CIRM Major Research Facilities Grant
Applicant Information & Signature Form

FA1-00611-1

Applicant Information

Applicant Organization	University of California, Davis		
Application Number	FA1-00611-1	Enter the application number you received via email from CIRM (for example "FA1-99999-1", where "9" represents any digit).	
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Authorized Executive Officer* (e.g., Provost, CEO)

Name	Dr.	Larry	N.	Vanderhoef	
	Prefix	First	Middle	Last	Suffix

Degree	Ph.D.	Choose the highest degree earned. If your degree is not listed, enter it in the drop-down box.	
Position Title	Chancellor		e.g., Provost, CEO
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***Authorized Executive Officer** - a senior organizational official who has the authority, **or who has been delegated the authority**, to commit funds for major facilities on behalf of the organization and who has the authority, **or who has been delegated the authority**, to commit the organization's resources to realize their strategic stem cell research program.

CIRM Category of Stem Cell Research Program

Please select the appropriate entry below to indicate the category for which you are competing in your application.

- (●) CIRM Institute (CIRM award of up to $50 million)
- ( ) CIRM Center of Excellence (CIRM award of up to $25 million)
- ( ) CIRM Special Program (CIRM award of up to $10 million)

CIRM Funds Requested

CIRM Funds Requested	$26,059,275
Matching Funds @ 20%	$ 5,211,855
Leverage Funds	$30,499,458
Total	**$61,770,588**

Signature

Authorized Executive Officer Dr. Larry N. Vanderhoef

I, the Authorized Executive Officer for the applicant organization, certify that the information presented in this application is true and correct.

Larry N. Vanderhoef — Signature: Authorized Executive Officer

Feb 22, 2008 — Date

Section 1. Executive Summary

As one of the nation's top public research institutions, the University of California, Davis (UC Davis) has a particular strength in biomedical research spanning basic, translational, and clinical sciences. UC Davis annually trains the largest number of biological science PhD's in the nation and is home to the nation's fastest rising *School of Medicine* and top ranked *School of Veterinary Medicine*, and has outstanding *Colleges of Agricultural and Environmental Sciences, Biological Sciences, Engineering, Law,* and *Letters and Science*. With an emphasis on disciplines directly relevant to stem cell research, UC Davis is the most academically comprehensive campus in the UC system. This contributes to an intellectually rich environment with ***highly collaborative, multidisciplinary interactions*** that spans the schools and colleges. This rich environment is strongly reflected in the *Stem Cell Program*. The ***unique combination of shared resources*** at UC Davis also provides an unprecedented strength in high-throughput technologies through the *Genome Center*, and supports diverse small and large animal models in specialized facilities, including the only *California National Primate Research Center*, with opportunities for translational stem cell research that are *unparalleled throughout California*. The Primate Center is also home to the NIH *Center of Excellence in Translational Human Stem Cell Research*, one of only two Centers nationally, with studies that focus on stem cell therapies for childhood diseases, and using novel imaging techniques to track and monitor transplanted cells. In addition, the *UC Davis Health System*, comprised of the School of Medicine and Medical Center, is nationally recognized for and excels at ***translating scientific discoveries and new technologies into improved patient care and community-wide health***. This is exemplified by the *Clinical and Translational Science Center (CTSC)*, one of two in California, which includes partnering with the *Northern California Shriners Hospital for Children, USDA Western Human Nutrition Center, Lawrence Livermore National Laboratories, Sacramento State University, the VA Northern California Health Care System, and the community*. As a part of a national consortium, the *CTSC* facilitates the development of new ways to enhance clinical and translational research; training and mentoring young investigators in the conduct of clinical and translational research; the ability of investigators to navigate the increasingly complex research system; and new partnerships with private and public entities that transform the clinical enterprise*. **These efforts represent clear strengths at UC Davis and ensure that new therapies will be translated more rapidly to patients and communities.***

The proposed **UC Davis CIRM Stem Cell Institute**, to be housed in an existing building, will serve as an incubator for these unique capabilities for successful research and training in diseases that might be prevented, reversed, or ameliorated by stem cell therapy. *The overarching goal is to effectively connect the basic and translational studies with clinical trials, and to provide an intellectual home for stem cell research.* This multidisciplinary program will be centrally located in a cutting edge facility that will foster collaboration for disease-specific teams and those working together toward therapies for liver, kidney, heart, and lung diseases; bladder reconstruction; vascular disease; neurodegenerative disorders (e.g., Parkinson's, Huntington's, and Alzheimer's disease; vision/hearing loss); blood and immune system diseases including HIV/AIDS; skin diseases and burns; and bone and cartilage disorders, among others. The disease teams bring together scientists with clinicians that will treat and care for patients. This team-based approach inspires the scientists and allows the physicians to provide their essential clinical insights. The facility will provide integrated space and infrastructure by co-locating key investigators and collaborators with affiliated partners, and within a synergistic environment to promote and advance the research. An existing building housing the *CTSC* will be renovated to capitalize on this rich environment and bring the ***spectrum of basic, translational, and clinical stem cell research efforts to one central location, and meet urgent needs for stem cell research space not currently available***. The intent is to implement a multi-directional strategy that has been highly successful in other programs at UC Davis, such as those associated with the study of cancer and HIV/AIDS. Investigators will address basic cell biology questions and pursue safety and efficacy studies, while cohorts of patients will be identified and characterized that can be entered into well-

designed FDA-approved trials. Therapies will be modified based on clinical trials, and data will be maintained in centralized databases that will provide new direction for further study. Thus, the **UC Davis CIRM Stem Cell Institute** will:

- establish an infrastructure to co-locate disease teams that span basic, translational, and clinical strengths to forge collaborative networks and promote communication and preclinical trials for human diseases across the lifespan;
- provide the necessary environment to collaboratively study human embryonic stem cells (hESC);
- obtain data from well-designed preclinical studies to effectively assess the safety of potential new cell-based therapies prior to human clinical trials;
- provide the tools to conduct clinical trials including a state-of-the-art 6-suite *Good Manufacturing Practice (GMP) facility* linked with an established clinical trials infrastructure in the *CTSC*;
- teach and train students, fellows, and investigators new to stem cell research;
- provide opportunities to recruit new faculty to further develop the program; and
- enhance public awareness and education.

The proposed plan ***highlights value with the immediate, expedited renovation of an existing building with ample space***, providing a physical home for 31 investigators and numerous collaborators. This proposed facility will be a major hub of activity for over 100 UC Davis faculty currently participating in the program, their laboratory staff, trainees, and collaborators from industry and other academic institutions. Stem cell-related activities are currently scattered across the UC Davis campuses which presents barriers to effective team science, and ***space is insufficient to meet the research needs***. This facility will provide powerful collaborative advantages by co-locating key disease team members, and relieve a pressing shortage of laboratory space for current investigators and those under active recruitment. Basic discovery programmatic themes (X) focuses on cells, the study of microenvironments and biomaterials, high-throughput and other technologies to characterize cells, and comparisons of stem and progenitor cells from different age groups in health and disease. *FACS*, *microscopy*, and *vector cores* will complement existing campus cores and services, and an *immune deficient mouse vivarium* will add to the campus strength in animal models. Studies in immune deficient mice (Y) will allow investigators to rapidly test human cells before conducting preclinical studies in larger species. Clinician-scientists teamed with basic and translational researchers will utilize the 6-suite *GMP facility* (Z) which is FDA-approved, and ***imminent construction and operation is critical to initiate several pending stem cell clinical trials*.** This facility is adjacent to other relevant programs such as the *Center for Biophotonics Science and Technologies, Cancer Center, M.I.N.D. Institute, and Imaging Center*, and the information technology network at UC Davis will interconnect these and other related sites such as the CIRM *Translational Human Embryonic Stem Cell Shared Research Facility*. As a result of approximately 2 years of architectural planning, this project can quickly be submitted for bid, which is advantageous for the UC Davis *Stem Cell Program* and will ensure the implementation of ***CIRM's broad goal of accelerating the development of new stem cell therapies for patients***.

Located on the Medical Center campus at the northeast corner of Stockton Boulevard and Broadway in Sacramento, the proposed **UC Davis CIRM Stem Cell Institute** building (formerly referred to as "Building 41" or the “Stockton Boulevard Research Center/SBRC”), currently contains 109,162 gross square feet (GSF) of space and previously included a medical warehouse and other functions that have been relocated to other facilities. The first phase of construction ("Phase 1") at this site was the build-out of 17,186 GSF for the UC Davis *CTSC*. The *CTSC* is a vital resource and ensures the success of the *Stem Cell Program*. A plan was prepared that envisioned the remaining 91,976 GSF of the building to undergo remodeling for critically needed stem cell research space. For planning purposes and to conform with the CIRM RFA 07-03 Guidelines, the University identified three category areas of **X**, **Y**, and **Z** as components of **"Phase 2"** which are highlighted on the floor plans as **Phase 2** representing the **"Z"** component (or

"Clinical Research" space)**, Phase 2A** the **"Y"** component (or "Translational" space), and **Phase 2B** the **"X"** component ("Discovery" space). The X/Y/Z areas are interwoven in the overall vision for the program and will support current and new investigators for the next decade and beyond. Following completion of the currently proposed project (the subject of this application or "Phase 2" which includes 2A and 2B) will be the build-out of the remaining space ("Phases 3 and 4"; *for Discovery and Translational research*) of approximately 32,000 GSF, and 5,600 GSF for a lecture hall, conference room, and a second building break room. This building was identified as an ideal location because (1) it is a University-owned building, (2) the structure has high floor to ceiling heights providing the interstitial space required to maintain HVAC equipment without breeching the clean laboratory environment, (3) relocation of the occupants had minimal impact to medical operations, (4) phased remodels could be completed as funds became available, and (5) *there are no major environmental issues*.

The proposed ("Phase 2") facility development addressed in this application includes:

- 5,496 ASF for an FDA-approved *GMP facility* (Z);
- 9,588 ASF for a *Specific Pathogen Free (SPF) barrier facility-Vivarium* for mice (Y/Z);
- 13,014 ASF for basic or "Discovery" research (X) in open wet-bench laboratory, laboratory support space, dedicated workrooms, and conference and office space;
- 7,637 ASF for "Translational" research (Y) in open wet-bench laboratory, laboratory support space, cell cryopreservation, gel and bacteria rooms, and conference and office space;
- 721 ASF for a fluorescence-activated cell sorting (FACS) core;
- 761 ASF for a secure liquid nitrogen Stem Cell Storage Bank with an onsite large capacity liquid nitrogen bulk delivery tank;
- central autoclave-glass washing room, centralized cylinder tank manifold rooms, and a central storage room for all of the research programs; and
- central corridor space with collaboration-interactive zones strategically placed, and lobbies at the west and east ends of the building.

A number of construction projects have been undertaken to accelerate the construction process for the build-out of the proposed space. UC Davis had chosen to expend several millions of dollars in advance of this application to bring this opportunity to fruition and to facilitate occupancy well within a two-year time period. The University demonstrates its strong commitment to expand the growing *Stem Cell Program* with ***three major infrastructure projects that have been undertaken***. These initial expenditures (with the 10% cap of Architects & Engineers/Administrative fees applied) includes a *seismic upgrade ($2,401,241), Central Plant Utility Tie-in ($8,416,414), and Utility Building ($3,980,773)* ***for a total investment of $14,798,428***. The 54,227 GSF project proposed for this building will continue that work and will complete 59% of available stem cell research space. The total costs for this project of $61,770,588 includes the CIRM proposed contribution of **$26,059,275** to complete the project, the 20% match ($5,211,855), and ***leverage funds of $30,499,458***. Beneficial occupancy is targeted for May 26, 2010, approximately 6 weeks prior to the anticipated 2-year anniversary of the proposed CIRM Notice of Grant Award.

In summary, the proposed **UC Davis CIRM Stem Cell Institute** will combine unique campus capabilities for research and training in diseases that might be prevented, reversed, or ameliorated by stem cell therapy. The overarching goal is to effectively connect the basic and translational studies with clinical trials, and to provide an intellectual and physical home for stem cell research. UC Davis has a long-standing reputation for being highly collaborative, sharing resources and infrastructure, and for providing outreach and expertise to other educational and medical facilities. ***Our geographical location and service to diverse communities throughout California will ensure that stem cell therapies developed and tested will be provided to all patients in need.***

Section 2. Mandatory Requirements

2A. Nonprofit Status. UC Davis is a nonprofit academic institution and a part of the University of California Systemwide program.

2B. Private Business Use. No private business will be conducted in the proposed facility. There will be opportunities for other academic institutions to utilize cores and facilities with campus approved recharge rates established for each of the services in compliance with UC Policy and Procedure. Any research activities sponsored by for-profit institutions will comply with University of California intellectual property policies as set forth by IRS Revenue Procedure 2007-47. The UC Davis Office of Research will ensure that the intellectual property provisions in all research agreements, material transfer agreements, or other contracts with non-governmental entities do not have intellectual property provisions that would be outside of the safe harbor of the Tax Reform Act of 1986. Additionally, The UC Davis *Technology Transfer Office* and *Innovation Access Program* directors will carefully review each sponsored activity on a case-by-case basis to ensure compliance.

2C. Construction and Renovation. This project will be performed in accordance with all UC Regents policies, procedures, and regulations, and all construction and renovation will be in accordance with State of California prevailing wage requirements. The payment of prevailing wages is addressed in the University's Supplementary Instructions to Bidders and the General Conditions, Article 14. CIRM Exhibit A will be made part of the Contract Documents and included in Specification Section 01290 Measurement and Payment.

2D. Plan to Meet the Goal for Use of California Suppliers. This project is being funded in part by Proposition 71. Contractors will be required to purchase goods and services from California suppliers to the extent reasonably possible, in a good faith effort to achieve a goal of more than 50% of such purchases from California suppliers. Additionally, Specification Section 01290 Measurement and Payment will require that the Contractor provide an accounting of the goods and services purchased from California suppliers prior to release of progress payments to the Contractor. Further, it is anticipated that the local contractor community will provide the majority of services and it would be cost effective for them to utilize local California suppliers for goods. Currently, the Architectural services are being provided by a California architectural firm, Stafford King Wiese Architects. Also, the construction management services will be provided by Turner Construction's California Office. The value of these two services is approximately $6,000,000. At the conclusion of the project the University will provide a final report indicating the participation achieved on the project for all goods and services.

Section 3. Program and Project Description

3A. Program Objectives. The proposed facility will significantly enhance campus research efforts in basic stem cell biology ("X") by promoting disease-specific teams and linking basic science efforts with translational ("Y") and clinical ("Z") themes. This approach will ensure elimination of barriers that prevent productivity, and support the overriding goal of new and effective cell therapies for patients. The objective is a productive stem cell "incubator" in which investigators conduct their research and gain synergistically from the co-location of colleagues, educational activities, and centralized research resources. The program will teach and train students and fellows, and provide mentoring to junior investigators including those new to stem cell research. Of the 31 investigators that will be housed in the facility, 6 will be completely and 8 partially housed in the "X" space, with collaborating scientists using shared space and cores (X and Y) (see floor plans). Programmatic themes that focus on the basic biology of stem cells; the study of microenvironments and biomaterials; and the use of high-throughput and other technologies to

evaluate cells are aided by investigators in the *Genome Center*, *Center for Biophotonics Science and Technologies*, and collaborations with the *Shriners Hospital*, *Lawrence Livermore National Laboratories*, and the *Buck Institute*. Cells obtained from hESC will be compared and contrasted to stem cells from different age groups in health and disease. UC Davis has established formal collaborations with the *Shriners Hospital* and a very close collaborative relationship with *Lawrence Livermore National Laboratories*. Many *National Laboratories* scientists are adjunct faculty at UC Davis and a large number of UC Davis faculty serve as advisors and consultants to *Lawrence Livermore National Laboratories*. This close relationship is exemplified by campus successful joint endeavors such as the *National Cancer Institute-designated Cancer Center* and the *Center for Biophotonics Science and Technologies*. This established collaboration provides UC Davis with access to the world's largest supercomputers with advanced computer models and powerful analyses, as well as to a unique pool of team scientists and engineers that have laid the groundwork for new technologies. UC Davis and the *Buck Institute* are working together under a formal memorandum-of-understanding (MOU) to develop programs and activities that leverage the *Buck Institute* faculty expertise in aging research and age-associated disease with the vast resources and intellectual infrastructure at UC Davis in neuroscience. The Parkinson's Disease Team also consists of members from UC Davis and the *Buck Institute*, and faculty are working toward hESC therapies to be developed in the UC Davis *GMP facility*.

The **UC Davis CIRM Stem Cell Institute** will further enhance campus translational research efforts by promoting disease teams and linking the basic science and clinical themes. A comprehensive translational program using animal models within state-of-the-art facilities and experienced support and scientific staff includes laboratory and avian species, domestic and companion animals, and nonhuman primates, *which sets UC Davis apart as the premier institution for preclinical, translational research*. To add to this depth and breadth of animal models, a recently launched *immune deficient mouse vivarium*, which will be housed in the new facility, will allow investigators to use techniques to rapidly test new human stem cell therapies as they are developed. Of the 31 investigators that will be housed in the facility, 7 will have their research programs completely in the "Y" space, and 9 will be partially housed and include collaborators in space designated by disease team (liver, vascular disease, HIV/AIDS, eye degeneration, skin/wound healing, cartilage/bone). Interactions will be integrated, ensuring the transition of promising treatments into well-designed clinical trials ("Z").

