3.00	$ 30,000
	Fire Alarm	10,000 SF	$ 1.65	$ 16,500
	Telecommunication	10,000 SF	$ 2.65	$ 26,500
	TOTAL SERVICES			**$ 1,053,000**
E	**EQUIPMENT & FURNISHINGS**			
	Entrance Mats	240 SF	$ 29.65	$ 7,116
	Passenger Elevator 3500 #-5 stop	1 EA	$ 160,000.00	$ 160,000
	TOTAL EQUIPMENT & FURNISHINGS			**$ 167,116**
F	**SPECIAL CONSTRUCTION & DEMOLITION**			
	Modifications at existing Building	3,900 LF	$ 150.00	$ 585,000
	Install Fire Sprinkler at existing building	54,400 SF	$ 6.00	$ 326,400
	Demolish Existing Building Façade	6,500 SF	$ 12.65	$ 82,225

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **ATRIUM**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 10,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	TOTAL SPECIAL CONSTRUCTION & DEMOLTION			**$ 993,625**
G	**SITEWORK**			
	Site Grading	10,000 SF	$ 0.39	$ 3,900
	Site Improvements	10,000 SF	$ 12.00	$ 120,000
	Site Utilities	1 LS	$ 25,000.00	$ 25,000
	Site Lighting	1 LS	$ 25,000.00	$ 25,000
	Site Specialties	1 LS	$ 10,000.00	$ 10,000
	TOTAL SITEWORK			**$ 183,900**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY FULL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**		**$ 6.94**	**$ 971,185**
B	**SHELL**		**$ 65.20**	**$ 9,128,644**
C	**INTERIORS**		**$ 77.71**	**$ 10,879,482**
D	**SERVICES**		**$ 181.25**	**$ 25,375,098**
E	**EQUIPMENT & FURNISHINGS**		**$ 7.03**	**$ 984,375**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**		**$ -**	**$ -**
G	**SITEWORK**		**$ 10.02**	**$ 1,403,000**
	SUBTOTAL		**$ 348.16**	**48,741,784**
	GENERAL CONDITIONS	**6%**	**$ 20.89**	**$ 2,924,507**
	OVERHEAD & PROFIT	**5%**	**$ 17.41**	**2,437,089**
	DESIGN CONTINGENCY	**15%**	**$ 50.48**	**7,067,559**
	TOTAL ESTIMATED COST		**$ 436.94**	**$ 61,170,939**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY FULL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**			
	Continuous Footings	229 CY	$ 325.00	$ 74,265
	Spot Footings	157 CY	$ 345.00	$ 54,294
	Below Grade Foundation Wall	11,200 SF	$ 22.68	$ 254,016
	Slab on Grade	35,100 SF	$ 3.75	$ 131,625
	Foundation Damproofing	10,080 LF	$ 1.65	$ 16,632
	Building Area Site Clearing	35,100 SF	$ 0.39	$ 13,689
	Shoring	6,000 SF	$ 20.00	$ 120,000
	Building Excavation	17,193 CY	$ 6.00	$ 103,155
	Backfill & Compaction w/ Imported fills	4,298 CY	$ 20.65	$ 88,757
	Remove Excess	17,193 CY	$ 5.00	$ 85,963
	Building Grading	35,100 SF	$ 0.39	$ 13,689
	Gravel Under Slab	686 TN	$ 22.00	$ 15,101
	TOTAL SUBSTRUCTURES			**$ 971,185**
B	**SHELL**			
B10	**Superstructure**			
	Roof Structure CIP Concrete	35,100 SF	$ 21.65	$ 759,915
	Penthouse Structure	22,000 SF	$ 79.00	$ 1,738,000
	Concrete Shearwalls	25,410 SF	$ 29.65	$ 753,407
	CIP Suspended Slab	104,900 SF	$ 21.65	$ 2,271,085
	CIP Concrete Columns 33' Span	628 CY	$ 580.00	$ 364,426
B20	**Exterior Enclosure**			
	Exterior Wall Framing	65,928 SF	$ 4.40	$ 290,083
	Rigid Roof Insulation	35,100 SF	$ 2.55	$ 89,505
	Roofing	35,100 SF	$ 2.75	$ 96,525

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY FULL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	Exterior Wall Sheathing w/ vapor barrier	65,928 SF	$ 1.99	$ 131,197
	Exterior Wall Finish- Masonry	19,778 SF	$ 20.00	$ 395,568
	Exterior Wall Finish- Metal Panel	6,593 SF	$ 55.00	$ 362,604
	Exterior Wall Finish- Concrete	6,593 SF	$ 35.00	$ 230,748
	Building Fireproofing	140,000 SF	$ 1.65	$ 231,000
	Exterior Glazing	32,964 SF	$ 38.00	$ 1,252,632
	Fire Stopping/ Caulking	140,000 SF	$ 0.25	$ 35,000
	Exterior Doors	8 EA	$ 3,650.00	$ 29,200
	Metal Flashings	3,500 SF	$ 6.50	$ 22,750
	Caulking & Sealants	1 LS	$ 75,000.00	$ 75,000
	TOTAL SHELL			**$ 9,128,644**
C	**INTERIORS**			
	Stud Frame Partitions	140,000 SF	$ 9.05	$ 1,267,000
	Interior Doors	140,000 SF	$ 5.52	$ 772,292
	Interior Glazing	4,500 SF	$ 34.50	$ 155,250
	Identifying Devices	1 LS	$ 75,000.00	$ 75,000
	Lab Base Cabinet with epoxy Top	2,917 LF	$ 365.00	$ 1,064,705
	Lab island with epoxy top	1,456 LF	$ 465.00	$ 677,040
	Plam Base Cabinet	1,905 LF	$ 225.00	$ 428,625
	Bio Safety Cabinet 6'	25 EA	$ 10,950.00	$ 273,750
	Bio Safety Cabinet 4'	13 EA	$ 9,200.00	$ 119,600
	Wall Hung Cabinets w/ Glass	316 LF	$ 225.00	$ 71,100
	Wall Hung Cabinets	76 LF	$ 165.00	$ 12,540
	Base Cabinet w/ Stainless Steel top	12 LF	$ 265.00	$ 3,180
	Adjustable Shelving	410 LF	$ 59.00	$ 24,190

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY FULL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY		UNIT COST		
	Office Shelving	2,200	LF	$ 95.00	$	209,000
	Call Center Bookshelves	100	LF	$ 125.00	$	12,500
	Other Millwork	140,000	SF	$ 8.82	$	1,234,348
	Mirrors	1,840	SF	$ 11.65	$	21,436
	Stairs	2,000	SF	$ 79.00	$	158,000
	Free Standing Railing	720	LF	$ 300.00	$	216,000
	Carpet	34,187	SF	$ 3.33	$	113,957
	Resilient Flooring	35,022	SF	$ 4.00	$	140,088
	Epoxy Flooring	5,559	SF	$ 5.50	$	30,575
	Ceramic Tile	504	SF	$ 10.65	$	5,368
	Commons Area Flooring	64,158	SF	$ 15.00	$	962,370
	Base	140,000	SF	$ 3.39	$	475,119
	Ceiling	140,000	SF	$ 6.40	$	896,647
	Wall Coverings	140,000	SF	$ 8.58	$	1,201,200
	Lockers	10	EA	$ 368.00	$	3,680
	Locker Bench	8	LF	$ 65.00	$	520
	Markerboard	2,784	SF	$ 14.65	$	40,786
	Tackable Wall Surface	600	SF	$ 4.65	$	2,790
	Projection Screen	12	EA	$ 950.00	$	11,400
	Projector Mounts	10	EA	$ 350.00	$	3,500
	Specialties	140,000	SF	$ 1.40	$	195,927
	TOTAL FINISHES				**$**	**10,879,482**
D	**SERVICES**					
	Plumbing	140,000	SF	$ 21.04	$	2,945,231
	Lab Gases	140,000	SF	$ 2.80	$	392,367

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY FULL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	HVAC Finished Area	140,000 SF	$ 80.00	$ 11,200,000
	Vivarium Watchdog System	1 LS	$ 65,000.00	$ 65,000
	Fume Hoods- 5'	5 EA	$ 11,000.00	$ 55,000
	Fune Hoods- 8'	97 EA	$ 14,800.00	$ 1,435,600
	Fume Hoods- 4'	1 EA	$ 8,800.00	$ 8,800
	Fire Protection	140,000 SF	$ 5.91	$ 827,400
	Canopy Hood	15 LF	$ 2,200.00	$ 33,000
	Electrical Service & Distribution	140,000 SF	$ 13.82	$ 1,934,347
	Electrical- Power	140,000 SF	$ 10.88	$ 1,523,529
	Electrical Lighting	140,000 SF	$ 17.73	$ 2,482,584
	Special Systems	140,000 SF	$ 9.83	$ 1,375,765
	Fire Alarm	140,000 SF	$ 2.44	$ 341,355
	Telecommunication	140,000 SF	$ 5.39	$ 755,119
	TOTAL SERVICES			**$ 25,375,098**
E	**EQUIPMENT & FURNISHINGS**			
	Mechoshades	28,019 SF	$ 9.65	$ 270,387
	Cold Rooms	1,140 SF	$ 166.00	$ 189,240
	Autoclaves	3 EA	$ 25,000.00	$ 75,000
	Glass Washer	3 EA	$ 6,600.00	$ 19,800
	Drying Oven	1 EA	$ 2,500.00	$ 2,500
	Other Equipment	140,000 SF	$ 1.95	$ 273,000
	Entrance Mats	150 SF	$ 29.65	$ 4,448
	Passenger Elevator-5 stop	1 EA	$ 150,000.00	$ 150,000
	TOTAL EQUIPMENT & FURNISHINGS			**$ 984,375**
F	**SPECIAL CONSTRUCTION & DEMOLITION**			

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION			1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **LABORATORY FULL BUILDOUT**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 140,000
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
	TOTAL SPECIAL CONSTRUCTION & DEMOLTION			**$ -**
G	**SITEWORK**			
	Site Grading	100,000 SF	$ 0.59	$ 59,000
	Site Improvements	64,900 SF	$ 10.00	$ 649,000
	Site Utilities	1 LS	$ 250,000.00	$ 250,000
	Campus Electrical Feed	1 LS	$ 275,000.00	$ 275,000
	Site Lighting	1 LS	$ 120,000.00	$ 120,000
	Site Specialties	1 LS	$ 50,000.00	$ 50,000
	TOTAL SITEWORK			**$ 1,403,000**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**		**$ 25.74**	**$ 836,422**
B	**SHELL**		**$ 28.15**	**$ 914,908**
C	**INTERIORS**		**$ 2.82**	**$ 91,775**
D	**SERVICES**		**$ 20.40**	**$ 663,000**
E	**EQUIPMENT & FURNISHINGS**		**$ 2.15**	**$ 70,000**
F	**SPECIAL CONSTRUCTION AND DEMOLITION**		**$ -**	**$ -**
G	**SITEWORK**		**$ 9.68**	**$ 314,750**
	SUBTOTAL		**$ 88.95**	**2,890,855**
	GENERAL CONDITIONS	**6%**	**$ 5.34**	**$ 173,451**
	OVERHEAD & PROFIT	**5%**	**$ 4.45**	**144,543**
	DESIGN CONTINGENCY	**15%**	**$ 13.34**	**433,628**
	TOTAL ESTIMATED COST		**$ 112.08**	**$ 3,642,477**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
A	**SUBSTRUCTURES**			
	Continuous Footings	80 CY	$ 325.00	$ 26,122
	Spot Footings	80 CY	$ 345.00	$ 27,729
	Below Grade Foundation Wall	9,120 SF	$ 22.68	$ 206,842
	Slab on Grade	32,500 SF	$ 4.25	$ 138,125
	Foundation Damproofing	9,120 LF	$ 1.65	$ 15,048
	Building Area Site Clearing	32,500 SF	$ 0.39	$ 12,675
	Shoring	3,500 SF	$ 20.00	$ 70,000
	Building Excavation	19,380 CY	$ 6.00	$ 116,278
	Backfill & Compaction w/ Imported fills	4,845 CY	$ 20.65	$ 100,048
	Remove Excess	19,380 CY	$ 5.00	$ 96,898
	Building Grading	32,500 SF	$ 0.39	$ 12,675
	Gravel Under Slab	636 TN	$ 22.00	$ 13,982
	TOTAL SUBSTRUCTURES			**$ 836,422**
B	**SHELL**			
B10	**Superstructure**			
	Concrete Shearwalls	2,592 SF	$ 29.65	$ 76,853
	CIP Suspended Slab	32,500 SF	$ 21.65	$ 703,625
	CIP Concrete Columns 33' Span	96 CY	$ 580.00	$ 55,680
B20	**Exterior Enclosure**			
	Building Fireproofing	32,500 SF	$ 1.65	$ 53,625
	Fire Stopping/ Caulking	32,500 SF	$ 0.25	$ 8,125
	Exterior Doors	8 EA	$ 1,500.00	$ 12,000
	Caulking & Sealants	1 LS	$ 5,000.00	$ 5,000
	TOTAL SHELL			**$ 914,908**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
C	**INTERIORS**			
	Interior Doors	4 EA	$ 1,050.00	$ 4,200
	Identifying Devices	1 LS	$ 5,000.00	$ 5,000
	Stairs	400 SF	$ 79.00	$ 31,600
	Free Standing Railing	296 LF	$ 125.00	$ 37,000
	Sealed Concrete	32,500 SF	$ 0.39	$ 12,675
	Parking Striping	32,500 SF	$ 0.04	$ 1,300
	TOTAL FINISHES			**$ 91,775**
D	**SERVICES**			
	Plumbing	32,500 SF	$ 1.95	$ 63,375
	Parking Ventilation	32,500 SF	$ 3.25	$ 105,625
	Fire Protection	32,500 SF	$ 3.35	$ 108,875
	Electrical Service & Distribution	32,500 SF	$ 2.65	$ 86,125
	Electrical- Power	32,500 SF	$ 1.95	$ 63,375
	Electrical Lighting	32,500 SF	$ 3.00	$ 97,500
	Special Systems	32,500 SF	$ 1.65	$ 53,625
	Fire Alarm	32,500 SF	$ 1.65	$ 53,625
	Telecommunication	32,500 SF	$ 0.95	$ 30,875
	TOTAL SERVICES			**$ 663,000**
E	**EQUIPMENT & FURNISHINGS**			
	Parking Equipment	1 LS	$ 50,000.00	$ 50,000
	Passenger Elevator- Additional Stop	2 EA	$ 10,000.00	$ 20,000
	TOTAL EQUIPMENT & FURNISHINGS			**$ 70,000**
F	**SPECIAL CONSTRUCTION & DEMOLITION**			
	TOTAL SPECIAL CONSTRUCTION & DEMOLTION			**$ -**

PROJECT ESTIMATE	CONSTRUCTION CONTROL CORPORATION	1/13/2009

PROJECT NAME……..…..UofU LS SKAGGS PHARMACY BUILDING **PARKING STRUCTURE**
LOCATION……..……..SALT LAKE CITY, UT
ARCHITECT…..……..…EDA SF 32,500
STAGE OF DESIGN……PROGRAMMING

UNI #	DESCRIPTION	UNIT QTY	UNIT COST	
G	**SITEWORK**			
	Site Grading	25,000 SF	$ 0.59	$ 14,750
	Site Improvements	25,000 SF	$ 12.00	$ 300,000
	Site Utilities- Inc. In lab building			
	Site Lighting- Inc. In Lab Building			
	Site Specialties- Inc. in Lab Building			
	TOTAL SITEWORK			**$ 314,750**

Geotechnical Report

Gordon Spilker Huber
Geotechnical Consultants, Inc.

REPORT
GEOTECHNICAL STUDY
PROPOSED NEW PHARMACY BUILDING
SOUTH OF L.S. SKAGGS PHARMACY BUILDING
HEALTH SCIENCE CORRIDOR
WITHIN THE UNIVERSITY OF UTAH
MEDICAL CAMPUS
SALT LAKE CITY, UTAH

Submitted To:

EDA Architects, Inc.
111 East Broadway, Suite 200
Salt Lake City, Utah 84103

Submitted By:

Gordon Spilker Huber Geotechnical Consultants, Inc.
4426 South Century Drive, Suite 100
Salt Lake City, Utah 84123

January 13, 2009

Job No. 0258-009-08

GSH
Gordon Spilker Huber
Geotechnical Consultants, Inc.

January 13, 2009
Job No. 0258-009-08

EDA Architects, Inc.
111 East Broadway, Suite 200
Salt Lake City, Utah 84103

Attention: Mr. Peter duP. Emerson

Gentlemen:

Re: Report
Geotechnical Study
Proposed New Pharmacy Building
South of L.S. Skaggs Pharmacy Building
Health Science Corridor
Within the University of Utah Medical Campus
Salt Lake City, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed at the site of the proposed new pharmacy building, which is located immediately south of the L.S. Skaggs Pharmacy building on the University of Utah Medical Campus in Salt Lake City, Utah. The general location of the site with respect to major topographic features and existing facilities, as of 1998, is presented on Figure 1, Vicinity Map. Another generalized layout of the site with regard to immediately adjoining facilities is presented on Figure 2, Area Map. A detailed layout of the site showing the proposed limits of the new building with regard to existing facilities and site-specific topography is presented on Figure 3, Site Plan. The locations of the borings drilled in conjunction with this study are also presented on Figure 3.

During the course of this study, preliminary conclusions and discussions pertaining to the geotechnical setting of the site were transmitted in an interim report dated December 5, 2008[1] and discussed with Mr. Peter Emerson of EDA Architects, Inc. and Mr. Ron Dunn of Dunn Associates, Inc., the project structural engineer.

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[1] "Interim Report, Geotechnical Study, Proposed New Pharmacy Building, South of LS Skaggs Pharmacy Building, Health Science Corridor, Within the University of Utah Medical Campus, Salt Lake City, Utah," GSH Job No. 0258-003-08.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of this study were planned in discussions between Mr. Peter Emerson of EDA Architects, Inc., and Mr. Bill Gordon of Gordon Spilker Huber Geotechnical Consultants, Inc. (GSH).

In general, the objectives of our scope were to:

1. Accurately define and evaluate the subsurface soil and groundwater conditions across the site.

2. Provide appropriate foundation, earthwork, subdrain, pavement, and geoseismic recommendations to be utilized in the design and construction of the proposed facility.

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the drilling, logging, and sampling of four exploration borings.

2. A laboratory testing program.

3. An office program consisting of the correlation of available data, engineering analyses, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided by returning a signed copy of our Professional Services Agreement No. 08-0947 dated September 29, 2008.

1.4 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils encountered in the exploration borings, projected groundwater conditions, and the layout and design data discussed in Section 2., Proposed Construction, of this report. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted engineering principles and practices in this area at this time.

2. PROPOSED CONSTRUCTION

A detailed layout and overall concept for the building are still being finalized. As presently proposed, the structure will have a total of seven levels; five levels above grade and two levels below. The overall structure will be of reinforced concrete construction with structural loads being transmitted down primarily through columns with some bearing walls. Recent information provided by the project structural engineer indicates that the maximum column loads will be in the range of 1,200 to 1,500 kips with maximum wall loads on the order of 6 to 8 kips per lineal foot.

The lowest level will be utilized for parking and subjected to traffic consisting of light volume of automobiles and light trucks. Connecting the proposed new building and the existing L.S. Skaggs Pharmacy building to the immediate north will be a two-level atrium. The lower level of the atrium, as presently proposed, will be a few feet below the main level of the L.S. Skaggs Pharmacy building to the north and match the main; that is, second structural level of the new building to the south. The top of the atrium will match the upper level of the existing building to the north. There have been discussions whether or not the two lower levels of the proposed new building will extend entirely or only partially beneath the atrium.

With two levels below grade, the lower level will extend approximately 20 to 29 feet below existing final grade to the east. Present concept is to excavate away existing soils on the west side of the below-grade levels of the parking structure so that ultimately the lowest level, the parking level, will only be six to eight feet below final grade immediately adjacent to the proposed new building.

3. SITE INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions across the site, 4 exploration borings were drilled to depths ranging from 39.5 to 46.5 feet with a truck-mounted drill rig equipped with hollow-stem augers. Locations of the borings are shown on Figure 3.

The field portion of our investigation was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of the drilling operations, a continuous log of the subsurface conditions encountered was maintained. In addition, relatively undisturbed and small disturbed samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications have been supplemented by subsequent inspection and testing in our laboratory. Detailed graphical representation of the subsurface conditions encountered is presented on Figures 4A through 4D, Log of Borings. Soils were classified in accordance with the nomenclature described on Figure 5, Unified Soil Classification System.

A 3.25-inch outside diameter, 2.42-inch inside diameter drive sampler (Dames & Moore) was utilized in the majority of the subsurface sampling at the site. Additionally, a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) was utilized at select locations. The blow-counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.

Following completion of drilling operations, one and one-quarter-inch diameter slotted PVC pipe was installed in all of the borings to provide a means of monitoring the groundwater fluctuations.

3.2 LABORATORY TESTING

3.2.1 General

In order to provide data necessary for our engineering analyses, a laboratory testing program was performed. The program included moisture and density tests, consolidation, and chemical tests. A description of the tests plus a summary of the test results are presented in the following sections.

3.2.2 Moisture and Density Tests

To aid in classifying the soils and to help correlate other test data, moisture and density tests were performed on selected undisturbed samples. The results of these tests are presented on the boring logs, Figures 4A through 4D.

3.2.3 Consolidation Test

To provide data necessary for our settlement analyses, a consolidation test was performed on each of five representative samples of the finer-grained soils encountered. The results of these tests show that the upper soils are moderately to moderately highly over-consolidated. The deeper clays are only slightly over-consolidated. When loaded below the over-consolidation pressures, the soils exhibit moderately low compressibility characteristics. Detailed results of the tests are maintained within our files and can be transmitted to you, upon your request.

3.2.4 Chemical Tests

To determine if the site soils will react detrimentally with concrete, chemical tests were performed on a representative sample of the silty clay soils encountered in Boring B-4 at a depth of 10 feet below existing grade. The results of the chemical tests are tabulated below:

Boring No.	Depth (feet)	pH	Total Water Soluble Sulfate (ppm)
B-4	10	7.9	4

4. SITE CONDITIONS

4.1 SURFACE

The primary footprint of the proposed new building is presently occupied by an existing at-grade asphalt concrete paved parking lot. The parking lot slopes downward gently to the southwest with maximum relief being on the order of two feet.

The site is bounded on the immediate south by landscaping and an entrance/exit roadway to Medical Drive. To the immediate southwest and west, the site is bounded by a moderately steep landscaped area which slopes gently downward to Medical Drive. Relief over this landscaped area is on the order of seven to eight feet. The site is bounded on the east by a two horizontal to one vertical west-facing slope with a roadway/pedestrian walkway at the crest. All indications are that this slope was recently cut-graded in conjunction with construction to the east.

The north and northwest sides of the site are occupied by sidewalks, entrance landings, and some landscaping areas associated with the L.S. Skaggs Pharmacy building.

4.2 SUBSURFACE SOIL AND GROUNDWATER

By far, the most predominant soil within the subsurface sequence consists of silty clays with trace to some sands and gravels and in areas with occasional layers up to four inches thick of granular soils. Interrupting the predominantly silty clay sequence at depths ranging from 19.5 to 26.0 feet is a 3.0- to 11.5-foot thick layer of dense granular soils consisting of clean sands and gravels, clayey sands, clayey sands and gravels, and silty sands. Generally, this layer is in the range of three to six feet thick. The sands and gravels will exhibit very high strength and low compressibility characteristics. The silty clays above the sands and gravels are moderately highly over-consolidated and when loaded below the over-consolidation pressure will exhibit moderately low compressibility. The deeper silty clays, however, are only slightly over-consolidated.

In Borings B-1 and B-2, the upper three and one-half to four feet of soil consist of silty clay fills which contain some sands and gravels. In Boring B-3, an asphalt concrete pavement section consisting of three inches asphalt concrete over two inches of aggregate base was encountered over the silty clays. In landscaped areas, two to three inches of topsoil defined as the zone of major roots was encountered. The fills and the upper 6 to 12 inches of the natural soils will generally exhibit relatively poor engineering characteristics.

Groundwater was not encountered to the depths penetrated. Periodic readings will be taken.

It should be noted that the site is known for laterally and vertically variable “perched” groundwater conditions, especially during the late spring and early summer months.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

Although an approximately 3.0- to 4.5-foot thick layer of dense to very dense silty and clayey sands and gravels, portions of which are slightly cemented, was encountered at depths ranging from 19.5 to 26.0 feet, the predominant subsurface soil consists of silty clays with trace to some sand and gravels and with numerous to occasional layers of silty and clayey granular soils. Although the granular soil sequence is projected to be encountered at about the base of the lower level of the proposed new building, the predominant silty clay sequence will govern foundation design.

Our analyses indicate that the proposed new building imposing maximum column loads of generally no more than 800 to 1,000 kips could be supported upon conventional spread and continuous wall foundations underlain by approximately 4 feet of replacement fill. For heavier loads to approximately 1,500 kips, the replacement fill sequence would be approximately 5 feet. Considering the size of the footings, even utilizing moderately high bearing pressures, the over-excavation would essentially require that the entire footprint of the structure be over-excavated to a depth of four and one-half to five feet below the base of the footings. The over-excavation would be backfilled with imported granular fill properly placed and compacted. Ultimately, conventional spread and continuous wall foundation would be established over the granular structural fill. As an option, it is our opinion that Geopiers® can be placed beneath the footings. Geopiers® would improve the underlying soils, thus controlling settlements, allowing for a higher bearing pressure and minimizing the amount of over-excavation. The final option would be to support the entire footprint upon a continuous mat. The mat would be established essentially upon the in-situ soils.

In the following sections, detailed discussions and recommendations pertaining to foundation, earthwork, lateral resistance and pressure, subdrains, and the geoseismic setting of the site are presented.

5.2 FOUNDATION SYSTEMS

5.2.1 General

As discussed above, three foundation options were evaluated in conjunction with this study. They include:

1. Conventional spread and continuous wall foundations underlain by extensive amounts of replacement granular structural fill.

2. Conventional spread and continuous wall foundations underlain by Geopiers®.

3. Utilization of a continuous structural mat to support the structure.

4. Cost will play a significant role in selecting the foundation system.

Advantages of the Geopiers® and a continuous structural mat are that mass over-excavation beneath the base of the footings, therefore deepening the overall mass excavation, will not be required. Utilization of replacement granular fill will essentially require that the entire base of the building footprint be over-excavated at least four to five feet below the proposed footings. The over-excavation would extend out at least four to five feet laterally from the perimeter of the perimeter footings.

5.2.2 Conventional Spread and Continuous Wall Foundations

5.2.2.1 Design Data

The conventional spread and continuous wall foundations may be established upon replacement granular fill or upon Geopiers® to primarily control settlement. The secondary advantage of the Geopiers® system would be to allow for the utilization of a somewhat higher bearing pressure in the design of the footings. For the footings, the following initial parameters are provided:

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 18 inches
Minimum Recommended Width for Isolated Spread Footings	- 24 inches
Maximum Net Bearing Established Upon Replacement Granular Fill	- 4,000 pounds per square foot*
Replacement Granular Fill Established Upon Geopiers® Systems	- 5,000+ pounds per square foot**
Bearing Pressure Increase for Seismic Loading	- 50 percent

* This is for the primary footings. Smaller, lightly loaded footings established directly upon suitable natural soils would be proportioned utilizing a lower bearing pressure.

** To be determined by Geopiers®.

Geopiers® soil reinforcement should be designed and constructed by an installer licensed by the Geopiers® Foundation Company, Inc. The installer should provide a Geopiers® layout and detailed design calculations sealed by a professional engineer licensed in the State of Utah. The design calculations should demonstrate that Geopiers® soil reinforcement is designed to control long-term settlement to magnitudes within the criteria for this project.

The design parameters should be verified by a full-scale Geopiers® modulus test (similar to a pile load test) performed in the field. GSH should be retained to monitor the modulus test and subsequent installation of production Geopiers® elements. The local contact for Geopiers® is David Phlen, (801) 891-2468.

The term "net bearing pressure" refers to the pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.2.2.2 Installation

Under no circumstances should the footings be established upon loose or disturbed soil, sod, rubbish, construction debris, frozen soil, or other deleterious materials. If unsuitable soils are encountered, they must be removed and replaced with compacted granular fill. If the compacted granular structural fill upon which the footings are to be established become loose or disturbed, they must be recompacted to the requirements for structural fill before the footings are poured.

5.2.2.3 Settlements

Projected settlements of various spread and continuous wall foundations underlain by varying thicknesses of replacement granular fill are tabulated below:

Foundation Type	Load (kips)	Minimum Thickness of Replacement Granular Fill (inches)	Projected Ultimate Settlement (inches)
Spread	800	4	⅝
	1,000	4	⅝ to ⅞
	1,500	5	⅝ to ⅞

With the Geopiers® system, it is the goal to control total maximum settlements to no more than five-eighths to three-quarters of an inch.

Settlements will occur rapidly with 60 to 70 percent occurring during construction.