UC Davis has a long history of performing clinical trials; currently active clinical trials are listed on the *CTSC* website (http://www.ucdmc.ucdavis.edu/clinicaltrials/trialsearch.aspx). The volume of clinical service activities (863,000 clinic visits; 46,000 emergency room visits; 33,000 admissions/year), combined with service to highly diverse communities, supports that UC Davis plays a nationally important role in engaging diverse populations in clinical research. This is exemplified by the *Cancer Center*, which has one of the highest recruitments into clinical trials of any National Cancer Institute-designated center in the Western US. UC Davis conducts more than 1,000 health-related research studies annually, including basic science, translational, and clinical trials research - *all with the goal of bringing safe and effective new treatments to patients as rapidly as possible following FDA approvals*. The communities served help the institution achieve goals by volunteering to participate in clinical trials that could lead to new and improved therapies. In addition, UC Davis encourages diversity in its clinical trial enrollments since the effects of diseases or conditions can vary with age, race, and ethnicity. The *Stem Cell Program* shares this institutional vision for improving healthcare for the diverse California communities.

Thus, one of the major goals of the **UC Davis CIRM Stem Cell Institute** is to co-locate key investigators according to disease teams ***but also to provide NIH-free space and alleviate space constraints that curtail growth and productivity***. The availability of essential space is vital to keep pace with proposed growth in preclinical, translational studies and to provide access

to GMP expertise for clinical trials that is not currently available in the context of stem cell research at UC Davis. Several years ago as the University was developing a vision for a full spectrum stem cell program, the campus leaders in the field adopted the concept of *allocating space to integrated disease team programs* rather than separating by Discovery ("X"), Translational ("Y"), and Clinical ("Z") research investigators. Therefore, the UC Davis *Stem Cell Program* is comprised of multidisciplinary faculty members that participate in many different disease teams, ranging from the most basic researchers, through translational scientists who test the stem cell products in novel animal models and perform regulatory testing required by the FDA, to the clinicians who will administer the stem cell products to their patients. A point of clarification presented in Part 1 of this application was the need to show a clear separation of the Discovery ("X") and Translational ("Y") research faculty by the designated space for these areas, therefore the University was obligated to categorize several of the selected faculty as either X, Y, or Z. However, three of the top researchers (Drs. Nolta, Tarantal, and Zern) have strengths in Discovery, Translational, and Clinical Research and could have been housed in either area labeled as Discovery or Translational. Therefore, the borders of the space delineated as X, Y, or Z as required by the RFA was followed *but the flow of the science from basic research through clinical trials transcend these demarcations*. The University's multidisciplinary approach is emphasized by the integration of the Discovery, Translational, and Clinical research groups within these laboratory suites. It is anticipated that the established research programs and innovative minds that will be co-located in the proposed Institute will accelerate the discoveries from the bench to the bedside as a result of these strategic adjacencies. The following quote from the review of Part 1 of our application in reference to Dr. Zern highlights this point: *"The Liver Disease Program is led by an established human embryonic stem cell investigator, and spans basic, translational, and clinical studies."* The other leaders of the program, and of each disease team, are highly interactive with each other as well as with all other members of the *Stem Cell Program*, and includes trainees as well as collaborators from many other academic and private institutions in California and nationally.

Many of the research and clinical centers in the UC Davis Health System have been at the forefront of engaging diverse populations in clinical research. More than 1,000 health-related research studies are carried out annually involving basic science, translational, and clinical trials research. The "Z" or clinical component of the proposed facility focuses on moving forward with clinical trials in the stem cell arena and developing new stem cell-based clinical trials. These trials will use adult stem cells in the first year after the facility is completed (currently under consideration by the FDA) and hESC in clinical trials as soon as safety and effectiveness is shown in relevant animal models. Research in many of the UC Davis Disease Teams is currently ongoing to demonstrate the safety of hESC-based therapies and to generate data that will be acceptable to the FDA. The adult trials highlighted in Part 1 of the application will be undertaken shortly and will provide an established infrastructure and framework upon which the future hESC trials will be undertaken. UC Davis is focused on research and preclinical validation to ensure that cells derived from hESC for regenerative medicine purposes are ***safe***. These studies will ensure that clinical trials can proceed at UC Davis safely and effectively, and with the confidence that they will provide evidence of long-lasting cures for patients desperately in need of new therapeutic options.

The *Stem Cell Program* at UC Davis is currently decentralized in several different research buildings located on the Sacramento and Davis campuses. While the campuses are in close proximity (within approximately 15 minutes of each other), *the success of the research program has grown substantially, there is extremely limited space available, and the lack of crucial physical adjacencies hampers further growth of successful programs and linking of new teams*. Decentralized research programs, regardless of research themes, present numerous challenges to investigators and the rapid advancement of new discoveries. UC Davis recognizes that a centralized research facility dedicated to stem cell research is essential to nurturing existing and cultivating new stem cell research programs and scientists. Understanding that the campus did not

have 5-10 years to establish a new building in close proximity to the clinical campus at the UC Davis Medical Center, leaders and administrators examined all opportunities within the existing research facilities and were unable to identify sufficient space to establish the compliment of resources necessary for the *Stem Cell Program*.

As stem cell research advancements moved to the forefront of research, UC Davis coordinated activities with leading investigators actively involved in stem cell research across the schools and colleges, and with the School of Medicine leadership, to evaluate the campus potential to expand contributions to the advancement of stem cell therapies. This incorporated recognition of unique attributes at UC Davis including a *National Primate Research Center* which is essential for advancing stem cell therapies from preclinical to clinical applications; a *Genome Center* which includes high throughput technologies in core facilities; extensive imaging capabilities from small animal models to humans; the *CTSC*, which facilitates the development of new methods and techniques to enhance clinical and translational research; experience with stem cell and other clinical trials; and access to a large, diverse human population from which to accrue patients for clinical studies. The UC Davis Health System had also recently completed a master planning effort for the development of a new research park to provide 500,000 ASF of research space over the next 5-15 years. "Building 41" (also previously called the "Stockton Boulevard Research Center/SBRC"), is within the footprint of this research park, and has a unique structural framework that provides natural separation into six "pods" of space each of approximately 16,000 GSF. It was therefore considered the ideal candidate space for expansion for the rapidly growing *Stem Cell Program*.

In 2006, the UC Davis Health System was fortunate to recruit two individuals that changed the California landscape of stem cell therapy, and could aid in accelerating the transition from bench to bedside: Dr. Jan Nolta, a nationally recognized expert in translational research for human stem cell therapies, and Gerhard Bauer who is recognized nationally and internationally as an expert in the design, development, implementation and operation of FDA-compliant GMP facilities, essential to develop the lifesaving therapies for patients. Leadership was then faced with the challenge of providing interim research space to enable these recruitments to continue their research while at the same time accelerating the planning efforts to provide a centralized stem cell research facility. While the campus identified pockets of temporary research space to allow current faculty with growing stem cell research funding to accommodate components of their additional stem cell program needs, this temporary fix was recognized as a short-term solution. UC Davis Health System leadership was successful in facilitating an arrangement to temporarily rent laboratory space at the *Shriners Hospital* across the street from the main hospital in order to house three new recruits (Drs. Nolta, Bauer, and Li). However, the deadline for this arrangement is fast approaching and this accelerates our drive to complete the build-out of the **UC Davis CIRM Stem Cell Institute** in a timely manner; ***there is no other space available for these investigators and their research programs***. Due to the NIH-free status, and the collaborative nature of the investigators housed there, the loaned research space in the *Shriners Hospital* has become a central focus area for interaction between many of the disease teams, including trainees and collaborators throughout both campuses who are working together on projects at the bench and in the immune deficient mouse core/animal facility (currently in temporary animal space). However, the rules for investigators to physically work in the *Shriners Hospital* are necessarily stringent, and this has been somewhat limiting. The new building will be the central site to expand collaborations, link through videoconferencing and other related technologies with other crucial campus stem cell sites (e.g., *Genome Center*, *Primate Center*, *Shared Research Facility*), and ensure that there are no barriers to the needed research and collaborative format that is the hallmark of research activities at UC Davis.

As it became evident that an *SPF barrier facility* and a *GMP facility* were critical components to the success of stem cell research, the remaining space in the initially identified section of the proposed building resulted in wet laboratory space adequate to support only one or two mid-career researchers. It was clear that we would need to allocate additional space to support the current and future recruitments in Discovery ("X") and Translational ("Y") fields of stem cell research. Thus, in early 2005 the project area expanded to include the space that this application represents. We chose to focus intense planning efforts to accelerate the design of the GMP and SPF barrier functions due to the complexity of their design requirements. A sub-group of the planning team (Mr. Romney and the Laboratory Planners) then began the design process for the two wet laboratory spaces in order to allow the majority of the efforts to focus on the GMP and SPF barrier space.

The rapid renovation of undeveloped space in this large, existing building adjacent to the UC Davis Medical Center and associated clinics will establish the necessary home to co-locate disease teams that span basic, translational, and clinical strengths. This setting for disease team-based research will forge collaborative networks, promote communication, and accelerate development of clinical trials for the treatment of human diseases. The disease teams include, but are not limited to, investigators working together towards therapies for liver, kidney, heart, and lung diseases; bladder reconstruction; vascular disease; neurodegenerative disorders (e.g., Parkinson's, Huntington's, and Alzheimer's disease); vision and hearing loss; blood and immune system diseases including HIV/AIDS; skin diseases and burns; and cartilage and bone disorders, affecting patients of all ages (children to aging populations). Stem cell clinical trials in four of these areas are currently pending, and will be performed in the state-of-the-art 6-suite *GMP facility* for cell processing, currently ready for construction based on plans that are FDA-approved. This facility will be linked with an established clinical trials infrastructure in the *CTSC* that will enable researchers to readily move cellular therapies into patients after conducting safety and efficacy studies in a wide range of preclinical models including nonhuman primates, ***which is unique to this institution***. The facility will provide integrated space and infrastructure by co-locating key investigators, collaborators, and affiliated partners within a synergistic environment to promote and advance the research. In addition to the powerful collaborative advantages of co-locating teams, this plan addresses urgent needs to relieve the pressing shortage of research space for current stem cell investigators and active recruitments, as noted above. *FACS, microscopy, and vector cores* will complement existing campus cores and services, and an *immune deficient mouse vivarium* (Y) will add to the campus strength in animal models. Studies in mice will allow investigators to rapidly test cells before conducting preclinical studies in larger animals including domestic species and nonhuman primates, and clinician-scientists teamed with basic and translational researchers will utilize the 6-suite *GMP facility* (Z) for human clinical stem cell trials. The information technology network will interconnect programs and sites to the new facility, and a data repository will be established in support of data sharing and training. The facility will be home to 31 investigators and will be a major hub of scientific and clinical activity for over 100 UC Davis faculty members currently participating in the *Stem Cell Program*, and their laboratory members, trainees, and collaborators from industry and other academic institutions. The facility will aid in meeting the *Stem Cell Program* and CIRM objectives of accelerating the applications of stem cell biology to clinical use; to teach and train students, fellows, and investigators new to stem cell research; enhance public awareness and education; and integrate teams that span the disease focus areas to promote synergy, and to improve health care for patients.

3B. Project Need. As stated above, a detailed space plan was undertaken by UC Davis to determine the best options for development of space for stem cell research. This plan addressed limitations in space for investigators with well-funded stem cell research programs, need for a full compliment of services and resources to ensure success for current and developing programs, current and future recruitments, strategic adjacencies, and future expansion of the program. As the largest research entity in the central valley UC Davis did not have the option to turn to a nearby

institution to share facilities. The planning team examined several approaches to fast tracking the development of space, including leasing and renovating shell space in a nearby industrial business park. This option was ruled out because the industrial park is 4 miles from the Sacramento campus and was not conducive to support the components necessary for basic, translational, *and* clinical research. The planning team also examined the option of working with various developers that owned land adjacent to the Sacramento campus, but those sites were too small to allow development of the program space without building up several stories and driving up construction costs substantially. Understanding that the University also did not have 5-10 years to create a new building, the planning team examined all opportunities within the current facilities at the UC Davis Health System Medical Center campus in Sacramento and identified a location that enabled build-out of a large amount of space within a short period of time, would also allow for expansion as the program grows, and provides the strategic adjacencies to the clinical entities necessary for clinical trials. The University had recently completed a master planning effort for the development of a new "Stockton Boulevard Research Park" to provide 500,000 ASF of research space over the next 5-15 years. "Building 41", as it was called at the time, was within the footprint of this park and had a unique structural framework that provided natural separation into six "pods" of space each of approximately 16,000 GSF. The team discovered that this building clearly had the opportunity to meet the program goals. The first phase of construction ("Phase 1") was the build-out of 17,186 GSF for the UC Davis *CTSC*, completed in 2004, which also provided a critical advantage for the use of this site.

Thus, "Building 41" was selected for several reasons: (1) it was a University owned building, (2) the structure had high floor to ceiling heights providing the interstitial space required to maintain HVAC equipment without breeching the clean laboratory environment, (3) relocation of the occupants would have minimal impact to medical and research operations, (4) phased remodels could be completed as funds became available, and (5) there were no major environmental issues. The building is a one-story structure of 109,000 GSF, divided roughly into thirds by concrete tilt-up panels that run floor-to-roof in the North/South direction. The roof has a ridge at approximately 22' above finished floor that runs in the East/West direction roughly along the building centerline. The roof slopes down from this ridge to approximately 17'-6" above finish floor near the building perimeter. The roof is framed by manufactured wood joists and glue-laminated beams supporting a nailed plywood diaphragm. Steel pipe columns support the glue-laminated beams at the interior and perimeter of the building. The concrete tilt-up panels support the adjacent roof framing by a bolted wood ledger. The roofing material is a single-ply roof membrane, except at the perimeter of the roof which is ringed by a wood framed mansard (approximately 8 ft. tall x 24 ft. deep) with a Spanish-tile roof. The perimeter exterior walls of the structure are brick masonry, approximately 13" thick with additional 12" thick concrete masonry unit (CMU) backing in limited areas. The brick-masonry walls are continuous from grade to roof framing at the East walls of the building, but terminate approximately 5'-0" short of the roof framing everywhere else to allow for windows.

According to renovation drawings obtained from the City of Sacramento, the building was significantly renovated in approximately 1980. Prints of the renovation drawings obtained from the City of Sacramento included a letter from Kleinfelder summarizing the results of an X-Ray investigation of the existing perimeter brick-masonry walls, which located no reinforcing. It was, therefore, expected that the perimeter walls were un-reinforced or very-lightly reinforced brick-masonry. To ensure the structure met seismic requirements as outlined in the 2001 California Building Code and complies with the seismic provisions for buildings owned by the University of California, Building 41 was evaluated under Section 1640A.2, Division VI - R, of the 2001 California Building Code. A detailed evaluation was conducted by a structural engineer/consultant team. The seismic evaluation determined that seismic retrofits to the foundations, floors, and walls were required. In order to fast track the current project and complete the remodel in a timely manner, a two-step approach was adopted to expedite the necessary seismic improvements. The seismic

and remodel projects were developed as two distinct projects so that the seismic retrofits could be accomplished when the building was vacant except for the *CTSC* occupants. The seismic project provided for comprehensive seismic upgrades that were mandated due to a change of use and occupancy. *The seismic upgrade project was submitted in May 2005 and approved by the UC Davis campus in June 2005. The project was awarded in September 2006 and construction was completed May 2007.*

The proposed master plan allows for the incremental development of laboratory space to be accessed from a central connecting corridor that bisects the building East to West. The building structure has been seismically stabilized as noted and in accordance with Division VI-R "Earthquake Evaluation and Design for the Retrofit of Existing State Owned Buildings" of the 2001 California Building Code in preparation for the proposed build-out and incremental development of laboratory spaces as noted above. The accomplished seismic stabilization included the addition of new steel braced frames and steel roof drag elements to resist the additional seismic mass added to the building as the laboratories are built out.

A new *Utility Building* is also currently under construction adjacent to the proposed site to serve the entire structure future laboratory loads. After considerable evaluation by the UC Davis Health Systems Facilities Planning, Design, and Construction Department, it had been decided that the UC Davis Medical Center Central Plant utilities will be extended to this project site to provide highly efficient, economical, and reliable power, heating, and cooling. This eliminated the need for new gas fired boilers and purchase of new emission credits, the need for diesel powered back-up generators with fuel tanks, and the need for a large secondary heating and cooling plant with the associated noise and maintenance. The building heating and cooling will be provided by utilities from the UC Davis Medical Center Central Plant heating and chilled water loop. *The Central Plant utility lines are in the process of tie-in to the Utility Building*. Two heating pumps will be installed in the Utility Building to provide full building load capacity and 100% redundancy.

Thus, the University demonstrates a strong commitment to expand the growing Stem Cell Program with three major infrastructure projects related to the proposed building. These initial expenditures (with the 10% cap of Architects & Engineers/Administrative fees applied) includes the *seismic upgrade* ($2,401,241), *Central Plant Utility Tie-in* ($8,416,414), and *Utility Building* ($3,980,773*) for a total investment of $14,798,428*. The 54,227 GSF project proposed for this building will complete 59% of space dedicated to stem cell research. The total costs for this project of $61,770,588 includes the ***CIRM proposed contribution of $26,059,275*** to complete the project, the 20% match ($5,211,855), and leverage funds of $30,499,458. Beneficial occupancy is targeted for May 26, 2010, approximately 6 weeks prior to the anticipated 2-year anniversary of the proposed CIRM Notice of Grant Award.