5.2.3 Continuous Mat Foundation

As an option to the two previous foundation systems, a continuous mat may be utilized. It is projected that the total gross load imposed by the bottom of an approximately 2.5-foot thick mat would be on the order of 1,300 to 1,600 pounds per square foot. This gross loading is approximately equivalent to a mass excavation with a minimum depth of approximately 14 feet. At a depth of 14 feet, the soil removed would result in a pressure relief of approximately 1,600 pounds per square foot.

5.2.3.1 Installation

The mat can be placed upon undisturbed natural soils.

5.2.3.2 Settlements

Settlement beneath the center of the mat is calculated to be on the order of one to one and one-quarter of an inch. At the edges and corners, the settlements should be on the order of one-half to five-eighths of an inch. In all cases, for elastic loading conditions the settlements will occur rapidly with at least the 60 to 70 percent of the quoted settlements occurring during construction.

5.3 AT-GRADE SLABS

It is recommended that the at-grade pavement at the parking level consist of five inches of non-reinforced Portland cement concrete over five inches of aggregate base. The base must be placed upon suitable natural subgrade.

5.4 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footings and the supporting soils. In determining frictional resistance, a coefficient of 0.40 should be utilized for footings established upon natural soil. If established upon granular structural fill or Geopiers®, a coefficient of 0.45 can be used. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

Lateral resistance can also be provided by backfill and side friction against subgrade walls, if required.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.5 LATERAL PRESSURES

The lateral pressure parameters, as presented within this section, assume that the backfill will consist of a drained granular soil placed and compacted in accordance with the recommendations presented herein. The lateral pressures imposed upon subgrade facilities will, therefore, be basically dependent upon the relative rigidity and movement of the backfilled structure. For active walls, such as retaining walls which can move outward (away from the backfill), granular backfill may be considered equivalent to a fluid with a density of 35 pounds per cubic foot in computing lateral pressures. "Free-draining" gravel extending at least three and one-half feet from the subgrade wall may be considered equivalent to a fluid with a density of 45 pounds per cubic foot. The gravel should be placed in lifts not exceeding 12 inches in loose thickness. Each lift should be compacted by running a hand-operated flat-plate compactor at least three times. The remainder of the backfill should consist of sands and gravels with no more than 12 percent fines, material passing the No. 200 sieve. The above values assume that the surface of the soils slope behind the wall is horizontal and that there are no secondary loadings such as imposed by adjoining structures.

In addition to the static pressure, seismic pressure must also be considered. The pressures are dependant upon wall height. Average uniform pressures are as follows:

Height of Wall (feet)	Average Uniform Pressure (psf)
10	170
15	255
20	340
25	424

The distribution is calculated by totaling the height of the wall times the average uniform pressure and then distributing the total load with 70 percent at the top of the wall and 30 percent at the base. The results appear graphically to be an inverted trapezoid.

If the deeper excavations were constructed vertically with soil-nail bracing, the lateral loads could be dramatically reduced. Single-framing against the wall would be most effective in reducing the loads.

5.6 SUBDRAINS

Although a true static groundwater table was not encountered to the projected maximum depth of the proposed building, the area is notorious for the presence of laterally and vertically variable "perched" groundwater conditions, especially during late spring and summer months. It is, therefore, our opinion that as a minimum a perimeter foundation/chimney subdrain be installed.

The perimeter footing subdrain should consist of a four-inch diameter slotted or perforated PVC pipe encased in a "free-draining" granular material, such as three-quarter- to one-inch minus clean gap-graded gravel. The gravel should extend at least two inches below and lateral from the pipe and at least 12 inches above the top of the lowest adjacent grade. The invert of the pipe should have at least a slope of 0.25 to a suitable point of gravity discharge and can be installed at least 12 inches below the base of the lowest adjacent slab. Gravel encasing the pipe should be wrapped in a geotextile fabric, such as Mirafi 140N or equivalent, to reduce the possibility of long-term infiltration of surrounding soils and subsidence.

Extending up from the top of this perimeter subdrain to within two feet of final grade should be a chimney subdrain consisting of at least six inches of "free-draining" granular soil or synthetic drain board, both extending into the top of the perimeter foundation subdrain. Prior to the placement of the subdrain systems, the parking level walls should, as a minimum, be dampproofed; however, any subgrade walls that will be adjacent to classrooms, laboratories, etc., should be waterproofed.

Water collected by the subdrain should be discharged to a sump and then pumped to a suitable point of gravity discharge. Projected flows for design would be on the order of 10 to 15 gallons per minute. The volume should be verified during the construction period where any groundwater seepage into the excavation would be controlled and measured before discharge.

5.7 EARTHWORK

5.7.1 Site Preparation

Prior to initiation of major construction activities, all surface vegetation, topsoil, pavements, and deleterious materials should be removed from the footprint of the proposed new building. In addition, at this time, below-grade utilities should either be re-routed and/or abandoned.

5.7.2 Excavations

Temporary construction excavations not exceeding four feet above or below the water table and through the cohesive soils may be constructed with near-vertical sideslopes. Deeper excavations up to approximately eight feet in the cohesive soils, above or below the water table, should be constructed no steeper than one-half horizontal to one vertical. In some areas, excavations approaching 25 to 28 feet will be required. Excavations through the predominantly stiff clays can be constructed with sideslopes no steeper than three-quarters horizontal to one vertical. If steeper slopes are required because of limitations on lateral extension, then the sideslopes should be braced, most preferably with a soil-nail system.

It is strongly recommended that the lower level of the proposed new building not extend to the full northern limit of the proposed footprint. If extended fully, underpinning and bracing of the southern end of the existing L.S. Skaggs Pharmacy building will be required. At this time, we recommend that the northern extension of the lower level of the proposed building extend no

closer than determined by a one horizontal to one vertical downward slope angle from the outside lower edge of the foundation supporting the building to the north.

5.7.3 Structural Fill

Structural fill will be required, possibly as replacement fill below footings, as backfill over foundations and utilities, and as structural site grading fill. All structural fill must be free of sod, rubbish, construction debris, frozen soil, and other deleterious materials. Maximum particle size within the structural site grading should generally not exceed four inches; although, occasional particles up to six to eight inches may be incorporated provided they do not result in "honeycombing" or preclude the obtainment of the desired degree of compaction. In confined areas, the general particle size should generally be restricted to two and one-half inches.

The majority of the soils removed from the mass excavation will be silty clays, which, in our opinion, should not be considered for re-utilization as structural fill; primarily because of the difficulty of placing and compacting these materials.

5.7.4 Fill Placement and Compaction

All structural fill should be placed in lifts not exceeding eight inches in loose thickness. Structural fills placed beneath the footprint of the proposed structure must be compacted to at least 95 percent of the maximum dry density as determined by the AASHTO[2] T-180 (ASTM[3] D-1557) compaction criteria. Structural fills greater than 10 feet thick are not anticipated at the site.

Compaction of the backfill around the perimeter of the structure will be dependent upon the ultimate surface loading over the fill. If these fills will be in landscaping areas, we recommend that they be compacted to 88 percent maximum dry density, as determined by the above-defined criteria, in order to minimize settlements. Sidewalks or sidewalk stairways entering into the proposed new building over these deep fills must be designed as structural elements spanning over the fill wedge.

5.7.5 Final Cut and Fill Slopes

Considering both maintenance and geotechnical considerations, it is our recommendation that final cut and fill slopes should be no steeper than two horizontal to one vertical and preferably two and one-half horizontal to one vertical. If more rapid grade transitions are required, retaining structures will be required.

---

[2] American Association of State Highway and Transportation Officials
[3] American Society for Testing and Materials

5.8 GEOSEISMIC SETTING

5.8.1 General

Utah municipalities adopted the International Building Code (IBC) 2006 on January 1, 2007. The IBC 2006 code determines the seismic hazard for a site based upon 2002 mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class. The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

The structure must be designed in accordance with the procedure presented in Section 1613, Earthquake Loads, of the IBC 2006 edition.

5.8.2 Soil Class

For dynamic structural analysis, the Site Class D – Stiff Soil Profile as defined in Table 1613.5.2, Site Class Definitions, of the IBC 2006 can be utilized.

5.8.3 Faulting

Review of available literature indicates no active faults pass through or immediately adjacent to the site. The nearest known active faults are located approximately 0.35 miles northwest of the site.

5.8.4 Liquefaction

The predominant soils within the subsurface sequence are cohesive and not susceptible to liquefaction, even during major seismic event.

5.8.5 Ground Motions

The IBC 2006 code is based on 2002 USGS (United States Geologic Survey) mapping, which provides values of short and long period accelerations for the Site Class B-C boundary for the Maximum Considered Earthquake (MCE). This Site Class B-C boundary represents a hypothetical bedrock surface and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for a MCE event and incorporates a soil amplification factor for a Site Class D soil profile in the second column. Based on the site latitude and longitude (40.7681 degrees north and 111.8337 degrees west, respectively), the values for this site are tabulated on the following page.

Spectral Acceleration Value, T Seconds	Site Class B-C Boundary [mapped values] (% g)	Site Class D [adjusted for site class effects] (% g)
Peak Ground Acceleration	61.1	61.1
0.2 Seconds, (Short Period Acceleration)	$S_S = 152.7$	$S_{MS} = 152.7$
1.0 Seconds (Long Period Acceleration)	$S_1 = 59.9$	$S_{M1} = 77.9$

The IBC 2006 code design accelerations (S_{DS} and S_{D1}) are based on multiplying the above accelerations (adjusted for site class effects) for the MCE event by two-thirds (⅔).

5.9 SUPPLEMENTAL CONSULTATION

This project is somewhat unique geotechnically in that there are a number of foundation options. After this report is reviewed, GSH strongly recommends that a meeting between representatives of the design team and GSH be held to further discuss the geotechnical options.

We appreciate the opportunity of providing this service for you. If you have any questions or require additional information, please do not hesitate to contact us.

Respectfully submitted,

Gordon Spilker Huber Geotechnical Consultants, Inc.

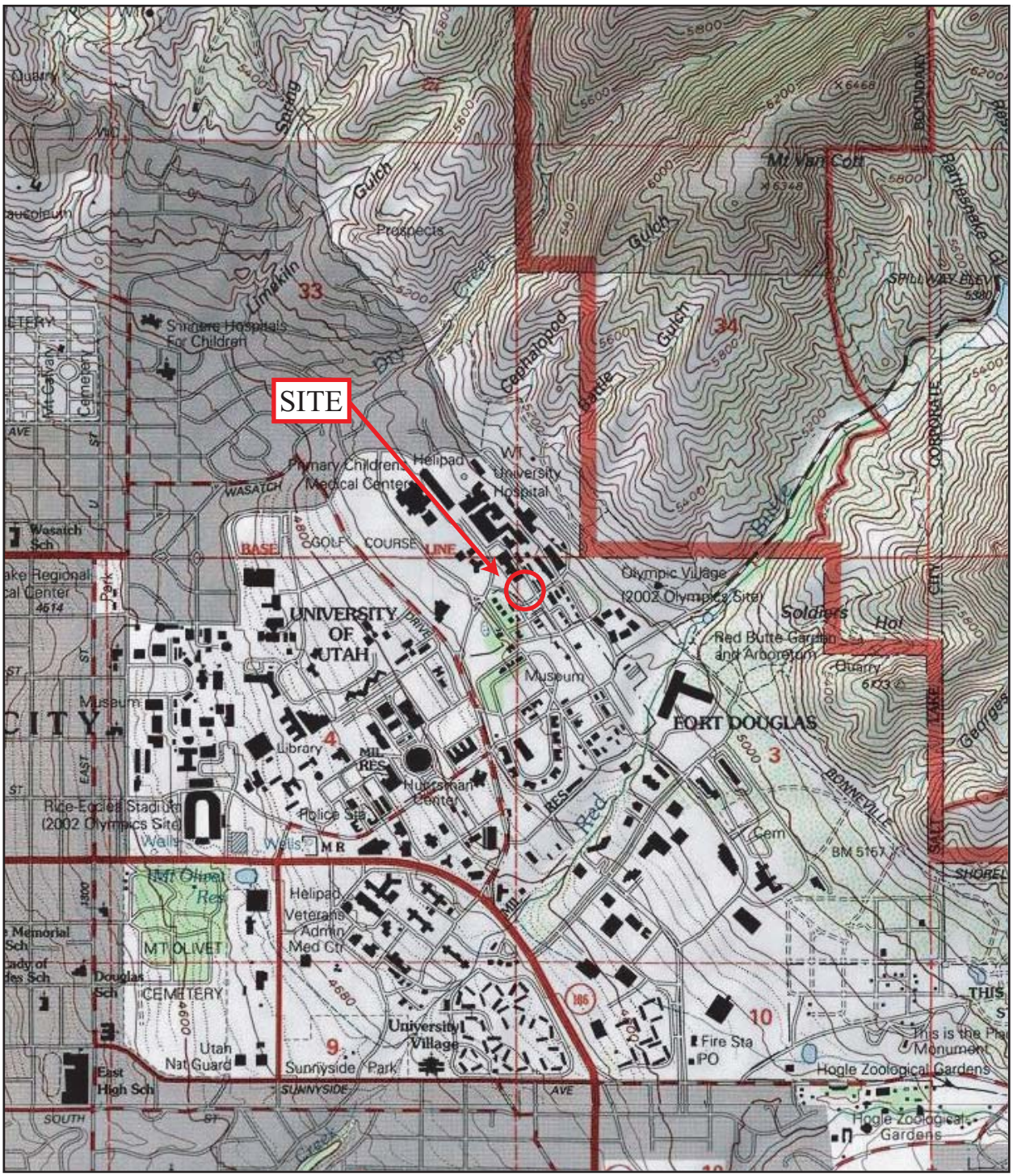
William J. Gordon, State of Utah No. 146417
Professional Engineer

WJG:jlh/sn

Encl. Figure 1, Vicinity Map
Figure 2, Area Map
Figure 3, Site Plan
Figures 4A through 4D, Log of Borings
Figure 5, Unified Soil Classification System

Addressee (3 + email)
c: Mr. Ron Dunn, Dunn Associates, Inc. (1 + email)
Mr. Joe Harman, Campus Design and Construction, University of Utah (1 + email)

EDA ARCHITECTS, INC.
JOB NO. 0258-009-08



SCALE IN FEET

1000 0 1000 2000

FIGURE 1
VICINITY MAP

REFERENCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAPS
TITLED "FORT DOUGLAS, UTAH" AND "SUGAR HOUSE, UTAH"
BOTH DATED 1998

GSH
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Geotechnical Consultants, Inc.

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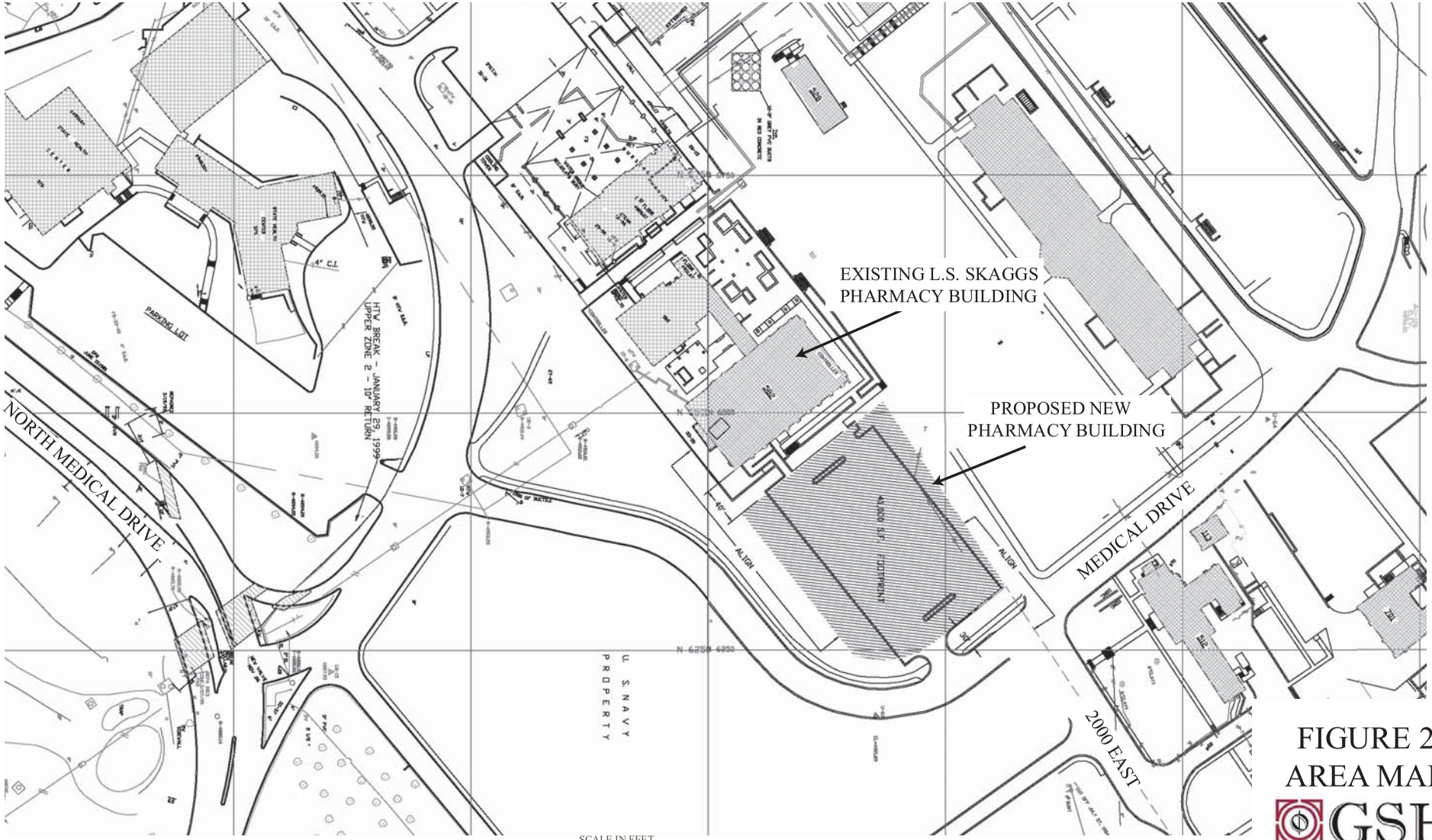
JOB NO. 0258-009-08



REFERENCE:
ADAPTED FROM DRAWING
PROVIDED BY CLIENT

SCALE IN FEET
50 0 50 100

FIGURE 2
AREA MAP

GSH
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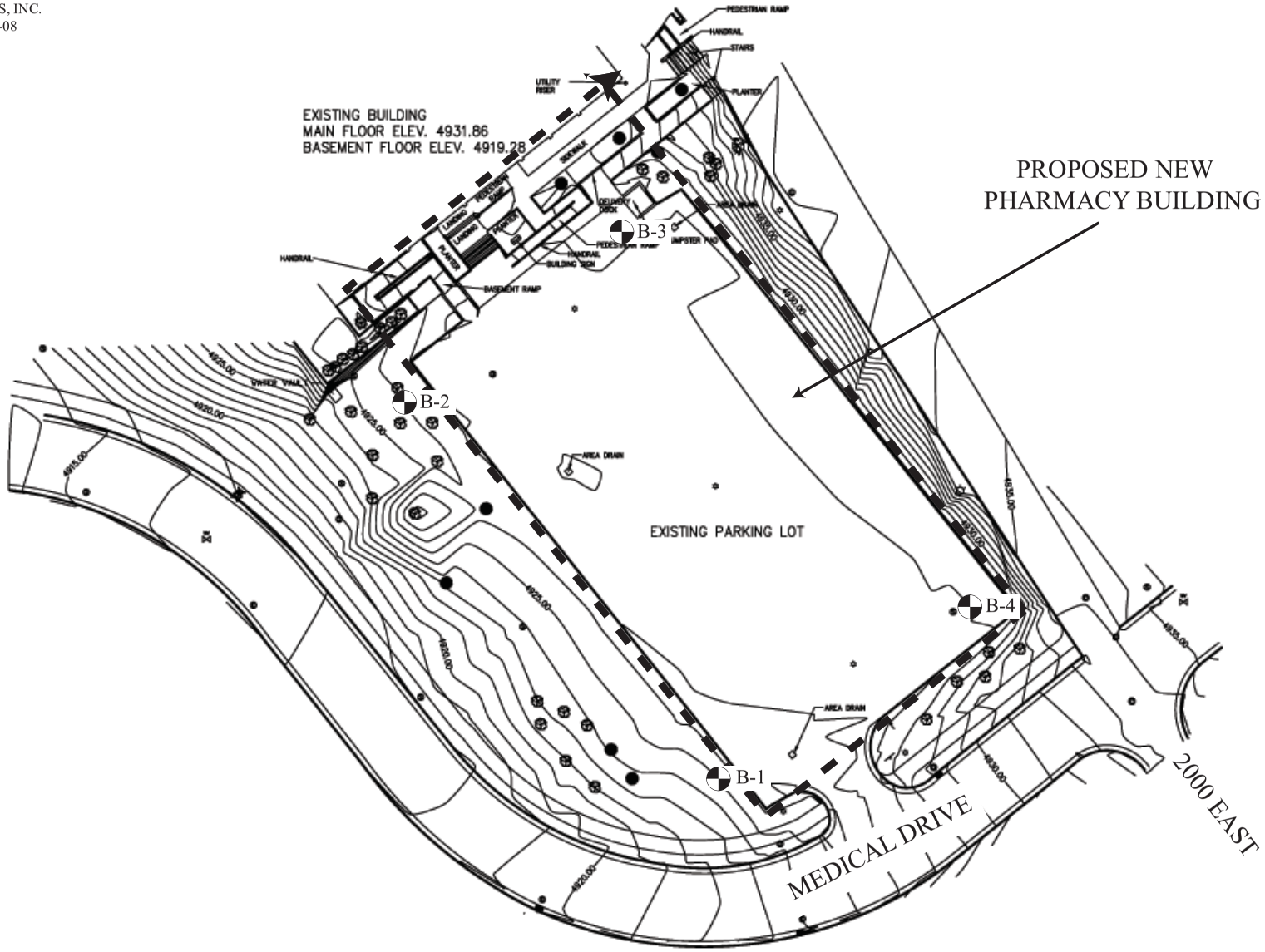

REFERENCE:
ADAPTED FROM DRAWING ENTITLED
"UNIVERSITY OF UTAH SKAGGS PHARMACY BUILDING"
BY PSOMAS, DATED NOVEMBER 5, 2008

SCALE IN FEET
20 0 20 40

FIGURE 3
SITE PLAN

GSH
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Geotechnical Consultants, Inc.

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4925' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datum: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		Ground Surface									
		SILTY CLAY, FILL with some fine sand; major roots (topsoil) to 2"-3"; trace organics; brown (CL-FILL)	0								loose to 3" moist
				19							stiff
		SILTY CLAY with trace fine sand; slightly blocky; petroleum odor; brown with light brown mottling (CL)	5								moist stiff
				21							
		grades with occasional layers up to 4" thick of silty fine sand; light brown and brown	10	41							very stiff
		SILTY CLAY with trace fine to coarse sand and occasional layers up to 1/8" thick of silty fine sand; grayish-brown and light gray (CL)									very moist
		grades with occasional silty fine sand; brown	15	13		24.3		98			stiff
		grades with occasional layers up to 6" thick of silty fine sand and silt; brown	20	16							
		SAND AND GRAVEL with trace silt; fine to coarse sand; fine and coarse gravel brown (SP/GP)	25								medium dense

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4A

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4925' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datum: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		SILTY/CLAYEY FINE GRAVEL with some fine to coarse sand; brown (CL/GC)		41		4.5		124			moist very stiff
		SILTY CLAY with some fine sand and occasional layers up to 6" thick of sand and gravel (CL)	30								
		drilling indicates occasional layers of sand and gravel up to 6" thick		40							
		SILTY CLAY with some zones of clayey silt; brown (CL/ML)									
		grades silty clay with some fine sand; occasional fine and coarse gravel; brown	35	16		24.1		111			stiff
		grades gravelly drilling at 37'									
			40	31							very stiff
		SILTY CLAY with some fine sand; brown and light brown (CL)	45	13							stiff
		Stopped drilling at 45.0'. Stopped sampling at 46.5'. Installed 1-1/4" diameter slotted PVC pipe to 46.5'.	50								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4A (con't)

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4926' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datum: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		Ground Surface	0								
		SILTY CLAY, FILL with some fine sand and occasional fine and coarse gravel; major roots (topsoil) to 3"; brown (CL-FILL)		11							loose to 3" moist medium stiff
		SILTY CLAY with some fine sand; brown with light brown (CL)	5	19							stiff
											moist stiff
				16		14.6		112			
			10								
		grades with occasional silty fine sand seams; slightly blocky		23							very stiff
			15								
		grades silty clay with some fine sand; fine sandy clay		14		23.8		96			stiff
			20								
		grades silty clay with some fine and coarse gravel; brown		93							
		SILTY SAND with trace gravel and occasional up to 1/4" layers of silty clay with fine to coarse sand and fine gravel; brown (SM/GM)									moist medium dense
			25								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4B

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4926' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datum: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		CLAYEY SAND AND GRAVEL fine to coarse sand; fine gravel; light brown to brown (SC)									
				50							hard/medium dense
		SILTY CLAY with some fine sand and layers fine and coarse gravel; light brown (CL)									
			30								
				16							stiff
		grades with zones of clayey sand and gravel	35								
				23		19.3		101			very stiff
		Stopped drilling at 38.0'.	40								
		Stopped sampling at 39.5'.									
		Installed 1-1/4" diameter slotted PVC pipe to 39.5'.									
		No groundwater encountered at time of drilling.	45								
			50								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4B
(con't)

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4927' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datum: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		Ground Surface	0								
		3.5" ASPHALT CONCRETE									
		1"-2" BASE COURSE									
		SILTY CLAY with some fine sand; brown with light brown (CL)									moist very stiff
				22							
			5	28							
		grades with occasional seams and up to 1/4" layers of silt and silty fine sand	10	20							stiff
		grades with occaisonal layers to 1/2" thick of clayey fine gravel	15	15							
		SILTY CLAY with trace gravel; light brown (CL)	20	22							very stiff
			25								hard

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4C

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4927' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datum: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		grades silty clay with some fine to coarse sand; fine gravel		57		12.5		122			
		CLAYEY GRAVELS AND SAND fine and coarse gravel and fine to coarse sand; light brown to brown (GC/SC)									
		grades with occasional fine and coarse gravel	30	22							very stiff
			35	33		9.9		131			
		SILTY CLAY with some fine to coarse sand and occasional fine and coarse gravel; brown (CL)	40	20							stiff
		Stopped drilling at 40.0'. Stopped sampling at 41.5'. Installed 1-1/4" diameter slotted PVC pipe to 41.5'.	45								
			50								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4C (con't)

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4927' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datus: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		Ground Surface	0								
		SILTY CLAY with some fine sand; major roots (topsoil) to 4"; reddish-brown (CL)									moist medium stiff
				7							
		grades with occasional fine sandy silt layers up to 1/4" thick	5	12		15.9		112			stiff
											moist
			10	20							
											loose
		SILTY CLAY with trace gravel and pockets of weekly to moderately cemented fine sand; reddish-brown (CL)	15	19							
		gravelly drilling from 17' to 19'									moist hard
		CLAYEY SAND with some fine to coarse gravel; slightly cemented; brown (SC)	20	75							
			25								slightly moist

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4D

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

Project Name: Proposed New Pharmacy Building
Project No.: 0258-009-08
Location: Health Science Portion of U of U Campus, SLC, UT
Client: EDA Architects, Inc.
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 11-24-08
GSH Field Rep.: RJG
Elevation: 4927' +/-
Water Level: No groundwater encountered (11-24-08)
Remarks: Datus: See Figure 3

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
				26							very stiff
		SILTY CLAY with some fine to coarse sand; brown (CL)									
		grades silty clay with some gravel and sand	30	44		9.2		129			hard
			35	35		11.2		126.5			
		grades no gravel; light brown mottling	40	15							stiff
		Stopped drilling at 40.0'. Stopped sampling at 41.5'. Installed 1-1/4" diameter slotted PVC pipe to 41.5'. No groundwater encountered at time of drilling.	45								
			50								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 4D (con't)

UNIFIED SOIL CLASSIFICATION SYSTEM

FIELD IDENTIFICATION PROCEDURES				GRAPH SYMBOL	LETTER SYMBOL [1]	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size. [2] (The No. 200 sieve size is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			Predominantly one size or a range of sizes with some intermediate sizes missing.		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
			Plastic fines (for identification procedures see CL below).		GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.
	SANDS More than half of coarse fraction is smaller than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.		SW	Well graded sands, gravelly sands, little or no fines.
			Predominantly one size or a range of sizes with some intermediate sizes missing.		SP	Poorly graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	Silty sands, poorly graded sand-silt mixtures.
			Plastic fines (for identification procedures see CL below).		SC	Clayey sands, poorly graded sand-clay mixtures.

IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE							
		DRY STRENGTH (CRUSHING CHARACTERISTICS)	DILATANCY (REACTION TO SHAKING)	TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)			
FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size. (The No. 200 sieve size is about the smallest particle visible to the naked eye)	SILTS AND CLAYS Liquid limit less than 50	None to slight	Quick to slow	None		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sand with slight plasticity.
		Medium to high	None to very slow	Medium		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		Slight to medium	Slow	Slight		OL	Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS Liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		High to very high	None	High		CH	Inorganic clays of high plasticity, fat clays.
		Medium to high	None to very slow	Slight to medium		OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS		Readily identified by color, odor, spongy feel and frequently by fibrous texture.				Pt	Peat and other highly organic soils.

[1] Boundary classifications: –Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW–GC, well graded gravel–sand mixture with clay binder.
[2] All sieve sizes on this chart are U.S. standard.

GENERAL NOTES

1. In general, Unified Soil Classification Designations presented on the logs were evaluated by visual methods only. There rore, actual designations (based on laboratory testing) may differ.

2. Lines seperating strata on the logs represent approximate boundaries only Actual transitions may be gradual.

3. Logs represent general soil conditions observed at teh point of exploration onthe date indicated.

4. No warranty is provided as to the continuity of soil conditions between individual sample locations.

FINE - GRAINED SOIL

CONSISTENCY	SPT (blows/ft)	TORVANE UNDRAINED SHEAR STRENGTH (tsf)	POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)	FIELD TEST
Very Soft	<2	<0.125	<0.25	Easily penetrated several inches by Thumb. Squeezes through fingers.
Soft	2 - 4	0.125 - 0.25	0.25 - 0.5	Easily penetrated 1 " by Thumb . Molded by light finger pressure.
Medium Stiff	4 - 8	0.25 - 0.5	0.5 - 1.0	Penetrated over 1/2 " by Thumb with moerate effort. Molded by strong finger pressure.
Stiff	8 - 15	0.5 - 1.0	1.0 - 2.0	Indented about 1/2 " by Thumb but penetrated only with great effort
Very Stiff	15 - 30	1.0 - 2.0	2.0 - 4.0	Readily indented by Thumbnail
Hard	>30	>2.0	>4.0	Indented with difficulty by Thumbnail

LOG KEY SYMBOLS

- Bulk / Bag Sample
- Thin Wall
- Standard Penetration Split Spoon Sampler
- No Recovery
- Rock Core
- 3-3/4" ID D&M Sampler
- 3" ID D&M Sampler
- Water Level
- California Sampler

COARSE -GRAINDE SOIL

APPERENT DENSITY	SPT (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
Very Loose	<4	0 - 15	Easily penetrated with 1/2 " reinforcing rod pushed by hand
Loose	4 - 10	15 - 35	Difficult to penetrated with 1/2 " reinforcing rod pushed by hand
Medium Dense	10 - 30	35 - 65	Easily penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Dense	30 - 50	65 - 85	Difficult to penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Very Dense	>50	85 - 100	Penetrated only a few inches with 1/2 " reinforcing rod driven with 5-lb hammer

STRATIFICATION

DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2 "
LAYER	1/2 - 12 "

DESCRIPTION	THICKNESS
Occasional	One or less per foot of thickness
Frequent	More than on per foot of thichness

CEMENTATION

DESCRIPTION	DESCRIPTION
Weakely	Crumbles or breaks with handling of slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumbles or breaks with finger pressure

MODIFIERS

DESCRIPTION	%
Trace	<5
Some	5 - 12
With	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible water, usually soil below Water Table

FIGURE 5

GSH
Gordon Spilker Huber
Geotechnical Consultants, Inc.

Equipment List

University of Utah
L.S. Skaggs School of Pharmacy

												Architectural			
New Room Number	Owner	Room Name	Equipment Number	Old Room Number	Equipment Description	Manufacturer	Model Number	Existing/New	Furnished By	Installed By	Width (IF NOT E for hoods – please use services matrix for actual width.	Depth (Inches)	Height (Inches)	Weight (Pounds)
Medicinal Chemistry														
	KB		123559	570002850	CENTRIFUGE	BECKMAN INSTRUMEN	J2-21	E						
	JAM		129872	582003150	HYBIRD SYSTEM W/PUMP	BECKMAN INSTRUMEN	322	E						
	CMI		149494	582003150	CHROMATOGRAPH, LIQUID	WATERS CORP	501	E						
	JAM		158203	058200303A	CHROMATOGRAPH SYSTEM	BECKMAN INSTRUMEN	SYSTEM GLD	E						
	JAM		160566	582003110	CHROMATOGRAPH SYSTEM, LIQ	BECKMAN INSTRUMEN	PROTEIN II	E						
	JAM		161444	058200038A	PUMP, SOLVENT	ISCO INC		E						
	KB		164474	570002710	DETECTOR SET	ISCO INC		E						
	CMI		172714	582003090	EVAPORATOR	SPEED VAC		E						
	CMI		172949	582003090	CHROMATOGRAPH		CURRENT	E						
	JAM		174371	582003110	RECORDING SYSTEM	PERKIN-ELMER CORP	C618-2000	E						
	CMI		174463	582000100	POLARIMETER	JASCO	DIP-370	E						
	EWS		175756	570002620	PUMP, INTELLIGENT	HITACHI	L-5011	E						
	DRD		176628	570000500	PROBE, OBSERVE	NALORAC		E						
	EWS		177017	570002620	CONTROLLER, HPLC	HITACHI		E						
	EWS		177018	570002620	DETECTOR, DIODE ARRAY	HITACHI	L-3000	E						
	DRD		185588	570000500	SPECTROMETER	VARIAN INSTRUMENT	UNITY 500	E						
	DRD		186073	570000500	PROBE, TRIPLE RESONANCE	NALORAC		E						
	CMI		188847	570002850	SPECTROPHOTOMETER	HEWLETT-PACKARD		E						
	DRD		189012	057000285A	INCUBATOR	BAXTER HEALTHCARE	WJ301D	E						
	KB		190553	570002740	PUMP, INTELLIGENT	HITACHI		E						
	KB		190554	570002740	DETECTOR, UV/VISIBLE	HITACHI		E						
	KB		190555	570002740	AUTOSAMPLER, ROBOTIC	HITACHI		E						
	DRD		194895	057000285B	SPECTROPOLARIMETER	JASCO	J-720	E						
	DRD		198684	570002850	PUMP	HITACHI	L-6200A	E						
	CMI		198688	570002800	DETECTOR	HITACHI	L-3000	E						
	DRD		211601	570002680	PHOTOMETER	HEWLETT-PACKARD	845SA	E						
	TEC		212413	570002950	WORKSTATION	SILICON GRAPHICS	CMNB007475	E						
	DRD		212420	057000285A	CABINET, SAFETY	FORMA SCIENTIFIC	1186	E						
	DRD		220999	057000285A	COUNTER	COULTER CORP	Z1-DUEL	E						
	DRD		223545	057000285A	MICROSCOPE	OLYMPUS	BX40	E						
	GDP		227247	859002050	SHAKER	INNOVA	4330	E						
	GDP		227279	859002050	FREEZER	FISHER SCIENTIFIC	21 CU FT	E						
	GDP		227289	859002050	DRYER, FREEZE	FISHER SCIENTIFIC	VLV 12L	E						
	GDP		227381	859002050	PRESS	SPECTRONIC INSTRU	FRENCH PRESSUR	E						
	GDP		227465	859002050	PROTEIN SEPARATOR	PHARMACIA BIOTECH		E						
	GDP		227553	859002050	CENTRIFUGE	DUPONT	ULTRAPRO80	E						
	GDP		227554	859002050	ROTOR	DUPONT	T-880	E						
	GDP		227555	859002050	ROTOR	DUPONT	T-865	E						
	GDP		227556	859002050	ROTOR	DUPONT	A-641	E						
	GDP		227557	859002050	ROTOR	DUPONT	AH-629	E						
	GDP		227558	859002050	CENTRIFUGE	DUPONT	RC-5C	E						
	JAM		228363	582003150	ROTOR	BECKMAN INSTRUMEN	50 TI	E						
	GDP		229639	859002050	CHROMOTOGRAPHY SYSTEM	PERSEPTIVE BIOSYS	BIOCAD	E						
	GDP		231378	859002050	PUMP	WATERS CORP		E						
	GDP		231379	859002050	DETECTOR	WATERS CORP		E						
	GDP		231380	859002050	REFRACTOMETER	WATERS CORP		E						
	GDP		233094	859002050	SPECTROPHOTOMETER	HEWLETT-PACKARD	8453	E						
	JAM		236727	582003150	CHROMATOGRAPH SYSTEM, LIQ	BECKMAN INSTRUMEN	NONE	E						
	GDP		240364	857003620	CABINET, BIOSAFETY	FORMA SCIENTIFIC	4 FT	E						
	GDP		240369	857003620	CABINET, BIOSAFETY	FORMA SCIENTIFIC	1186	E						
	TEC		242217	570002950	WORKSTATION	SILICON GRAPHICS	200 MHZ	E						
	DRD		243566	570000500	PROBE	NALORAC	500MHZ	E						
	DRD		244315	570000500	PROBE	NALORAC	600MHZ	E						
	DRD		246218	570000500	PROBE	NALORAC	600MHZ	E						
	DRD		247948	570000500	AIR CONDITIONER	AIRJET	CRYSTAL	E						
	DRD		250120	570000500	SPECTROMETER SYSTEM	INNOVA	600MHZ NMR	E						
	DRD		252136	565035320	COMPUTER	SILICON GRAPHICS	P-270	E						
	GDP		253685	857003600	READER, MICROPLATE	PHENIX RESEARCH	MR20-150	E						
	DRD		255046	582000010	POLARIMETER, F.T.I.R.	JASCO INC	FTIR 420	E						
	JAM		258729	582003110	STORAGE SYSTEM		NITROGEN GENER	E						
	TEC		258730	19002750	COMPUTER	UNIVERSAL SYSTEMS		E						
	TEC		258731	19004180	COMPUTER	UNIVERSAL SYSTEMS	PIII-733	E						
	TEC		258732	19004180	COMPUTER	UNIVERSAL SYSTEMS	PIII-733	E						
	TEC		258849	057000295A	COMPUTER	SILICON GRAPHICS		E						
	TEC		258862	057000295A	COMPUTER	SILICON GRAPHICS		E						
	DRD		260175	582000020	SPECTROMETER	VARIAN INSTRUMENT		E						
	GDP		260371	859002050	READER, MICROPLATE	GEMINI	SPECTRAMAX	E						
	DRD		260374	570000500	PROBE	NALORAC	5MM	E						
	DRD		260994	570000500	PROBE	NALORAC	MDBG500-3	E						
	DRD		262483	570000500	PROBE	NALORAC	4NG400-5T	E						
	DRD		264110	570002850	CENTRIFUGE	CENTRA	MP4R	E						
	CMI		267135	582003150	CHROMATOGRAPH SYSTEM	AGILENT TECHNOLOG		E						
	DRD		267299	570002800	READER, MICROPLATE	FISHER SCIENTIFIC	MULTISKAN PLUS	E						
	JAM		270210	582003110	FREEZER	THERMO FORMA	8516 ULTRA LOW	E						
	GDP		270224	857003610	FREEZER	THERMO FORMA	981	E						
	CMI		270506	582003110	SPEEDVAC SYSTEM	SAVANT INSTRUMENT		E						
	JAM		272320	582003110	COMPUTER	DELL	POWEREDGE 2500	E						
	CMI		274349	582003120	COUNTER	COULTER CORP	Z1	E						
	GDP		276409	857003620	INCUBATOR	FISHER SCIENTIFIC	CELL CULTURE	E						
	GDP		278487	857003610	AUTOCLAVE		HV-110	E						
	CMI		279629	582000500	CRYOPROBE		NMR	E						
	CMI		279695	582003090	CONCENTRATOR SYSTEM	PRECISION SCIENTI		E						
	CMI		280726	582003090	POWER SUPPLY	LIEBERT	NFINITY	E						
	KB		281765	570002710	FREEZER	THERMO FORMA	995 UPRIGHT	E						
	CMI		281843	582003120	FREEZER	THERMO FORMA	995	E						
	KB		283216	570002740	THERMALCYCLER	MJ RESEARCH	DNA ENGINE	E						
	CMI		283765	582003150	SPECTROMETER	WATERS CORP	MICRO MASS	E						
	TEC		283800	40000950	COMPUTER	UNIVERSAL SYSTEMS	2U DUAL STORAG	E						
	CMI		284405	582003120	CENTRIFUGE	INTERMOUNTAIN SCI	AIR COOLED	E						
	EWS		285381	570002620	SONICATOR	INTERMOUNTAIN SCI	750W	E						
	GDP		285833	589002050	DETECTOR	WYATT TECHNOLOGY	TRISTAR LIGHT	E						
	GB		286311	857003650	CHROMATOGRAPH SYSTEM, LIQ	WATERS CORP	ALLIANCE	E						
	GB		286312	857003650	CHROMATOGRAPH SYSTEM, LIQ	WATERS CORP	PREPARATIVE	E						
	CMI		286327	582003150	COLLECTOR, FRACTION	WATERS CORP		E						
	CMI		286475	582003120	LUMINOMETER	VERITAS		E						
	GB		287868	859002050	COUNTER, MULTILABEL	PERKIN-ELMER CORP	VICTOR V	E						
	GDP		287875	857003620	MICROSCOPE	OLYMPUS	CKX41	E						
	EWS		288273	057000285B	THERMALCYCLER	BIO-RAD LABORATOR	DNA ENGINE	E						
	CMI		288424	582003150	CONCENTRATOR SYSTEM	SAVANT INSTRUMENT	SC210A-115	E						
	CMI		288493	582003150	COMPUTER	BECKMAN COULTER I	285419	E						
	AB		290522	570002680	MICROPLATE READER	MOLECULAR DEVICES	SPECTRAMAX M5	E						
	AB		290635	570002680	CHROMATOGRAPHY SYSTEM	POLARIS		E						
	AB		290789	570002680	FREEZE DRYER	FTS SYSTEM INC	FLEXI-DRY MP F	E						

New Room Number	Owner	Room Name	Equipment Number	Old Room Number	Equipment Description	Manufacturer	Model Number	Existing/New	Furnished By	Installed By	Architectural: Width (in.) NOTE for hoods -- please use services matrix for actual width	Depth (Inches)	Height (Inches)	Weight (Pounds)
	KB		290792	570002710	CHROMATOGRAPHY SYSTEM	GE HEALTHCARE BIO	AKTAPRIME PLUS	E						
	CMI		292067	582003150	DETECTOR, WATERS ELS	WATERS CORP	2424 ELS	E						
	KB		292155	570002710	CHROMATOGRAPHY SYSTEM	HITACHI	7000	E						
	CMI		292222	057000010P	FREEZER	FISHER	ISOTEMP BASIC	E						
	KB		292326	570002710	CENTRIFUGE	EPPENDORF	5810R	E						
	KB		292327	570002710	SPECTROPHOTOMETER	FISHER SCIENTIFIC	GENESYS 6	E						
	CMI		292411	582003150	VACUUM SYSTEM	THERMO FISHER SCI		E						
	KB		293605	570002710	CHROMATOGRAPHY SYSTEM	TELEDYNE ISCO INC	COMBIFLASH RF	E						
Pharmaceutics														
	DG			207 BPRB	Fisher Scientific Reader Plate			E						
	DG			207 BPRB	Packard Bell scintillation counter			E						
	DG			207 BPRB	Packard Bell gamma counter			E						
	WH			209 BPRB	Boyle Instrument microscope			E						
	WH			209 BPRB	Beckman Instrument pumping system			E						
	WH			209 BPRB	Kontron Spectrophotometer			E						
	WH			209 BPRB	Hewlett Packard autosampler			E						
	WH			209 BPRB	Hewlett-Packard Detector			E						
	WH			209 BPRB	Agilent Technology detector			E						
	SK			303A Wakara Way	Fisher Sientific Incubator			E						
	SK			303A Wakara Way	Olympus Microscope			E						
	SK			303A Wakara Way	Fisher Scientific incubator			E						
	SK			303A Wakara Way	Olympus Microscope			E						
	SK			303A Wakara Way	VWR Scientific biosafety cabinet			E						
	SK			303A Wakara Way	VWR Scientific cabinet biosafety			E						
	SK			303A Wakara Way	VWR Scientific cabinet biosafety			E						
	SK			303A Wakara Way	VWR Scientific cabinet biosafety			E						
	YHB			302 Wakara Way	Bio-Rad Laborator			E						
	YHB			302 Wakara Way	Waters Corp Chromatography system			E						
	YHB			302 Wakara Way	Spectromax spectrophometer			E						
	YHB			302 Wakara Way	Coulter Corp counter, particle			E						
	YHB			302 Wakara Way	Aquastar titrator			E						
	YHB			303 Wakara Way	VWR Scientific centrifuge			E						
	YHB			303 Wakara Way	Olympus Microscope			E						
	YHB			304 Wakara Way	VWR Scientific freeze dry system			E						
	YHB			304 Wakara Way	Shimadzu Scientific optical bench			E						
	YHB			304 Wakara Way	Laurell Technology processor, spin			E						
	YHB			304 Wakara Way	Malvern Instrument setasizer			E						
	YHB			304 Wakara Way	Molecular Devices microplate reader			E						
	YHB			304 Wakara Way	Agilent technology chromatograph			E						
	YHB			304 Wakara Way	Fisher Scientific water purification			E						
	YHB			304 Wakara Way	Hemox B Analyzer			E						
	YHB			302 Wakara Way	Waters Corp Chromatography system			E						
	YHB			302 Wakara Way	Bio-Rad Laborator			E						
	YHB			302 Wakara Way	Spectromax spectrophometer			E						
	YHB			302 Wakara Way	Coulter Corp counter, particle			E						
	YHB			303 Wakara Way	VWR Scientific centrifuge			E						
	YHB			303 Wakara Way	Olympus Microscope			E						
	YHB			303 Wakara Way	Leeds Precision I microscope			E						
	YHB			304 Wakara Way	VWR Scientific freeze dry system			E						
	YHB			304 Wakara Way	Shimadzu Scientific optical bench			E						
	YHB			304 Wakara Way	Laurell Technology processor, spin			E						
	YHB			304 Wakara Way	Malvern Instrument setasizer			E						
	YHB			304 Wakara Way	Molecular Devices microplate reader			E						
	YHB			304 Wakara Way	Agilent technology chromatograph			E						
	YHB			304 Wakara Way	Fisher Scientific water purification			E						
	YHB			304 Wakara Way	Hemox B Analyzer			E						
	YHB			302 Wakara Way	Aquastar Titrator			E						
	CL			306 Wakara Way	Intermountain Sci Electroporator			E						
	CL			307 Wakara Way	Olympus Microscope			E						
	CL			307 Wakara Way	Phenix Research Luminator			E						
	CL			306 Wakara Way	Intermountain Sci Electroporator			E						
	CL			307 Wakara Way	Olympus Microscope			E						
	CL			307 Wakara Way	Phenix Research Luminator			E						
	CL			307 Wakara Way	VWR Scientific freezer			E						
	CL			307 Wakara Way	VWR Scientific Freezer			E						
	BY			308 Wakara Way	microcal Inc calorimeter			E						
	BYu			308 Wakara Way	microcal Inc calorimeter			E						
	Byu			308 Wakara Way	microcal Inc circulating bath			E						
	BYu			308 Wakara Way	Agilent Technology chromatography			E						
	BYu			309 Wakara Way	VWR Scientific fume hood			E						
	BYu			309 Wakara Way	Fisher Scientific circulating bath			E						
	BYu			308 Wakara Way	microcal Inc calorimeter			E						
	BYu			308 Wakara Way	microcal Inc calorimeter			E						
	BYu			308 Wakara Way	Microcal Inc. circulating bath			E						
	BYu			308 Wakara Way	Agilent technology chromatograph			E						
	BYu			309 Wakara Way	VWR Scientific fume hood			E						
	BYu			310 Wakara Way	Agilent technology chromatograph			E						
	ZRL			314 Wakara Way	encapsulation unit			E						
	ZRL			324 Wakara Way	amercham pharmaci chromatograph			E						
	ZRL			324 Wakara Way	Icon Scientific chromatograph			E						
	ZRL			324 Wakara Way	Horizon purification system			E						
	ZRL			326 Wakara Way	Cascade freeze dryer			E						
	ZRL			326 Wakara Way	Agilent Technology chromatograph			E						
	ZRL			326A Wakara Way	E Light Company Microscope			E						
	ZRL			326A Wakara Way	JP Scientific autoclave			E						
	ZRL			326A Wakara Way	Minolta camera			E						
	ZRL			326A Wakara Way	Fisher Scientific Incubator			E						
	ZRL			314 Wakara Way	encapsulation unit			E						
	ZRL			324 Wakara Way	amercham pharmaci chromatograph			E						
	ZRL			324 Wakara Way	Icon Scientific refractometer			E						
	ZRL			324 Wakara Way	Horizon purification system			E						
	ZRL			326 Wakara Way	Cascade freeze dryer			E						
	ZRL			326 Wakara Way	Agilent Technolog chromatograph			E						
	ZRL			326A Wakara Way	E Light Company Microscope			E						
	ZRL			326A Wakara Way	JP Scientific autoclave			E						
	ZRL			326A Wakara Way	Minolta camera			E						
	ZRL			326A Wakara Way	Fisher Scientific incubator			E						
	ZRL			327 Wakara Way	Cooper Laser- laser			E						
	DG			70 Skaggs Hall	Fisher Scientific plate reader			E						
	DG			207 Skaggs Hall	Packard Bell scintillation counter LI			E						
	DG			207 Skaggs Hall	Packard Bell gamma counter			E						
	WH			209 Skaggs Hall	Boyle Instrument microscope			E						
	WH			209 Skaggs Hall	Beckman Instrument pumping system			E						
	WH			209 Skaggs Hall	Kontron Spectrophotometer			E						
	WH			209 Skaggs Hall	Hewlett-Packard autosampler			E						

University of Utah
L.S. Skaggs School of Pharmacy

New Room Number	Owner	Room Name	Equipment Number	Old Room Number	Equipment Description	Manufacturer	Model Number	Existing/New	Furnished By	Installed By	Architectural: Width (in.) NOTE for hoods -- please use services matrix for actual width	Depth (Inches)	Height (Inches)	Weight (Pounds)
	WH			209 Skaggs Hall	Hewlett-Packard Detector			E						
	WH			209 Skaggs Hall	Hewlett-Packard Detector			E						
	WH			213 Skaggs Hall	Hewlett-Packard chromatograph			E						
	WH			213 Skaggs Hall	Jas Instruments potentiostat			E						
	JH			150A BPRB	VWR Scientific Incubator			E						
	JH			154 BPRB	Biotek Instruments Microplate Reader			E						
	JH			154 BPRB	Lambda Spectrophotometer			E						
	JH			154 BPRB	Pharmacia LKB Controller			E						
	JH			154 BPRB	Hart Scientific Calorimeter			E						
	JH			154A BPRB	ISS Inc. Flourimeter			E						
	JH			154BPRB	ISS Inc. Spectroflourometer			E						
	JH			158A BPRB	Silicon Graphics Computer			E						
	DG			182 BPRB	Chemidoc Bio-Rad Laboratory			E						
	DG			182 BPRB	Nikon Microscope			E						
	DG			182BPRB	Nikon Microscope			E						
	DG			182 BPRB	AG Heinze Camera			E						
	ZRL			327 Wakara Way	Newport Corp Table Top			E						
	ZRL			327 Wakara Way	Brookhaven Instru Goniometer			E						
	ZRL			328 Wakara Way	Eppendorf Centrifuge			E						
	ZRL			330 Wakara Way	Digilab Inc. Spectrometer			E						
	ZRL			330 Wakara Way	Mettler Balance			E						
	ZRL			330 Wakara Way	Technique Optical Bench			E						
	ZRL			330 Wakara Way	Bio-Rad Laboratory Spectrometer			E						
	ZRL			330 Wakara Way	Physiologic Instr Current Clamp			E						
	ZRL			330 Wakara Way	Chromatograph System			E						
	ZRL			335 Wakara Way	Ultra Centrifuge			E						
	ZRL			335 Wakara Way	Scintillation Counter			E						
	ZRL			335 Wakara Way	Beckman Instrument centrifuge			E						
	ZRL			335 Wakara Way	Quantachrome Surface Area Analyzer			E						
	ZRL			335 Wakara Way	Varian Instrument Spectrometer			E						
	ZRL			336A Wakara Way	Water Specialties DI Water System			E						
								E						
Pharmo-Toxicology CHT														
					N2 generator			E			24	24		
					N2 dewar 2-3			E			24	24		
					flammable solvent storage (2)			E			43	18		
					floor centrifuge (3)			E			30	25		
					CHEST Freezer (4)			E			62	28		
					UPRIGHT freezer (8)			E			36	36		
					isoTemp -20 freezer			E			53	33		
					-70 Freezer (2)			E			36	40		
					upright glass Cold Box (2)			E			80	36		
					drying oven			E			46	25		
					bookshelf			E			36	15		
					Incubator			E			35	29		
					Homogenizer			E			14	21		
					RC5B centrifuge			E			30	39		
					ultraPro80 centrifuge			E			42	38		
					filing cabinets (9)			E			15	25		
					TSQ MS mass spectrometer			E			104	40		
					LCTSQ mass spectrometer			E			116	64		
					GCTSQ mass spectrometer			E			116	64		
					GCSSQ mass spectrometer			E			116	64		
					QSTAR Mass Spec			E			116	64		
					QPXE Mass Spec			E			104	40		
					flow cytometer			E			120	36		
					Walk-in cold box			E						
					walk-in freezer			E						

Med Chem

KB	KUBERAN BALAGURUNATHAN
AB	AMY BARRIOS
GB	GRZEGORZ BULAJ
TEC	THOMAS E. CHEATHAM
DRD	:ELL R. DAVIS
CMI	CHRIS M. IRELAND
JAM	JAMES A. MCCLOSKEY
GDP	GLENN D. PRESTWICH
EWS	ERIC W. SCHMIDT

Hazardous Material Inventory

Department of
Environmental Health and Safety
THE UNIVERSITY OF UTAH

CHEMICAL INVENTORY FORM
Date: 10-29-08
PI: Wilkins, D.; Rollins, D.; Moody, D.; Slawson, M.; Foltz, R.
Lab Supervisor: Andrenyak, D.
Bldg: 417 Wakara Way, Suite 2111
Rm: 2029

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Chemicals
GASES				
Compressed Gases				-
Flammable Gases				-
LPG (liquefied petroleum gas)				-
Oxidizing Gases				-
Toxic Gases				-
OTHER CHEMICALS				
Combustible Liquids				-
Corrosives		5 gr		acetic anhydride
		300 mL		hydroiodic acid
Cryogenics				-
Explosives				-
Flammable Liquids				-
Flammable Solids			100 gr	sodium borohydride
Highly Toxic				-
Organic Peroxides				-
Oxidizers			20 gr	silver nitrate
			500 gr	potassium permanganate
Pyrophorics				-
Toxic		250 mL		N,N-dimethyl-formamid
			100 gr	sodium borohydride
			50 gr	tetraethyl thiuram disulfide
			5 gr	Trypan blue
Unstable Reactives				-
Water Reactives				-

Department of
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THE UNIVERSITY OF UTAH

CHEMICAL INVENTORY FORM

Date: 10-29-08
PI: Wilkins, D.; Rollins, D.; Moody, D.; Slawson, M.; Foltz, R.
Lab Supervisor: Andrenyak, D.
Bldg: 417 Wakara Way, Suite 2111
Rm: 2151

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Chemicals
GASES				
Compressed Gases	K2			air
	K2			nitrogen
	K2			argon
	K2			helium
Flammable Gases	K2			hydrogen
	K2			methane
LPG (liquefied petroleum gas)				-
Oxidizing Gases				-
Toxic Gases				-
OTHER CHEMICALS				
Combustible Liquids		300 mL		methyl sulfoxide, DMSO
Corrosives				-
Cryogenics				-
Explosives				-
Flammable Liquids		4 L		methanol
		3 L		ethyl acetate
		4 L x5		hexane
		1L x6		isopropanol
Flammable Solids				-
Highly Toxic				-
Organic Peroxides				-
Oxidizers				-
Pyrophorics				-
Toxic				-
Unstable Reactives				-
Water Reactives				-

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Environmental Health and Safety
THE UNIVERSITY OF UTAH

CHEMICAL INVENTORY FORM

Date: 10-29-08
PI: Wilkins, D.; Rollins, D.; Moody, D.; Slawson, M.; Foltz, R.
Lab Supervisor: Andrenyak, D.
Bldg: 417 Wakara Way, Suite 2111
Rm: 2160

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Chemicals
GASES				
Compressed Gases				-
Flammable Gases				-
LPG (liquefied petroleum gas)				-
Oxidizing Gases				-
OTHER CHEMICALS				
Combustible Liquids		100 gr		phenylacetone
Corrosives				-
Cryogenics				-
Explosives				-
Flammable Liquids				-
Flammable Solids				-
Highly Toxic			625 gr	potassium cyanide
			25 gr	strychnine
Organic Peroxides				-
Oxidizers				-
Pyrophorics				-
Toxic			12 gr	amphetamine sulfate
			100 gr	sodium barbital
			17 gr	cocaine
			20 gr	heroine
			65 gr	methamphetamine
			20 gr	secobarbitl
Unstable Reactives				-
Water Reactives				-