3C. Project Description. Based on the research planned for the **UC Davis CIRM Stem Cell Institute**, the design team applied the following allocation of space per program-funded individual (PFI) (see School of Medicine space allocation plan described in 6C., below). "Open-Bay" laboratories provide multiple open bench "bays" that can accommodate 3-4 individuals per bay. The allocation unit is 120 ASF per PFI. This includes a bench bay allocation and a portion of shared laboratory support space. Based on this standard a space program was developed to determine the amount of and type of space needed to support the current and projected research needs. The approved space program referred to above identified the summarized space which is shown in an attached table (*Table 1. Space Program-Project Description*).

Accessibility Compliance. The project will be designed to comply with the California Building Code, Accessibility Code. The reviewing agency will be the State of California, Division of the State Architect (DSA) Accessibility Compliance Section (ACS). The exterior Accessible Path of Travel

will be upgraded where required in the site work package. For example, the west entrance walk from the Stockton Boulevard sidewalk will be modified to include a ramp and a level area at the top of the ramp and at the entrance doors. The east entrance was previously upgraded for path of travel compliance from the existing handicap accessible parking stalls in the adjacent parking area. Since the project is a new, build-out of an existing building, ***very few if any conditions exist which will require modifications*.** All new work will comply with the California Building Code 2007 version.

Interior Working Environment. Creating a pleasant quality of life in the space is an important goal. To successfully function as a collaborative center, the facility must be inviting, stimulating, and comfortable. This will contribute directly to the productivity, recruitment, and retention of faculty and staff. The principal factors that significantly influence the quality of life in lab facilities include:

- **Laboratory Density** - Providing scientists with an adequate amount of workspace is essential. When investigators are not provided adequate amounts of space in which to work, they invent creative solutions to their workspace deficiencies, generally sacrificing both safety and comfort. Minimum workspace requirements were detailed on room data sheets used in the planning.

- **Comfortable Workspace** - Investigators cannot be productive in facilities with temperature extremes or when they feel threatened because of poor or inadequate ventilation. Long-term exposure to this type of environment is neither healthy nor consistent with current laboratory planning design criteria and building codes. Temperature extremes can also disrupt sensitive analytical instruments resulting in the need for recalibration. Building mechanical, electrical, and plumbing systems will provide good ventilation and adequate individual environmental control.

- **Acoustics** - Noise in research facilities is difficult to control and is an issue that warrants careful consideration. Laboratory equipment and exhaust systems are noise generators and room finishes in laboratories are generally hard and acoustically nonabsorbent. The design of the facility will isolate noise-sensitive areas from noise sources. This will be accomplished by separating noise-sensitive areas such as meeting or interaction rooms from noise-producing areas. The surface finishes of laboratories are required to be hardwearing, chemically resistant, easily cleaned and, in some cases, sterile. This usually results in surfaces that are hard and non-porous. These in turn are highly sound reflecting and result in rooms that are excessively reverberant. Reverberant rooms have the characteristics of high ambient noise levels, limited decrease in the noise level with distance from the noise source, and poor intelligibility of speech. Sound absorbing surfaces are usually porous, soft, or fibrous, making them unsuitable for laboratory walls and floors. Some sound absorbing material will be introduced in the form of a suspended acoustic ceiling in the open laboratories and hard lid ceiling in specific laboratory support rooms (cell culture, electrophysiology, microscopy, animal manipulation).

  Footfalls on hard floors in the laboratories produce noise and excite the floor, creating vibration. This effect can be reduced with the use of a resilient floor covering system. Commonly used laboratory floor surfaces consist of vinyl tiles or sheets. Backing the vinyl with a resilient material such as PVC foam improves acoustic performance.

- **Interaction** - Communication, interaction, and collaboration among researchers and staff can enhance work results. Encouragement of student/fellow and staff interaction is a high priority and will be a sought-after element in the design solution. Functional organization and relationships that promote interaction was carefully nurtured in the design process. A planning concept that encourages casual encounters is the strategic location of common facilities such as conference rooms, coffee, food, clerical, and supply areas that all serve to foster meaningful interactions. Careful consideration of circulation patterns can also contribute to the potential for

this type of interchange between researchers and their staff. Interaction spaces will be designed for comfort and to encourage staff to leave the laboratory from time-to-time. Interaction spaces also will provide a place for researchers to safely consume food and drink outside of the laboratory. Experience has shown that proximity to coffee stations, restrooms, and main corridors can make interaction areas successful.

Fire and Life Safety. The existing building has fire sprinklers, is type III no hour construction, and will be classified as B occupancy. It is divided into three separate sections by two 4 hour rated tilt-up concrete area separation walls. Each of the three separate sections has a basic allowable area of 12,000 GSF tripled for sprinklers to 36,000 GSF. The most westerly section of the building can also be increased by 100% due to separation on three sides, to a total allowable area of 72,000 GSF. The actual area of the west building is 38,744 GSF. Located approximately 20' to the north of the center section is the new Utility Building referred to above, which encompasses the secure delivery and service yard. Utilizing the same construction type with sprinklers and an F-2 occupancy for the Utility Plant, the basic allowable area of 18,000 GSF tripled for sprinklers is 54,000 GSF. The mixed occupancy calculation of actual to allowable for the two occupancy types is less than one and thus the adjacency of the two functions as a single building is allowable. The east building can also be increased by 50% due to separation on two sides to a total allowable area of 54,000 GSF. The actual area of the east building is 34,178 GSF. Two exterior doors exit from the building into the adjacent new delivery and service yard. This will require two means of egress out of the yard. An additional exterior door will exit the south side of the building to an accessible path of travel. There is a one-hour occupancy separation requirement between F-2 and B occupancies. A one-hour occupancy separation is required to separate the laboratories from adjacent areas.

Lobbies and Central Corridor. The primary public spaces in the building are the two lobby spaces and the central corridor, which connects the two lobbies. The primary entrance will be the east entrance. These public spaces are opportunities for collaborative conversations. To support these opportunities, the central corridor will include fixed seating and table furnishings to encourage impromptu conversations and work sessions. To support these sessions, white boards, or write-able wall surfaces will be provided. To control acoustical performance, the use of acoustical wall panels and an acoustical ceiling system will be part of these spaces. Off the existing central corridor in the building are several support spaces to serve the master plan of the building. These support spaces are to include: Men's and Women's Restrooms, Janitor Closet, and a Lactation Room. The materials and finishes for these spaces include ceramic tile floors, both painted gypsum board and painted gypsum board walls, and painted gypsum board ceiling in the restrooms. Vinyl composition tile (VCT) flooring, painted gypsum walls, and suspended acoustical panel ceiling will be in Janitor and Lactation Rooms.

Building Support Spaces. The spaces in this area include building receiving, a central liquid nitrogen Stem Cell Bank, the *GMP facility* CO2 manifold room, the *vivarium* manifold and tank storage room, the service hallway, the building storage room, and the autoclave/glass washing room. The materials and finishes for these spaces are: sealed concrete floors, painted gypsum board walls, painted gypsum board ceilings, and painted hollow metal doors and doorframes.

Basic Discovery ("X") Space. The first build-out for Discovery Research will provide 13,014 ASF of space consisting of open lab space, laboratory support space (12 isolated cell culture rooms, 3 workrooms, 3 lab support rooms, and shared equipment space), FACS core space of an additional 721 ASF, and office space for faculty, graduate/medical students, postdoctoral/clinical fellows (divided into carrels/cubicles), technicians, and administrative and conference space. The materials and finishes for this area includes cleanable materials; chemical resistant metal modular laboratory casework with epoxy resin counter tops, VCT flooring in the open laboratory and sheet

vinyl in the laboratory support rooms, painted gypsum board walls, painted gypsum board ceilings in support rooms with hard ceilings, suspended acoustical ceilings panels, and painted hollow metal doors and door frames.

Translational ("Y") Space. The first build-out for Translational Research will provide 7,637 ASF of space with open lab space, laboratory support space (6 isolated tissue culture rooms, a bacterial culture room, gel electrophoresis, immunology, cryopreservation, and shared equipment space), microscopy core space and isolated animal procedure (non-SPF) space, and office space for administrative personnel, for the *Stem Cell Program* Director, Manager, Clinical Trials Director, Program Manager, medical/graduate students, postdoctoral/clinical fellows, technicians, and a conference room. The materials and finishes for this area includes cleanable materials, chemical resistant metal modular laboratory casework with epoxy resin counter tops, VCT flooring in the open laboratory and sheet vinyl in the laboratory support rooms, painted gypsum board walls, painted gypsum board ceilings in support rooms with hard ceilings, suspended acoustical ceilings panels, and painted hollow metal doors and door frames.

Specific Pathogen Free (SPF) Barrier Facility – Vivarium ("Y/Z"). National trends continue to show an explosion in animal-based research, specifically with rodents, where the ability to genetically alter mice has led to exponential population growth and changes in the physical environment for their care. Animal facilities have truly become an extension of the research laboratory, with increased emphasis on barrier and containment space, procedure space, specialty cores, and investigator access. The facility will consist of approximately 9,588 ASF of disease-free housing for experimental mice so that research is not compromised by diseases that would be present in the same animals in standard non-barrier housing conditions. The *SPF barrier facility* works through a system of environmental and air isolation and filtering which ensures that the space within the barrier is maintained free of airborne debris and pathogens such as dust particles, bacteria, viruses, fungi, pollens, and yeast, all of which can contaminate research animals.

This *SPF barrier facility* is comprised of twelve holding/procedure rooms, divided into three suites of adaptable rooms initially configured for a ratio of 2:1 holding rooms to procedure rooms and a separate suite of two larger procedure/manipulation rooms that will be outfitted to provide both holding and procedure opportunities. The top 30 users of animals at UC Davis mimic the national average of 248 cages per investigator. Using this average of 248 cages per investigator as the standard, this initial configuration will support 15 of these national average investigators. The ability to convert rooms will enable the space to be used at its maximum potential. All mice delivered to the facility will be housed in microisolator cages, processed to enter the building through a specialized animal transfer station (Nuaire biological safety cabinet designed for specialized transfer procedures). In addition, an irradiator will be housed in the room adjacent to the transfer room. All material entering the *SPF barrier facility* will go through a wipe-down process and then transferred through interlocking pass-through cabinets, and all personnel must change into scrubs and personal protection equipment and enter through an air shower.

To eliminate the need for animals to leave the animal facility for advanced imaging, three separate specialized imaging/procedure rooms will be available within the barrier facility providing imaging modalities such as micro Computed Tomography (microCT), micro Positron Emission Tomography (microPET), ultrasound, optical/fluorescence, X-ray, and other imaging equipment. Support spaces outside the barrier include: two lockers rooms with an air shower entry port into the vivarium, a file room, an office, a break room, a feed storage room, vivarium receiving, and open storage. The primary materials and finishes in these spaces include: epoxy flooring inside the vivarium spaces, VCT flooring in support spaces outside the barrier, epoxy painted and fiberglass reinforced plastic (FRP) walls, epoxy painted gypsum ceilings, and epoxy painted hollow metal doors and doorframes.

GMP Facility ("Z"). The *GMP facility* will contain approximately 5,496 ASF for the clinical grade manufacturing of cellular products, including expanded and differentiated hESC, isolated adult stem cells, and other therapeutic products manufactured for administration into humans. This highly specialized and environmentally sensitive manufacturing facility will have special entry and exiting zones, a testing laboratory, imaging, and administrative support space all located within a controlled and secure zone. The *GMP facility* includes (2) gowning rooms, (2) intermediate entry rooms, (6) manufacturing rooms, a shared imaging room, an intermediate exit room, an autoclave room, and a de-gowning room. The primary materials and finishes for the *GMP facility* include: epoxy resin flooring, pre-finished modular clean room wall and ceiling panels, sealed light fixtures, epoxy painted hollow metal doors and doorframes, and stainless steel pass-through units. Outside the primary GMP laboratory is a GMP testing area, an open office with three workstations, and the director's office. The testing area was developed as a typical open laboratory space with VCT flooring, metal modular casework, painted gypsum walls, painted gypsum ceiling due to the interstitial support space above, and painted hollow metal doors and doorframes.

In the *GMP facility*, all manufacturing rooms are physically separated from each other and provide one-way personnel and product flow to avoid cross-contamination of products. Six different products can be worked on simultaneously. Pass-through boxes are available from gowning rooms to intermediate rooms to manufacturing rooms. All manufacturing rooms are completely isolated from each other by sealed walls and ceilings. In addition, an imaging room is located within the intermediate exit area of the *GMP facility* enabling the researchers to use state-of-the-art imaging technologies without having to leave the *GMP facility*.

The manufacturing laboratories are only entered, one at a time, from an intermediate room. The laboratories are exited only into another intermediate room, one at a time accomplished by an elaborate door interlock system. This provides spatial and temporal segregation of personnel and products, which is a necessity to prevent product cross-contamination. The door interlock system allows doors to be opened only one at a time, which also assures unidirectional flow of personnel and products. Manufacturing rooms, intermediate rooms, and gowning/de-gowning rooms are isolated from each other by air pressure gradients. This assures protection of the products to be manufactured in the manufacturing rooms from outside contaminants, and at the same time, protects the outside environment from potentially biohazardous materials produced in the *GMP facility*. Individual, balanced HVAC units for each room maintain these air pressure gradients. The manufacturing rooms are certified and maintained as Class 10,000 clean rooms; the intermediate rooms are certified and maintained as Class 100,000 clean rooms. These two classes, per GMP regulations, define the level of air cleanliness or the maximum number of particles of a prescribed size allowable in a cubic foot of air per minute. For example, the class 10,000 room could have a maximum of 10,000 particles of a size 0.5 microns or larger per cubic foot per minute. Biological safety cabinets installed in the manufacturing rooms are classified as Class 100.

Four of the six manufacturing laboratories will be equipped with one 4 foot biological safety cabinet and one 6 foot biological safety cabinet, two sets dual stacked incubators, a table top centrifuge, a microfuge, an inverted microscope, and other miscellaneous laboratory equipment. One of the manufacturing rooms will be outfitted with all of the components listed above, and will include a clinical grade cell sorter installed within a biological safety cabinet, refrigerator, and freezer. As per FDA approval, the remaining manufacturing room can be set up to provide Biological Safety Level 2+ containment for work with infectious agents. Quality control and monitoring plans will be in effect. The facility will be electronically monitored continuously, and additional daily manual monitoring by core personnel will ensure adherence to standards as regulated by Standard Operating Procedures (SOPs).

Building Exterior. The exterior walls are faced with full brick veneer with high windows on three sides of the building. There are a series of entry portals around the building in-filled with a storefront system. There is a hipped mansard roof around the entire perimeter of the building with mission style clay tiles. Behind the mansard roof is a center sloped PVC single ply roof, with mechanical units mounted on curbs. The roof is divided into three parts by the concrete area separation walls, which extend through and above the roof plane. There is an attached enclosed delivery dock and exterior truck ramp on the north side of the building. The work required for the exterior will include the removal of the existing PVC single ply roofing, removal of abandoned mechanical units, placement of new mechanical air-handling and exhaust units, installation of new sloped cricket rigid insulation, installation of new roof drain and overflows, replacement of flashing systems, and installation of a new single ply roofing system. To complete the final phase of the structural stabilization work, the existing roofing will be removed to expose the existing plywood roof sheathing for re-nailing (with the exception of the roof over the *CTSC*). The existing delivery dock enclosure and ramp will be removed and in-filled to provide site utility upgrade access from the street to the back of the building and coordinate with the new Utility Plant underground utilities being delivered to support the building. The above referenced building exterior work excludes any work above the *CTSC* space because the mechanical system will remain in use and it has been determined that the repairs to the *CTSC* roof that were completed as part of the *CTSC* build-out in 2004 are sufficient.

Existing Mechanical Systems. The existing building mechanical systems, with the exception of the fire sprinkler system, are largely non-existent or inadequate to support the planned research laboratory usage. New utility services will be required to support the proposed laboratory functions.

Heating, Ventilating, and Air Conditioning (HVAC) Systems. Laboratories will receive 100% outside air at a minimum rate of six air changes/hour (AC/HR) and higher AC/HR quantities where required to cool room equipment heat loads. The *vivarium* will receive 100% outside air at a rate of 10 AC/HR. Animals will be housed in microisolator cages connected to local room HEPA ventilation systems that will provide air change rates inside the cages in excess of 15 AC/HR. Ventilation air will be provided at a minimum of 20 CFM per person in the office areas. Restrooms will be exhausted at a minimum of 12 AC/HR and janitor closets at six AC/HR and will be exhausted to rooftop general building exhaust fans. Wherever possible, high heat equipment will be grouped together and directly exhausted. Based on average equipment loads of 8.0 watts per square foot minimum and Laboratory Lighting Loads of 3.0 watts per square foot minimum, the laboratory areas have been sized for an average of 12 AC/HR, with a 10 ft. ceiling, total supply, and exhaust air is approximately 2 CFM/SFT. These internal laboratory loads match NIH guidelines and should be used for sizing individual air handlers. These values may be increased or decreased in specific areas as required by room equipment loads. Recirculating cooling only fan coil units will be utilized in research equipment rooms where the equipment loads require supply airflows in excess of the 12 AC/HR average outside air requirement. The corridor area is calculated to have approximately 0.6 CFM/SFT.