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THE UNIVERSITY OF UTAH

CHEMICAL INVENTORY FORM

Date: 10-29-08
PI: Wilkins, D.; Rollins, D.; Moody, D.; Slawson, M.; Foltz, R.
Lab Supervisor: Andrenyak, D.
Bldg: 417 Wakara Way, Suite 2111

Rm: 2171

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Chemicals
GASES				
Compressed Gases				-
Flammable Gases				-
LPG (liquefied petroleum				-
Oxidizing Gases				-
Toxic Gases				-
OTHER CHEMICALS				
Combustible Liquids		3 kg		methyl sulfoxide, DMSO
Corrosives		500 mL x3		hydrochloric acid
		500 mL		perchloric acid
		2.5 L x5		glacial acetic acid
		500 mL		sulfuric acid
		500 mL		phosphoric acid
		50 mL		hydroiodic acid
		100 mL x4		formic acid
		200 gr		trichloroacetic acid
			400 gr	trifluoroacetic acid
			500 gr	L-ascorbic acid
		500 mL x2		Cromaclean
		500 mL x7		ammonium hydroxide
			1 kg	sodium hydroxide
			750 gr	potassium hydroxide
		500 mL		Bradford reagent
Cryogenics				-
Explosives				-
Flammable Liquids		10 mL x3		acetaldehyde
		I L x3		acetone
		4 L x2		acetone
		500 mL x2		boron trifluoride
		4L x3		chlorobutane
		4 L		cyclohexane
		500 mL x6		ethanol
		4L x3		ehtyl ether
		200 mL		ethanethiol
		4 L x3		ethyl acetate
		4 L x2		hexane

		4 L		isooctane
		4L x4		isopropanol
		4 L x12		methanol
		2 L x2		methanol
		1L		n-propanol
		4 L		pentane
		4L x3		toluene
Flammable Solids			1 kg	sulfur
Highly Toxic				-
Organic Peroxides		500 mL		ether, anhydrous
Oxidizers		100 mL		hydrogen peroxide
		500 mL		sodium hypochlorite
		500 mL		perchloric acid
Pyrophorics				-
Toxic		4 L x6		acetonitrile
		4 L x3		dichloromethane
		4 L x2		chloroform
		less than 2L		carbon disulfide
		4 L x4		MTBE
		less than 5 gr		thiourea
			600 gr	sodium fluoride
Unstable Reactives		4L		tetrahydrafuran
Water Reactives				-

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CHEMICAL INVENTORY FORM
Date: 10-29-08
PI: Wilkins, D.; Rollins, D.; Moody, D.; Slawson, M.; Foltz, R.
Lab Supervisor: Andrenyak, D.
Bldg: 417 Wakara Way, Suite 2111
Rm: 2172

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Chemicals
GASES				
Compressed Gases	2 cu feet			air
	K2			nitrogen
	GP-45 x4			argon
	1800 PSI			argon
	K2 x2			helium
Flammable Gases	14 L			hydrogen
	3 cu feet			methane
	14 L			methane, 1% in nitrogen
	6 oz x5			isobutane
LPG (liquefied petroleum gas)				-
Oxidizing Gases	8 oz			nitrous oxide
	57 L			oxygen
Toxic Gases	19 lb			NH3 anhydrous
	182 gr			NH3 anhydrous
	0.41 lb			dimethylamine
	0.43 lb			trimethylamine
	454 gr			hydrogen bromide
OTHER CHEMICALS				
Combustible Liquids				-
Corrosives				-
Cryogenics				-
Explosives				-
Flammable Liquids				-
				-
				-
				-
Flammable Solids				-
Highly Toxic				-
Organic Peroxides				-
Oxidizers				-
Pyrophorics				-
Toxic				-

Unstable Reactives				-
Water Reactives				-

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CHEMICAL INVENTORY FORM

Date:
PI: Youhan Bae
Lab Supervisor: Youhan Bae
Bldg: 421 Wakara Way, Suite 318 Rm:301

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Examples
Combustible Liquids				
Decalin		500 mL		
Corrosives				
3-amino-1,2-propanediol		25g		
serinol			6 g	
Thionyl chloride		100 mL		
Flammable Liquids				
DMF		100 mL		
Ethyl acetate		100 mL		
Methol		100 mL		
Toluene		1 L		
Dioxane		100 mL		
Flammable Solids				
Calcium hydride			100g	
Triethylamine		100 mL		
Toxic				
Hexadecylpyridinium chloride			25 g	
2-mercaptoethanol		100 mL		
DMF		1L, 4L×3, 100 mL		
N,N'-dicyclohexylcarbodiimide			100 g	
Methol		4L		
4-(dimethylamino) pyridine			5 g	

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CHEMICAL INVENTORY FORM

Date:11/24/08
PI:Sheryl M. Dutson
Lab Supervisor: William Crowley
Bldg: 421 Wakara Way Rm: Lab #302

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Examples
GASES				
Compressed Gases	0			helium, carbon dioxide, nitrogen
Flammable Gases	0			acetylene,carbon monoxide, hydrogen
LPG (liquefied petroleum gas)	0			propane
Oxidizing Gases	0			oxygen, ozone, fluorine, nitrous oxide, chlorine
Toxic Gases	0			boron trifluoride, arsine
OTHER CHEMICALS				
Combustible Liquids		0		kerosene, cyclohexanol, acetyl cellosolve
Corrosives		0		hydrochloric,nitric,hydrofluoric, perchloric acids, sodium hydroxide
Cryogenics		0		liquid nitrogen
Explosives		0		2,4-dinitrophenol, organic azides
Flammable Liquids		500 ml EtoH, 2L Isopropyl alcohol		acetone, petroleum ether, ethyl acetate, hexane, xylene, methanol, acetaldehyde
Flammable Solids			0	picric acid powder, magnesium
Highly Toxic		0	100g Dinitrochlorobenzene (DNCB)	carcinogens, teratogens, cyanides, acrylamide, phenol, methyl-nitrosourea, formaldehyde,benzene, carbon tetrachloride
Organic Peroxides		0		benzoyl peroxide, old ethers (e.g., ethyl, isopropyl)
Oxidizers		0	0	nitrates, nitrites, permanganates, perchlorates, chlorates, chlorites, bromine
Pyrophorics	0	0	0	silane, phosphorus, titanium dichloride, tributylaluminum, lithium
Toxic		0	50g Sodium Lauryl	chloroform, acetonitrile, acrolein
Unstable Reactives		0	0	tetrahydrafuran
Water Reactives		0	0	sodium, sodium metal, calcium carbide

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CHEMICAL INVENTORY FORM

Date:
PI: You Han Bae
Lab Supervisor: You Han Bae
Bldg: 421 Wakara Way Rm:303

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Examples
Combustible Liquids				
Isopropyl alcohol		1L		
Ethyl alcohol		4L×4		
Corrosives				
Hydrogen peroxide		500 mL		
Iron (III) cholride			500g×2	
Ferric chloride			100 g	
Chloroacetyl chloride		100 mL		
Ethylenediamine		100 mL		
Hexylamine		5 mL		
Hexamethylene diamine			25 g	
Trifluoroacetic acid		100 g		
Potassium tert-butoxide			100 g	
4-(dimethylamino) pyridine		100 g		
Pyridine		100 g		
Potassium hydroxide			3.5 kg	
Sodium hydroxide			4 kg	
Lithium bromide			100 g	
Flammable Liquids				
Nitromethane		500 mL		
Dimethyl sulfoxide-d6		10 g		
Isopropylamine		25 mL		
Toxic				
Potassium ferricyanide			500g	
Sodium nitrite			500g	
Hydrazine			50 g	
Highly Toxic				
Potassium cyanide			25 g	
Potassium cyanide			125g	
Sodium azide			100 g	
Oxidizers				
Hydrogen Peroxide	200mL			

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CHEMICAL INVENTORY FORM

Date:

PI: Youhan Bae

Lab Supervisor: Youhan Bae

Bldg: 421 Wakara Way, Suite 318 Rm: 304

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Examples
Compressed Liquids				
Liquefied Ammonium		20 kg		
Nitrogen	230 cu. ft. ×2			
Cryogenics				
Liquid nitrogen		7 L		
Combustible Liquids				
Ethyl 3-bromopropionate		100g		
N,N,N',N'-Tetra-methyl-ehtylenediamine		5mL		
Acetone		1 L		
Ethyl ether		20 L×2		
Ethyl acetate		4L×2		
Cyclohexane		4L		
Petroleum ether		4L×2		
Corrosives				
Trifluoroacetic acid		100g		
p-Toluene sulfonic acid		100g		
Sodium methoxide			100g	
Sodium			100g	
Potassium tert-butoxide		50mL		
Potassium tert-butoxide			100g	
Benzyl Chloroformate		100g		
N-Ethylmaleimide			5g	
Maleic anhydride			25g	
Phosphoruc pentoxide			500g	
Ammonium hydroxide		2L		
o-Phosphoric acid		500 mL		
Oleylamine 70%		500 g		
Thionyl chloride		100 mL ×4		
Flammable Liquids				
2,2,2-Trifluoroethanol		100g		
Styrene		1L		
Potassium tert-butoxide		50mL		
Acetic acide		4L×2		
1-Octanol		4L		
Dioxane		4L×2, 500 mL×4, 100 mL×1		

Pyridine		1L		
Methol		4L×3, 500 mL×1		
Toluene		4L×7, 1L×2		
DMF		4L×2, 100mL×1		
Tetrahydrofuran		4L×1, 500 mL×6		
Acetonitrile		4L×2		
2-Propanol		4L×2		
Methylsulfoxide		4L×1, 200 mL×1		
Flammable Solids				
Sodium methoxide			100g	
N-Ethylmaleimide			5g	
Potassium tert-butoxide			100g	
Harmful				
Styrene		1L		
5,5-Diphenylhydantoin			100g	
Ferrous sulfate 7hydrate			500g	
Pyridine		1L		
Polyethyleneimine		250mL		
Potassium ferrocyanide(II) trihydrate			100g	
Phosphoruc pentoxide			500g	
Potassium ferriccyanide			100g	
Adenine			5g	
caprolactone		50g		
Ammonium bicarbonate			1kg	
Highly Toxic				
Sodium nitroferriccyanide (III) dihydrate			5g	
Ethyl bromoacetate		500g		
Potassium dichromate			500g	
Phosphorus(V) chloride			100g	
Chloroform		4L×3		
Chloroform-d		100g		
Dichloroform		50g, 4L×2		
Irritant				
Styrene		1L		
Ethylenediaminetetraacetic dianhydride			50g	
Stannous 2-ethyl-hexanoate		100g		
Succinic anhydride			100g	
DOWEX-50W			500g	
1-Dodecylpyridinium chloride hydrate			25g	
Octadecylamine			500g	
Hexyl alcohol		100mL		
Magnesium carbonate			500g	
1-Octanol		100mL		
Polycaprolactone diol			500g	
Potassium carbonate			500g	
Potassium Bromide			25g	
Activated carbon			250g	
Sodium phosphate monobasic			500g	
Sodium phosphate dibasic			500g	

Silica gel			1kg	
Sodium chloride			500g	
Oxidizers				
Potassium Permanganate			500g	
Perchloric acid		500 mL		
Potassium Dichromate			500g	
Toxic				
Ammonium Nitrate			500g	
Benzyl Chloride		100 mL		
Benzyl Chloroformate		100g		
Verapamil hydrocloride			1g	
Triphosgene			25g	
Theobromine			25g	
Trypan Blue			5g	
2,2,2-Trifluoroethanol		100g		
Benzyl alcohol		100mL		
Bis-(trichloromethyl) carbonate			10g	
Hydrochloric acid		4L×2		
Sulfuric acid		4L×5		

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THE UNIVERSITY OF UTAH

CHEMICAL INVENTORY FORM
Date: 11-29-2008
PI: Grzegorz Bulaj
Lab Supervisor: Dan McDougle
Bldg: 421 wakara way Rm: 368

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Examples
GASES				
Compressed Gases	Helium-10lbs (2) N2-10lbs (4)			helium, nitrogen
Flammable Gases	0			
LPG (liquefied petroleum gas)	0			
Oxidizing Gases	0			
Toxic Gases	0			
OTHER CHEMICALS				
Combustible Liquids		x		ether
Corrosives		HCl-1 L H2SO4- 1L HNO3-500mL NaOH 500g	20	hydrochloric,nitric, perchloric acids, sodium hydroxide
Cryogenics		0	0	
Explosives		0	0	
Flammable Liquids		Acetone-20L Acetonitrile-4L Hexane-20L Ethanol-15L Methanol-4L 2-Propanol-1L Ethyl Acetate-20L		acetone, petroleum ether, ethyl acetate, hexane, xylene, methanol, NMP. DMF, Ethyl Acetate, ethanol,dichloromethane
Flammable Solids			5	magnesium
Highly Toxic		Formaldehyde-2L Phenol-500mL	10	phenol,Trifluoroacetic acid,benzene, carbon tetrachloride
Organic Peroxides			1	benzoyl peroxide,
Oxidizers			10	permanganates, perchlorates, chlorates, bromine
Pyrophorics		10	10	BuLi, lithium hydride
Toxic		Acetonitrile-4L Chloroform-2L		chloroform, acetonitrile
Unstable Reactives		5		tetrahydrafuran, MTBE
Water Reactives		Na, NaH	5	sodium, sodium metal, Potassium

Department of
Environmental Health and Safety
THE UNIVERSITY OF UTAH

CHEMICAL INVENTORY FORM

Date: Nov 14 2008
PI: Dr Kuberan Balagurunathan
Lab Supervisor: Dr Kuberan Balagurunathan
Bldg: BPRB 271 Rm:

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Examples
GASES				
Compressed Gases	5			helium, carbon dioxide, nitrogen
Flammable Gases	No			acetylene,carbon monoxide, hydrogen
LPG (liquefied petroleum gas)	No			propane
Oxidizing Gases	No			oxygen, ozone, fluorine, nitrous oxide, chlorine
Toxic Gases	No			boron trifluoride, arsine
OTHER CHEMICALS				
Combustible Liquids		Yes		kerosene, cyclohexanol, acetyl cellosolve
Corrosives		Yes	Yes	hydrochloric,nitric,hydrofluoric, perchloric acids, sodium hydroxide
Cryogenics		Yes		liquid nitrogen
Explosives		Yes	Yes	2,4-dinitrophenol, organic azides
Flammable Liquids		Yes		acetone, petroleum ether, ethyl acetate, hexane, xylene, methanol, acetaldehyde
Flammable Solids			Yes	picric acid powder, magnesium
Highly Toxic		Yes	Yes	carcinogens, teratogens, cyanides, acrylamide, phenol, methyl-nitrosourea, formaldehyde,benzene, carbon tetrachloride
Organic Peroxides		Yes	Yes	benzoyl peroxide, old ethers (e.g., ethyl, isopropyl)
Oxidizers		yes	Yes	nitrates, nitrites, permanganates, perchlorates, chlorates, chlorites, bromine
Pyrophorics		Yes	Yes	silane, phosphorus, titanium dichloride, tributylaluminum, lithium
Toxic		Yes	Yes	chloroform, acetonitrile, acrolein
Unstable Reactives		Yes	Yes	tetrahydrafuran
Water Reactives			Yes	sodium, sodium metal, calcium carbide

Department of Environmental Health and Safety
THE UNIVERSITY OF UTAH

CHEMICAL INVENTORY FORM
Date: January 9, 2009
PI: Darrell R. Davis
Bldg: 570 (BPRB) Rm: 280

Hazard Class	Quantity gas (units)	Quantity liquid (units)	Quantity solid (units)	Examples
GASES				
Compressed Gases	Ar-2 x 50lbs CO2-50lbs N2-50lbs			helium, carbon dioxide, nitrogen
Flammable Gases	x			acetylene,carbon monoxide, hydrogen
LPG (liquefied petroleum gas)	x			propane
Oxidizing Gases	O2 - 50 lbs			oxygen, ozone, fluorine, nitrous oxide, chlorine
Toxic Gases	H2S- 50 lbs			boron trifluoride, arsine
OTHER CHEMICALS				
Combustible Liquids		x		kerosene, cyclohexanol, acetyl cellosolve
Corrosives		HCl-2.5 L ; HF - 500 mL H2SO4-2.5 L; TFA - 500 mL HNO3-2.5 L Acetic Acid - 2.5L	NaOH - 5 Kg; KOH - 5 Kg	hydrochloric,nitric,hydrofluoric, perchloric acids, sodium hydroxide
Cryogenics				liquid nitrogen
Explosives			x	2,4-dinitrophenol, organic azides
Flammable Liquids		Acetone-20 L ; Ethyl Acetate - 20 L Acetonitrile-8L; Pet. Ether - 4L Hexane-4L; Dioxane 1L Ethanol-20L Methanol-4L 2-Propanol-20L Xylene-4L Ethyl Ether-4L		acetone, petroleum ether, ethyl acetate, hexane, xylene, methanol, acetaldehyde
Flammable Solids			Paraformaldehyde- 500 g	picric acid powder, magnesium
Highly Toxic		carbon tetrachloride-4L benzene - 1L phenol - 1L	Sodium Cyanide - 100g acrylamide - 1Kg	carcinogens, teratogens, cyanides, acrylamide, phenol, methyl-nitrosourea, formaldehyde,benzene, carbon tetrachloride
Organic Peroxides		tBuOOH - 1L		benzoyl peroxide, old ethers (e.g., ethyl, isopropyl)
Oxidizers			Potassium permanganate - 5 Kg	nitrates, nitrites, permanganates, perchlorates, chlorates, chlorites, bromine
Pyrophorics			NaH - 100g; lithium aluminum hydride - 100 g; calcium	silane, phosphorus, titanium dichloride, tributylaluminum, lithium hydride
Toxic		Acetonitrile-8L Chloroform-20L 2-Mercaptoethanol-500 mL Methylene Chloride - 20 L		chloroform, acetonitrile, acrolein
Unstable Reactives		Tetrahydrofuran - 2L		tetrahydrafuran
Water Reactives			Sodium Metal - 200g Potassium Metal - 200g	sodium, sodium metal, calcium carbide

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Environmental Health and Safety
THE UNIVERSITY OF UTAH

PI: Kuby
Lab Supervisor:
Bldg:

Rm:

thiophosgene		Inorganics
0.02 N Iodine (Kater/pyridine)		
1-Pentyne	5g	Organics
1,1-Sulfonyldiimidazole	5g	organics
1,2:3,4-Di-O-isopropylidene-alpha-D-galactopyranose	**25 g**	
1,2:3,5-Di-O-isopropylidene-alpa-D-xylofuranose	5 g	
1,2:5,6-Di-O-isopropylidene-alpha-D-glucofuranoside	25 g	
1,2-Benzenedimethanol	1G	Organics
1,2-Dianilinoethane	25g	
1,2-Diiodoethane	25 g	
1,3-benzenedimethanol	2g	Organics
1,3'-Dicyclohexylcarbodiimide, DCC	25 g	
1,3-Dihydroxynaphthalene, Naphthoresorcino	5 g	
1,3,5-Triethynylbenzene	1g	organics
1,4-Dioxane	1 L	
1,9-Decadiyne	5g	Organics
1-10 diamino decane	10g	
1-Octyne	25g	Organics
1-acetyl 2-phenyl hydrazine	25g	
1-Hydroxybenzotriazole hydrate	25g	
1,6-Heptadiyne	5g	Organics
1,7-Octadiyne	5g	Organics
1,8-Nonadiyne	5g	Organics
1-hydroxybenzotriazole hydrate		
1-Naphthol	**10g**	**Organic**
2', 3' - Isopropylideneadenosine 98%	5g	
2,2,2-Trichloroethanol	100mL	organics
2,2'-Azobis(2-methylpropionitrile), AIBN	100 g	
2,2-Dimethoxypropane	500 mL	
2,3:5,6-Di-O-isopropylidene-D-mannofuranose	5 g	
2,3-Dihydropyran	25g	
2,3-Dimethoxynaphthalene	5 g	
2',3'-isopropylideneadenosine	5g	
2,4,6-Triisopropylbenzenesulfonyl Chloride	25 g	
2,4-Pentanedione, 99+%, Acetylacetone	100 mL	
2,6-Di-tert-butyl-4-methylpyridine	5 g	
2,6-Lutidine	100 mL	
2-amino 2-methyl 1-propanol	100g	
2-deoxy D-galactose	1g	
2-deoxyadenosine	5g	
2-Deoxy-D-glucose	1 g	

2-iodobenzoic acid	100 g	
2-Mercaptopyridine	25 g	
2-methoxynaphthalene	5 g	
2-methoxypropene	250 g	
2-Naphthaleneethanol	1 g	
2-Naphthaleneethiol	5 g	
2-naphthalenemethanol	5g	organics
2-nitrobenzyl alcohol	5g	organics
2-Nitrobenzyl bromide	10 g	
2-Phenylpropionaldehyde	5 g	
2-propynyl-tetraacetyl-beta-D-glucopyranoside	1g	
3,4,6-Tri-O-acetyl-D-galactal	1 g	
3-4 diamino pyridine	1g	
3-4-Dihydro-2H pyran		
3-Butyn-1-ol	10 g	
3-Chloro benzylamine		
3-Chloroperbenzoic acid, MCPBA	25 g	
3-Fluoro-3-deoxy-D-glucose	50 mg	
3-Methyl-1-butanol, Isoamyl alcohol	500 mL	
3-pyridine carboxaldethylle		
3-thiophene methanol	5g	organics
4-(Dimethylamino)benzaldehyde	25 g	
4-(trifluoromethyl) benzylamine		Aldrich (NPS)
4,4' dinitrostilbene-2-2'-disulfonic acid	1g	
4,6-(Benzylidene)methyl-alpha-D-glucopyranoside	5g	
4-amino pyridine	5g	
4-anthracene carboxylic acid	10g	
4-bromo-(1,1'-Biphenyl)-4-ol	5g	organic
4-bromophenol	5g	organics
4-chlorophenol	5g	organics
4-Dimethylaminopyridine, DMAP	50 g	
4-fluoro phenol	25g	organic
4-iodophenol	5g	organics
4-methoxy phenol	5g	organics
4-Methoxybenzyl chloride	25 g	
4-Nitrophenol	250 g	
4-Methylumbelliferyl-B-D-Xyloside	25mg	Refrigerator (-20degree)
4-Pentyn-1-ol	5 g	
5-chloro-2-notrobenzyl alcohol	2g	organics
5-Hexynoic Acid	5g	Organics
50% 1,5-Hexadiyne Pentane Solutior	1g	Organics
5'-DMT deoxy Adenosine (n-bz)	5 g	
6-bromo 2-naphthol	25g	organic
9-BBN, 9-Borabicyclo[3.3.1]nonane solutior	100 mL	
Acetic Acid Chloride, CH3COCl	100 mL	
Acetic acid glacial	1lb	inorganics
Acetic Anhydride	500 mL	
Acetonitrile	4 L	
Acetyl Chloride-1-13C, 99 atom% 13C	1g	Fridge
acetyl galactosamine	1g	refrig

Acrylamide	1 kg	
Activated carbon decoloring		
adenine 9-B-D Arabinofuranoside	1g	
Adenosine	25 g	
Adenosine 3'-Phosphate 5'-phosphosulfate, PAPS	10 mg	
Adenosine 5'-Triphosphate Disodium Salt Trihydrate	25 g	minus 80 freezer
Adenosine-5'-triphosphate Sulfurylase Saccharomyces cerevisiae, ATP: Sulfate adenylyltransferase	25 UN	
Affi-Gel Blue Gel	100 ml	
Agarose	500 g	
Allyl Alcohol	100 mL	
Allyl bromide	250 mL	
Allyltributylstannane	5 g	
Allyltributyltin		
Aluminium oxide neutral 60 GF-254 for TLC	500g	Inorganics
Aluminum fluoride trihydrate		Inorganic
Amberlite-IR-120 plus (ion-exchange resin)	250g	Inorganics-M
Amberlite-IRA-410 Ion exchange resin	100g	Inorganics-M
Ammonium Acetate	1 kg	
Ammonium Bicarbonate	500 g	Inorganics
Ammonium Bromide	500g	Inorganics
Ammonium Carbamate	25g	Inorganics
Ammonium Cerium (IV) Nitrate	500 g	Inorganics
Ammonium Cerium (IV) Sulfate	5 g	
Ammonium Chloride	500g	Inorganics
Ammonium Fluoride Trihydrate	100g	
Ammonium formate	100 g	Inorganics
Ammonium Molybdate	100g	Inorganics
Ammonium Nitrate	500g	Inorganics
Ammonium Persulfate (APS)	100 g	
Ammonium Sulfamate	100 g	Inorganics
Ammonium Sulfate	500 g	Inorganics
Ammonium Thiocyanate	100g	Inorganics
Ampicillin Trihydrate	25 g	
Amylomyces rouxii Calmette		
Anion Exchange Resin	1 lb	Inorganics-M
Anthrone	10g	
Anti-thrombin solution	100µl aliqu	EMSA Box -800C
Azidotrimethylsilane	50g	fridge
Azidotrimethylsilane	10g	
Barium Oxide	125g	Inorganics
belta-D- Lactose		Inorganic
Benzaldehyde dimethyl aceta	100 g	
benzene d6	10g	
Benzene, Anhydrous	1 L	
Benzeneselenol	1 g	
Benzonase	2,500 U	
benzothiazole	100mL	org
Benzoyl chloride	250 mL	

Benzoyl peroxide		
Benzyl Alcohol	500 g	
benzyl bromide	50 ml	Organics
benzyl bromide	100 ml	fridge
benzylamine	100g	
B-estradiol	5g	
Bio-Gel P-10 Fine	100 g	
Bio-Gel P-2 Gel extra fine	100 g	
Bio-Gel P-4 Gel extra fine	100 g	
Bis(cyclopentadienyl)zirconium(IV) dichloride	5 g	
bis(diisopropylamino)chlorophosphine	5g	
Bisacrylamide	100 g	
Bis-Homotris	1g	organics
Bis-Tris Propane	100 g	
Borane-dimethylamine complex	5 g	
Boric Acid	500 g	
Boron trifluoride diethyl etherate	100 mL	
Bromobenzene	1L	
Bromophenol Blue	25 g	
Butyllithium 2.5M in hexane	100 mL	
Cabazole 0.1% (w/v) in 95% ethanol		Fridge A
Cacodylic Acid	10g	Inorganics
Cacodylic Acid Sodium Salt Hydrate	100g	Acid
Cadmium Chloride'	100g	
Calcium Acetate	500 g	
Calcium Chloride, CaCl2 , Dihydrate	500 g	Inorganics
Calcium Chloride, CaCl2, Anhydrous	2.5 kg	Inorganics-M
Calcium hydride	500 g	
Carbazole, C12H9N	25 g	
Carbon disulfide	100 mL	
Carbon tetrabromide, Tetrabromomethane	5 g	
Carbon tetraiodide, Tetraiodomethane	5 g	
Ceric Ammonium Sulfate, Dihydrate	100g	Inorganics
Cesium Carbonate	5g	Inorganics
Cesium Cholride	25g	Inorganics
Cetylpyridinium Chloride monohydrate	500g	Inorganics
Cetyltrimethylammonium Bromide	100g	Inorganics
CHAPS	25 g	
Chemical/Solvent Name	Amount (u	Location
chitin	100g	
Chloroacetic anhydride	25g	*Inorganic*
Chloroform, CHCl3	20 L	
Chloroform-d	100 g	
Chloroform-D	50 g	
Chloroform-D	50 g	
chlorophosphoric acid diethyl ester	1g	Fridge
Chlorotriethylsilane, TES chloride	5 g	
Chlorotrimethylsilane, TMCS	100 mL	
Chondroitinase ABC	10 UN	
chronium V trioxide		inorganic

Citric Acid, Anhydrous	500 g	
Cobalt (II) Chloride	5g	Inorganics
Coomassie Blue, Brilliant Blue R-250	25 g	
Copper (III) Sulfate, Cupric Sulfate	100 g	
Copper(I) iodide	50 g	Inorganics
Copper(II) sulfate, anhydrous powder	10 g	Inorganics
cortisone acetate	250mg	
Cuprous Chloride	500g & 50	Inorganics
Cyclohexanol	5g	organics
Cyclopentanol	5g	organic
Cyclopropanecarbonyl chloride 98%	25g	Fridge
cytidine	1g	
D-(+)-cello-biose		Inorganics
D-(+)-cello-biose		Inorganics
D-(+)-fucose	1g	carbs
D-(+)-Glucosamine hydrochloride	100 g	
D-(+)-Glucose	500 g	
D-(+)-Xylose	25 g	
DAST, (Diethylamino)sulfur trifluoride	5 g	
DAST, (Diethylamino)sulfur trifluoride	5 g	
DBU	100g	refrig
D-cycloserine		
DEAD, Diethyl Azodicarboxylate	25 g	
DEAE Sepharose Fast Flow	500 mL	Fridge A
DEAE-Sephacel	500 mL	Fridge A
deoxy Adenosine (n-bz)	5 g	
deoxy Adenosine (n-bz)	5 g	
Dess-Martin periodane 97%	5g	
Dextran sulfate	500g	
D-glucoronic acid	10g	carbs
D-glucoronuc acid lactone		
D-Glucose (U-13C6, 99%)	1g	
D-Glucurono-6,3-lactone, D-Glucuronic Acid Lactone	25 g	
Diacetone-D_Glucose	25G	Carbs
Diacetyl	100mL	
Dibenzoyl peroxide	100g	Fridge
Dibenzyl-phosphate		
Dibutylamine	500 g	
Dibutyltin(IV) oxide	100 g	
Dichloromethane	20 L	
(DiethylAmino)Sulfur trifluoride	1G	Organics
(DiethylAmino)Sulfur trifluoride	1G	Organics
Diethylene glycol dimethyl ether	500 mL	
Dihydro pyran	100 ml	refrig
Diisobutylaluminum hydride, DIBAL-H	100 mL	
Dimethyl Chloride, Methylene Chloride	4 L	
Dimethyl sulfate	1 L	
Dimethyl sulfide, DMS	100 mL	
Dimethyl sulfoxide-d6	1 Pak	
Di-t-butylsilyl bis(trifluoromethane sulfonate)	5g	

Dithiothreitol, DTT	5 g	
DMPU, 1,3-Dimethyl-3,4,5,6-tetrahydro-2(1H)-pyrimidinone	100 g	
Dowex 1X8-100 ion-exchange resin	100g	Inorganics-M
Dowex 50X8-400	500g	Inorganics-M
D-Tryptophan	5 g	
DTT solution	1M	Fridge A
EDC hydrochloride, N-(3-Dimethylaminopropyl)-N'-ethylcarbodiimide hydrochloride	5g	
EMSA Binding Buffer (B.B)	1ml aliquat	EMSA Box -80oC
Estrone 3-methyl ether	1 g	
Ethanol Absolute 200 Proof	1 Gallon	
Ethidium Bromide	5 g	
Ethyl acetate	4 L, Case of 4	
Ethyl Ether	4 L	solvent
Ethyl Ether Anhydrous	500 mL	
Ethylenediamine Tetraacetic Acid , EDTA (Free Acid)	500 g	
Ferrous chloride	250 g	
Ferrous sulfate	1lb	Inorganics
Filter Agent, Celite 521	1 kg	Inorganics-M
Florisil		Inorganics
Florist 200 mesh	250g	Inorganics-M
Fluoroboric Acid		Acrocs (NPS)
forskolin	10mg	
Furfuryl alcohol	10g	Organic
furosemide	10g	
Gentamycin Sulfate	5 g	
Glucorondractone 1mM		Fridge A
Glycerol	1 L	
Glycerol, cell culture tested insect cell culture testec	100 mL	
Glycine	500 g	
Glycogen	5 g	
Guanidine Hydrochloride	500 g	
Hams F12 Media	1000 mL	
Heparin disaccharide III-S sodium salt	1 mg	
Heparin disaccharide II-S sodium salt	0.5 mg	
Heparin Sepharose 6-Fast Flow	50ml	Fridge A
Hexadecyl Trimethyl ammonium Bromide	100g	Inorganics
Hexamethyldisilane, HMDS	10 mL	
Hexamethylphosphoramide, HMPA	100 g	solvent
Hexanes Reagent	20 L	
HMDS; 1,1,1,3,3,3-Hexamethyldisilazane	100 mL	
Hydrobromic Acid >33% in Acetic Acid	250mL	
Hydrobromic Acid		
Hydrobromic Acid, 33-35%, in Acetic Acid	500 mL	
Hydrofluoric acid	100 mL	
Hydrogen Bromide (30% in Acetic Acid, ca. 5.1mol/L)	500 g	
Hydrogen Fluoride- Pyridine, (HF-Pyridine)	25 g	

Imidazole	500 g	
Indium (I) Iodide	2g	dessicator
Indium (III) chloride	5g	dessicator
Indium powder	5g	dessicator
Inorganic Pyrophosphatase, from bakers yeast	1 KU	
Iodine	100 g	
iodobenzene diacetate	25g	
iodomethane	100mg	Fridge
Iron (II) chloride		Inorganics
Iron(II) chloride tetrahydrate	250g	Inorganics
Iron(II) sulfate heptahydrate	1 kg	Inorganics
Isobutyraldehyde		refrig
Isopropyl-b-D-thiogalactopyranoside, IPTG Dioxane Free	10 g	Box I at -20C, Frige A
Isoproyl Alcohol, 2 -Propanol	500 mL	Cabinet under Hood #4
L-(+)-Arabinose	100 G	Organics
L-(+)-Arabinose	25 g	
Lactose -ß-D	500g	Inorganics
L-Arginine	25g	
Lauryl Sulfate	250g	Inorganics
Lead (IV) Acetate	6g	Inorganics
L-Glutamine	100 mL	
L-Homoserine	1 g	
Lithium Acetate dihydrate		Inorganic
Lithium Azide	25 g	
Lithium Bromide	500 g	Inorganics
Lithium Chloride	1 lb	Inorganics
Lithium diisopropylamide solution	100 mL	
Lithium fluoride		Inorganics
Lithium Iodide	10g	Inorganics
Lysozyme, from Egg White	10 g	
M-Diethylnylbenzene	5g	Organic
Magnesium Chloride, MgCl2	500 g	Inorganics
Magnesium turnings	500g	Inorganics
Magnessium Metal	1 lb	Inorganics
Magnessium Oxide	1 lb	Inorganics
Maleic Anhydride	5 g	
Manganese (II) Chloride	1 kg	
m-Anisic Acid	25g	
Mercury (II) acetate	100g	Inorganic
Mercury (II) Bromide	25g	Inorganics
Mercury (II) Chloride		
Mercury (II) cyanide	5g	Inorganics
Mercury (II) Oxide	100g	Inorganics
MES	100 g	
Methanesulfonyl chloride, Mesyl chloride	100 mL	
Methanol, anhydrous 99.8%	1 L	flammable solvents
Methyl Alcohol, Anhydrous CH3OH	500 mL	
Methyl magnesium bromide	100mL	fridge
Methyl Trifuoromethanesulfonate	10g	refrig

Methyl-Alpha-D-Glucoside	500 g	Inorganics
Methyl-Alpha-D-Mannopyranoside		Inorganic
Methylsulfoxide, Anhydrous, DMSO	100 mL	
Methyltriphenylphosphonium Bromide	100 g	
MnO2	50g	Inorganics
Molecular sieves, 4Å	1 kg/ 500g	Inorganics-M
Monopersulfate compound		Inorganics
Montmorillonite K100		
MOPS	500 g	Inorganics
Multi Vitamine		Inorganics
Mung Bean Nuclease	2000 units	
N, N-Diisopropylamino Cyanoethyl phosphoramidic-Cl	5g	
N,*N*-Diisopropylethylamine	100 mL	
N,N-Dimethylformamide	1 L	
N-Acetyl-D-glucosamine	25 g	
N-Acetylneuraminic Acid, Sialic Acid	1 g	
Na-p-Tosyl-L-lysine chloromethyl ketone hydrochloride	500 mg	
N-Bromosuccinimide, NBS	100 g	
Ni Sepharose High Performance	25 mL	
Nickel	1 lb	Inorganics
Nickel (II) chloride	50 g	
Nickel (II) Iodide	1g	dessicator
N-Iodosuccinimide	25 g	
Nitromethane	100 mL	
Nonofluoro-1-butanesulfonic acid	10g	Inorganics
N-*p*-Tosyl-L-phenylalanine chloromethyl ketone	1 g	
N-vinylformamide	100ml	
Oxalacetic acid	5 g	
Oxalyl Chloride 98%	100 g	
p-diethynylbenzene	1g	Organic
palladium kit		dessicator
Palladium on activated alumina	10 g	
Palladium on carbon	10 g	
Para-Nitrophenyl sulfate	1 g	
Pen-Strep	100 mL	
Phenol	500 mL	
Phenolphthalein	500 g	
Phenylacetaldehyde	25 mL	
phenylacetylene	25ml	fridege
Phenylboronic acid	10g	fridge
Phosphine kit		dessicator
phosphoricacid dibenzyl ester	1g	fridege
phosphorous tribromide	100ml	dessicator
Phosphorus Pentoxide, P2O5	500 g	
Phospoenol pyruvate monopotassium	5g	minus 80 freezer
Phthalic anhydride	1 kg	
Phthalimide, potassium derivative	100g	Inorganics
PIPES, Piperazine-N,N'-bis(2-Ethanesulfonic Acid)	250 g	

Pivaloyl chloride, Trimethylacetyl chloride	100 mL	
PMSF(phenylmethylsulfonyl fluoride)	5 g	
Polyethylene Glygol 6000 (PEG-6000)	1 kg	
Potassium bromate	100 g	Inorganics
Potassium bromide		
Potassium carbonate	1 kg	Inorganics
Potassium chlorate	500g	Inorganics
Potassium Chloride, KCl	500 g	Inorganics
Potassium cyanate	100g	Inorganics
Potassium Dihydrogen phosphate	500g	Inorganics
Potassium fluoride	100 g	
Potassium Hydroxide	1kg	Inorganics
Potassium Iodide	100g	Inorganics
Potassium Permanganate		Inorganics
Potassium Persulphate	100g	Inorganics
Potassium Phosphate (dibasic)	1 kg	Inorganics
Potassium Phosphate (monobasic)	500 g, Cas	Inorganics
Potassium Tert-Butoxide Reagent	100 g	
Potassium thiocyanate	500	Inorganic
Potassium Trimethyl-silanolate	100g	Inorganics
Propargyl alcohol, 2-Propyn-1-ol	100 mL	
Propargyl Bromide	25 g	
propargylamine	5g	
Propionic anhydride	50g	Organic
propiolic acid	25g	
Propionyl Chloride	500 mL	
Protease Streptomyces grieus, Type XIV	1 g	
Proteinase K	100 mg	
p-Toluenesulfonic acid monohydrate	100 g	
p-Toluenesulfonyl Chloride	500 g	
Pyridine Anydrous	1 L	Solvent
pyridine	500 mL	solvent
Pyridine, Azabenzene, C5H5N	500 mL	
Pyridinium chlorochromate	100 g	
Pyrogallol	50 g	
Pyruvate Kinase Type VII from Rabbit	1 KU	
Raney Nickel, Nickel sponge	100 g	
Red Sepharose Cl-6B	10g	Fridge A
Reillex 402	50g	Inorganics-M
Ruthenium (III) Chloride, RuCl3, Anhydrous	2 g	Inorganics
Ruthenium (III) Chloride,hydrate	5g	Inorganics
Ruthenium (IV) oxide hydrate	5g	Inorganics
salicylic acid	500g	
Samarium Powder 40 Mesh	10 g	
Selectfluor Fluorinating reagent, F-TEDA	25 g	
Selectfluor Fluorinating reagent, F-TEDA	5 g	
Sephacryl S-200	150 mL	
Silica Gel 200-400 mesh	250g	Inorganics -M
Silver Benzoate	25g	Inorganics
Silver Carbonate	25g	Inorganics

Silver Nitrate		Inorganics
Silver Oxide	25g	Inorganics
Silver perchlorate, AgClO4	5 g	
Silver Salicylcite		Inorganics
Silver trifluoromethanesulfonate	1 g	
Sodium Acetate, anhydrous	500 g	
Sodium Azide, NaN3	500 g	
Sodium Bicarbonate	500 g	
Sodium Bisulfate		
Sodium Bisulfide		Inorganics
Sodium Borohydride		Inorganics
Sodium Carbonate	1 kg	
Sodium carcodylate		Inorganics
Sodium Chloride	2.5 kg	
Sodium Chloride	500 g	
Sodium Cyanide	1 kg	
Sodium Cyanoborohydride	50 g	
Sodium Dodecyl Sulfate, SDS	500 g	
Sodium fluoride		Inorganics
Sodium hexafluorophosphate (V)	25 g	
Sodium hydride (60% dispersion in mineral oil)	100 g	
sodium hydrosulfite		Inorganics
Sodium hydroxide		Inorganics
Sodium metaperiodate, NaIO4	100 g	
Sodium Methoxide	500 g	
Sodium molybdate dihydrate		Inorganics
Sodium Nitrate, NaNO2	500 g	
Sodium orthovanadate		Inorganics
Sodium perchlorate		Inorganics
Sodium phosphate (dibasic)	500 g, Case of 4	
Sodium phosphate (monobasic)	500 g	
sodium potassium tartrate		Inorganics
Sodium Pyruvate	100 g	
Sodium Sulfate, Anhydrous	1 kg	
Sodium Sulfate, Anhydrous, powder	12 kg	
Sodium tetraborate	100 g	
Sodium Thiosulfate		Inorganics
SodiumL-ascorbate	100 g	
Sodium-L-ascorbate	250g	Inorganics
Spectra/Por - molecular membrane tubing	3: 18m x 5	Fridge A
Stanous chloride		Inorganics
Succinic anhydride	5 g	
Sucrose	1kg	carbs
sulfur trioxide pyridinecomplex 98%	25g	
Sulfuryl chloride	100mL	organics
t-4-Aminomethyl cyclohexane carboxylic Acid	10g	
TBDMSCl, tert-Butyldimethylchlorosilane	100 g	
TBDMSOTf	5 g	
TEMED	20 g	Fridge A
TEMPO, 2,2,6,6-Tetramethylpiperidine 1-oxy	5 g	

Tempo, free radical		
Tert-Butyl Alcohol	500 ml	
Tert-Butanol	500 mL	
Tert-butyldimethylsilyl trifluoromethanesulfone		
Tert-Butyl-hydroperoxide		
Tertramethyl Ammonium hydroxide pentahydrate	250g	Inorganics
Tertzole solution		
Tetrabutylammonium Bromide	500 g	
Tetrabutylammonium Fluoride	25 g	
Tetrabutylammonium Fluoride, TBAF	25 mL	
Tetrabutylammonium hydrogensulfate	100 g	
tetraethylammonium hydroxide		Inorganics
Tetrafluoroboric Acid-Dimethyl ether complex	450mL	
Tetrahydrofuran, THF	4 L	
tetramethyltin		Organic
Tetra-n-butylammonium floride		
Thioacetic Acid, (CH3COSH)	100 g	
Thiophenol, 99%+	500 mL	
Tin(IV) Chloride	250 g	
Titanium(IV) Chloride	200 g	
TMS OTf	40 mL	
Tributyltin hydride	50 g	
Tributyltin(IV) oxide, Bis(tributyltin) oxide	5 g	
Trichlorofluoromethane, CFC-11	100 mL	
Triethanolamine	25g	Inorganics
Triflic anhydride, Trifluoromethanesulfonic anhydride	50 g	
Trifluoroacetic anhydride	25 g	
Trifluoromethanesulfonyl chloride	25 g	
Triisopropylsilyl Chloride, TIPS Chloride	5 mL	
Trimethylsilyl		
Trimethylsilyl acetylene	5g	fridge
trimethylsilyl cyanide	10g	fridge
Trimethylsilyldiethylamine, N-	25 mL	
Trimethylsulfonium iodide	25g	Inorganics
Trimethylsulfoxonium iodide	25G	Organics
Tri-O-acetyl-D-glucal	25 g	
Tri-O-acetyl-D-galactal	1g	Fridge door
Tri-O-acetyl-D-galactal	5g	Carbohydrate
Triphenylphosphine	100G	Organics
Triphenylphosphine	500 g	
TRIS	500 g	
TRIS Hydorchloride	500 g	
Trityl Bromide, Bromotriphenyl methane	25 g	
trizma Base Reagent Grade	1kg	
Tungstic Acid	100g	Inorganics
UNOsphere Q - strong anion exchange media	100 mL	Fridge A
Urea	3kg/500g	Inorganics
Xenon difluoride	1 g	
X-Gal, 5-Bromo-4-chloro-3-indolyl- b-D-galactopyranoside	100 mg	Box I at -20C, Frige A

Xylenes Reagent	4 L	
Zinc acetate dihydrate	500g	Inorganics
Zinc chloide	100g	Inorganics
Zinc, Dust	1 kg	Inorganics

Department of
Environmental Health and Safety
THE UNIVERSITY OF UTAH

PI: Lim
Lab Supervisor:
Bldg: Rm:

Chemical	amount	units	number amount	units	concentration	conversion to gallons	conversion to pounds
0.1% TFA	1.056803	gal	4000	ml		0.000264201	
1-butanol	0.1321	gal	500	ml		0.11994716	
2-mercaptoethanol	0.006605	gal	25	ml		0.001321004	
6a-methyl-17a-hydroxy-progesterone acetate	0.002203	lbs	1	grams			0.110132159
acetic acid	0.1321	gal	500	ml		0.066050198	
acetone	1.321004	gal	5000	ml		1.321003963	
Agarose	0.825991	lbs	375	grams			0.825991189
amphotericin B	0.002203	lbs	1	g			0.002202643
anhydrous calcium sulfate	1	lbs	454	grams			1
bromophenol blue	0.011013	lbs	5	grams			0.011013216
calcium chloride	0.110132	lbs	50	g			0.110132159
casein enzymatic hydrolysate	0.550661	lbs	250	grams			0.550660793
chloroform	0.1321	gal	500	ml		0.132100396	
chromic acid	0.01321	gal	50	ml		0.01321004	
cyclohexane	0.1321	gal	500	ml		0.132100396	
DMSO	1.321004	gal	5000	ml		1.321003963	
EDTA	1.321586	lbs	600	grams			1.321585903
ethanol	10	gal	10	gal		10	
Ethidium bromide	0.002642	gal	10	ml	10mg/ml	0.002642008	
ethyl acetate	1.056803	gal	4000	ml		1.05680317	
flutamide	0.002203	lbs	1	g			0.002202643
gentamycin solution	0.005284	gal	20	ml	50mg/ml	0.005284016	
glycerol	0.264201	gal	1000	ml		0.264200793	
glycine	1.101322	lbs	500	grams			1.101321586
guanidine hydrochloride	0.088106	lbs	40	g			0.088105727
Hepes sodium salt	0.495595	lbs	225	grams			0.495594714
hydrochloric acid	0.660502	gal	2500	ml		0.660501982	
imidazole solution	0.01321	gal	50	ml		0.01321004	
isopropanol	1.056803	gal	4000	ml		1.05680317	
kanamycin sulfate	0.077093	lbs	35	grams			0.077092511
LB broth	2.202643	lbs	1000	grams			
magnesium sulfate	1.101322	lbs	500	grams			2.202643172
manganese (II) chloride	0.022026	lbs	10	g			1.101321586
methanol	2.113606	gal	8000	ml			0.022026432
mineral oil	0.264201	gal	1000	ml		2.113606341	
MOPS SDS buffer, 20x	0.1321	gal	500	ml		0.264200793	
MOPS solution	0.264201	gal	1000	ml		0.132100396	
nonylphenylpolyethylene glycol	0.264201	gal	1000	ml		0.264200793	
potassium acetate	0.220264	lbs	100	g		0.264200793	
Potassium chloride	1.101322	lbs	500	grams			0.220264317
potassium hydroxide	0.550661	lbs	250	grams			1.101321586
potassium phosphate	0.220264	lbs	100	grams			0.550660793
sodium acetate	1.101322	lbs	500	grams			0.220264317
sodium benzoate	1.101322	lbs	500	grams			1.101321586
sodium chloride	2.202643	lbs	1000	grams			1.101321586
sodium dodecyl sulfate	0.220264	lbs	100	grams			2.202643172
sodium hydroxide	6.60793	lbs	3000	grams			0.220264317
sodium molybdate dihydrate	0.220264	lbs	100	g			6.607929515
sodium phosphate	0.550661	lbs	250	grams			0.220264317
sodium phosphate monobasic monohydrate	0.264201	lbs	250	g			0.550660793
sodium sulfide	0.264201	gal	1000	ml		0.066050198	
sucrose	0.550661	lbs	250	grams	10g/l	0.264200793	
TEMED	0.006605	gal	25	ml			0.550660793
trichloroethylene	0.1321	gal	500	ml		0.00660502	
Tris base	1.101322	lbs	500	grams		0.132100396	
tris hydroxymethyl aminomethane hydrochloride	1.101322	lbs	500	grams			1.101321586
Triton-X 100	0.1321	gal	500	ml			1.101321586
Tryptone	0.550661	lbs	250	grams		0.132100396	
Tween-20	0.1321	gal	500	ml			0.550660793
Tween-40	0.1321	gal	500	ml		0.132100396	
urea	0.220264	lbs	100	g		0.132100396	
yeast extract	1.101322	lbs	500	grams			0.220264317
Qiagen Maxi prep kits	5						1.101321586
Qiagen Mini prep kits	1						
Zippy Maxi prep kit	1						
Zippy Mini prep kit	1						

Department of
Environmental Health and Safety
THE UNIVERSITY OF UTAH

PI: Zheng-Rong Lu
Lab Supervisor:
Bldg: Rm:

Solid chemicals

name	CAS	Quantity
2, 2-dipyridyl disulfide	1127-03-09	5g
teta hydrate	112926-00-8	1000g
(H-cys-NH2)2 2HCl(disulfide bond)		1g
(H-cys-OEt)2 2HCl(disulfide bond)		5g
(H-cys-OMe)2 2HCl(disulfide bond)		25g
[[(carboxymethyl)imino bis(ethylenenitriilo)]tetraacetate	67-43-6	500g
1,2-dibromoethane		1kg
1,2-ethanedithiol	540-63-6	100ml
1,3-dibromoprpane	109-64-8	100g
1,6-hexane diamine	124-09-4	100g
1-1-thiocarbonyldi 2-(1H) pyridone	102368-13-8	5 g
1-chloro-2,4-dinitrobenzene	97-00-7	100g
2 mercaptoethylamine hydrochloride	156-57-0	25 g
2, 6, 10, 14-tetra-methyl-pentadecane	1921-70-5	250ml
2-amnioethanethiol hydochloride	156-57-0	25 g
3-(trismethsilyl)-1-propanesulfonic acid sodium salt	2039-96-5	1g
3-Mercaptopropionic acid		5g
4, 4-dipyridyl disulfide	2645-22-9	5 g
4-Nitrophenol	100-02-7	1000g
6-amino carporic acid	60-32-2	50g
acetic acid		500ml
acetic anhydride		500mlX24
Acetic anhydride		
Acetonitrile, anhydrous		500ml
Acetonitriles (anhydrous)		
adenine	73-24-5	10g
Alumnia adsorption	1344-28-1	500 g
Amerjet 4400 OH	9017-79-2	500 g
aminobenzylic alcohol		
Ammonia in methaol	341428	100 ml
Ammonia solution in methanol	499145	100 ml
Ammonium acetate	631-61-8	500 g
ammonium bicarbonate		50 g
ammonium bicarbonate		500g
ammonium chloride crystal	12125-02-9	500 g
Ammonium hydroxide	1336-21-6	500 ml
bis(20hydroxypropyl)amine	110-97-4	50 g
BOC(Lys)BOC-OH DCHA		
Boc(lys-Boc)-OH DCH		
boc-2-aminoethylbromide	39684-80-5	5 g
Boc-Beta-ala-oh	3303-84-2	25 g
Boc-Lys(Boc)-OH DCHA	15098-69-8	50g
Boc-Lys(Boc)-OH DCHA 25 GR, HBTU 100GR		
Boc-Lys(boc)osu	04-12-0017	5 g
Brij	9002-92-0	500 g
bromoacetics acid	79-08-3	250g
bromoacetyl bromide		
bromoacytyl bromide (25g)		
bromophenol blue	115-39-9	5 g
caprolactone	502-44-3	250g
cation exchange dowex HCR-W2	69011-22-9	500g
Charcoal activated	7440-44-0	500g
chloride triphenyl methane	76-83-5	100g

chloroform-d D	865-49-6	100g*2
chlorophenol		
chloroquine		
chlorotrimethylsilane	75-77-4	250ml
chlorotriphenyl methanol		25 g
Cholesteryl chloroformate	08-003-7144	25 g
chromium(IV) oxide	1333-82-0	100g
chromium(IV) trioxide		50g*2
citric acide monohydrate	5949-29-1	500g
copper bromide		
cryotube		
cyanuric chloride	108-77-0	25 g
cyclo [arg-gly-asp-D-phe-lys(PEG-PEG)		60 mg
cystamine dihydrochloride		
cystamine sulphate		500g
cytosine	71-30-7	5g
d-glucose	50-99-7	100g
diazald	80-11-5	25 g
dichloroacetic acid	79-43-6	500ml+2500g
diethyl iminodiacetae(25gr)	6290--05--7	25mL
di-tert-butyl dicarbonate	24424-99-5	25g
DMF, anhydrous		
DOTA NHS ester 100mg		100mg
DOTAP		
Dowex 50WX4-200	11113-61-4	65g
dowex-1x8-50(Cl)	69772-06-1	50g
dulbeccols phosphate buffered saline	10387-40	10 g
EDC	25952-53-8	25g*2
ethanol amine	141-43-5	100g
ethyl bromoacetate	105-36-2	100g
ethyl iodoacetate	623-48-3	5g
ethylenediamine		250 ml *2
Ethylenediaminetetraacetic acid (EDTA)	25102-12-9	100g
ethyl-trifluoroacetate	383-63-1	50 g
Ferric chloride		
Florisil	1343-88-0	500g*3
FMOC-ASN(TRT)OH	04-12-1089	5 g
furfuryl alcohol		
gadolinium (III) chloride	13450-84-5	25g
gadolinium (III) oxide	12064-62-9	25g
Glycine	56-40-6	1000g
glycine	56-40-6	1000g
glycine	56-40-6	250g
Guanidine	113-00-8	25g
Guanidine Hydrochloride 500 G		500 G
HEPES	7365-45-9	100 g
histamine dihydrochloride		25 g
histamine dihydrochloride	56-92-8	25g*2
H-Lys(boc)-OH	4-012-5117	25 g
hydrindantin dihydrate	5950-69-6	25g
hydrogen chloride	12/31/7642	25 ml
Iodine	7553-56-2	25g
Iodoacetic acid	64-69-7	10 g
iron eisen	7439-89-6	50g
Iron(II,III)oxide nanopowder	1317-61-9	25g
Isobutyl chloroformate	543-27-1	100g
Lauric acid	143-07-7	25g
L-cystein methyl ester		25 g
L-cysteine	52-90-4	100g
L-cysteine methyl ester hydrochloride		25g
L-cystine	56-89-3	1000g
l-dlutamic acid	56-86-0	250 g
L-glutamic acid 5-benzyl ester	1676-73-9	5g
Lithium hydroxide	1310-66-3	500g
L-lysine	56-87-1	5 g
magnese acetate	638-38-0	500g