The *GMP facility* and *vivarium* rooftop air-handling systems will each include two 100% outside air rooftop units (100% redundant) for each space. The ductwork will be interconnected to allow the units to provide backup to each other. All air-handling units are custom designed, factory fabricated, and provided with chilled water and hot water coils, mist eliminator intake filter, 35% pre-filters, 95% filters, plenum, or double width-double inlet (DWDI) supply fans with variable frequency direct drives, and internal vibration isolation. The supply air will be ducted to the *vivarium*, receiving, offices, and laboratories with terminal reheat boxes providing air volume and temperature control. HEPA filtered supply outlets will be provided in the *GMP facility* and where required. Rooftop exhaust fan assemblies will exhaust all air.

The GMP clean room laboratories with re-circulation fan coil air-handling systems will draw air from low-wall return air inlets into the return plenum, and distribute to 99.997% HEPA filtered laminar flow ceiling supply outlets. Re-circulating fan coil units will be installed for each GMP lab space to allow overall lab usage redundancy. The re-circulation rate will be 60 AC/HR in the Class 10,000 (ISO Class 7) Manufacturing rooms and 30 AC/HR in the Class 100,000 (ISO Class 8) intermediate entry, intermediate exit, and imaging rooms. The Class 10,000 and 100,000 rooms will typically be positively pressured with the room exfiltration airflow flowing to the less clean space, from the Class 10,000 rooms to the 100,000 rooms and out to the gown and de-gown rooms. The gown and de-gown rooms will be negative pressure to the adjacent corridor. The *GMP facility* area air-handling system will include the outside air system described above for the open labs, which will provide the necessary make-up air to the re-circulation units.

Variable frequency drives on the re-circulation air handler supply fans will maintain constant room air circulation rates and variable air volume (VAV) terminal control valves on the general supply air and exhaust air ducts will maintain pressurization requirements of the labs. Manufacturing rooms MFR 3 and MFR 6 will each be provided with a 100% exhausted biological safety cabinet connected to a separate laboratory exhaust system with a redundant fan as described below. These rooms will be controlled to allow the rooms to be run with either positive or negative air pressure. The GMP Testing Lab will be provided with a fume hood with its own exhaust fan.

The “X” and "Y" space rooftop air-handling systems will include one 100% outside air rooftop unit. All air-handling units will be custom designed, factory fabricated, and provided with chilled water and hot water coils, mist eliminator intake filter, 35% pre-filters, 95% filters, and multiple plenum or DWDI supply fans in a “fan wall” configuration with direct drive motors and redundant variable frequency drives. Each fan has a direct drive motor so the failure of a single fan or motor will not shut down the entire air handler. All of the fans are controlled by a single variable frequency drive so the addition of one redundant variable frequency drive provides 100% back-up for this important fan system component without the expense of a second air handler. The supply air will be ducted to the labs with terminal reheat boxes providing constant air volume and temperature control. All air will be exhausted by rooftop exhaust fan assemblies and fume hood exhaust fans. General office, Corridor, and Vivarium Receiving area rooftop air-handling systems will be custom designed, factory fabricated provided with chilled water and hot water coils, 35% pre-filters, 90% final filters, plenum or DWDI supply and return fans with variable frequency drives, full 100% outdoor air economizer, variable volume control for zone VAV boxes with hot water reheat, minimum ventilation measuring station, and internal vibration isolation. Office zones will be limited to a maximum of three or four offices controlled by a single temperature sensor. In areas of special occupancy, a room may be served by a single terminal unit and temperature sensor.

Exhaust. Both the “X” and "Y" space will be exhausted by roof mounted fan assemblies with vertical plume discharge fans. The 100% exhausted biological safety cabinets will be exhausted by similar roof mounted fan assemblies with HEPA filter racks located on the roof in the fan assembly. These rooms with the biological safety cabinets will be controlled with Phoenix air valves to allow the room pressurization to react quickly to changes in the biological safety cabinet’s sash position and safely operate the room in either positive or negative air pressure modes. Air from the laboratory general room air will be exhausted separately from the exhausted (B2) biological safety cabinets and the fume hoods. Separate exhaust fans will be provided for the constant volume bypass type chemical fume hoods. Imaging rooms will be provided with several snorkel exhausts. Animals will be housed in individually ventilated cages connected to local room HEPA ventilation systems that will provide air change rates inside the cages in excess of 15 AC/HR as described above.

Controls. The HVAC system will be controlled, monitored, and alarmed by Johnson Controls Direct Digital System and connected to the existing UC Davis Medical Center Johnson Control system.

Utility Building. The cooling load of the built-out laboratory area is estimated at 770 tons with an average estimated equipment load of 8.0 watts per SFT and lighting load of 3.0 watts per SFT. This load assumes the use of run around heat recovery coils in Phase 2B (X) and future build-out Phases that will transfer energy from the general exhaust air stream to the 100% outside air rooftop air handling unit intake air stream. The heating load of the built-out laboratory area is estimated at 5.5 million BTU/h with the use of run around heat recovery coils in Phases 2B and future Phases. The Utility Building is currently under construction and will be completed shortly. This creates a secure delivery yard and will encompass over a third of the secure wall surrounding the building, with cameras, gating, and card readers. It houses the building-wide air compressors, vacuum pumps, deionized water systems, electrical transformers, switchgear, and other noise, heat, and vibration generating equipment, and frees up over 3,000 ASF inside the building for research space.

Plumbing System. The existing services are inadequate to serve the building's new laboratory functions. *The upgrade to the domestic water service is currently under construction*. The existing gas service supplied from Stockton Boulevard will need to be upgraded to serve the open laboratory equipment loads and still continue to serve the existing water heaters and AC units in the existing *CTSC* office areas. Laboratory services will be distributed on a modular basis, with points of connection for each service provided at a uniform position relative to each laboratory-planning module. The points of connection will be easily accessible, allowing future services to be simply connected and extended from the primary distribution system into any laboratory module to the point of use. Accessible system components minimize the cost of disruption to ongoing research activities. All utilities, including communication and information systems, will be organized into planned zones, both horizontally and vertically, to provide a consistent and accessible systems distribution concept. *Accessibility to systems components will be considered a major functional design criteria*. An accessible modular systems approach to design simplifies and facilitates the construction process. Repetitive modular systems components allow some systems components to be shop assembled for delivery and installation at the project site, thus reducing construction time.

Central lab air compressor and lab vacuum pump systems will be located in the new Utility Building to serve the current project and the future laboratories. Equipment will be provided with multiple compressors and pumps for redundancy. Deionized water will be handled in a similar manner as the lab air and vacuum. Grade I, 18 mghmn, deionized water will be generated in the Utility Building following UC Davis Medical Center criteria and looped to laboratory outlets. Point-of-use polishing units will be provided as required to generate local high-grade pure water in the laboratories.

Commonly used lab gases will be located in individual lab gas rooms to allow control by each laboratory director. The *GMP facility* will have its own CO2 gas manifold room. The *vivarium*, "X", and "Y" space will each have their own CO2 and specialty gas manifold rooms. The *vivarium* manifold room will also function as a central building gas cylinder storage closet. Gases will typically be in cylinders (compressed) and dewars (liquid). A bulk liquid nitrogen tank will be located outdoors adjacent to the building and will be directly piped to the individual liquid nitrogen freezers, controlled rate freezer, and LN2 filling port located in the Stem Cell Bank.

New waste and vent systems will be required for the building, as the existing piping is limited, very old, and in very poor condition. New hot and cold water, corrosion resistant waste, and corrosion resistant vent plumbing will be required to serve the future laboratories. New domestic hot and cold

water, waste, and vent plumbing will be required to serve the new restroom and break area fixtures. Only domestic (potable) hot and cold water will be provided to the building instead of both domestic and non-potable water services. Laboratory plumbing fixtures will be provided with local vacuum breakers on each fixture to protect the water lines and laboratory equipment will be provided with backflow preventors. Domestic hot water will be generated using Central Plant heating water and redundant heat exchangers located in the Utility Building. Emergency showers and eyewash stations will be provided as needed. Domestic cold water will be provided for emergency fixtures. It is anticipated that substantial saw cutting of the floor will be required to install the new waste systems. Waste lines will be stubbed into future Phases to minimize disruption to the occupied areas.

Fire Protection/Fire Sprinkler Systems. The existing fire sprinkler system will be modified to provide protection to the new laboratories and *vivarium*. The existing building sprinkler system in the new remodeled areas will require the replacement of the high flow upright sprinkler heads with conventional upright and down drop fire sprinkler heads. In addition, the existing sprinkler system serving the proposed build-out spaces of the building appears to be constructed with older non-approved pipefittings. This area will require the pipe and fittings to be replaced. There are three riser assemblies, one in each building bay, all located inside the building along the south wall.

Existing Electrical Systems. The existing building electrical systems are not adequate for the proposed research laboratory usage. The existing building is provided with two services. One is an 800-amp 120/208V, 3∅, 4W service that feeds the existing *CTSC* space. The other is a 2,500 amp 277/480V, 3∅, 4W service that feeds the remainder of the existing areas. We will be combining these services to have one service for the building, 4,000 amps @ 277/480V, 3∅, 4W (Normal Power) and a 1,200 amp 277/480V, 3∅, 4W (Emergency Power). The building will be provided with both normal and emergency power from the adjacent Utility Building. The existing lighting throughout the building consists of various types of fluorescent fixtures (T8 Lamps). Pendant mounted strips and HID type low bay fixtures will be used within the existing areas with surface and recessed mounted fixtures used in existing office areas. These fixtures will remain "as is" in those areas not affected by this proposed project. New lighting systems will be installed in each new Phase of work to be completed in the future.

Normal and Emergency Power. Normal power is provided by UC Davis Medical Center Central Plant Facilities through a new service in the adjacent Utility Building. The electrical service is a 4,000-amp 277/480V, 3∅, 4W single meter service previously installed with the construction of the *CTSC* in this building ("Phase 1"). As phases of construction are completed, the existing distribution equipment within each phase will be removed and new equipment will be installed. New transient voltage surge suppression (TVSS) systems will be incorporated at service panels feeding each phase of work to help provide for a more clean power environment within the building. The main services for the building are located within the new Utility Building to serve current and future build-out phases. In addition to miscellaneous laboratory equipment within the building, the new services will also provide power to new air handling, exhaust equipment, and fan coil units located on the mechanical mezzanine within the building for each phase of work. Emergency power is provided by UC Davis Medical Center Central Plant Facilities. A new 1,200 amp 277/480V, 3∅, 4W emergency power switchboard is provided next to the normal power switchboard located within the new Utility Building. Emergency power is provided through the Central Plant Building being fed from the local utility company (Sacramento Metropolitan Utility District, SMUD) then through back-up generators located within the main Central Plant Building for the campus. From the emergency generators an underground service line feeds the building, which powers the Emergency switchboard at the Utility Building. Specific research equipment and components require connection to an emergency generator (incubators, ultra low freezers, and

liquid nitrogen units, as well as life safety requirements of emergency lighting and fume hood exhaust fans). Enhanced requirements for reliable normal power and emergency power are required for the *SPF barrier facility* and the *GMP facility*. Federal regulations exist in relation to animal holding rooms and FDA approval of a *GMP facility* necessitates redundancy of both mechanical and electrical systems.

Open Laboratories. Small power (receptacles, miscellaneous lab equipment, etc.) is to be distributed within the space. Included will be a 400-amp 277/480V, 3∅, 4W, 42-circuit panel. This panel will feed (2) new 225 amp 120/208V, 3∅, 4W, 42 circuit panel boards through two (2) 75 KVA 480:120/208V, 3∅, and 4W transformers.

Lighting. New lighting within the space will be with recessed 2x4 fluorescent and surface fluorescent lighting fixtures used in miscellaneous storage and support areas. The completed building will have both new and innovative lighting systems throughout to complement the new laboratory and office spaces and comply with the most recent Title 24 requirements.

Fire Alarm System. A new fire alarm panel will be installed as part of this project and will be a central system to support this and future build-outs in the building. Initiating devices will be distributed throughout the project area as well as new audible/visual annunciation devices spaced per ADA requirements.

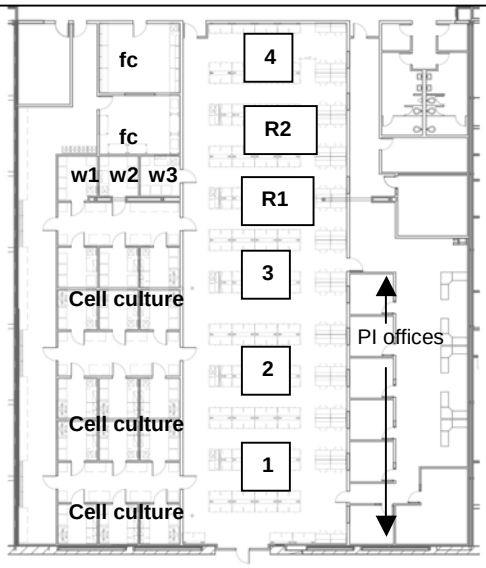
Low Voltage. All low voltage systems (data, phone, security) will be distributed throughout the building within cable tray supported from the ceiling. There are 2 additional communication rooms strategically placed within the building to support future phases of general lab and office space.

Security. UC Davis Health System Facilities Planning, Design, and Construction has worked with the UC Davis Police Department's Crime Prevention Unit to establish security measures for all areas and following established University policies and procedures. With the creation of the PATRIOT Act and other increased security concerns UC Davis convened a committee of representatives from the UC Davis Police Department and other related units to address these additional security measures for research buildings located on the Davis and Sacramento campuses. For the benefit of this project and all research in the **UC Davis CIRM Stem Cell Institute**, a "Card-Key" card access/alarm system will be installed and will provide controlled access to the building and specific rooms within the building, and is tied to a building burglar alarm system that is monitored by the UC Davis Police Department. Numerous security cameras will be installed in both the interior and exterior of the building. UC Davis Health System Facilities Planning, Design, and Construction has worked with the UC Davis Police Department's Crime Prevention Unit to further establish additional security measures for areas including physical security, data and IT security, security policies for personnel, and other areas of emerging concern as a separate project prior to the commencement of this proposed project.

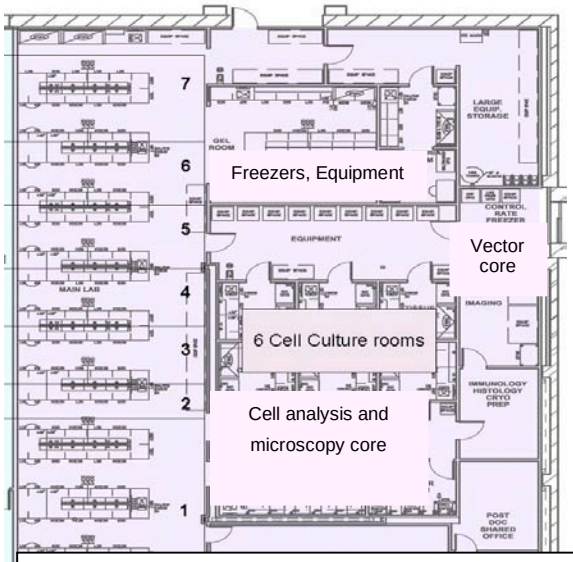
Future Program Expansion. Space encompassing 37,600 GSF shown on the floor plan ("Phases 3 and 4") will remain temporarily as shell space and will be built-out in the future through philanthropic donations. The *Stem Cell Program* has a team to solicit donations, and the local "Regenerating Hope" Board is assisting with fundraising efforts to contribute to future expansion. There is a very high level of institutional commitment to ensure the vision for this facility as a UC Davis stem cell research "incubator" is realized. Start-up funds in the *Stem Cell Program* cover initial operating costs until the cores are self-sufficient (see 6C., below). The space will be used for recruits and to centrally locate educational activities in the *Stem Cell Training Program*, including the formal classes in Stem Cell Biology and Medicine, and the Ethical, Legal, and Social Issues of Stem Cell Research, as well as the weekly journal clubs and monthly Stem Cell/Regenerative Medicine Seminar Series.

3D. Space Layout. The current facility plan will permit the immediate, highly expedited renovation of state-of-the art research space, providing both a visible and intellectual home for the UC Davis *Stem Cell Program*, and a physical home for 31 investigators as well as numerous collaborators from other academic institutions and the private sector. In addition to the powerful collaborative advantages of co-locating members of disease teams, this plan addresses a number of other urgent facility needs and relieves a pressing shortage of research space for current investigators as well as for several active recruitments. The facility also addresses a critical need for expanded mouse *SPF vivarium* space for stem cell investigators. The new facility also provides scientists access to a number of specialized core facilities. In addition, the specific location of this facility on the Sacramento medical campus presents close adjacencies to other important collaborating research and departmental programs in medicine. Research space for basic discovery ("**X**"; 18,120 GSF) includes space for investigators to work with students, fellows, and junior/senior collaborators on hESC; the study of microenvironments and biomaterials; and technologies to characterize cells. Dr. Tarantal will have space to study kidney cells obtained from hESC adjacent to Dr. Zern's liver program, and Dr. Kurzrock will study bladder regeneration alongside bioengineering colleagues. Drs. Li and Chiamvimvonat will work with the cardiac team, and next to a new recruit. Shared electrophysiology equipment will be located in a workroom, along with the FACS core and workrooms for combinatorial chemistry, biophotonics, and biomaterials, and multiple cell culture laboratories. Office space for investigators, students, fellows, and staff, and meeting rooms are also included.