Magnesium sulfate anhydrous	7487-88-9	500g
maleic anhydride	108-31-6	250g
Maleimide	541-59-3	5
Manganese acetate	638-38-0	
Manganese acetate	638-38-0	
Manganese ICP standard		
MES (2-(N-morpholino)ethanesulfonic acid monohydra	4432-31-9	100g
MES, monohydrate, free acid, crystalline	4432-31-9	200g
metaphosphoric acid	37267-86-0	100g
Methanol, anhydrous	67-56-1	1L
Methyl acrylate	96-33-3	250ml*3
Methyl sulfoxide	67-68-5	100ml
Molecular sieve	1344-00-9	500g
Molybdenum oxide	1313-27-5	5g
mono-methyl succinate	3878-55-5	10 gram
MOPS, free acid, ultrol grade	1132-61-2	100g
MTT		
MTT		
N-(20aminoethyl carbamic acid tert-butyl ester	57260-73-8	1 g
N, N di-T-boc-l-lysine hydroxysuccimide ester	30189-36-7	1 g
N,N'-Di-CBZ-L-cystine		25g
N,N'-dicyclohexylcarbodiimide	538-75-0	100g*2
N,N'-dicyclohexylcarbodiimide(DCC)	538-75-0	500g
N,N'-diisopropylethylamine	7087-68-5	100ml
n-2-aminoethylpiperazine	140-31-8	25 ml
N-3(aminopropyl)carbamic acid	75178-96-0	1g
N3-PEG7-COOH		1g
N-4-ethylphenyl-maleimide	76620-00-3	2 g
N-acetyl-L-cysteine		25g
N-hydroxy methyl) acetamide	625-51-4	25g
N-hydroxy succinimide	6066-82-6	100g*2
N-hydroxymethylacetamide	625-51-4	25 g
Ninhydrin, monohydrate	485-47-2	25g
N-N-propyl-maleine	21746-40-7	5 g
N-phenyl-2-naphthylamine	135-88-6	25 g
octaamonium POSS		50g
oleic acid	112-80-1	5 g
oleic acid		5ml
Oleic acid 1g*10		
oleic acid 5 g		
Pallodium	5/2/7436	10 g
PAMAM		5 gram
paraformaldehyde	30525-89-4	1000 g
PBS		
pentaethylenehexamine	4067-16-7	25 g
Phenol	108-95-2	500g
Phenolphthalein, indicator	77-09-8	100 g
phosgene		
phosphorus pentoxide	1314-56-3	500 g
phosphours pentoxide		500 g
phosporic acid		500 g
piperidine		
polyethylenime	9002-98-6	100 ml
postassium bisulfate 7646-93-7		50 g
postassium carbonate	584-0-8-7	500 g
Potassium bicrbonate	298-14-6	500g
potassium carbonate	584-08-7	500 g
Potassium chloride	7447-40-7	500g
potassium hydroxide	1310-58-3	2500 g
Potassium hydroxide, Pellet	1310-58-3	2.5kg
potassium phosphate	16788-57-1	500g
Potassium phosphate (monobasic anhydrous)	7778-77-0	500g
potassium phosphate monobasic	7778-77-0	500 g
potassium thioacetate	10387-40-3	25g
propargyl-PEG-NSH ester		
Protamine sulfate		25 g

p-toluenesulfony chloride	98-59-9	500g
p-toluenesulfony chloride	98-59-9	5g
Pyrene, DHP, EDA, DIPEA and OA		
Reporter lysis buffer		
Silica Gel 60, 60-100 Mesh	7631-86-9	250g
Silica Gel, grade 12, 28-200 mesh	112926-00-8	1kg
Silver nitrate, 10%W/V	7761-88-8	125ml
sliver carbonate/celite		
Sodium acetate, anhydrous	127-09-3	500g
sodium azide	266-28-22-8	100g
Sodium bicarbonate	144-55-8	500g
sodium biusulfate anhydrous	7681-38-1	1kg
Sodium borohydride	16940-66-2	10g*2+100g
Sodium carbonate	497-19-8	1kg
Sodium chloride, certified	7647-14-5	500g
Sodium citrate,dihydrate,crystal	4/3/6132	2.5 kg
Sodium cyanoborohydride	25895-60-7	25g
sodium diethyldithiocarbamate trihydrate	20624-25-3	5g
Sodium dodecyl sulfate (SDS)	151-21-3	100g
sodium hexamethyldisilazane	1070-89-9	10 g
sodium hydrosulfide	7775-14-6	100g
Sodium hydroxide, Pellet	1310-73-2	2.5 kg
Sodium hydroxide, pellet	1310-73-2	2.5 kg
Sodium hydroxide, volumetic solution (0.10N)	1310-73-2	1L
Sodium metaperiiodate	7790-28-5	10g
sodium periodate	7790-28-5	100g
Sodium phosphate	7782-85-0	3kg*2
Sodium phosphate dibasic heptahydrate	7782-85-6	500g
Sodium sulfate, anhydrous, granular(10-60 mesh)	7757-82-6	2.5kg*2
Sodium tert-butoxide,97%	865-48-5	5g
Sodium thiosulfate, in QORPAK Bottle		10g
spermine	71-44-3	1g*2+5g
Stearic acid	57-11-4	25g
Terb chloride		
tert-butyl bromoacetate	5292-43-3	50mL
tetraazacyclododecane		
tetrabutylhydroperoxide solution anhydrous	75-91-2	25ml
tetraethylene pentamine	112-57-2	25g
thymol blue	76-61-9	25g
triethylene glycol dimethyl ether	112-49-2	500ml
triethylenetetramine hexaacetic acid	869-52-3	5 g
trifluoroacetate		20 g
triisobutylsilane		25g
trimethylchlorsilane	7577-4	25 g
triphenylmethanol	76-84-6	25 g+50g
tris(2,2'-bipyridyl)ruthenium(II) chloride hexahydrate	50525-27-4	1g
tris(base)	77-86-1	5g
Triton X-100		
Tween 40	9005-66-7	500 ml
uracil	66-22-8	10g

peptide

(H-cys-Ome)2.2HCl	32854-09-4	25g
2-Chlorotrityl chloride resin (200-400 mesh) 2%		5g
Albumin Bovin serum		1g
Albumin Egg		1g
Bis-(2-aminoethyl)-ether trityl resin		1g
Boc-Lys-OH		
BSA fraction V	9048-46-8	25g
Dde-OH		5g
DIPEA 500ml		500ml

Fmoc-2-aminoethylbromide		1g
Fmoc-Ala-OH		10g
Fmoc-Ala-OH	35661-39-3	25g
Fmoc-Arg(Pbf)-OH		5g
Fmoc-Asn(trt)-OH		5g
Fmoc-Asn(Trt)-OH-5GM		5GM
Fmoc-Asp-Oall		1g
Fmoc-beta-ala-OH		5g
Fmoc-cys(Acm)-OH		5g
Fmoc-cys(tButhio)-OH		5g
Fmoc-cys(trt)-OH	103213-32-7	25g,10g
Fmoc-D-Phe-OH		5g
Fmoc-D-Trp(Boc)-OH		5g
Fmoc-Gln(Trt)-OH	132327-80-1	25g
Fmoc-Gln-OH		5g
Fmoc-Glu(OtBu)		1g
Fmoc-Glu(OtBu)-OH	71989-18-9	25g
Fmoc-Gly-OH	29022-11-5	25g,10g
Fmoc-His(Trt)-OH	109425-51-6	25g*2
Fmoc-ile-OH	71989-23-6	25g*3
Fmoc-Leu-OH	35661-60-0	25g
Fmoc-lys(boc)-OH	71989-26-9	25g
Fmoc-Lys(Dde)-OH		5GM
Fmoc-lys(Fmoc)-OH		25g,100g
Fmoc-lys(ivDde)-OH		1g
Fmoc-Met-Oh		5g
Fmoc-NH-PEG2-COOH		1GM
Fmoc-Ser9tBu)-OH	71989-33-8	25g,10g
Fmoc-Thr(tBu)-OH		5g
Fmoc-Trp(Boc)-OH		5g
Fmoc-Tyr(tBu)-OH		5g
Fmoc-Val-OH		5g
HATU		5g
HBTU		100g
mono-Fmoc-ethylene diamine hydrochloride		1g
NovaSyn TGT alcohol resin		5g
PyBOP	128625-52-5	100g
Rink amido MBHA resin		5g
TBTU	125700-67-6	25g*2
trityl chloride resin		5g

solvents

name	CAS	Quantity
chloroform	67-66-3	20L+4L+4L+4L+1L+4L
chloroform HPLC	67-66-3	100mL
dichloromethane	75-09-2	100ml
dichloromethane	75-90-2	19L+4L
diethylamine	109-89-7	2.5L+2L
diisopropylamine	108-18-9	1000ml+500mL
dioxane	123-91-1	4L+4L+500mL
DMF	68-12-2	4L*2+1Galon+2L+200mL
ethyl acetate	141-78-6	20L+4L
ethyl alcohol	64-17-5	20L
ethyl ether anhydrous	60-29-7	2500g*2+1L+20L
ethylenediamine	107-15-3	500ml
formaldehyde solution	50-00-0	4L
hexanes	110-54-3	4L+2L+20L
hydrobromic acid in acetic acid	64--19-7;10035-10-6	500ml
hydrochloric acid	7647-01-0	2.5L
methanol	67-56-1	4L
methanol	67-56-1	20L
methyl acrylate	96-33-3	1L*2
methyl ethyl ketone	78-93-3	4L+4L

nitric acd	7697-37-2	500ml*2+2.5 L+50mL
o-phosphoric acid	7664-38-2	2L*3
pentane	109-66-0	2L
perchloric acid	7601-90-3	500ml+1L
phenol	108-95-2	500ml
phosphoric acid	7664-38-2	500g*6
piperidine	110-89-4	450ml
pyridine	110-86-1	500ml+400mL+200mL
pyridine extra dry	110-86-1	100ml
sulfuric acid	7664-93-9	2.5L*3
tatrahydrofuran	109-99-9	4L*4
tatrahydrofuran anhydrous	109-99-9	100mL
tert-butuyl alcohol	75-65-0	20L
tetrahydrofuran	109-99-9	4L
toluene	108-88-3	4L+4L+4L
trithylamine	121-44-8	500ml
xylenes	1330-20-7	4L

liquid chemicals

name	CAS	Quantity
1-amino-2-propanol	78-96-6	250mL
1-amino-3-methyl butane isopentylamin	107-85-7	100mL
1-butanol	71-36-3	1L
1-methyl-2-pyrrolidinone	872-50-4	500 mL*2
2,2'-(ethylenedioxy)bis-(ethylamine)	929-59-9	100ml
2-butanol anhydrous	78-92-2	100mL
2-mercaptoethanol	60-24-2	100mL*3
2-methoxyethanol	109-86-4	500mL
2-methylbutyronitrile	25570-03-0	1g*2
3,3'-dimethylallyl bromide	870-63-3	10g*3
3-aminopropyltriethoxy silane	919-30-2	500ml
3-mercaptopropionic acid	107-96-0	100g*
4-bromo-2-methyl-2-butene	870-63-3	10g+10g
4-methylmorpholine	109-02-4	100ml*3
4-nitrophenol	100-02-7	250g
acetic anhydride	108-24-7	100mL
acetone extra dry	67-64-1	100mL
allyamine	107-11-9	250mL
amyl alcohol	30899-19-5	500mL
benzoyl chloride	98-88-4	250mL
Boric acid	10043-35-3	500g
bromoacytyl bromide (25g)		25g
bromine	7726-95-6	150ml
calcium hyride(CaH2)	7789-78-8	100g
calcium hyroxide	1305-6-2--0	500g
caprylic acid	124-04-2	100ml
carbon disulfide	75-15-0	500mL
carbon tetrachloride HPLC	56-23-5	1L
chloroacetic acid	79-11-8	100g
chloroform:iso-amyl alcohol24:1		500mL
dimethyl sulfoxide	67-68-5	100ml*2
dimethylsulfoxide	67-68-5	100ml*6+4L+4L
ethyl acetate extra dry	141-78-6	1L
ethylamine hydrochloride	557-6-6--4	250g
ethylenediamine	107-	1L
ethylenediamine	107-15-3	100mL
ethyleneglycol dimethyl ether	110-71-4	500mL
halothane	151-67-7	250mL+250mL
hexylamine	111-26-2	250mL
hydrazine hydrate	10217-52-4	100ml
hydrofluoric acid	7664-39-3	500mL
hydrogen perodixide(H2O2)	7722-84-1	100ml+500ml

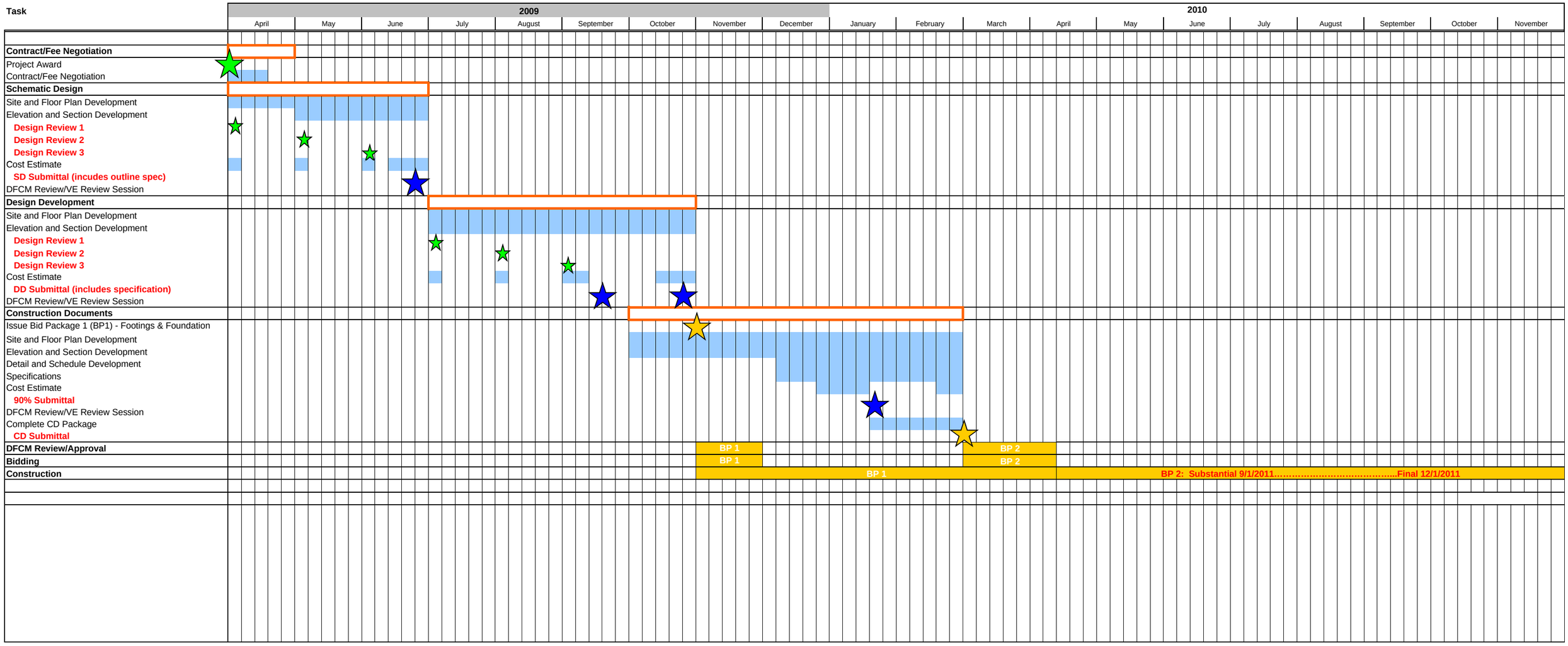
isoamyl alcohol	123-51-3	500mL
iso-propyl ether	108-20-3	500mL
isovaleronitrile	625-28-5	25g
methylamine hydrochloride	593-5-1--1	500g
N-(2-aminothy)morpholine	2038-03--1	25ml*2
N,N'-diipropylcarbodiimide	693-13-0	100ml
N,N-dimethylacetamide	127-19-5	1L
N,N'-dimethylethylenediamine	108-00-9	50g
n-butylamine	109-7-3--9	500mL
nitrobenzene	95-95-3	1L
Octylamine		250ml
phthalyl chloride	88-95-9	25g
piperazine hexahydrate	142-6-3--2	500g
piperidine	110-89-4	450 ml
p-toluene sulfonyl chloride	98-59-9	1000g
succinic anhydride	108-30-5	50g
sulfuryl chloride	7791-25-5	250g
tert butylamine	75-6-4--9	500mL
tertiary -butanol	75-65-0	500mL
TETA		1L
tetra-n-butylammoniun fluoride	429-41-4	100mL
TFA	76-05-1	100mlx3
thiophosgene	463-71-8	25g
trichloroacetic acid solution		100mL*2
triethylamine	121-44-8	500ml*2
triethylene tetramine	112-24-3	2kg
tris(trimethylsiloxy)chlorosilane	17905-99-6	25g

Project Schedule

Preliminary Design Schedule

L.S. Skaggs Pharmacy Research Building

University of Utah



Meeting Minutes

University of Utah L.S. Skaggs Pharmacy Research Building		December 18&19, 2008
Project Name		Meeting Date
Salt Lake City, Utah	100466.00	January 5, 2009
Project Location	NBBJ Project Number	Date Typed
STEERING COMMITTEE: Leadership Summit, Programming Workshop 1, 2 & 3, Program Draft Review		1 of 9
Meeting Type		Page

Attending		Representing
Steve Panish, *Asst. VP of Health Sciences*	X	University of Utah
John Mauger, *Dean*	X	UU College of Pharmacy
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Chris Ireland, *Chair*	X	UU College of Pharmacy, Medicinal Chemistry
Darrell Davis	X	UU College of Pharmacy, Medicinal Chemistry
William Crowley, *Chair*	X	UU College of Pharmacy, Pharmacology & Toxicology
Matt Slawson		UU College of Pharmacy, Pharmacology & Toxicology
David Grainger, *Chair*	X	UU College of Pharmacy, Pharmaceutics..
Steve Kern	X	UU College of Pharmacy, Pharmaceutics..
Diana Brixner, *Chair*	X	UU College of Pharmacy, Pharmacotherapy
Barbara Crouch		UU College of Pharmacy, Pharmacotherapy
Joseph Harman	X	University of Utah, Campus Design & Construction
Christin Robbins	X	University of Utah, Campus Design & Construction
Tami Cleveland	X	University of Utah, Facilities Planning
Claudia Luttrell		ALSAM Foundation
Lindsay Cutshall	X	ALSAM Foundation
Ronny Cutshall	X	ALSAM Foundation
Rick James		DFCM
Ken Ament		CCC
Dave Whitton	X	Envision
Kim Harris	X	VBFA
Leslie Morton		PSOMAS
Ron Dunn		Dunn & Associates
Peter Emerson	X	EDA
Stephanie McCarthy	X	EDA
Brad Leathley	X	NBBJ
Kyle Elliott	X	NBBJ
David Bryant	X	NBBJ
Jack Taylor	X	University of Utah, Director, Office of Comparative Medicine
Matt Yurick	X	UofU Space Planning and Management
Kris Larson	X	CCC

Mtg	Orig. Date	Description
		Purpose of Meeting
1.1	10.10.08	Review Needs, Goals and Concepts of the College of Pharmacy.

University of Utah L.S. Skaggs Pharmacy Research Building		November 5 & 6, 2008
Project Name		Meeting Date
Salt Lake City, Utah	100466.00	November 14, 2008
Project Location	NBBJ Project Number	Date Typed
STEERING COMMITTEE: Leadership Summit, Programming Workshop 1, 2 & 3, Program Draft Review		2 of 9
Meeting Type		Page

Needs

1.2 10.10.08

Needs for the College of Pharmacy includes:

- Monument to Sam Skaggs – a magnificent building
- Bring us together to allow us to take on bigger problems
- Teach to be lead innovators
- Rely on leadership of the four chairs
- Increased connectivity
- Increased capacity
- Design to high standards of safety and security.
- Preserve existing Skaggs Auditorium, but develop as more active center.
- On-site pharmacy to “dispense information”
- Gym and/or on-site showers for building users.
- Spontaneous writing surfaces (glass, white boards, etc)
- Vibration control (Center for Human Toxicology and other).
- Consider the existing Skaggs Building in forming a ‘whole” for the Skaggs Pharmacy Institute.
- Consider flexibility around infrastructure in design of new space.

Goals

1.3 10.10.08

Goals for the Project include:

- Sustainability as research enterprise.
- Practice Translational Research.
- Enable an entrepreneurial environment.
- Recruitment of the best as “good citizens”.
- A body of diverse faculty and students – highly trained and international.
- Promote collaboration across Health Science.
- Integrate our efforts.
- Create community.
- Produce graduates that meet the market’s needs.
- Innovation to the max.
- Sell Poison Control
- Cross fertilization
- Flexibility is use and assignment
- Graduate Education as driver
- Show-off the science
- Maintain environment of compatibility with campus.
- Create a “bump and buzz”

Concepts

1.4 10.10.08

Preferred planning and design concepts include:

- Faculty Office Clusters (with varied office sizes).
- Open Labs.
- Neighborhood Lab/office (offices adjacent to lab).
- Poison Control as part of lab.
- Shelling of space (1-2 floors) to maximize build-out but help with budget.
- Site as gateway.
- Strengthen Health Science Walk.
- Maximize views and light.
- Shared Instrument Areas.
- Atrium as Translational Center.
- Centralized computational/visualization area.
- Core facilities (cell culture, animal, imaging, computers, instrumentation)
- Consider concept around art (electronic). 1% of budget is allocated to art.

Examples/Precedents

1.5 10.10.08

Good examples/precedents

- UCSF (best example for pharmacy program)
- University of Wisconsin (for pharmacy program)
- University of Michigan (for pharmacy program)
- University of Texas (for pharmacy program)
- University of Kansas (for pharmacy program)
- University of Colorado (for pharmacy program)
- University of Arizona (for pharmacy program)
- Duke
- Vanderbilt (high end biomedical science)
- University of California Berkeley
- Stanford
- The Biodesign Institute at Arizona State
- The Vollum Institute
- John Moran Eye Center (atrium space and labs)
- Gardner Hall (atrium space)

Bad examples/precedents:

- Offices in BPRD
- Henry Eyring Chemical Engineering Building

Adjacencies

1.6	10.10.08		School of Pharmacy has connections and relationships with other campus facilities as follows: • Bioengineering Building • UStar • MPES • Biopolymers Research Building • School of Medicine • School of Nursing • Eccles Health Science Education

Other Items

1.7	10.10.08	10.22.08	Facilities analysis of existing Skaggs Building needs to be considered. Study should analyze how existing space is being used and consider best use of space to create a unified and whole School of Pharmacy. A. Design Team to submit proposal to DFCM.
1.8	10.23.08 10.10.08	10.22.08	Noted that subcommittees will need to be organized around the following: • Computer/Data Management • Animal Research • Chemical Quantities • Code • Cost Control B. Steve Panish will coordinate and form these subcommittees. Design Team to meet with all subcommittees in next set of meetings (10.22.08). Subcommittee Report: The subcommittee meetings were held on 10/22/08. See Subcommittee meeting minutes for issues reviewed / discussed. Subsequent meetings will be held in Workshop 2 to be held 11/5-6/08. A Sustainable Design Subcommittee shall be established. The first meeting will be held in Programming Workshop 2.
1.9	10.10.08	10.17.08	Design Team requested the following information from School of Pharmacy: • Faculty counts by department/type • Admin counts for school and department • Growth projections for faculty and admin.

- Student counts by year, in each department
- Post Doc and visiting scientist count
- For School of Pharmacy: Rm #, lab name and PI
- Grant/contract $
- Growth curve and analysis of projections

C. Art to provide to design team by end of next week.

Emergency / Essential Power

2.1 10.23.08

- A generator will be provided
- Emergency Power will be supplied to fulfill life safety requirements, including the Poison Control Center which operates 24/7/365.
- Essential power will be supplied to all essential components of the building. These buildings shall be identified by the College of Pharmacy and documented in the program.
- Battery backup for servers should be explored to compensate for time lapse between standard building power shutdown and emergency power kick in.

Telecommunications

2.2 10.23.08

- The cost benefit of Voice/IP vs. Traditional Land Lines shall be investigated. This issue will be reviewed with Dave Kosanki, UofU Telecommunications.
- Video Conferencing / Data/ IT requirements for conference rooms needs to be reviewed and defined.

Concept Diagrams

3.1 11.06.08

The programming team reviewed concepts / drivers in a diagram format in the context of theme, site and building. Comments were as follows:

College of Pharmacy = “Crowning Jewel” of Health Sciences

Currently, the College of Pharmacy is a programmatic beacon for the University. This status is not currently reflected in the physical manifestation of its facilities.

Views to the building are equally as important as views from the building. It is interesting to note that views to the building are experienced on many scales: Salt Lake Valley, Lower Campus, Medical Drive South approach, Health Sciences District.

"Information Explosion *but* Implosion of Meaning"

Human Experience/ Impact:

- Science translates to medicines that help people
- NATURE / CHEMISTRY / WELLNESS
- Discovery / Testing / Delivery / Outcomes
- Generating a crop of future scientists
- Translational Center = Feedback Loop

Recognition of Opportunity

View of the world through the lens of Pharmacy

Translational Center

- Neuro Network – Mind of Pharmacy Changes
- Fosters connectivity between groups

3.2 11.06.08

Program Distribution Options

The programming team reviewed preliminary options for allocating space through the building in plan and section. The comments were as follows:

Carefully consider the location of Secure Spaces :

- Vivarium
- CHT
- Poison Control

Pharmacy is currently driven by small groups. Given the right physical environment, this could move toward larger groups.

Presented with an opportunity to support conferences with all required spaces in close proximity (e.g., the Swiss Institute)

In an effort to identify programming opportunities for the building it would be interesting to look at a year in the life calendar of the College of Pharmacy.

Offices and labs need to have an adjacency

Revise program allocation plan and section diagrams to indicate types of spaces and "translational" opportunities. Do not use departments as terms for space allocation.

Costs: Consider Building Components combinations (shelled and

finished) and provide options for meeting budget

- Wet Lab
- Dry Lab / Offices
- Atrium
- @ 65% efficiency
- @ 60% efficiency

CBE needed for one level of parking

4.1 11.21.08

Parking / Vivarium / Security

The question of security relative to the vivarium and the parking garage was raised. Specifically, the possibility of someone parking an explosive device underneath the vivarium.

4.2 11.21.08

Building Height

In order to accommodate the mechanical penthouse within the 75' height restriction per the fire code, the floor to floor height of the top floor may be reduced as this floor will not house wet labs.

4.3 11.21.08

Sustainability

- Take advantage of Rocky Mountain Power 's Energy Saving Programs. Coordinate a meeting with the State during Schematic Design Phase.
- Opportunity for LEED Innovation Credit for commissioning fume hoods.
- EB/OM Approach to design.
- The University is working with the State to resolve water rights issues relative to capturing and utilizing rain water on the roof, etc.
- Water Neutral strategies support University campus wide goals
- Aquifer recharge?

4.4 11.21.08

Vibration Criteria

Determine foot paces /min. criteria: 50,75 or 100.

4.5 11.21.08

Orientation of Program

The following principles were agreed to:

- The offices will face west / Salt Lake Valley
- The Labs will face East /Academic Corridor

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Draft Review Comments

5.1 12.19.08

Cost:

- Costs may need to be adjusted to address the south façade of the building
- Increase the # of fume hoods per lab. Program team to verify with departments
- Verify the # of Bio Safety cabinets required per lab with departments
- No escalation is included in the cost estimate at this time per Joe Harman's recommendation. Rick James to verify escalation value to be utilized with the State
- The CBE shall reflect the $50 million construction cost (no more)
- Add Alternates will be identified in the design phase
- Peer review of cost estimates will be required in the design phase
- $300,000 has been included in the parking structure estimate (for parking access.
- Joe Harman to forward new requirement for Safety Showers to Program Team
- Small Shower / Locker room to be provided in addition to facility included in the vivarium.
- Add snowmelt
- Biometrics security system?
- Security access system must interface with the University.
- CCTV in parking structure (Elec. & Costs)

Code:
Reviewed and approved current scheme with ground floor level below grade.

Schedule:
Opportunities to save time in the design phase per Joe Harman and are as follows:
State Review – 1 day (overall savings to schedule = 1.5 mo.)
University Review -1 day

Rick James needs a funding letter and request to proceed with selection of Architects and CMGC from University to move forward with RFP
6 weeks required to select Architect

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Joe Harman urged for an accelerated schedule to select architect and CMGC by Feb. 1, award Feb. 15

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Prepared by:

Stephanie McCarthy

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ALSAM: Leadership Summit, Programming Workshop 1, 2 & 3		1 of 3
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Attending		**Representing**
John Mauger, *Dean*	X	UU College of Pharmacy
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Steve Panish, *Asst. VP of Health Sciences*	X	University of Utah
Claudia Luttrell	X	ALSAM Foundation
Lindsay Cutshall	X	ALSAM Foundation
Ronny Cutshall	X	ALSAM Foundation
Karen Mauger	X	UU College of Pharmacy
Peter Emerson	X	EDA
Stephanie McCarthy	X	EDA
Brad Leathley	X	NBBJ
Kyle Elliott	X	NBBJ
David Bryant	X	NBBJ
John Mauger, *Dean*	X	UU College of Pharmacy
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Steve Panish, *Asst. VP of Health Sciences*	X	University of Utah
Claudia Luttrell	X	ALSAM Foundation
Lindsay Cutshall	X	ALSAM Foundation
Ronny Cutshall	X	ALSAM Foundation
Karen Mauger	X	UU College of Pharmacy
Peter Emerson	X	EDA

Mtg	**Orig. Date**	**Description**
		Purpose of Meeting
1.1	10.09.08	The programming team met with members of The ALSAM Foundation to review the programming process and provide an open forum for the foundation to define their vision and goals for the project. • The Institute's architectural expression and programmatic interfaces should be a monument to the unique legacy of Mr. Skaggs. • The facility should be innovative and forward looking. • The atrium (aka the "Translation Center") should speak to the intersection of generations (LS Skaggs, SR and LS Skaggs / Scientific Research) • Safety and Security are paramount
		Fundraising Opportunities
1.2	10.23.08 10.09.08	• The Poison Control Center will be located in either the existing or new facility with a presence in the atrium (Translational Center).

- Naming rights for the new building is an opportunity.
- The design of the atrium (Translational Center) should accommodate future fundraising events / opportunities.
- A donor recognition area shall be provided in the atrium (Translational Center) in a prominent location.
- The donor wall in the existing building shall remain. If the need arises to shift the location the existing donor wall, it shall be reviewed with Dean Mauger and representatives from The ALSAM Foundation.
- The design team will provide a timeline for quantifying the costs of building components (i.e., labs, conference rooms, etc.)

Budget

1.3 10.23.08 10.09.08

Shelling floors is an option to maximize future expansion opportunities. A portion of the funds saved might be used for selective upgrades to the existing LS Skaggs Hall required to create an open connection to the atrium (Translational Center).

During the Code Subcommittee meeting it was determined that sprinkling the existing building will allow the Institute (LS Skaggs Hall + the Atrium + the new facility) to function as one structure without physical boundaries (i.e., area separations / fire walls). Joe Harman indicated that there is an ongoing effort, funded by the University, to provide sprinkler systems in existing facilities. LS Skaggs Hall is on the list along with many others. Ronny Cutshall asked what it would take to move LS Skaggs Hall to the top of the list. A conversation with President Young was recommended by Steve Panish.

Parking

2.1 10.23.08

The design team will be providing information to Dean Mauger and The ALSAM Foundation relative to the pros and cons of including structured parking below the new facility.

Groundbreaking

2.2 10.23.08

The groundbreaking will be held on June 9, 2009.

Programming Concepts Review

3.1 11.06.08

- College of Pharmacy = “Crowning Jewel” of Health Sciences

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- Currently, the College of Pharmacy is a programmatic beacon for the University. This status is not currently reflected in the physical manifestation of its facilities.

- Views to the building are equally as important as views from the building. It is interesting to note that views to the building are experienced on many scales: Salt Lake Valley, Lower Campus, Medical Drive South approach, Health Sciences District.

- The program team should plan to meet with the College of Nursing to review plans for planned renovations to the Nursing Building and explore opportunities for interaction / collaboration with the College of Pharmacy.

Programming Concepts Review

4.1 **11.20.08**

An informal ALSAM meeting was held the evening of November 20, 2008. Discussions included the following:

- **Schedule – critical timeline and milestones**
- **Translational Center – assumptions (outlined above) relative to the programmatic functions and aesthetic qualities of the space were reviewed and confirmed**
- **Parking – impact of parking funding commitment on the schedule.**
- **Fundraising opportunities and strategies.**

The notes proceeding represent my record of items reviewed and concluded during the course of the meetings noted. Please contact me within five days of receipt if there are any corrections, questions or omissions in content.

Prepared by:
Stephanie McCarthy

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Attending		Representing
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Chris Ireland, *Chair*	X	UU College of Pharmacy, Medicinal Chemistry
Kuby Balagurunathan		UU College of Pharmacy, Medicinal Chemistry
Greg Bulaj		UU College of Pharmacy, Medicinal Chemistry
Tom Cheatham		UU College of Pharmacy, Medicinal Chemistry
Darrell Davis	X	UU College of Pharmacy, Medicinal Chemistry
Eric Schmidt		UU College of Pharmacy, Medicinal Chemistry
Amy Barrios		UU College of Pharmacy, Medicinal Chemistry
Peter Emerson	X	EDA
Stephanie McCarthy	X	EDA
Brad Leathley		NBBJ
Kyle Elliott	X	NBBJ
David Bryant	X	NBBJ

Mtg	Orig. Date	Description
		Purpose of Meeting
3.1	11.05.08	Review of Space List, Room Data Sheets, and Relationships. All edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.
		Vision and Goals
1.2	10.22.08 10.10.08	The School of Pharmacy has the team, but no "stadium". Central facilities need to be planned that bring the school together and allow for movement of information/equipment between groups for greater collaboration and integration. By bringing the department together additional programs might be added, and existing ones strengthened (neuroscience, ~~cancer~~ drug discovery, in-silico and wet science).
		Function
1.3	10.22.08 10.10.08	This department functions around teaching (25%) and research (mostly pre-clinical) in discovery. The department includes: • The Center for Therapeutic Biomaterials which looks at things like wound-healing gels, tissue regeneration, and drug discovery. • The Center for Cell Signaling • The International Cooperative Drug Discovery Program which looks at drug discovery for disease like TB, malaria,

and cancer.

- Anticonvulsant Screening Program

Program Groups/Space Needs

1.4 10.22.08
10.10.08

Currently located at Research Park, Biopolymers and Skaggs, this department is made up ~~seven~~ eight groups (and expanding to nine), each with 5-6 people but growing to 8-10 people, as follows:

- Tom Cheatham does theoretical and computer based research with simulation of biomolecular structure, dynamics and interactions. Informatics, dynamic modeling and conversion of hard science to soft will be utilized. Large, shared conference spaces should be considered for visitors to come to learn, close to atrium. Space should be accessible to department, with some security maintained. Large LCD's will be utilized. Space will be shared with Steve Kern. Computer based research will continue to grow and expand with the advent of science.
- Kuby Balagurunathan does research around chemical biology of cell surface-bound carbohydrates and testing of fish and mice Wet Lab space is required which includes 8 fume hoods, HPLC, PCR, centrifuge (shared) and Mass Specs. Allow research space for 8-10 people.
- Greg Bulaj's research is similar to Kuby's and is focused around chemistry, cell cultures and collaborative animal work. Equipment/space needs include Peptide Synthesis, HPLC (not shared), Freezers, Refrigerators and Spectrophotometers. Allow research space for 8-10 people, and 4-5 hoods. Greg prefers to be close to Steve in Pharmacology. Chemical inventory ranks 2 in dept.
- Glenn Prestwich does heavy synthetic chemistry work and requires wet lab space with benches, fume hoods (4' hood/student). His research also includes Molecular Biology and requires cell culture space (as part of core). Allow research space for 8-10 people
- Eric Schmidt does wet chemistry work. Space requires isolated BSL2 microbiology/protein expression space (shared with Kuby) with shaker and incubators. Equipment needs include Mass Specs. Allow research space for 8-10 people, and 4-5 hoods.
- Amy Barrios does wet chemistry works with peptides and proteins, organic synthesis, and cell biology. Allow research space for 8-10 people, and 4-5 hoods. Chemical Inventory ranks 3 in dept.
- Chris Ireland does heavy wet chemistry work, which requires 1 hood/student. His space also includes tissue

culture facilities and a separate analytical lab with (4) HPLC's and mass specs. Chemical Inventory ranks 1 in dept. Chris works closely with Lou Barrows and Eric.

- Darrell Davis does wet chemistry work with RNA, nucleic acid biochemistry, and NMR structural biology. Allow space for 8-10 people, bench space and 4-5 hoods.

Allow 4' hood/ student.

1.5	10.22.08 10.10.08	This department uses a lot of chemicals. A centralized chemical distribution/storage with process waste distribution and storage should be considered. Design team to meet with EH&S to review chemical inventory. This group is the highest user of chemicals in the School of Pharmacy. Refer to Chemistry Subcommittee Meeting Minutes. Chemical quantities appear to be within required range for Control Areas, and can be stored in approved storage cabinets within the lab. Used solvents can be stored in 5-gallon carboys in vented storage cabinets in the core.
1.6	10.22.08 10.10.08	This department handles a lot of radioactive material. Rad labs and storage should be considered. Refer to Chemistry Subcommittee Meeting Minutes. Used radioactive material is low-level (C14, Tritium, and I25) and can be stored in the lab. Waste will be collected in tagged (red) buckets per the current protocol.
1.7	10.22.08 10.10.08	Provide restricted space for toxins storage. Provide storage room with table, 4' hood, and space for (2) -20 Freezers, (2) -80 freezers on emergency power. Provide punch-code or prox. Reader at the door to maintain security.
1.8	10.22.08 10.10.08	This department is more prone to flooding. Consider locating on a lower floor to mitigate water damage to space below. Do not locate over equipment areas or the Dean's office. Provide floor drains at all showers.
1.9	10.22.08 10.10.08	Well-ventilated gas tank storage room needs to be provided. Provide for house compressed air, vacuum and nitrogen. Other services needed include gas, and RO water (see other program groups for requirements).

1.10	10.22.08 10.10.08	Equipment with large footprints and high heat output (-80's, Freezers) should be located together and MEP systems designed around their use. Every lab will have -80 freezers and centrifuges. -80 and -20 Freezers should be on emergency power and alarmed for security.
1.11	11.05.08 10.22.08 10.10.08	Provide for large walk-in cold rooms. This department uses around protein purification, and utilizes columns. Provide with sliding door with temperature of 4 degrees +/- 1 degree. Provide Stainless Steel bench top with sink and HW/CW.
1.12	10.10.08	Design team should consider a Cell Culture Core, and distribute on each floor.
1.13	10.10.08	Opportunities for a Pre-Clinical Core were discussed, but dismissed for this facility at this time.
1.14	10.10.08	Shared rooms and areas for the School should be considered, but most equipment will be directly assigned to individuals.
1.15	10.22.08 10.10.08	Future lab space will likely include more automated systems and robotics with less wet lab space. However, chemistry labs will remain as wet lab spaces with possibly more flexible bench space.
1.16	10.22.08 10.10.08	Consider small pilot plant/fermentation for this department. Process will not be above pilot scale, or 100 liters (for a one-week run). Plan for small-scale fermentation space with (4) 30 liter fermenters. Provide space for (4) shakers (6'x'3') and 4' BSL2 cabinet. Provide adjacent to cell culture core and a small autoclave/glasswash room. Helpful to have this space isolated, but not required.
2.1	11.05.08 10.22.08	Provide for small autoclave/glasswash room close to cell culture room and fermentation/microbiology. Room to include SS countertop and sink with HW/CW.
1.17	10.10.08	Espresso Bar with coffee and food is desirable.
1.18	10.10.08	Labs should allow for 4' hood space, and 12' bench space/Student and Post Docs.
1.19	10.10.08	Allow for 2 offices per PI with student carrels outside of the lab space. Faculty to have private offices.
3.2	11.05.08	Open Lab Space RDS review: Noted that space needs to be provided for up to 10 students/PI in the lab or adjacent to the lab. Flexible equipment space in the lab is seen as desirable. Team

		space, and equipment room/other support spaces need to be close to lab. Students to have 30" deep countertops. Fume Hoods can be located close to each other to maximize bench top work space (ie. rather then spread out and small work space between).
3.3	11.05.08	Computational Lab: This space can be located close to office area, and atrium or Translational Center. Space to allow for 6 students and 6 visitors each with work area for 1-2 computers and 2 large LCD screens. Provide a lot of power and data in this space.
3.4	11.05.08	Visualization Room: Provide space adjacent to the Computational Lab for future virtual learning, immersion reality. Room will likely need projectors and mirrors with a adjoining computer closet (20x18).
3.5	11.05.08	Large Conference Room: Large conference room required for the entire College, and should be about 600sf. This room will also function as the audio visual conference area, with LCD projector and screen.
		Other Items
1.20	10.22.08 10.10.08	Department will grow –nucleus of current staff ~~is the best~~ for this department has been recognized as best in the country.
1.21	10.10.08	Provide for redundancy in air handling systems (for fume hoods and flexible design).
1.22	10.10.08	Biochemistry Building is a good model for lab space, not good for office space.
2.2	10.22.08	All labs to have RO water at all sinks. One sink in each lab to have RO and scrub to MilliQ (at reagent prep).
2.3	10.22.08	One shower and locker room is desirable in the building.
		Program Group Space Allocation / Room Data Sheet Review
4.1	11.20.08	The Program Group Space Allocations: • The Large Conference Room square footage should be split among the 4 departments • Computational Lab and Visualization Room square footage shall be split between Medicinal Chemistry and Pharmaceutics. Room Data sheets for wet labs and offices were reviewed.. Revisions discussed will be reflected in the final program

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		document.
		Program Draft Review
5.1	12.19.08	• Core/Lab ratio OK • Cold Room too small: Delete Media Prep and substitute 2nd Cold Room • Foot paddle for cup sinks would be great • Provide (1) Radio Isotope Hood in each Chem. Lab • Provide flexibility for adjustable shelving at lab perimeter • Provide sensor alarms on freezers and link to current University System (CE Cure) • No physical barriers between lab and office space.

The notes proceeding represent my record of items reviewed and concluded during the course of the meetings noted. Please contact me within five days of receipt if there are any corrections, questions or omissions in content.

Prepared by:

David Bryant

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Attending		**Representing**
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
William Crowley, *Chair*	X	UU College of Pharmacy, Pharmacology & Toxicology
Diana Wilkins		UU College of Pharmacy, Pharmacology & Toxicology
Glen Hansen		UU College of Pharmacy, Pharmacology & Toxicology
Matt Slawson		UU College of Pharmacy, Pharmacology & Toxicology
Gary Yost		UU College of Pharmacy, Pharmacology & Toxicology
Annette Fleckenstein		UU College of Pharmacy, Pharmacology & Toxicology
Peter Emerson		EDA
Stephanie McCarthy		EDA
Brad Leathley		NBBJ
Kyle Elliott		NBBJ
David Bryant	X	NBBJ

Mtg	**Orig. Date**	**Description**
		Purpose of Meeting
3.1	11.05.08	Review of Space List, Room Data Sheets, and Relationships. All edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.
		Vision and Goals
1.2	10.09.08	• Increased Capacity • Increased Connectivity • Increased Space • Integration will generate ideas for grants • Attract good grad students • Build Collaboration • New building will be transformative
		Function
1.3	10.09.08	The department has over 30 people in multiple buildings, including Biopolymers (7 in this building), Research Park and Skaggs. Pharmacology and Toxicology are integrative and interdisciplinary sciences that investigate the actions of chemical agents on living systems through research and testing.

Program Groups/Space Needs

1.4 11.05.08 10.22.08 10.09.08

Space Groups include:

- Center for Human Toxicology (CHT), Diane
- Project Program Group (PPG), Glen
- Other Wet Lab Spaces (Dr. Barrows and Dr. Blumenthal to be located close to each other)

Space needs include:

- Animal Holding and Procedure
- Wet Lab Space
- Dark Rooms
- ~~Rad Rooms.~~ Levels not high enough to require separate room, per meeting with EH&S.
- Instrument Rooms
- Conference Rooms
- Offices
- Cold Room (Can be shared with other departments)

Animal Holding and Procedure
(reference separate sub-committee group meeting minutes).

1.5 11.05.08 10.22.08 10.09.08

Provide Animal Holding and Procedure Rooms for (6) animal holding rooms for mice and rats. Allow for experimental self-admin chambers – (2) at 400-500 SF and accommodating 60 cages. Cage washing is handled outside of facility by Animal Resources. Estimate approximately 5000 SF for animals and up to 7500 SF. Adjacency to PPG more critical than CHT.

Other program request made by the Animal Group Subcommittee (Refer to notes from Animal Group Subcommittee):

- All rooms will be BSL2
- Locker space and Gown-in
- Cagewash
- Infrastructure for Ventilated rack system for future use. ~~with~~ Wire racks currently in use which are not compatible with ventilated rack system. ~~bottom~~
- Accessible to Loading Dock

Center for Human Toxicology (CHT) – Diane

1.6 10.09.08

The CHT is an internationally recognized leader in the development of assays for drugs in specimens. Most of these assays are based on immunoassay techniques, gas chromatography and mass spectrometry (GC/MS) and liquid chromatography and mass spectrometry (LC/MS).

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1.7	11.05.08 10.22.08 10.09.08	Provide secure space for offices and labs. Labs to have space for Mass Specs and other instrumentation. Current space is 11,500sf and has 33 people with 7 faculty. Other requirements/needs: • Due to equipment loads, heat load and electrical loads need to be considered. • Operates 24 hours/7 days a week. • All samples are hand delivered through secure entry. • Provide Sample Receiving Area, where samples are tagged. Provide reception desk with space for send-outs. • Provide Sample Storage Area off receiving area. Provide (2) Cold Rooms and (2) Freezers (walk-in). Storage of 12-15,000 frozen samples needs to be provided (specimens are required to be held for 2 years, with court cases being held for 5-7 years). Provide adjustable shelving in storage rooms, and bench top with power in cold rooms. • Provide 24-hour temperature monitoring of walk-in coolers and freezers. Current system is Johnson Controls. • Provide Sample Accessioning Area, adjacent to lab. Provide bench space with snorkel hood. Space will be used by 2-3 at a time. • Provide lab space. Equipment needs include HPLC, (8) Mass Specs, Flow Cytometry, wall-mounted MilliQ, and fume hoods (6). Provide benches (doors and drawers) with sinks and shelving. Provide overhead service for power at equipment areas. Provide for Nitrogen, and exhaust. Other equipment needs include chest freezers, upright freezers, floor standing centrifuge, and Tissue Homogenizers., and Spectrophotometers. • Provide tank storage room for nitrogen dewars, hydrogen, ammonia, helium, air and vacuum. Optimally would like house nitrogen and compressed air (100psi). • Provide records storage room. Files stored require special floor loading requirements. Locate close to conference room and office. • Provide QC Sample Prep off of lab. Needs to be isolated space from lab (alcove). Provide storage for small safe, and benchtop with sink, ~~dishwash~~, freezers, frig, balance. • Vibration control is critical. • Future needs: 1 addition bench (beyond what they have currently), 3 more faculty. 15-20% growth anticipated. • PPG and Neuro groups should be in close proximity. • Provide Exam Room with access to public (will share space with Steve Kern).

- Provide Office Space adjoining receiving area.
- Adjacency to Pharmaceutics (Steve Kern) is important.
- Provide separate glass wash alcove with SS sink, bench top, UC dishwasher (w/DI rinse), Drying Oven and Glassware Storage.
- Dept to provide equip. info for labs.
- Dept to confirm rqmts for RecordStorage

Program Project Group (PPG), Glen

1.8 — 10.09.08

(3) faculty each require lab space of 1500-1600sf. Labs to be split in function between radioactive and non-radioactive. Provide fume hoods and bench space in lab with offices adjacent.

Other Space Requirements

1.9 — 11.05.08, 10.22.08, 10.09.08

Other space requirements include:

- Equipment rooms for -80 Freezers (5), -20 Freezers (2), centrifuge (2) and gamma counters (1). Consider heat generation and power requirements.
- Radioactive area uses Tritium, C14 and I125. Provide space within lab for storage of material. Levels are low and do not require a separate, secure room.
- Conference room space (approx. 360sf)
- Dark Room~~s~~
- Break Rooms/Lunch Rooms.
- Anticipate growth to 3 new lab spaces (total of 6).
- Cold Rooms (can be shared with other departments).
- Provide space in open lab for scintillation.

1.10 — 11.05.08, 10.22.08, 10.09.08

Office/desk space to include:

- Desk space for grad. students in lab – students in lab at end of bench is preferred.
- Three (3) offices, 140sf, for current faculty and,
- Six (6) additional offices for research faculty ~~to allow for growth~~, 140sf each.

2.1 — 10.22.08

Wet Lab Space for Dr. Barrows (1500sf) and Dr. Blumenthal (1500sf) – both currently located in Research Park. Locate labs close to Chris Ireland (Medicinal Chemistry).

2.2 — 10.22.08

Steve White may move into lab space (works with Anti-convulsion drug-delivery). If he moves into space, size of Animal Facility may increase.

Other Items

1.11 10.09.08

Group interacts/collaborates with Pharmaceutics (David Grainger and Steve Kern), Medicinal Chemistry (Chris Ireland and Tom Cheatham), Pharmacotherapy, School of Medicine, and UStar.

1.12 10.22.08
10.09.08

In the future this department expects to still be doing research in a new facility with new lab space around behavioral pharmacology (animal research space), molecular genetics (wet lab space), and computer bioinformatics (core facility space).

4.1 11.20.08

The Program Group Space Allocations:

- 8 faculty offices for PPG in lieu of 9
- Cold Room – need occasional access
- House Nitrogen – cost vs. portable
- CHT labs are like large equipment rooms
- CHT – Medical grade compressed air?

Review of Space List, Room Data Sheets, and Relationships. All edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.

Program Group Space Allocation / Room Data Sheet Review

5.1 12.19.08

For the partial build out for the PPG:

- reduce faculty offices to 6 @ 140 = 840 sf
- increase research offices to 20 @ 60 = 1200 sf
- Keep the rest of office allotment the same so total office is 3829 sf (reduced by 20 sf)
- Keep the lab allotment the same @ 5171 sf
- So total for PPG in partial buildout is 3829 sf office and 5171 sf
- lab for total of 9000 sf

For the full build out of PPG, use the full build out figures on Your table for offices @ 4429 sf and keep the lab allotment from the partial build out @ 5171 sf. This brings a total of 4429 sf office and 5171 sf lab =9600 sf.

For the full buildout of CHT:

- Office space: 5 faculty offices @140 = 700 sf
- 30 research offices @ 60 = 1800 sf
- the rest of the allotment as listed
- total office space is 3402 sf (reduced by 1000sf)

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- Lab space: 6 wet lab @ 1200 = 7200 sf
- 1 cold room @ 120 = 120 sf
- 2 freezer rooms @ 120 = 240 sf
- 1 accessioning @ 165 sf = 165 sf
- 1 tank storage @ 100 sf = 100 sf
- eliminate glasswash alcove and qc preps
- total lab space = 7825 sf
- The total for CHT then would be 3402 sf office and 7825 sf lab =11,227 sf

Adding the PPG total of 9000 sf = a total pharmtox of 20,227 sf

The notes proceeding represent my record of items reviewed and concluded during the course of the meetings noted. Please contact me within five days of receipt if there are any corrections, questions or omissions in content.

Prepared by:

Stephanie McCarthy

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Attending		**Representing**
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
David Grainger, *Chair*	X	UU College of Pharmacy, Pharmaceutics
Steve Kern		UU College of Pharmacy, Pharmaceutics
Carol Lim		UU College of Pharmacy, Pharmaceutics
Jim Herron		UU College of Pharmacy, Pharmaceutics
Peter Emerson		EDA
Stephanie McCarthy	X	EDA
Brad Leathley		NBBJ
Kyle Elliott		NBBJ
David Bryant		NBBJ

Mtg	**Orig. Date**	**Description**
		Purpose of Meeting
3.1	11.05.08	Review of Space List, Room Data Sheets, and Relationships. All edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.
		Vision and Goals
1.2	10.23.08 10.10.08	The School of Pharmacy should be translational, not just within the School of Pharmacy, but also Health Sciences and School of Medicine. This building should not be a “selfish building”, but should engage with the rest of Health Sciences, campus and community. The building should be organized around building teams, and finding the greater good of the individual. The Building should be planned around function and socialization. It should allow for interactive relationships, and will not have an insular image. Open lab spaces and shared equipment spaces are desirable.
		Function
1.3	10.23.08 10.10.08	The group functions around delivery and does device-based and cell-based research around the application of materials and medicines to improve patient health. Devices developed include sensors, prosthetics, and implanted devices. Cell-based therapies include the creation of cells that relieve pain. Innovative drug delivery systems are developed that combine

		new targeting, imaging and triggered release features to improve therapy. This group studies the fundamental properties of materials that control how drugs interact with the human body – its core is around physical chemistry.
1.4	10.23.08 10.10.08	This group works closely has a conceptual relationship with Pharmacotherapy, but wants an integrated facility with all groups. the building should create opportunities for cross-over with all groups in the College of Pharmacy, in addition to the Health Science District.
2.1	10.23.08	This department is pursuing a personalized health initiative that charts patterns of disease based on genealogy and family history, allowing for more personalized and targeted medicines to treat disease.
		Program Groups
1.5	10.23.08 10.10.08	This is a “soup to nuts” department, with processes and work that includes: 1. Organic synthesis 2. Formulation and device design 3. In Vitro and cell testing 4. Pre-clinical and model testing (some animal work) A clinical group (Steve) group works with humans to understand delivery of medicines – studying dosage quantities and frequency. His group works with pediatrics, anesthesia, School of Medicine and helps clinicians to use devises or drugs to achieve clinical goals. This group acts as a bridge between research and clinical. Space needs include computational lab, wet lab and support spaces. A Biology group (Carols) group does pre-clinical testing to understand how drugs move through the body. Her group uses basic science applied to therapy or testing of drug substance. She works with drug delivery people, pharmacist, and cancer specialist, also working closely with Pharmacology and Toxicology. Both groups target therapies around personal medicine, with studies around devise, delivery and interaction. This program group will collaborate with other groups to form translational research around medicine – to better forecast and understand formulas and have knowledge about the patient to determine responsiveness of drug.

The following program areas need to be considered in the new building:

- Device practice
- Wet lab practice
- Computer Lab practice
- Clinical practice (off-site)

Device Practice

1.6 10.23.08 10.10.08

Requires a controlled environment room, similar to a shop. Requires space for equipment – Drill Press, Lathe, and other equipment. Space needs to be provided with a lot of power. Work with instrumentation – optics, lasers, devise prototypes. Equipment includes one small Bioreactor. Allow working space for three (3) people.

Noted that this space can be provided in the lab. A dedicated machine shop is not required. If needed, the department can use the Physics lab.

Wet Lab Practice

1.7 11.05.08 10.23.08 10.10.08

Provide wet lab space for biology and chemistry functions. Space to include:

- Common Equipment/Instrument Room
- Common Instrument Room with bench top.
- Cell Culture Room or Suite with cell culture rooms and BSC to isolate contaminates. Desirable to have each PI have their own Cell Culture Room – provide (4) Cell Culture Room as part of a suite for this group. Each Cell Culture Room to have (2) 6' type IIA BSC and (2) stacked incubators.
- Meeting Areas to talk about experiments with whiteboard.
- Dark Room with scanner.
- Radioactive room for secure isotopes. Radioactive material (P32, I125 and tritium) not required in separate room. Can provide in lab in secure cabinet.
- Cold Room (working lab with columns) and stainless steel bench top, sink and HW/CW (10'x16').
- Select Agent Storage Room, secure room with frig and safe. Noted that only one needs to be provided for the building and can be shared (see Medical Chemistry).
- Lab space with chemical hoods (overdesign for hoods to allow for flexibility) for 10 people (currently 5 PI's +

Chair). Provide 4' fume hood/researcher or approximately 15 hoods with vented chemical storage below. Provide for maximum flexibility allowing for 6 RI/PI. Provide for pure H20 with point of use (MilliQ) at one sink in each lab. Provide duplex outlet 16" OC. ER power needs on lab to be defined.

- (8) 8' laminar flow hoods in lab.
- Space in lab for particle characterization (as an alcove). Needs Purified water.
- Microscopy Suite: Alcoves in lab for microscopy with HPLC, and Gel Process. Alcoves to have computer, microscopes and bench space. Provide (3) rooms, one to be darkened.
- Dedicated room for DLS light scattering equipment. Room to be HEPA filtered with optical bench and designed for vibration-sensitive equipment. Provide 408/3-phase power and large bench for laser and equipment. Note that laser is water-cooled.
- Space for organic synthesis with (3) 8' hoods.(keep organic synthesis separate from chemicals work).
- Small area in lab for Steve, which should include 2 benches/2 people, small fume hood, HPLC's and ovens (GLP Toxicology).

Flexible Bay Space is desirable, with large open labs preferred to smaller labs.

Computer Lab Practice

1.8		10.23.08 10.10.08	Current space serves 4 people, but will need space for 9 people in new facility, allowing for a mini-course with 12 people. Provide desk space for laptops with data and power connections. Provide white board. Noted that a new computer space is not required. This to be reviewed further with the IT/Data subcommittee.
1.9	Meet with Derek (IT)	10.10.08	This group has strong IT needs which need to be reviewed with Derek.
1.10		10.23.08 10.10.08	In the future computer modeling./data processing will likely increase, while wet lab functions are likely to decrease (with the exception of chemistry lab space).
2.2		10.23.08	Noted that a good example of lab space is at 383 Coloron Drive. David recommended a site visit.

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Office Space Requirements

1.11	10.10.08	Provide private office space for faculty. Students and Post Docs can share office space (consider bullpen). Student should have views to lab space from office and/or desk space. Provide flexible space for guest office.
3.2	11.05.08	Provide faculty work area space central to office area, and adjoining private offices. This space can be used for casual meetings and work space.
3.3	11.05.08	Chairs office to be sized the same as faculty – at 160sf.
3.4	11.05.08	Provide small kitchen alcove (90sf) adjoining the lounge (240sf) – locate one on each floor.
3.5	11.05.08	Data closets to be located on each floor (noted that this will be calculated as gross sf space).
3.6	11.05.08	Provide one large conference room space for the whole building (600sf).
1.12	10.10.08	Consider interior glazing at offices to allow for more visibility.
4.1	11.20.08	The Program Group Space Allocations: • Provide an Autoclave on each floor • Steam generator at basement preferred (not clean steam) • ! cup sink at hoods • Closed chilled water loop will be provided and dropped to each bench. Temp. to be consistent through building • Bottled Nitrogen at bench is acceptable • No Natural Gas required
		Review of Space List, Room Data Sheets, and Relationships. All edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.

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Program Group Space Allocation / Room Data Sheet Review

5.1	12.19.08	• Provide sufficient capacity for Fume Hood expansion in the future in labs. Currently, it costs $40,000 per hood to add to an existing facility.

The notes proceeding represent my record of items reviewed and concluded during the course of the meetings noted. Please contact me within five days of receipt if there are any corrections, questions or omissions in content.

Prepared by:

David Bryant

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Attending		Representing
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Diana Brixner, *Chair*	X	UU College of Pharmacy, Pharmacotherapy
Karen Gunning, *Continuing Education*		UU College of Pharmacy, Pharmacotherapy
Barbara Crouch, *Poison Control*	X	UU College of Pharmacy, Pharmacotherapy
Joe Biskupiak, *Outcomes Research*		UU College of Pharmacy, Pharmacotherapy
Gary Oderda, *Drug Regimen*		UU College of Pharmacy, Pharmacotherapy
Heather Bennett, *Poison Control*		UU College of Pharmacy, Pharmacotherapy
Frederick Albright, *CPCSS*		UU College of Pharmacy
Peter Emerson	X	EDA
Stephanie McCarthy	X	EDA
Brad Leathley		NBBJ
Kyle Elliott	X	NBBJ
David Bryant	X	NBBJ
Brandon Jennings		UU College of Pharmacy, Pharmacotherapy

Mtg	Orig. Date	Description
		Purpose of Meeting
1.1	10.10.08	Review Program Groups, Relationships, and Initial Requirements
		Program Groups
1.2	10.23.08 10.10.08	This program group functions around validation, working closely and collaboratively with all other departments. ~~Pharmaceutics in Delivery~~. Program Groups include: • Continuing Education and Clinical Faculty (Karen) • Poison Control Center (Barb) • Research Faculty or Outcome Research Center (Joe) • Tenured Tenure Track Faculty or Drug Regimen (Gary)
2.1	10.23.08	This department works in collaboration with Health Science Center, RGE and UPED, Huntsman Cancer, SOM, Department of Pediatrics and others.
		Continuing Education and Department Core (TTT) Clinical Faculty
1.3	10.23.08 10.10.08	This group's activity is focused around didactic work (50%) and practice site work (50%). There is a strong link to Salt Lake City

pharmacy practice. There are ~~12~~ 16 Clinical TTT Faculty in this group, which will require office space 50% of the time (the rest of time they are in the field).