"X": **1**=Tarantal; **2**=Zern; **3**=Kurzrock; **4**=Li; **R1**/**R2**=new recruits; **fc**=FACS core; **w1-w3**=special workrooms



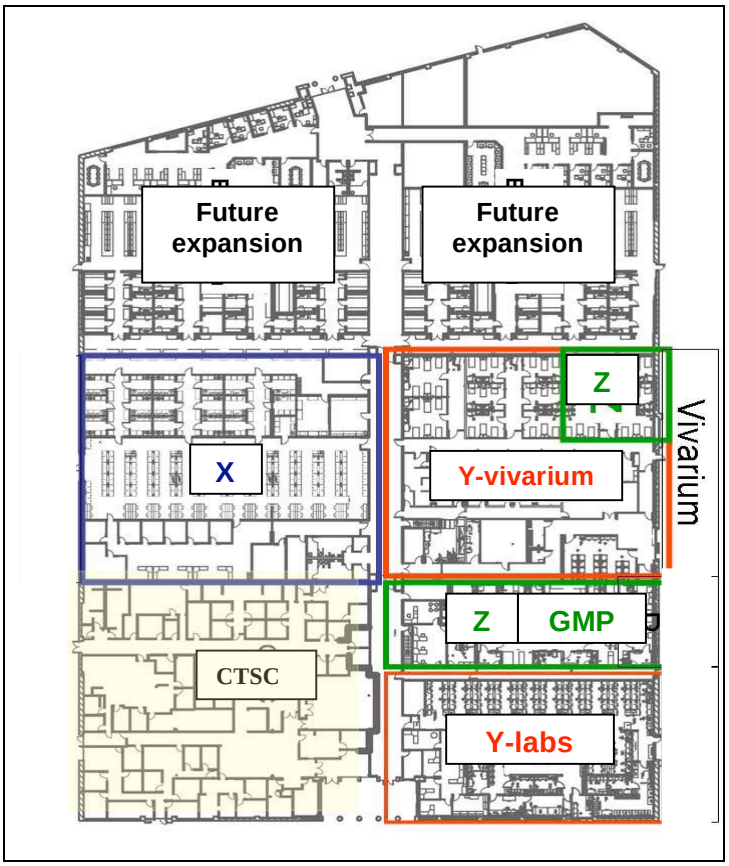
The "**Y"** space (10,633 GSF) is designed to maximize interactions between disease teams and investigators that have extensive experience in the use of immune deficient mice. Here, investigators will use techniques to rapidly test new human stem cell-based therapies as they are developed, and obtain FDA-mandated validation data. Each of the disease teams will be co-located and working towards a common goal: to use the *Stem Cell Program's immune deficient mouse vivarium* (13,350 GSF) in the adjacent space to obtain safety and efficacy data to aid in progressing toward clinical trials. Four investigators in this space with expertise in the use of these models and correlative GMP validations (Nolta, Bauer, Pontow, Zhou) will be completely housed in this area and will work closely with investigators who will be transiently housed during the conduct of their studies (e.g., 3-6 month periods). Those partially housed in this space will consist of members from each investigators laboratory participating in a disease team, and working towards a specific therapy. Once a disease team has used the vivarium and associated cores to obtain sufficient data to progress to large animal models, or to obtain an



"Y": 1=Liver/vascular team**; 2**=HIV/AIDS team**;** **3**=eye team; **4**=skin/burn team; **5**=cartilage/bone team; **6**=neuroscience team; **7**=new recruit

IND approved for a clinical trial, *a different group of investigators will then use the space to initiate their studies*. The laboratories (open lab space and support space for cell culture, workrooms, and vector core) and *mouse vivarium* will be open to outside investigators on a recharge basis. Additional spaced includes autoclaves, space for washing glassware, freezers, supplies storage, meeting rooms, and office space.

The "**Z"** space (7,652 GSF) centers around the *GMP facility* and an area for toxicology/validation space in the *vivarium*. Completion of the new 6-suite *GMP facility* will provide an unrivaled large, centrally located facility for cell processing for trials. The *GMP facility* is essential for completing clinical trials of cellular therapies currently pending for UC Davis faculty. The facility will be made available to California investigators on a recharge basis (see 6C., below). UC Policy and Procedure will be implemented and followed. The overall goal is for the *FACS core, the immune deficient mouse vivarium, and the GMP facility to be self-supporting within three years*. *Microscopy and vector cores* are currently self-sustaining, and with addition of new services, a similar paradigm will be followed. Investigators housed in **X** will use the *vivarium* (**Y**) to test engraftment of human stem cells in immune deficient mouse models. Promising translational outcomes in the *vivarium* (**Y**) will be further tested in the **Z** portion of the *vivarium*, which is reserved for FDA-mandated toxicology/safety studies.



Space vacated by Stem Cell Program members moving into the new Stem Cell Institute will be retained for program-related investigators. As examples, Drs. Nolta and Li will vacate space in the Shriners Hospital Research wing. This space is already slated for Dr. David Pleasure, Director of the Institute for Pediatric Regenerative Medicine, to recruit additional faculty for his program in spinal cord repair. Dr. Zern will vacate space that will be given to a joint recruitment between the Department of Dermatology and the *Stem Cell Program*. Dr. Tarantal will expand a part of her program in the Institute ("X") since she currently does not have sufficient research space as justified by her level of funding. This will allow her to increase laboratory members desperately needed as well as add new trainees to better accomplish the goals of her research program, and to build on the established synergies already in place. Other faculty to be housed in the Institute do not currently have independent laboratory space, but are in the laboratories of their former mentors, although they have independent funding. Their relocation will allow each mentor to house new junior faculty trainees in the field of stem cell research. *Therefore, the completion of the new Stem Cell Institute will have a high level of beneficial stem cell space impact across the entire UC Davis campus*.

3E. Sustainability. This project will comply with the University of California Policy on Green Building Design and lean Energy Standards approved by the Regents, as well as the Presidential Policy for Green Building Design and Clean Energy Standards dated June 16, 2004. As required by these polices, the project will adopt the principles of energy efficiency and sustainability to the

fullest extent possible, consistent with budgetary constraints and regulatory and programmatic requirements. To extend the life cycle of an existing building an effort was made to re-use the building shell and structure and not modify the existing footprint. Re-work of the existing brick façade was kept to a minimum, allowing the majority of the existing façade to be re-used. Nearly 98% of the building structure, shell, and exterior skin including windows assemblies are to be maintained. The existing building is located in a neighborhood that includes several varieties of business and alternative transportation including both a public and campus bus system. Strategies to reduce environmental impacts including heat island effect and noise pollution to an adjacent school and retail center were made. Reduction in the heat island effect is achieved by an installation of high solar reflecting PVC single ply roof over 5” rigid insulation.

The interior finishes of the public space are either constructed of post-consumer products or are completely recyclable. These materials include high-density, solution-dyed, recyclable nylon carpet tiles, recycled metal studs, and structural steel and high-reflective ceiling tiles consisting of 75% post-consumer recycled material. Additionally, materials, coatings, adhesives and other product with solvents are specified to have low to no volatile organic compounds (VOCs), limiting the quantity of indoor contaminants during and after construction. During the construction phase, a strict construction indoor air quality (IAQ) management plan will be enforced to sustain the comfort of construction workers and existing tenants. Connection to the central plant through services provided by Johnson Controls allows constant measurement and verification of energy and water usage to allow for ongoing management and correction of the facility.

The new 3,130 GSF pre-engineered Utility Building is located on the north side of the building. This building will house mechanical elements such as a fan coil unit, a central compressed air system, a vacuum and pump system (with dual compressors and pumps for redundancy), a de-ionized water treatment system, four heat exchangers for domestic and lab hot water, and hot water circulating pumps. The electrical components include electrical switchgear, transformers, and controls panels. The mechanical and electrical rooms will be ventilated by thermostatically controlled dampers connected to building louvers and a suspended cooling fan coil unit. A new fire sprinkler riser will be located in this structure and will be connected to the 6" fire service main. Site work activities that are part of the scope of work are an enclosed delivery yard (2,773 GSF), service/utility area (2,997 GSF), storage area (400 GSF), and a liquid nitrogen tank pad. A concrete pad to accommodate a 3,000 gallon bulk liquid nitrogen tank will be located within the fenced enclosure and be placed adjacent to the building. Liquid nitrogen will be directly piped to the LN2 freezers, to a controlled rate freezer, and dewar fill station in the Stem Cell Bank. The main electrical service will be located adjacent to the Utility Building on a concrete pad. In addition, new underground utilities are required to upgrade the domestic hot/cold water service, fire protection water, sanitary drain lines, vent plumbing, and additional tie-ins to the storm drainage system. All upgrades will be sized to carry the entire loads and utility demands of the building when completely built out.

A life cycle energy analysis performed by Capital Engineering in November 2005 concluded a pay back of less than 8 years. This was based on the cost of the independent stand-alone energy center for the building at approximately $4 million versus the estimated cost of the Central Plant utilities extension of $8.1 million. The yearly utilities cost savings for utilities supplied by the Central Plant was projected to be around $557,000 based on current rates. The reason for the annual utility savings is due to the 80% efficiency of the Central Plant, as compared to 30-40% efficiency for stand-alone equipment in an independent energy center. The rate the University pays for natural gas supplied to the Central Plant is approximately 60-70% less than the cost of commercial rates the University pays for buildings not connected to the Central Plant. Since the energy analysis was prepared, initial field surveys and preliminary planning activities have revised the project cost to $11 million dollars. Although the total project cost is now higher, proceeding with the

Central Plant Utilities Extension provides reliable utility services to the **UC Davis CIRM Stem Cell Institute**. Thus, the benefits of connecting to the Central Plant are:

- elimination of the 10-15 SMUD power outages encountered per year;
- a higher power factor enabling HVAC and lab equipment to perform more efficiently;
- utility infrastructure for future research buildings will be constructed at current construction costs;
- eliminate the need to purchase offset credits for PM 10 (particulate matter emissions of 10 microns or less);
- co-generation rate for natural gas is 60-70% less than the cost of PG&E commercial rates paid to operate stand-alone heating units; and
- provides extremely reliable power, heating, and cooling.

By using utilities from the UC Davis Health System's Central Plant the **UC Davis CIRM Stem Cell Institute** project is assured of reliable and quality power with the two sources of normal power provided by the Central Plant. Emergency power is also available within 10 seconds. The stand-alone co-generation plant had some downtime associated with it for maintenance. The addition of emergency power for the stand-alone plant also made it very expensive. Emission credits would have to be purchased to construct the stand-alone plant. The Central Plant was planned and sized to support the full campus build-out. By connecting to a stand-alone plant the economics used during the planning phase would have been nullified. Financially, the payback time for connecting the **UC Davis CIRM Stem Cell Institute** to the Central Plant is less than 7 years, considering the heating and cooling supplied by the waste heat from Central Plant gas turbine. Connecting to the Central Plant makes the Central Plant even more efficient with the increased load.

Research facilities require considerable reliable utility services to operate safely and efficiently. For electrical power there are few options. It is either purchased from SMUD or self-generated. The power that the building receives will be delivered through the utility lines constructed from Central Plant and supply power that is self-generated by the Central Plant. If SMUD had been used as the primary supplier for the Institute and future facilities there would have been both electrical charges and surcharges for these facilities. As the **UC Davis CIRM Stem Cell Institute** would fall into this category, the surcharge would have been significant. If this project is not undertaken SMUD will also levy demand charges that escalate during peak and super peak times of the days. The **UC Davis CIRM Stem Cell Institute** would also be subjected to rolling blackouts if connected to SMUD (blackouts frequently occur when connected to the residential grid). Specific research equipment and components require connection to an emergency generator (incubators, ultra low freezers, and liquid nitrogen freezer as well as life safety requirements of emergency lighting and fume hood exhaust fans). Enhanced requirements for reliable normal power and emergency power are required for the *SPF barrier facility* and the *GMP facility*.

Heating and cooling costs are part of the "steam offset" from the Central Plant which results in building heating and cooling being provided by the steam generated from the gas turbine exhaust of the Central Plant. If this building were to be connected to SMUD and PG&E, the University would pay PG&E for the gas to run stand-alone boilers for heating and SMUD for the electricity to run chillers for cooling along with the electricity for lighting and equipment. Centrally produced hot and chilled water provides high-quality energy (heat) to operate air conditioning and related high BTU-consuming equipment. To produce the hot and chilled water, either a large boiler or small stand-alone units are employed, or buildings are outfitted with a series of decentralized gas and electric fired units that provide the appropriate service at a significant premium. While large boilers and chillers produce hot and cold water more effectively, they require a 24-hour human operator and an expensive complex permit. Smaller installations do not require a costly permit (emission credits) from the Sacramento Metropolitan Air Management Quality District but they fail to produce

the volume and quality of hot water necessary to support many applications. Connecting smaller units together results in major operational and reliability inefficiencies.

3F. Group 2 Equipment. Tables shown below include equipment purchased since August 24, 2007 (*Table 2*) (UC Davis is not seeking Leverage credit for this equipment), equipment that will be purchased after the proposed grant approval and installed as part of the initial complement of equipment (*Table 3*), and existing equipment that will be moved into the building (*Table 4*).

Table 2. Equipment Purchased since August 24, 2007

Item #	Qty	Item	Unit Price	Location	Funding Source
1	1	Microplate Reader	$7,236	Nolta Lab	Start-up Nolta
2	1	Laser Doppler Imaging System	58,026	Nolta Lab	Start-up Nolta
3	1	PCR System w/Tower Computer	28,985	Nolta Lab	Start-up Nolta
4	1	Ultracentrifuge rotor-fixed	7,213	Nolta Lab	Start-up Nolta
5	1	Centrifuge Rotor, SW-28 Swinging bucket	16,057	Nolta Lab	Start-up Nolta
6	1	Auto C02/low oxygen incubator	8,115	Nolta Lab	Start-up Nolta
7	1	C02 Incubator	5,533	Nolta Lab	Start-up Nolta
8	1	Stimulator, Cell Culture, C-PaceEP	9,424	Li Lab	Start-up Li
9	1	Palm Laser Microdissecting System w/Robomover	53,336	Li Lab	Start-up Li
10	1	BD FACS Calipur Clinical-Grade Cell Analyzer	130,000	GMP temporary Lab	Stem Cell Program Start-up
11	1	SYSMEX Clinical Grade Cell Counter	160,000	GMP temporary Lab	Stem Cell Program Start-up
		Total Equipment Funds	**$483,925**		

The Group 2 Equipment, below, contains equipment that does not currently exist but will be purchased to ensure the **UC Davis CIRM Stem Cell Institute** is fully functional. If this equipment is not supported in this project by CIRM major equipment funding, equipment will be purchased using *Stem Cell Program* start-up funds. This equipment is required in addition to equipment that has already been purchased (*Table 2*) and "existing equipment" (*Table 4*).

Table 3. Equipment Needed

Item #	Qty	Item	Unit Price	Extended Price	Funding Source*
1	13	6' Biosafety cabinet - Recirculating	$9,590	$124,670	SOM R
2	24	4' Biosafety cabinet - Recirculating	7,317	175,608	SOM R
3	87	C02 Incubators	5,533	481,371	SOM R
4	26	Table Top Centrifuge w/Rotor	10,004	260,104	SOM R
5	3	High Speed Centrifuge w/Rotor	48,000	144,000	SOM R
6	3	Ultra Centrifuge w/Rotor	92,000	276,000	SOM R
7	33	Inverted microscope	3,881	128,073	SOM R
8	22	-86° UL Freezers	7,948	174,856	SOM R
9	4	Controlled Rate Freezer	16,394	65,576	SOM R
10	14	LN2 Freezer	8,140	113,954	SOM R
11	24	-20° Freezer	5,232	125,565	SOM R
12	14	45.5 CF Refrigerator	6,615	92,617	SOM R
13	14	29.2 CF Refrigerator	5,829	81,606	SOM R
14	1	Confocal Microscope Set-up	400,000	400,000	SOM R
15	1	Fluorescent Microscope Set-up	65,000	65,000	SOM R
16	1	Clinical Grade Cell Sorter	850,000	850,000	SOM R
17	1	(40) MicroIsolator Vent Racks, (22) HEPA EFU, 1,944 Cages	1,459,499	1,459,499	SOM R
18	3	Flake Ice Machine	5,206	15,618	SOM R
19	6	Water Polisher	5,217	31,302	SOM R
20	1	Movable Lab Casework (Lump sum)	300,000	300,000	SOM R
			Total	**$5,365,419**	
			5% Contingency**	**$268,271**	
			Adjusted Total	**$5,633,690**	

**SOM R - UC Davis School of Medicine Reserves*
***Contingency allowance for price increases if necessary for equipment purchase in 2009-2010*

Table 4. Existing equipment that will be moved into the building (not included in the budget).

Equipment Purchased for the UC Davis CIRM Stem Cell Institute - prior to August 24, 2007					
Item #	**Qty.**	**Item**	**Unit Price**	**Location**	**Funding Source**
1	1	Shepard Mark IV mouse irradiator (purchased 4/11/07)	246,000.00	SPF Barrier Irradiator Room	Stem Cell Start-up Funds
2	1	Cytopeia InFlux Cell sorter –research sorter	650,000.00	FACS core	Stem Cell Start-up Funds
3	1	Floor shaker, digital with adjustable tube rack	9,894.04	Nolta Lab	Start-up Nolta
4	2	Biosafety cabinet, 4', class II	2 x 8,365.07	Nolta Phase 2A Lab	Start-up Nolta
5	1	CLINIMACS Stem cell isolation device	65,000.00	GMP Facility	Clinical progenitor lab funds
6	6	-20 Freezers	6 x 5232.00	Nolta, Zern, Li Labs	grants
7	6	-86 Freezers	6 x 7,948.00	Nolta, Zern, Li Labs	grants
8	1	Temperature controller system with perfusion	5,475.36	Li Lab	Start-up
9	1	Microscope, Olympus with Stereo Zoom	8,434.20	Li Lab	Start-up
10	3	45.5 CF Refrigerator	3 x 6,615	Nolta, Zern, Li Labs	grants
11	3	29.2 CF Refrigerator	3 x 5,829	Nolta, Zern, Li Labs	grants
12	6	Biosafety cabinet, 4', class II	6 x 8,365.07	Nolta, Zern, Li Labs	grants
13	1	Cell Elutriator	30,000	FACS core	clinical progenitor lab funds
14	1	Fluorescent Microscope Set-up	65,000	Nolta Lab,	grants
15	6	C02 Incubators	6 x 5,533	Nolta, Zern, Li Labs	grants
16	3	Table Top Centrifuge w/Rotor	3 x 10,004	Nolta, Zern, Li Labs	grants
17	1	Fluorometric Analyzer	36,071.47	Li Lab	Start-up
18	1	Microscope, patchclamp	23,067.23	Li Lab	Start-up
19	1	Amplifier, microelectrode, capacitor feedback	10,580.03	Li Lab	Start-up funds
20	1	PCR System w/ CyclerThermal Cycler and PC Laptop Computer	22,468.88	Li Lab	Start-up funds
21	1	Manipulator, 150um Travel	6,761.38	Li Lab	Start-up
22	1	Microscope, LEICA DM IL HC	13,993.23	Li Lab	Start-up
		Total	**$1,439,288.38**		

3G. Project Elements Innovative in Design/Function. Unique design features include:

- **Centralized Utility Core** - All utilities pipe and electrical utilities are centralized in the interstitial space above the corridor and branched out to serve the entire building. Future phases can be connected to the utilities with minimized effort and disturbance to the adjacent tenants.

- **Seismically Separated Mechanical Units** - To reduce the vibration impact on highly sensitive laboratory spaces the specific roof mounted air-handling and exhaust fans have a minimized connection to the roof structure. Columns from the ground level stabilize the units above the roof plane. Full interstitial space above the *SPF barrier facility* and *GMP facility* space will allow maintenance of HVAC units, filters, and lighting without breeching the clean environments.

- **Mechanical and Electrical** - During the initial design phase for the project, UC Davis Health System identified the need to provide at lease 3,000 ASF of space for the mechanical and electrical building main systems. With the requirement to enclose a delivery yard for the *vivarium*, a recommendation was made to house all of the major mechanical and electrical systems in the pre-engineered Utility Building twenty feet north of this building and to use the Utility Building to provide 40% of the “fence” area while also freeing up the 3,000 ASF of space inside the building to be used for research. Other factors that supported this concept were the isolation of the noise and vibration emitting equipment. Once the site of the Utility Building was confirmed, the project team began evaluating the different means of providing the necessary utilities. One of the most important concerns was the electrical service. If the project was to rely on the existing SMUD residential grid that was feeding the building, a large diesel generator and building-wide UPS system were required at a minimum. Frequent brownouts and blackouts occur in the residential grid serviced areas and restoration time is length given the priorities of restoring business customers and life safety infrastructure before residential service. Evaluations evolved from a concept to connect to the local SMUD residential grid with an onsite diesel generator and building-wide UPS to a small onsite co-generation system (Bluepoint). The connection of the Utility Building to Central Plant provided two legs of high quality reliable normal power with connection to a bank of emergency generators as the third level of power. This solution eliminated the need for onsite generators and a building-wide UPS system. This also provided the opportunity to supply hot water (which is a by-product of the co-generation electricity production) to the building to support both the water needs and enable heating and cooling without the need for chillers or boilers in the project area.

  The initial configuration was to include electrical services from the local electrical provider and the reliance of a stand-alone emergency generator. Due to the strict requirements to maintain the environmental conditions for the *SPF barrier facility*, LN2 Stem Cell Bank, and the *GMP facility*, as well as the laboratories and support spaces, the project team investigated the option of providing service from the UC Davis Health System co-generation plant located near the proposed project site. Thus, this proposed project will receive clean power as the primary source.

- **Laboratory Floor Plan/Fixture Designs: Accessibility, Efficiency, Safety, and Flexibility** - Properly designed laboratories must address both critical life/safety concerns and the functional needs of the investigators. Safe access to and around equipment, containment devices, and bench top surfaces must be provided and meet current accessibility requirements for individuals with disabilities. The use of a **metal modular laboratory casework** system and freestanding metal laboratory tables help to achieve several important goals including: (1) provides adaptable work surface heights/workstation configurations for individuals with disabilities; (2) provides adaptable work surface heights/workstation configurations for varying research program requirements; and (3) allows the flexibility to interchange storage components with minimal effort and expense, and provides more useable storage space (e.g., the upper shelving allows equipment to be stored across a 36” deep span; the unobstructed island bench tops have

virtually 5' of depth, allowing equipment placed in the middle to be easily accessed from both sides).

All of the **laboratory support rooms** will be provided with a full compliment of utilities plumbed to the wall. The utilities will provide the infrastructure to support activities ranging from electrophysiology, cell culture, imaging, microscopy, and others with minimal down time or modifications. A **laboratory storage room** will be provided in the central receiving area of the building. This room is a large open room with sections fenced in with a tight grid metal fencing material so that the various laboratory programs can store supplies securely, while still being able to see into the storage area. This low cost option allows the research programs to purchase supplies at bulk prices while at the same time avoid having to take up valuable bench or equipment space to store these materials. To allow ease of moving equipment in and out of the laboratories and equipment rooms, one of the **doorways** into each of the laboratory spaces will be increased from 36" to 42" wide.

Section 4. Shared Facilities

A variety of ***cores and specialized services and facilities*** *are available across the UC Davis campuses. These cores, facilities, and service entities are listed on a CTSC searchable website (http://hsresweb01.ucdmc.ucdavis.edu/fcr/fcr.aspx).* These facilities and services are available to investigators ***and clearly leverage the opportunities provided within the proposed new facility, and maximize the CIRM financial investment***. Some examples include the following:

- The *Genome Center* which is a "technology center" that provides services to the campus community. The *Metabolomics Core* in the *Genome Center* provides high-quality services in a cost-effective manner and is working closely with the *Proteomics* and the *DNA Technologies Cores* to provide complex services to investigators. The *NMR Facility* and *Mass Spectrometry Laboratory* provides instrumentation, scientific services, data evaluation tools and computational resources, and training. These resources are used on a fee-for-service basis by numerous investigators and collaborators from other academic institutions. *Therefore, the potential investment of CIRM in developing a Stem Cell Institute at UC Davis is increased in value by the presence of these outstanding facilities, cores, and resources which all contribute to stem cell research.*

- The *UC Davis CIRM Translational Human Embryonic Stem Cell Shared Research Facility* is currently under construction and scheduled to open July 2008. This ~2,500 GSF facility located at the *Primate Center* will include cell culture laboratories; flow cytometry and cell sorting; a molecular core; a histology core; controlled-rate cryopreservation and cell storage for cell banks for investigators experiments; and an infrastructure of experienced personnel to ensure efficient operation, to provide services, and to ensure the necessary training and guidance in the growth and culture of hESC. To facilitate investigator interactions, a conference room will be available for group meetings, presentations, and to discuss data, with shared cubicles for investigators, students, and staff to use with internet access and computer workstations. Videoconferencing and videotraining using the information technology network will be available with links in all rooms in the facility and to the new proposed facility site. *The Shared Research Facility will strongly complement activities in the Stem Cell Institute* and link resources and services.

- The *California National Primate Research Center (CNPRC)* is a national resource that has major functions to support and conduct translational research, and to **provide services to the greater research community**. Working with nonhuman primates requires highly specialized knowledge and expertise and Staff Scientists provide this intellectual infrastructure to investigators for a variety of collaborative and service opportunities. The *CNPRC* has established cores that provide specialized services and consultative and collaborative expertise

to investigators, and quality assurance (QA) support with experienced study directors for projects conducted under the FDA Good Laboratory Practice (GLP) guidelines. *The CNPRC is the only Primate Center in California and is a valuable resource available to investigators. The CNPRC provides the infrastructure and essential expertise for preclinical/translational studies, and with an emphasis on stem cell therapies and regenerative medicine.*

- The NIH *Center of Excellence in Translational Human Stem Cell Research,* located at the *CNPRC*, is a multidisciplinary partnership center that unifies investigators and research programs across basic science, translational, and medical disciplines for a common goal - ***the advancement of cellular therapies for the treatment of childhood diseases*.** The Center brings together research teams that capitalize on translational research efforts at participating institutions (UC Davis, Indiana University, BC Children's Hospital, Childrens Hospital Los Angeles) and includes research projects and cores that offer state-of-the-art services and training to investigators nationally. In addition, the ***Pilot and Feasibility Program*** builds on a long-standing commitment to providing opportunities to investigators, and fostering cross-disciplinary and multidisciplinary collaborations. The objective is to provide intellectual infrastructure and specialized expertise to investigators nationwide to facilitate bench-to-bedside stem cell therapies. *The potential investment of CIRM in developing a Stem Cell Institute at UC Davis is increased in value by the presence of this existing Center and the established expertise.*

- The NIH *Center for Fetal Gene Transfer for Heart, Lung, and Blood Diseases,* located at the *CNPRC*, **supports investigators annually through a competitive process** and, to date, has funded studies for over 30 investigators around the nation. In addition to extensive outreach, the Center provides training and develops new techniques and methodologies each year that are shared with the greater research community. *The focus of the Center is congenital or acquired diseases of the heart, lung, or blood, and the studies and expertise directly relate to disease focus areas in the Stem Cell Program, thus further leveraging CIRM funds.*

- The *Veterinary Medical Teaching Hospital (VMTH)* is equipped with state-of-the-art equipment, highly trained technical and nursing staff, and internationally recognized veterinarians that utilize the latest research findings in veterinary medicine and patient care. Resources and services include a complete range of diagnostic and veterinary medical services for teaching and research. For example, the *Veterinary Genetics Laboratory* is internationally recognized for expertise in DNA testing and parentage analysis, genetic disease screening, forensics, and diagnostic testing. *Collaborations are currently underway to use canine and equine large animal models for preclinical assessments of several pending stem cell therapies for both animals and humans, providing California collaborators with opportunities for preclinical trials*.

- The *Mouse Biology Program* and *Mutant Mouse Regional Resource Center* provides scientists access to the most technologically advanced research discoveries, resources, and training in mouse mutagenesis, phenotyping, and repository management, and as a part of the mission of the *Center for Comparative Medicine* (joint facility for the Schools of Medicine and Veterinary Medicine). The program is comprised of key components centralized within a dedicated facility with a new repository for the *Knockout Mouse Project (KOMP)* which stores, archives, and makes available to researchers unique mouse models. The goal of this program is to build a comprehensive and **publicly available** resource covering the entire mouse genome.

- The *Department of Animal Science* is the only such department in the UC system, and faculty engage in teaching and research related to biology and production of domestic species. *Many investigators throughout California collaborate with faculty in this Department.*

- The *Molecular Imaging Program* at UC Davis has been designed to mirror and leverage the above translational strengths of the institution, providing the infrastructure and expertise to develop new molecular imaging technologies, agents, assays, and quantitative tools, and move these from preclinical investigations to patient care through the *CTSC*. *UC Davis has recognized in vivo imaging as a priority and has invested heavily in infrastructure* (e.g., a multimodality preclinical imaging center, the *Center for Molecular and Genomic Imaging or CMGI*, in the Department of Biomedical Engineering). The program capitalizes on 6 years of consistently evolving strengths in molecular imaging science that includes development of new imaging technologies and novel targeted imaging agents, and advances in quantitative imaging methodologies. This campus program includes the *CMGI*, imaging facilities at various animal facilities (*CNPRC, VMTH*), and the *Imaging Research Center* which supports human imaging science research and imaging research training. *All of these facilities are regularly used by many investigators in the Stem Cell Program at UC Davis and by their collaborators from other academic institutions.*

- The *Cancer Center* has core facilities which provide the resources and experienced personnel to perform analyses for clinical and preclinical drug development studies. In addition to providing basic services, this facility encourages and facilitates all areas of cancer research, including basic and translational research, by providing a range of analytical services. The *Cancer Center* research program consists of members of many schools and colleges, and faculty collaboratively study new cancer-based therapies for veterinary patients that are translated to new treatments for human patients. The *Cancer Center* members are involved in clinical trials with many other California groups, and a growing number of tumor stem cell research studies are being launched as collaborations with other teams from academic institutions in California.

- The *Center for Biophotonics Science and Technologies* includes researchers developing new light-based tools to identify cell populations, and techniques to allow scientists to observe how microscopic particles damage blood vessels. Collaborations with investigators throughout California are ongoing. *The new Institute will contain a workroom to house a biophotonics team, and allow characterization of cells in close proximity to the disease teams and their related equipment.*

- UC Davis has a very close collaborative relationship with *Lawrence Livermore National Laboratories*. This close relationship is exemplified by successful joint endeavors such as the *Cancer Center* and *Center for Biophotonics Science and Technologies*. *This established collaboration provides UC Davis with access to a unique group of scientists and engineers that develop new and essential technologies that will have a major impact on stem cell investigations and new therapies.*

- The *UC Davis Department of Dermatology*, *Shriners Hospital*, and the *VA Hospital at Mather* are working together to develop novel strategies to repair non-healing foot ulcers, a common complication of diabetes, and to more quickly heal severely burned skin. Collaborative research is underway, and a Phase III clinical trial of topical cell delivery to diabetic foot ulcers is currently accruing patients.

- A formal collaboration with *ThermoGenesis*, a Sacramento-based corporation that focuses on technologies for blood processing, cell cryopreservation, and cell storage, has been established. The FDA-approved ThermoGenesis AXP Platform is currently in use in scale-up experiments in the immune deficient mouse hindlimb ischemia model using human bone marrow progenitors.

- The *CTSC* encompasses a variety of programs ***that facilitate clinical and translational research and substantially leverage CIRM's investment***. Key programs in the *CTSC* include:

Translational Technologies, Resources, and Methodologies which provides infrastructure support for the conduct of translational research, identifies and links translational research groups and projects, identifies new methodologies and technologies for translational research and methods to communicate these resources, and provides pilot funding for collaborative research proposals; *Research Education, Training and Career Development* supports multidisciplinary clinical and translational researchers through effective research education, training, and career development, and links various training programs including the *Stem Cell Training Program*; *Community Engagement* places particular emphasis on ensuring active participation of the community to help reduce health disparities in clinical research; and ***services for investigators*** include *Biomedical Informatics* which can assist investigators with database design and management, data sharing and security, electronic data capture, website support, and digital communication; the *CTSC Clinical Research Center* located at the *VA* which provides clinical research facilities, resources for patient-oriented research, flexible, mobile research personnel for investigators and staff, and continuous 24/7 support for inpatient and outpatient protocols; *Design, Biostatistics, and Clinical Research Ethics* assists investigators with ethical study design and analysis with biostatisticians and a bioethicist to review and assist with study design, and education and training; data mining and computer-intensive tools; and *Regulatory Knowledge and Support* which facilitates the research process through assistance with all regulatory aspects including IND/IDE applications.

- The *Institute for Data Analysis and Visualization* focuses on large-scale scientific data visualization, computer graphics, and geometric modeling; data analysis and exploration; and digital image processing, and is collaborating closely with, and developing innovative software solutions for, national laboratories, industry, and state and federal agencies related to fundamental and applied problems in massive data processing, compression, visualization, manipulation, and exploration.

- The *Center for Health and Technology* is a nationally prominent telehealth program that provides support for clinical and translational research using a variety of information and telecommunication technologies. Examples include videoconferencing to facilitate relationships between researchers at different academic institutions, and with community researchers; to identify subjects in remote areas and perform assessment via telemedicine; follow patients at distant locations using telemedicine; and leverage existing telemedicine clinical sites to reach specific populations (such as migrant farm workers, rural seniors, Native American populations). *This program will be well-integrated in the new facility and in educational activities for the scientific and medical communities, and the public.*

- The Stem Cell Program *Immune Deficient Mouse Core* will be housed in the new vivarium and complements the strong campus mouse biology program (see above). *Business plans are under development that will allow models to be used at a reasonable cost for UC Davis faculty, collaborators, and other CIRM-funded California investigators.* UC Davis also has collaborations ongoing with Jackson Laboratories West, who provide additional mouse services for stem cell research. Similarly, the *FACS Core* will be a satellite facility of the UC Davis *Optical Biology Shared Resource* which has been in place for the past decade. *The FACS Core is critical to the studies that will be conducted in the new facility, and is* ***available to all qualified investigators in the region***.

- Completion of the *GMP facility* will provide an unrivaled centrally located California facility for cell processing for clinical trials. The facility will be made available to California investigators on a *recharge basis*. A fee-for-service structure is under development.