1.4 10.23.08 10.10.08

~~This~~ The Continuing Education group requires space for the following:

- Filing cabinets
- ~~Large room with small tables that can be configured for group discussions around continued education. Room is used during weekends and needs to be close to the building entry. Allow space for 150-300 people.~~ Noted that this will be provided in another building, and is not required for this space.
- (4) Work Rooms/Project Rooms for 8-12 people with tables that can be reconfigured for on-line training. Provide teleconference capabilities, whiteboards and projection screen. These rooms can be shared with all other groups in dept.
- Allow space for storage of flyers, posters, blood pressure devises, and other equipment
- Consider Pharmacy for dispensing information (no drugs).

The TTT Clinical Faculty require space for the following:

- Library (shared with department). Could be shelving in a conference room.
- Clinical office space with filing cabinets.

Poison Control Center

1.5 10.23.08 10.10.08

Poison Control Center has a staff of ~~20~~ 25 people (pharmacist and nurses), and offers a 24 hotline to the community. The space is required to be secure and locked down, and needs adjacency to toilets and a lounge.

1.6 10.23.08 10.10.08

This group requires space for the following:

- A call “nerve” center for 4-5 students, 2 staff in AM, 3 staff in PM and 1 staff overnight. Plan space for max. (4-5) people in Nerve Center. Provide cubicle desk space and whiteboards. Provide shelving and countertop space for fax, printer and file cabinets.
- Student Area/Surge Space for (4) students. Provide cubicles. Adjacent to Nerve Center.
- Outreach Education Program ~~requires storage for videos, flyers and pamphlets, and~~ needs to allow space for 2-3 people. Provide area for (1) office, and (1) shared

cubicle with two computers. Provide storage area adjacent for storage of videos, flyers, etc. This area to be provided outside of secure area.
- Conference Room w/ shelving for library (consider outside of secure area and shared).
- Provide Break Area with Coffee-maker, Frig, and Microwave (can share with other groups and departments).
- Admin space for offices and cubicles (see 1.7)
- Provide secure space for patient record storage, close to administration.

1.7 — 10.23.08 10.10.08

Office space needs to allow for:
- (2) Asst. Directors (in offices)
- (1) Director (in office)
- (1) Medical Director (in office)
- (1) Admin Assistant (cubicle)
- (1) Educator (cubicle)
- (1/2) Educator(cubicle)
- (1/2) QC Person (cubicle)
- (2) Project People (full time Project Coordinator and Project Manager in cubicles). Locate close to reception.
- (4) Poison Information Providers (students). Locate away from Call Center to work on project in cubicles.
- Provide for (5) private offices, all other cubicles.

Review against Organization Chart – does this include vacant?

Outcome Research Center

1.8 — 10.10.08

The Outcome Research Center's mission is to facilitate the interaction of academia and patient care systems through outcomes research, the presentation and publication of results, training of healthcare professionals and facilitating the utilization of outcomes research information to improve patient care. The center contracts with the pharmaceutical industry, foundations, managed care organizations and government.

1.9 — 10.23.08 10.10.08

The Outcome Research Center includes 20 people with the following breakdown:
- 7-8 Faculty
- 4 Researchers
- 4 Admin.
- 2-3 Student Fellows
- ~~1-2~~ 4-6 Students

All faculty and research associates have private offices, all others are in cubicles.

1.10 10.23.08 10.10.08

Other spaces/activities required include:

- Common Reception with Drug Regimen, Poison Control, and TTT
- Large Conference Room shared with Drug Regimen, TTT, (and Poison Control?). Provide video conference and projection screen.
- Library (shelving in conference room).
- Lunch/Break Room (shared with Drug Regimen, ITT, Poison Control and College of Pharmacy)
- Work Areas, semi-private for 3-4 (area requires desktop computers, white board). Shared with Department (see CE and Clinical Faculty).
- Requirement for a lot of computer data storage.

Drug Regimen Review

1.11 10.10.08

The Drug Regimen Review Center works in conjunction with the Utah Department of Health to review the medication profiles of select patients - the purpose being to help clinicians optimize drug therapy and reduce drug costs without compromising patient care.

1.12 10.23.08 10.10.08

This center involves a lot of outbound calling. Security is important and there are no visitors. Can be located in secure area with Poison Control.

1.13 10.23.08 10.10.08

This group includes ~~5-6~~ 3-4 Pharmacist, and ~~3-4~~ 2-3 staff support. All Staff support in cubicles.

Other Items

1.14 10.10.08

Pharmacotherapy has a strong need for computer services. Data Storage requirements are large. Data Center should be provided to support the school. Design team to schedule meeting with Derek.

Program Group Space Allocation / Room Data Sheet Review

4.1 11.20.08

Review of Program Group Space Allocation. All edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.

Review of Space List, Room Data Sheets, and Relationships. All

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		edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.
		Program Draft Review
5.1	12.19.08	• Computer component is Pharmacotherapy “wet lab”. • Data Center component is dependent upon direction the University chooses to co in for Central Data Center.

The notes proceeding represent my record of items reviewed and concluded during the course of the meetings noted. Please contact me within five days of receipt if there are any corrections, questions or omissions in content.

Prepared by:

David Bryant

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Attending		**Representing**
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
William Crowley, *Chair*	X	UU College of Pharmacy, Pharmacology & Toxicology
Steve Kern	X	UU College of Pharmacy, Pharmaceutics
Dave Whitton	X	Envision
Don Bradshaw	X	VBFA
Peter Emerson		EDA
Stephanie McCarthy	X	EDA
Brad Leathley	X	NBBJ
Kyle Elliott		NBBJ
David Bryant	X	NBBJ
Jack Taylor	X	University of Utah, Director, Office of Comparative Medicine
Kristen Keefe	X	UU College of Pharmacy, Pharmacology & Toxicology
Annette Fleckenstein	X	UU College of Pharmacy, Pharmacology & Toxicology
Glen Hanson	X	UU College of Pharmacy, Pharmacology & Toxicology

Mtg	**Orig. Date**	**Description**
		Purpose
1.1	10.22.08	Members of programming team and Art Broom met with Jack Taylor, Director, Office of Comparative Medicine to review the Standard Operating Procedures for the use and care of Animal Facilities on the University of Utah Campus.
		Administration of Animal Facilities
1.2	10.23.08	All animal facilities on the University of Utah Campus fall under the umbrella of Thomas Parks, VP for Research, Office of the President. • The maintenance of the existing animal facility in located in LS Skaggs Hall is the financial responsibility of the College of Pharmacy. This is the exception to the rule on Campus. • The administration will determine responsibility for the maintenance of the new facility. • Include Jack Taylor in all programming meetings involving animals.
		Existing LS Skaggs Animal Facility
1.3	10.22.08	At this time it has not been determined if the existing animal facility will remain. Concerns have been raised about the proximity of the existing facility to the public atrium space as the animals are very sensitive to disturbances to their environment

(noise and vibration)

Standard Operating Procedures

1.4 10.22.08

Removal of Animals

- Newer facilities on campus are equipped with procedure rooms.
- If an animal is removed from the facility policy dictates that it is a one way trip for the animal.
- Exceptions gave been made that allow animals to be removed from the facility as long as they are returned within a 24 hour time period.

Access

- Access to and within the animal facility is monitored by a "Watch Dog System".
- Research Staff has access to the holding rooms. Individuals entering the rooms are only required to gown if they will be in contact with the animals or the cages.
- Procedure rooms are typically multi-functional and must be scheduled for use.
- Equipment can be left in the procedure rooms

Components / Function

1.5 10.22.08

Jack Taylor indicate that the animal facility in the new facility should be a self contained , fully functional Vivarium:

- ABSL 2 Level (min.)
- Cage washing space w/ equipment
- Cage storage (auto feed preferable)
- Ventilated racks on wheels: Some of the researchers prefer wire bottom cages as it prevents the animals from consuming their own waste. The wire bottom cages will not fit on the ventilated racks. However, infrastructure for ventilated racks should be incorporated into the design and construction so that ventilated racks can be installed in the future.
- Ventilated rack system coupled with SOP will be utilized in lieu of isolation facility.
- Rodents (assume rabbits or smaller)
- Zebra Fish may be utilized in the future, this would be accommodate off site.
- Provide generic, flexible facility
- Procedure rooms can be located adjacent to the holding room or down that hall as long as spaces facilitate SOP.
- Provide hand wash sink or disinfectant dispenser in holding room. If sink is located outside holding room door, place sink in an alcove to avoid damage from

hallway traffic.

- A segregated freight elevator will be required to transport animals through the facility. This elevator should also be connected to the loading dock.
- The loading dock will not require an animals only area.
- Animal waste and bedding to be stored in a separate dumpster at the loading dock.
- It is preferred that the animal facility be located underground. However, the parking lot adjacency proposes many issues relative to noise and vibration. Therefore, the animal facility may be located on the top floor.
- Provide a storage space for food, bedding, equipment, clean and dirty cages.
- Cage transfer will occur in hood.
- Provide small pharmacy / controlled substance locker.
- Provide small quarantine area.
- No resident staff will be provided
- Necropsy vs. Procedure: Separation requirements individual to each PI. Provide a bio safety cabinet for the carcass storage
- University uses Thoren cage systems. This should be provided per the FF&E budget. Jack Taylor will provide letter relative to sole sourcing.
- Disposal of animals treated with radionuclides depends upon the nuclide.
- No drains in the animal rooms. Each room has a mop sink and bucket that stays in the room.
- No valves to fog individual rooms.
- See UofU design standards for required materials

Purpose of Meeting

2.1 11.06.08

Review of Space List, Room Data Sheets, and Relationships. All edits noted directly on above documents, and reflected in notes below where changes have been made to spaces noted.

Review Summary

2.2 11.06.08

- Quarantine Room :
  a. Required.
  b. May be combined with Receiving and Packaging.
  c. Will be Administered by Jack Taylor's staff.
- Deliveries will be scheduled
- Provide 6 Holding Rooms, 4 Procedure Rooms and 1 Necropsy Room
- Reduce size of Cage Wash facility.

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- The existing animal facility may need to be abandoned as it does not meet current ALAC SOP. Could this area be used for storage of food and clean cages?
- Provide a Cold Room for storage of 3 palettes of food
- Electrical will need to address reverse day/night issues
- Jack Taylor to provide plans of facility in 417 for review by the programming team.

Review Summary

3.1 11.06.08

- Jack Taylor indicated that he is looking to establish a central cage wash facility for the University. With this in mind, Jack indicated that the project did not need to plan on providing a furnished cage wash facility in the vivarium. However, the project should provide a space with the appropriate infrastructure in the event a cage wash room needs to be provided in the building in the future
- The preliminary layout proposed by the design team was acceptable to the subcommittee.
- Provide mop sink in each Holding Room
- The loading dock should have a clean and dirty end, no separation is required
- Access to the loading dock should be easy, however, strictly limited through security controls
- Fumes from the dock must be controlled and not enter the vivarium
- At minimum, a prox. card shall be required to access General Receiving from the dock
- At minimum, a prox. card shall be required to access Holding from General Receiving.
- A secure entrance (biometrix preferred) must be provided at the locker rooms and airlock
- Controlled access to elevator
- Provide 4 racks in the Holding Room(s)
- Provide 2 procedure rooms with hoods
- Provide 2 procedure rooms with counters on both sides
- Quarantine: Receiving – Quarantine – Holding. Shall have fume hood, vent rack, 6' Type 2A Biosafety Cabinet.

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Prepared by:
Stephanie McCarthy

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Attending		Representing
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Darrell Davis	X	UU College of Pharmacy, Medicinal Chemistry
William Crowley, *Chair*		UU College of Pharmacy, Pharmacology & Toxicology
Joseph Harman		University of Utah, Campus Design & Construction
Dave Whitton	X	Envision
Kim Harris	X	VBFA
Peter Emerson		EDA
Stephanie McCarthy	X	EDA
Brad Leathley	X	NBBJ
Kyle Elliott		NBBJ
David Bryant		NBBJ
Gary Yost	X	UU College of Pharmacy, Pharmacology & Toxicology
You Han Bae	X	UU College of Pharmacy, Pharmaceutics
Michele Johnson	X	UU EHS
Grzegorz Bulaj	X	UU College of Pharmacy, Medicinal Chemistry
Michele Johnson	X	University of Utah EHS

Mtg	Orig. Date	Description
		Purpose of Meeting
1.1	10.22.08	Members of programming team and Art Broom met with representatives from the College of Pharmacy to review the types and quantities of chemicals used in departmental research and the methods of disposal employed.
		IBC (International Building Code)
1.2	11.06.08 10.22.08	• The IBC limits the quantities of chemicals in storage rooms and open space per control area by floor level. Allowable quantities begin to decrease for labs located on the 4th floor and above. • UofU EHS has determined that College of Pharmacy is currently in code compliance. Michele Johnson, EHS concurs. • It was determined that the most chemically intensive programs, i.e., Medicinal Chemistry, will need to be located within the parameters of floors 1-3. • A modest increase in chemical use may be seen over the next 10-15 years. It was felt that any increases would fall well within code limitations as shift to computation based research grows.

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Delivery

1.3 11.06.08 10.22.08

- Due to chemical management concerns, the College has asked that a storage area not be provided at the dock. Chemicals will be delivered directly to the PI laboratory. Each PI will be responsible for maintaining their own chemical inventory log. Michele Johnson, EHS concurs.

Waste Management

1.4 10.22.08

- Per the request of Radiological Health, centralized waste storage will not be provided. Waste shall be put into approved containers, tagged and stored appropriately in the lab for pick up by EHS or Radiological Health. Michele Johnson, EHS concurs.
- Adequate waste storage (Cabinets/red plastic containers for hazardous materials) shall be provided in each laboratory.
- Liquid and solid waste needs to be separated Michele Johnson EHS concurs.
- Per EHS SOP – No biological waste down the sink or other drains. Michele Johnson EHS concurs.

Components / Function

1.5 11.06.08 10.22.08

- Designated Radioactive Areas: there is usually a hood at each bench designated for radioactive work.
- Flammable Storage Cabinets Acid will be stored separately (below hoods), flammables separately.

House Systems

1.5 10.22.08

- 2 Micron Nitrogen Gas
- Natural gas
- Compressed air
- Recirculating chilled water
- Pure water system?

Inventory

1.6 11.06.08 10.22.08

Programming team to contact Michele Johnson w/ EHS to acquire existing inventories for College of Pharmacy Labs. EHS will have updated Chemical Inventories available in 30 days.

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		Purpose
2.1	11.06.08	The CHEMICALS Subcommittee met to review the information gathered and documented in the previous workshop meeting and review these items/issues with Michele Johnson of UofU EHS.
		Summary
2.2	11.06.08	• Seismic bracing for equipment, lips on shelves. • Air permitting will be required for generators. • Generators to be diesel

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Prepared by:

Stephanie McCarthy

University of Utah L.S. Skaggs Pharmacy Research Building		October 20 - 21, 2008
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Attending		**Representing**
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Rick James	X	DFCM
Joseph Harman	X	University of Utah, Campus Design & Construction
Christin Robbins	X	University of Utah, Campus Design & Construction
Dave Whitton		Envision
Peter Emerson	X	EDA
Stephanie McCarthy		EDA
Brad Leathley		NBBJ
Kyle Elliott	X	NBBJ
David Bryant		NBBJ
Mike Halligan	X	UU Fire Marshal
Enzo Calfa	X	DFCM , State Code Compliance
Bryan Romney	X	UU, University Code Compliance
Josh Green	X	RJA

Mtg	Orig. Date	Description
		Purpose of Meeting
1.1	10.23.08	To identify and review code issues to be addressed in the programming process.
		Building Evaluation
1.2	10.23.08	Concept plans combining the foot prints of the existing Pharmacy Building and the new building were reviewed. Each plan represented a variation on connecting the two buildings based on the code classification for type. Building type was based on square footage, setbacks, materials, and area or fire separation. The intent was to identify a building configuration and classification that would allow the most flexibility to integrate the two buildings and utilize the atrium as a physical open connection. The greatest limitation was the existing auditorium and the fact that there appear to be combustible structural components. The existing building also lacks a fire suppression system throughout the entire building.
		Code Classifications
1.3	10.23.08	It was agreed that the existing auditorium building is classified 3B. The existing building is classified 2B with the assumption that the auditorium section will be isolated from the rest of the building with a fire separation. The new building will be classified 2B. The possibility of developing a performance based code for the

project was discussed but it was agreed that the process would be burdensome and require significant time to develop and document. This approach was eliminated.
It was agreed that the parking structure below the building posed no code compliance restrictions but that it would need to have a 2 hour separation.
All Agreed that an H occupancy classification for the building is not desirable. It is understood that chemical inventories and locations of these materials will need to be addressed and confirmed to maintain a B2 classification.

Existing and New Building

1.4 10.23.08

The goal of allowing the atrium to connect the existing and the new building without limitations on openings was identified as critical to the overall concept of the Pharmacy Institute.

The committee unanimously agreed that concept plan #1 met the needs of the Institute and the College of Pharmacy. Option #1 requires that the existing auditorium building be isolated from the existing building by a fire separation. The existing building will be required to have a fire suppression system installed. This will allow both the new building and the existing building to have unrestricted openings into the atrium space.

t was discussed that there is a University capital improvements budget allocated to adding fire suppression systems to existing University buildings. Mike Halligan was asked to determine if there might be funds within that budget that might be allocated to help offset the cost of upgrading the existing Pharmacy building.

Fire

1.5 10.23.08

Mike Halligan noted that there is acceptable fire department access on the east and south sides of the building. Access on the west side will need to be addressed as part of the site design.
It was noted that the shafts in the existing pharmacy building would not have to be modified based on pursuing Option#1.

Code Issues

1.6 10.23.08

It was noted that the average grade around the building would need to be established to determine if the parking structure will be considered a below grade structure.
The difference between the Universities Chapter 7 fume hood exhaust requirements and the IBC which the State will enforce was discussed. Enzo indicated that the IBC will control and that

exhaust shafts cannot be connected between floors. They could be connected in a manifold above the roof level in order to address redundancy.
Chapter 34 will be used to evaluate modifications to the existing building .The DOPL web site should be checked for amendments to chapter 34.
Presently the 2006 version of the IBC will be the governing code for the design of the building. If the construction documents for the building are submitted to the state for review after Dec, 31, 2010, the 2009 IBC will control. Enzo Calfa indicated that the State was willing to allow multiple bid packages for constructions documents. For the building to fall under the 2006 IBC the first bid package must include at a minimum, footing and foundation design. This requirement needs to be evaluated further in regards to the building schedule. It was noted that it may be appropriate to design the building under the 2009 code which would eliminate the impact of the States transition to the new code in 2010.
The structure of the atrium cannot bear on or connect to the existing pharmacy building without requiring significant structural and seismic upgrades to the existing building. The two buildings will be seismically isolated.

ADA

1.7 10.23.08

It was restated that ADA compliance short comings in the existing pharmacy building will be accommodated in the new atrium space. The areas to be addressed include restrooms and elevator access to all floors.

IBC 2006 vs. IBC 2009

2.1 11.20.08

In order to utilize the 2006 IBC the first bid package will need to be submitted for permit no later than December 31, 2009.
Bid packages will be required to meet this schedule:
Bid Package 1: Footings and Foundations
Bid Package 2: Final Package
Enzo Calfa and Bryan Romney took no exception to this strategy.

Penthouse

2.2 11.20.08

- If the penthouse area is greater than 33% of the roof area it is considered an occupiable space. See Section 1509 Roof Area.
- Enzo Calfa will check to clarify occupiable space
- Premium for mechanical in basement
- Mechanical will require 18' floor to floor
- Just air system on roof

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Atrium

2.3 11.20.08

- Kyle reviewed stacking options
- Atrium open on 3 levels, 2 levels sealed off
- Smoke Evacuation: will pressurization work with intermediate spaces?
- Can be open for 3 level but that area needs to be figured for smoke evacuation
- Natural ventilation in Atrium will not be 72 degrees

Interface of Old and New

2.4 11.20.08

- Kyle reviewed stacking options
- Atrium open on 3 levels, 2 levels sealed off
- Smoke Evacuation: will pressurization work with intermediate spaces?
- Can be open for 3 level but that area needs to be figured for smoke evacuation
- Natural ventilation in Atrium will not be 72 degrees
- Chemicals: If one facility, containment of chemicals will need to be evaluated
- Per Section 3403.2, evaluate if the increased for of the fire sprinkler system exceeds 5%.

Fume Hoods

2.5 11.20.08

Confirm manifolds of fume hood exhaust.

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Prepared by:

Peter Emerson

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Attending		**Representing**
John Mauger, *Dean*	X	UU College of Pharmacy
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Steve Panish, *Asst. VP of Health Sciences*	X	University of Utah
Joseph Harman	X	University of Utah, Campus Design & Construction
Christin Robbins	X	University of Utah, Campus Design & Construction
Claudia Luttrell		ALSAM Foundation
Lindsay Cutshall	X	ALSAM Foundation
Ronny Cutshall	X	ALSAM Foundation
Peter Emerson	X	EDA
Stephanie McCarthy	X	EDA
Brad Leathley	X	NBBJ
Kyle Elliott	X	NBBJ
David Bryant	X	NBBJ

Mtg	Orig. Date	Description
		Purpose of Meeting
1.1	10.22.08	To identify and review issues effecting the development of a programming cost estimate.
		Structured Parking
1.2	10.22.08	It was restated that the budgeted cost for the below grade parking structure was ten million dollars. It was agreed that the intent is to provide as many cars as possible below the new pharmacy building, approximately 200. Funding is the responsibility of the University and it is still to be resolved It will be important to understand the impact of the parking structure on the cost of the building.
		Bench Marking
1.3	10.22.08	Local project discussed were ; Westminster College new Science Center – recently bid - $345/sq' This building is a laboratory teaching facility State Unified Lab Building - bid in 2008 -$370/sq' 45,000sq' of lab space with 45 fume hoods, small vivarium and a BLS 3 space National lab buildings were identified; the one with the closest cost / sq' to the current master planning budget was the Univ. of Colorado

Additional benchmarking needs to be developed. Joe Harmon indicated he would provide the sq' costs for the HSEB. We will also try and get the costs for the Emma Eccles Jones lab building. These numbers will need to be escalated.
Two additional buildings that could be evaluated are the science building at Dixie and the new USTAR lab building at USU. DFCM would need to provide these costs

Cost Risks

1.4 10.22.08

A new project budget and schedule were developed and presented to the project team by Joe Harmon. The budget is currently identified as $50,000,000. This number wad arrived at by shortening the project schedule, reducing the escalation factor to 10% and taking advantage of the savings associated with bidding the project earlier. Joe Harmon will provide the updated budget to the design team.
The team needs to identify and clarify the components and systems in the building to more accurately understand the costs
The atrium sq' and associated cost are part of project budget
The extent and level of the lab finishes need to be identified.
The impact of the below grade parking on the costs of the buildings concrete structure due to isolation and vibration control.
Costs associated with code required upgrades and improvements in the existing Skaggs Pharmacy Building have not been identified.
The costs identified for IT systems in the new building may not be realistic. Additional program information needs to be identified.

Miscellaneous Items

1.5 10.22.08

Rick James to arrange for an asbestos survey of the existing Skaggs Pharmacy Building.
Rick James to confirm if the line item for legal fees in the CBE budget actually comes out of the building costs.

Allied Professions

1.6 10.08.08

The design team will set up coordination a coordination meeting with University Allied Professionals including but not limited to:

- Radiological Health
- Disability Services
- Sustainability
- Space Planning

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Defining Options

2.1 11.06.08

Based on the need to clearly identify the project costs as accurately as possible in the program document, the project team has looked at benchmarking similar projects locally and nationally. Benchmarking has raised a concern that the project costs need to be reevaluated to address the research component of the building. Also since the atrium space had not been identified in the original master plan cost estimates, the cost of the atrium needs to be identified as well as the cost of modifications required to the existing Pharmacy Building.

A new CBE has been prepared by the University which identifies a reduced project budget based on savings realized by expediting the project schedule and taking advantage of the savings associated with escalation costs. In order to meet the project budget and still give the College of Pharmacy flexibility in planning for current and future needs the project team in conjunction with the College has identified building options which address the number of floor levels and the possibility of shelling space.

Size of Building

3.1 11.21.08

150,000 sf maximum build out.

- Legislative piece does not specify
- Submittal was 150,000.
-

Flooring

3.2 11.21.08

150,000 sf maximum build out.

- Legislative piece does not specify
- Submittal was 150,000.

Parking

3.3 11.21.08

Program team to determine maximum number of stalls in a one level below grade scheme and provide associated costs.

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Cost Options

3.4	11.21.08	Cost options were reviewed. Option #2 w/ reduced atrium was selected.

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Prepared by:

Stephanie McCarthy

EDA ARCHITECTS nbbj

• MEETING NOTES

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Attending		**Representing**
John Mauger, *Dean*	X	UU College of Pharmacy
Arthur Broom, *Associate Dean for Research & Planning*	X	UU College of Pharmacy
Darrell Davis	X	UU College of Pharmacy, Medicinal Chemistry
Christin Robbins	X	University of Utah, Campus Design & Construction
Tami Cleveland	X	University of Utah, Facilities Planning
Ronny Cutshall	X	ALSAM Foundation
Ken Ament	X	CCC
Dave Whitton	X	Envision
Kim Harris	X	VBFA
Leslie Morton	X	PSOMAS
Ron Dunn	X	Dunn & Associates
Peter Emerson	X	EDA
Stephanie McCarthy	X	EDA
Brad Leathley		NBBJ
Kyle Elliott		NBBJ
David Bryant	X	NBBJ
Frederick Albright	X	UU College of Pharmacy
Matt Yurick	X	UU ,Space Planning and Management
Craig Forster	X	UU, Office of Sustainability
Richard Gilbert	X	ArcSitio

Mtg	**Orig. Date**	**Description**
		Purpose
1.1	11.05.08	Members of programming team and Art Broom met with various representatives from the University, College and Donor Groups to review the opportunities for sustainable design presented by the new facility.
		Summary
1.2	11.06.08	The 4 Departments are currently scattered across campus in 6 different locations. One third of the College is housed in various buildings in Research Park. The opportunity to bring the majority of the college under the Biopolymers and the new institutes will result in the reduction of redundancy • Reduction of space needs • Transportation requirements reduced • Carbon footprint reduction • Shared equipment Teaching and Learning opportunity

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American College and University Climate Committee: Any opportunity to generate power for building on site supports the President's initiative for the UofU to be a carbon neutral campus.

A for profit organization can provide energy producing initiatives and charge the user for energy use. The provider can earn tax credits

Does Rocky Mountain Power offer rebates for the university?

Can photovoltaic strategies be used to offset Red Butte Garden upgrade requirements?
A green roof may be considered on a portion of the atrium roof. Marriott Library offers an on campus example. Benefits – reduces impact on sewer system, increases overall lifespan of roof membrane.

Water Efficiency Opportunities:

- Lab cup sinks are used as aspirators = water waste. Alternative = House Vac? If yes, waste materials will need to be captured / filtered / diluted.
- The UofU is working on addressing water neutral issues, e.g., water rights for water retained on roofs and reused for irrigation, etc.
- Condensation from HVAC system used for irrigation?
- Low water urinals?

Floor drains a must.

Lighting:

- Day lighting is key. Is solar hybrid day lighting / fiber optics an option?
- Since this is a 24/7 facility lighting control systems will need to be given allot of thought as they relate to laboratories, the vivarium and the exterior perimeter of the building (security).
- Lights on motion sensors for all areas except vivarium.
- Dark Skies ordinance observed.

Local material should be considered and utilized where possible

- Concrete
- Stone
- Masonry

Consider utilizing recycled materials where possible. For example, steel.

The discussion of permeable concrete raised concerns relative to

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snow and ice and the use of salt to mitigate.

Waste Management:

- Many building product manufacturers sponsor reclamation programs.
- Consult with waste management groups

Certified Wood: note that local lumber yards are not yet completely up to speed on this issue.

Modularity of lab bench offers opportunity for flexible reuse / reconfiguration.

Low VOC Paint – historically a poor performer to date.

Can we utilize heat generated by freezers to reheat building?

LEED Gold is a great *goal*.

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Stephanie McCarthy