- The **UC Davis CIRM Stem Cell Institute** will be the hub for the development of new clinical trials for each disease team, and the program brings the expertise of numerous investigators into Northern California. Projects include colleagues and collaborators across the U.S. and international sites. Thus, the *"value added"* vision is exponentially strengthened by the depth and breadth of collaborations. As an example, UC Davis and the *Buck Institute* are actively working together to develop programs and activities that leverage the *Buck Institute*'s expertise in aging research and age-associated disease with the vast resources and intellectual infrastructure at UC Davis in neuroscience. Formal MOUs are in place for these collaborations. An investigational new drug application to use hESC to treat Parkinson's disease is being written jointly, and the cell expansion, validation, and cryopreservation of stem cells and banks and other related activities will be performed in the UC Davis *GMP facility*. Once established, the cells will be administered to Parkinson's patients by the UC Davis *Movement Disorders Clinic* team and physicians at *Kaiser Permanente* in Sacramento. This trial will capitalize on existing equipment and expertise at the two sites for an ongoing collaborative effort (http://www.ucdmc.ucdavis.edu/news/movement_disorders.html). Current treatments for Parkinson's disease are provided to over 500 patients throughout Northern and Central California. *Since the Buck Institute has not included a GMP facility in a CIRM major facilities application, they will use the UC Davis proposed facility. This represents a considerable cost savings to CIRM and to the State.*

Section 5. Budget, Cost Plan Summary, and Cost Estimate

The total cost for the **UC Davis CIRM Stem Cell Institute** project is estimated to $61,770,588 which includes an allowance of $5,633,390 for approved Group 2 equipment. UC Davis is requesting a CIRM contribution in the amount of **$26,059,275** and has approved funds in the amount of $30,499,458 as match and leverage to be funded through reserves available to the School of Medicine. See attached documentation.

5A. Capital Improvement Budget. See Subpart C.

5B. Cost Plan Summary. See Subpart C.

5C. Detailed Cost Plan/Estimate. See Cumming estimate-Subpart C.

Cumming Corporation is an independent cost estimating consultant. The corporation has no ties to contractors or designers, thus ensuring that each client receives an unbiased opinion of cost for their project. Cumming provides cost estimating services from programming through final construction documents and they understand the importance of accurate, traceable, and audit-proof cost estimates. A structured and timely approach to develop, review, and implement approved estimates into the construction management process is incorporated. Cumming routinely solicits real-time quotations from trades and manufacturers for integration with an existing library of historical cost data, current project information, and industry recognized cost databases and publications, thereby ensuring that all estimates are current and appropriate with respect to the dynamic nature of the industry. This includes both economic and geographic considerations. To ensure accuracy and quality in estimates, Cumming teams adhere to these strict steps in the development of cost estimates:

- **Definition of Project Scope** - To provide a complete and accurate project estimate, the estimating team first develops an understanding of the project scope, parameters, and constraints. Cumming's team works with the project scope document along with the plans, specifications, and templates to fully understand the scope of the work. They then generate matching estimates. Cumming reviews the project scope and identifies project constraints and nonstandard cost issues up front.

- **Quantity Measurement** - An accurate and complete Quantity Take-off (QTO, or Quantity Survey) is a key element to a successful cost estimate. Cumming adheres to strict principles of precise measurement. For each project, Cumming estimators prepare detailed QTOs in all trades for items identified. All QTOs are prepared on QTO sheets identifying the locations from which measurements are taken. All calculations are clearly shown and crosschecked. Cumming's experience in preparing budget estimates permits asking key questions to identify potential items required in the project and to then apply reasonable allowances for those items.

- **Local Market Conditions/Current Pricing Data/Forecasting** - Identifying the key current market conditions in the project location is an important factor in providing an accurate estimate. Cumming has developed a crew-based database that utilizes current local labor rates, workers comp rates, sales tax, subcontractor's mark-ups, and material pricing. Cumming currently tracks key national and regional trends on a monthly basis, including the US$ exchange rate, cost of energy, global demand, key material prices, construction volume, and labor availability. This information is published in a monthly economics report and applied to the current price databases. Cumming obtains key quotes from vendors for uniquely specified items. When a current event impacts the construction industry, Cumming will often research the dynamics of that impact to determine the cost considerations for the project.

- **Data Input** - Upon completion of the QTO, reviews and checks, and the collection of local pricing data, Cumming estimators input data into the estimating system. Cumming sets up the estimate Work Breakdown Structure (WBS) to best accommodate the needs of the project. General Condition costs are clearly broken out, and all markups are distinctly identified within the estimate.

- **Review/Check Estimate** - Once the estimate has been input, the lead estimator and an independent reviewer assesses the estimate. Quality controls are conducted for math and spelling. In addition, parametric tests such as comparisons of areas, comparisons with similar projects or similar scopes of work, and against previous estimates, are made to ensure accuracy.

- **Publish Estimate and Review with the Project Team** - On completion of the final estimate review/check and modifications as required, Cumming will publish and review the estimate with the Project Team. Once the estimate is reconciled, the estimate is reissued with the appropriate revisions.

- **Other Party Estimate Comparison** - Cumming will review and provide a detailed comparison between estimates and estimates prepared by others (design team, contractors, or other independent estimators). They identify areas of difference and reconcile the differences. Upon completion of the reconciliation, Cumming will revise their estimate, if necessary, and report the changes.

Section 6. Funding Plan, Leverage, and Drawdown Schedule

6A. Leverage. See Subpart D.

6B. Drawdown Schedule. See Subpart D.

6C. Operation of the Facility.

Operations and Maintenance. The **UC Davis CIRM Stem Cell Institute** building will be operated and maintained by UC Davis Health System Plant Operations & Maintenance (PO&M). PO&M is responsible for the operation, maintenance, and repair of buildings and building systems within the

UC Davis Health System. PO&M provides a broad array of professional facility services for the basic maintenance of state funded buildings with additional maintenance services, repair of department-purchased equipment, and facility improvements available through individual recharge or service agreements. PO&M also advances energy conservation and provides skilled crafts and laborers for minor building renovation projects. PO&M includes experienced in-house carpenters, electricians, plumbers, engineers, operators, mechanics, technicians, and administrative staff to serve the entire Health System. PO&M management of facilitates is through preventative maintenance scheduling as well as an on-line system request process. All requests are reviewed, scheduled, and delegated to the various essential trades to ensure compliance and oversight of the process.

On an annual basis, UC Davis submits a request to the State of California for Operations and Maintenance Funds for the University owned Research and Education Buildings. This building will be added to the list for fiscal years 2009-2010 and 2010-2011 based on the phased completion in 2009 and 2010, respectfully. Should funds not be allocated for any period of time for this building, UC Davis Health System will cover such expenses.

The **UC Davis CIRM Stem Cell Institute** will have a Building Coordinator and Safety Coordinator, comparable to all UC Davis Health System buildings. These persons are responsible for notification and oversight of the facilities, as well as acting as the main contact for the coordination and dispersal of all policy and procedure information for facility occupants.

Space Management and Assignment. The Stem Cell Program has a Director, two Associate Directors, and an Advisory Committee composed of representatives from basic, translational, and clinical research; the *GMP facility*, the School of Medicine Dean's office, the *Stem Cell Training Program*, the *CTSC*, imaging resources, bioethics, and facilities (Mark Romney and Ted Wandzilak). The **UC Davis CIRM Stem Cell Institute** space will be assigned by the Director of the *Stem Cell Program* in conjunction with the Associate Dean for Research. All space will be assigned based upon the School of Medicine Space Allocation Model. This model assigns space based upon the total number of program funded individuals (PFIs) within a Principal Investigators (P.I.) research program. The P.I. is assigned approximately 120 ASF of wet lab bench space per 100% funded PFIs within their research program. A portion of shared core space such as cold rooms, freezers, dark rooms, and equipment is also assigned with the PFI. Space allocation is reviewed approximately every 3 years with the reassignment and adjustment of space made based upon programmatic and institutional assessments.

Cores. The cores will complement existing cores and services on the UC Davis campuses and be essential for the studies to be conducted in the new facility (cores are listed in X, Y, and Z space). Each core will have recharge rates and charge-back mechanisms that are reviewed and approved annually by the University according to established policy and procedure. The cores are administered through a core director and a committee comprised of the co-directors and the facility manager. The committees will meet regularly to plan requested participation in research projects, to allocate resources, discuss ongoing work, new approaches needed for evolving projects, areas for development, and address logistical details, recharge rates, and services. Facility use and training is coordinated through the facility manager, and an efficient online calendar sign-up process will be used where appropriate, comparable to other cores and facilities at UC Davis. The cores will recharge technical salaries, equipment use, and supplies directly to the grants of UC users and develop a mechanism for recharge for investigators outside of the UC system. The successful paradigm and associated experiences at many of the cores, resources, and facilities at UC Davis will be applied in the proposed facility, with plans to evolve the operation to self-sufficiency within a three-year time frame. The *Stem Cell Program* will provide the initial start-up and support. Similar to other cores, a website will include the costs associated with use of the

equipment, costs for reagents and consumables, and technical support, if needed (hourly rate). These services will also be listed on the *CTSC* facilities, cores, and resources website (http://hsresweb01.ucdmc.ucdavis.edu/fcr/fcr.aspx).

A program coordinator/analyst will assist with the administrative activities. The facility manager will provide the daily supervision of the laboratories and the staff, and the staff will work with the facility manager to oversee the day-to-day operations, to provide services and quality assurance, and all essential equipment maintenance for efficient operation. The *Oversight Committee* (see below) will also aid the manager and staff in efficient operation, planning, and oversight. This organizational structure will provide the general management and oversight for all activities, and promote interactions with other CIRM-supported programs to maximize effectiveness in supporting stem cell research.

An *Oversight Committee* will be constructed of members of campus schools (*Medicine, Veterinary Medicine*) and colleges (*Biological Sciences, Engineering*), collaborating institutions (e.g., *UC Merced*, *Buck Institute*), as well as an external member with stem cell and core resource expertise outside California. The committee will review policy and procedure, and the effectiveness of core functions by evaluating the specific service(s) provided, users of the service, and costs per service. Detailed reports will be reviewed monthly to assess cost recovery, and to assure that support services are available to all approved California investigators and utilized by a reasonable number of investigators. Recharge rates established for each of the services will be developed in compliance with UC Policy and Procedure, and reviewed annually. The rates will be based on the actual cost of supplies and labor. In order for the facility to move towards self-sufficiency, four components will need to be considered as rates are developed: labor, supplies, equipment maintenance and usage, and administration. Optimal utilization of the facility will be discussed including time allocation, and any potential problems that may arise with scheduling. The committee will also be responsible for evaluating progress, the annual budget, ensuring the facility is effectively planning for self-sustainability, address any relevant issues related to the website, and ways to foster collaborations with other CIRM-supported facilities that may enhance cost-effectiveness. The committee will meet monthly with tele/videoconferencing for those outside of the Davis/Sacramento area. Membership was chosen based on mission, expertise, to promote equity, and optimize input.

Section 7. Schedule/Implementation Plan. See Subpart F. Reviewers of Part 1 noted that plans for the *GMP facility* were already approved by the FDA; therefore, the facility could be rapidly completed upon approval of the application. Reviewers noted this was a significant milestone that has already been met in building such a facility.

Mitigation of Construction Disruptions to Existing Occupants. All heavy noise will be completed for all areas prior to the occupancy of the *GMP facility* and *vivarium*. The *vivarium* requires the sentinel mouse testing certification which can take a few months and the *GMP facility* requires intense validation of environmental conditions and equipment. Additionally, saw cutting and other infrastructure intense activities will be performed in what is identified as "Phase 4" adjacent to the *SPF barrier facility* so that this disruptive work does not need to be done while the facility is in operation. All efforts will be made to ensure that there is little disruption to occupants in the *CTSC* (office and administrative space, meeting rooms). The UC Davis Tupper Hall laboratory remodel focused on renovation of nearly half of the 4th floor of the largest research building on the UC Davis campus, and provides an example that is relevant to this issue. This challenging project required coordination with adjacent research operations to avoid major disruptions to critical activities; no research disruption with installation of a building-wide emergency power generator installation; and the relocation of existing research activities to facilitate the renovation construction. While the project scope included a major renovation of existing laboratory space to

new program requirements, the impact to the surrounding areas was minimized by effective communications between the UC Davis staff and the construction contractors.

7A. Schedule. See Subpart E.

7B. Approvals. No internal or external design or environmental impact approvals or local or state permits are currently needed that impact the proposed scheduling of the project.

7C. Teams Responsible.

Managing and Tracking the Project. The UC Davis Health System Facilities Planning, Design, and Construction Department will manage and track this project. This department is responsible for the administration of the Medical Center capital program. Under the direction of the Campus Architect, each capital project is assigned to one of 20 highly experienced project managers. The project manager has overall responsibility for the budget, schedule, and administration for each assigned project, from the start of design to the finish of construction. The project managers oversee the work of all outside consultants and contractors. The project managers are assisted by a highly integrated team of professional support staff for building inspection, engineering review, contracts preparation, accounting, clerical support, and cost estimations. *This department is currently administering a capital program with projects in programming, design, and construction with a total project value of over $750 million*. This department will provide oversight for all design documentation, construction documentation, public competitive bidding, contract award, construction inspection, and construction coordination. Change orders will be managed through the designated Project Manager and funded through the reserves set aside in the contingency costs. This project will be performed in accordance with University policies, procedures, and regulations.

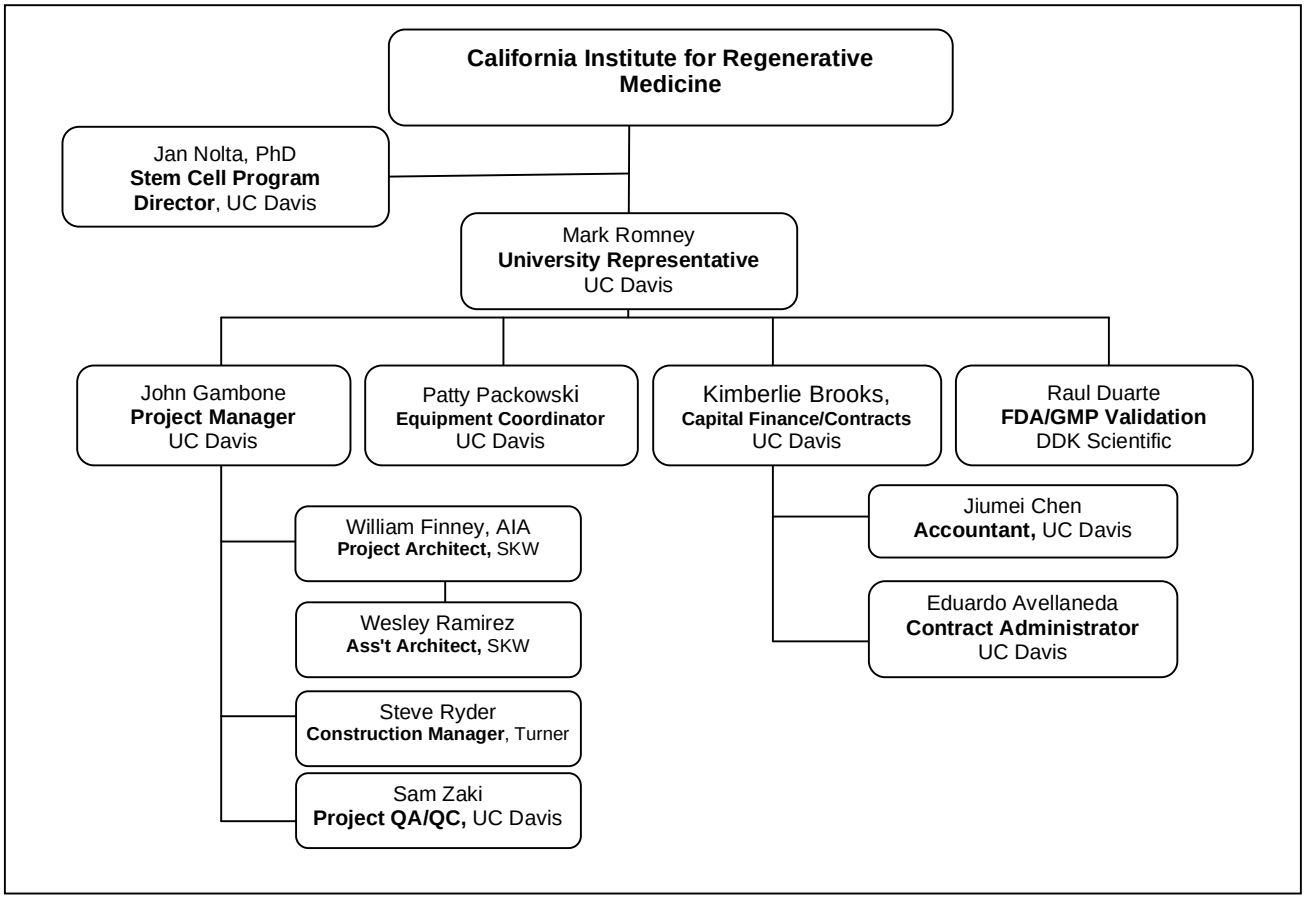
Some examples of UC Davis projects managed by the Facilities Planning, Design, and Construction Department include:

- Davis Tower Phase 3: Build-out of two shelled floors in the Davis Tower Hospital for a new Neonatal Intensive Care Unit and a Medical Surgery floor encompassing 50,000 GSF
  Original Contract Value: $14,604,158
  Value of Change Orders: $412,728
  Proposed Project Schedule Duration: 03/19/04 - 08/05/05
  Actual Project Schedule Duration: 03/19/04 - 08/05/05

- Davis Tower Phase 4: Build-out of a shelled floor in the Davis Tower Hospital for a new Medical Surgery floor encompassing 25,000 GSF
  Original Contract Value: $10,997,152
  Value of Change Orders: $7,885
  Proposed Project Schedule Duration: 03/05/07 - 07/08/08
  Actual Project Schedule Duration: Approximately 75% complete with construction and on schedule to finish by 07/08/08

UC Davis has historically maintained a construction change order rate well under 5% for laboratory renovation projects. With the design concept for this project the 5-7% contingency proposed is appropriate. Overseeing the development of the *SPF barrier facility* and its subsequent operation is the Director of the UC Davis *Center for Laboratory Animal Science (CLAS)*. *CLAS* manages 100,000 GSF of UC Davis animal facilities. The campus Attending Veterinarian will also provide oversight for all animal activities in the new vivarium. The UC Davis animal care program is AAALAC accredited. A working group consisting of the *Stem Cell Program* Director, CLAS Director, *GMP facility* Director, and representatives from UC Davis Facilities Planning, Design, and Construction Department (Mike Boyd, Tom Rush, John Gambone, and Mark Romney), have been

instrumental in the planning of this complex CIRM Institute Level facility. This working group will continue to remain involved and meet regularly throughout the final planning, design, and construction phases until the facility is fully occupied and operational. Key personnel from the UC Davis Fire and Police Departments and the UC Davis Environmental Health and Safety Office have been, and will continue to be, involved in the development and implementation of this project.



Mr. Romney will be the University Representative/Facilities Contact for this project. Mr. Romney, who is the Research Facilities Planner for the UC Davis Health System, has held a similar role in several NIH NCRR C06 projects and is currently in this position on the *UC Davis CIRM Translational Human Embryonic Stem Cell Shared Research Facility* project. Mr. Romney represents the School of Medicine in joint school and college projects (e.g., College of Biological Sciences, School of Veterinary Medicine) and has been asked to assist in several international projects.

Architect and Construction Management Company. The *Project Architect* is William R. Finney, AIA, Healthcare Design Studio Manager, who has 30 years experience working in GMP and vivaria facilities as well as construction of laboratories. He is employed by Stafford King Wiese (SKW) Architects. The *Construction Management Company* is Turner Construction, founded in 1902. The following are examples of Turner wet laboratory construction projects:

- **UCSF Mission Bay Genentech ($158 million), San Francisco, CA**
  Turner provided Construction Management services for the first building in the biotech campus at Mission Bay. This 435,000 GSF facility contains computational biology, chemistry, biochemistry, mass spectroscopy, NMR facility, animal care facilities as well as teaching, administration, and support functions. The laboratory facilities are supported by stand-alone

mechanical and electrical systems including an emergency power generator and steam systems. The facility has a large outdoor amphitheater, which provides a central gathering place for campus employees and guests. The Amphitheater is contiguous with “The Green”, a four-acre landscaped open space.

- **Veterans Administration Replacement Hospital ($150 million), Palo Alto, CA**
  Turner was the Construction Manager on this project which consisted of the demolition of the existing hospital, extensive site work over 1,513,000 GSF, and the construction of a four-story administrative building and a four-story research hospital. The buildings are braced frame structural steel with composite metal deck and concrete fill. The interior departments are standard to hospitals except that there are 65 fume hoods incorporated into numerous labs.

- **Stanford University Gilbert Biological & Sciences Laboratory ($26 million), Palo Alto, CA**
  This 90,000 GSF facility is comprised of 87 "wet" research laboratories, 22 animal holding areas, rooftop greenhouses, and laser laboratories. Features include a centralized reverse osmosis pure water system, customized casework and perchloric acid fume hoods with dedicated exhaust. Utility distribution within the lab areas is provided through interstitial spaces at each level, which facilitated the construction schedule and will provide future user flexibility. The HVAC system is a once-through, full supply/exhaust system.

- **California Institute of Technology – Beckman Institute ($32 million), Pasadena, CA**
  A 160,000 GSF building for wet and dry research laboratory space, computer labs, offices, auditorium, classrooms, small museum, and library with 4 above grade and 2 subterranean levels.

- **St. Mary’s College - J.C. Gatehouse Hall ($20.8 million), Moraga, CA**
  Turner provided general contracting services for the construction of the new J.C. Gatehouse Hall. The project included a new 57,000 GSF science building with eleven wet labs and renovation of an existing building of 40,000 GSF. Renovations include seismic strengthening and raising of the roof to accommodate an additional floor. Work on this project was completed in two phases.

- **S.R.I. Building #32 ($45 million), Menlo Park, CA**
  Construction of a 188,000 GSF, three story steel frame wet laboratory and office building facility with a thin shell precast concrete exterior.

- **Amgen, Queen Anne Lab Remodel ($1.1 million), Seattle, Washington**
  This project included the integration of three separate user-groups into this new 14,000 GSF office space with wet labs. Existing utilities were documented and marked during the preconstruction phase to save time and cost during construction. Value engineering on existing casework together with in-house carpentry capabilities resulted in re-use of many pieces within the new design.

Section 8. Plans and Specifications

8A. Hard copy.

8B. Plans and Specifications. See Subpart F.

8C. Table of GSF/ASF. See Subpart F.

8D. Space Plan. See attached. The approved space program has not changed since the Part 1 Application submission, but due to wall location adjustments in relation to electrical rooms and other non-assignable space there was a reduction of 702 ASF, which represents less than a 2% decrease in assignable project area.

SPACE PROGRAM-PROJECT DESCRIPTION

Function/Room	***Qty***	***ASF Each***	***Total Design ASF***	***Total Actual ASF***
Administrative/Building Support Space				
Stem Cell Program Administrator Office	1.00	110	110	118
Stem Cell Program Administrator Staff Work Station	1.00	80	80	136
Building General Receiving	1.00	400	400	408
Research Programs Secure Storage Room	1.00	400	400	505
Glass Wash/Autoclave	1.00	400	400	414
Glass Wash/Autoclave-Service	1.00	150	150	149
LN2 Stem Cell Bank	1.00	700	700	761
Subtotal Administrative Support Space			***2,240***	***2,491***
Core Laboratory Space				
FACS Analysis	1.00	400	400	390
Cell Sorter	1.00	350	350	331
Subtotal Core Laboratory			***750***	***721***
GMP (Good Manufacturing Practice) Facility				
Gowning	2.00	100	200	180
Intermediate Entry Room	2.00	300	600	664
GMP Restricted Corridor	1.00	600	600	686
Manufacturing Room	6.00	240	1,440	1,482
Shared Imaging	1.00	220	220	216
Intermediate Exit Room	1.00	700	700	758
Degowning	1.00	100	100	108
Autoclave	1.00	100	100	85
GMP Testing Lab	1.00	400	400	509
GMP Testing Lab Storage	1.00	100	100	118
GMP CO2 Manifold Closet	1.00	100	100	55
GMP LN2 Transfer/Tank Storage	1.00	60	60	56
GMP Director/Staff Shared Office	1.00	200	200	214
GMP Open Office	1.00	360	360	365
Subtotal GMP Facility			***5,180***	***5,496***
SPF Barrier Vivarium				
Animal Corridor	1.00	900	900	1,042
Secure Interior Hallway	1.00	440	440	451
Holding/Procedure Ante Rooms	3.00	300	900	937
FDA Toxicology-Safety Studies -Animal Holding	4.00	240	960	964
FDA Toxicology-Safety Studies Procedure	2.00	240	480	482
Animal Holding	4.00	240	960	1,020
Procedure	2.00	240	480	510
Combination Animal Holding/Procedure	2.00	440	880	892
Imaging	3.00	220	660	662
Animal Transfer	1.00	120	120	132
Equipment Transfer	1.00	120	120	111
Clean Storage	1.00	120	120	132

Function/Room	***Qty***	***ASF Each***	***Total Design ASF***	***Total Actual ASF***
Dirty Cage Staging	1.00	110	110	151
Men's Locker Room	1.00	330	330	331
Women's Locker Room	1.00	330	330	331
Air Shower	1.00	30	30	42
Feed Storage	1.00	150	150	136
Irradiator Room	1.00	144	144	148
Receiving / Open Storage	1.00	450	450	643
Vivarium Staff Shared Office	1.00	120	120	116
Vivarium File Room	1.00	120	120	116
Vivarium Break Room	1.00	120	120	137
Vivarium Manifold- Cylinder Closet	1.00	100	100	102
Subtotal SPF Barrier Vivarium			***9,024***	***9,588***
Subtotal			**17,194**	**18,296**
DISCOVERY RESEARCH SPACE (X AREA)				
Shared Laboratory Workrooms				
Located in Basic-Discovery but available to all programs				
Combinatorial Chemistry	1.00	110	110	112
Biophotonics	1.00	110	110	110
Biomaterials	1.00	110	110	121
Subtotal Shared Laboratory Workrooms			***330***	***343***
Shared Office Support				
Located in Basic-Discovery but available to all programs				
Shared Conference Room	1.00	250	250	292
Subtotal Shared Office Support			***250***	***292***
TOTAL -			**580**	**635**
BASIC-DISCOVERY RESEARCH SPACE BY DISEASE PROGRAM ("X" AREA)				
KIDNEY DISEASE Team Leader- Tarantal				
Office Space				
Faculty Office	1.00	120	120	120
Administrative Staff Workstation	2.00	80	160	180
Graduate Student/Fellow Carrel	1.00	48	48	48
Subtotal Office			***328***	***348***
Laboratory Space				
Open Laboratory Modules				
	2.00	445	890	907

Function/Room	***Qty***	***ASF Each***	***Total Design ASF***	***Total Actual ASF***
Laboratory Support Modules				
Equipment	2.50	164	410	485
Cell Culture	3.00	110	330	331
Lab Support	1.00	110	110	109
Subtotal Open Laboratory / Laboratory Support			***1,740***	***1,832***
TOTAL - KIDNEY DISEASE			**2,068**	**2,180**
LIVER DISEASE Team Leader- Zern				
Office Space				
Faculty Office	1.00	120	120	122
Administrative Staff Workstation	4.00	80	320	360
Graduate Student/Fellow Carrel	2.00	48	96	96
Subtotal Office			***536***	***578***
Laboratory Space				
Open Laboratory Modules				
	3.50	445	1,558	1,587
Laboratory Support Modules				
Equipment	4.00	164	656	776
Cell Culture	3.00	110	330	335
Lab Support	1.00	110	110	110
Subtotal Open Laboratory / Laboratory Support			***2,654***	***2,807***
TOTAL - LIVER DISEASE			**3,190**	**3,386**
BLADDER Team Leader- Kurzrock				
RECONSTRUCTION				
Office Space				
Faculty Office	1.00	120	120	122
Administrative Staff Workstation	2.00	80	160	180
Graduate Student/Fellow Carrel	1.00	48	48	48
Subtotal Office			***328***	***350***
Laboratory Space				
Open Laboratory Modules				
	1.00	445	445	453
Laboratory Support Modules				
Equipment	1.00	164	164	171
Cell Culture	1.00	110	110	110
Subtotal Open Laboratory / Laboratory Support			***719***	***734***

Function/Room	*Qty*	*ASF Each*	*Total Design ASF*	*Total Actual ASF*
TOTAL - BLADDER RECONSTRUCTION			**1,047**	**1,085**
HEART DISEASE Team Leader- Li				
Office Space				
Faculty Office	1.00	120	120	122
Administrative Staff Workstation	2.00	80	160	180
Graduate Student/Fellow Carrel	1.00	48	48	48
Subtotal Office			***328***	***350***
Laboratory Space				
Open Laboratory Modules				
	2.50	445	1,113	1,134
Laboratory Support Modules				
Equipment	2.00	164	328	388
Cell Culture	3.00	110	330	334
Electrophysiology	1.00	110	110	110
Subtotal Open Laboratory / Laboratory Support			***1,881***	***1,965***
TOTAL - HEART DISEASE			**2,209**	**2,316**
NEW RECRUIT 1 Team Leader -To-Be-Named				
Office Space				
Faculty Office	1.00	120	120	122
Administrative Staff Workstation	2.00	80	160	180
Graduate Student/Fellow Carrel	1.00	48	48	48
Subtotal Office			***328***	***350***
Laboratory Space				
Open Laboratory Modules				
	2.50	445	1,113	1,134
Laboratory Support Modules				
Equipment	2.00	164	328	388
Cell Culture	1.00	110	110	110
Subtotal Open Laboratory / Laboratory Support			***1,551***	***1,631***
TOTAL- NEW RECRUIT 1			**1,879**	**1,982**
NEW RECRUIT 2 Team Leader -To-Be-Named				
Office Space				

Function/Room	***Qty***	***ASF Each***	***Total Design ASF***	***Total Actual ASF***
Faculty Office	1.00	120	120	122
Administrative Staff Workstation	2.00	80	160	180
Graduate Student/Fellow Carrel	1.00	48	48	48
Subtotal Office			***328***	***350***
Laboratory Space				
Open Laboratory Modules				
	1.50	445	668	680
Laboratory Support Modules				
Equipment	1.50	164	246	291
Cell Culture	1.00	110	110	110
Subtotal Open Laboratory / Laboratory Support			***1,024***	***1,081***
TOTAL- NEW RECRUIT 2			**1,352**	**1,431**
TOTAL DISCOVERY RESEARCH SPACE (X AREA)			**12,323**	**13,014**
TRANSLATIONAL RESEARCH SPACE (Y AREA)				
Shared Laboratory Core				
Located in Translational space but available to all programs				
Microscopy	1.00	220	220	198
Animal Procedure	1.00	110	110	119
Gel Laboratory	1.00	440	440	493
Immunology-Histology-Cryo Prep	1.00	220	220	179
Imaging	1.00	220	220	244
Bacteria Preparation & Culture	1.00	220	220	215
Controlled Rate Freezer	1.00	110	110	116
Subtotal Shared Laboratory Core			***1,540***	***1,564***
(Total ASF listed above for reference only, the ASF is allocated to each "Y" Disease Team in the Shared Laboratory Support sections)				
Shared Office Support				
Located in Discovery spacebut available to all programs				
Shared Conference Room	1.00	250	250	182
Subtotal Shared Office Support			***250***	***182***
TRANSLATIONAL-PRECLINICAL RESEARCH SPACE BY DISEASE PROGRAM				
LIVER DISEASE- Team Leader - Nolta				
M.I.-P.V.D.				
Office Space				
Administrative Staff Workstation	1.00	80	80	136
Faculty Office (Director)	1.00	160	160	175
Stem Cell Program Manager	1.00	120	120	103

Function/Room	***Qty***	***ASF Each***	***Total Design ASF***	***Total Actual ASF***
Stem Cell Clinical Trials Director	1.00	120	120	118
Graduate Student/Fellow Carrel	2.00	45	90	105
Subtotal Office			***570***	***637***
Laboratory Space				
Open Laboratory Modules				
	10.50	154	1,617	1,496
Laboratory Support Modules				
Equipment	10.50	70	737	1,003
Cell Culture	3.00	110	330	339
Shared Laboratory Support	10.50	110	1,155	1,216
Subtotal Open Laboratory / Laboratory Support			***3,839***	***4,054***
TOTAL LIVER DISEASE-M.I.-P.V.D			**4,409**	**4,691**
HIV/AIDS & HSC Team Leaders- Dandekar - Bauer				
Office Space				
Administrative Staff Workstation (Shared)	0.25	80	20	23
Subtotal Office			***20***	***23***
Laboratory Space				
Open Laboratory Modules				
	1.00	154	154	142
Laboratory Support Modules				
Equipment	0.50	70	35	47
Cell Culture	0.50	110	55	56
Shared Laboratory Support	0.50	110	55	57
Subtotal Open Laboratory / Laboratory Support			***299***	***302***
TOTAL - HIV/AIDS & HSC			**319**	**325**
RETINAL Team Leaders - Telander - Park				
DEGENERATION / BLINDNESS				
Office Space				
Administrative Staff Workstation (Shared)	0.25	80	20	23
Graduate Student/Fellow Carrel (Shared)	0.25	45	11	13
Subtotal Office			***31***	***36***
Laboratory Space				
Open Laboratory Modules				
	2.00	154	308	285
Laboratory Support Modules				

Function/Room	*Qty*	*ASF Each*	*Total Design ASF*	*Total Actual ASF*
Equipment	0.50	70	35	48
Cell Culture	0.50	110	55	56
Shared Laboratory Support	0.50	110	55	63
Subtotal Open Laboratory / Laboratory Support			***453***	***452***
TOTAL RETINAL DEGENERATION/BLINDNESS			**484**	**487**
SKIN DISORDERS- Team Leaders - Zhao - Isseroff				
ULCERS & WOUND HEALING				
Office Space				
Administrative Staff Workstation (Shared)	0.25	80	20	23
Graduate Student/Fellow Carrel (Shared)	0.25	45	11	13
Subtotal Office			***31***	***36***
Laboratory Space				
Open Laboratory Modules				
	2.00	154	308	285
Laboratory Support Modules				
Equipment	0.50	70	35	48
Cell Culture	0.50	110	55	56
Shared Laboratory Support	0.50	110	55	63
Subtotal Open Laboratory / Laboratory Support			***453***	***452***
TOTAL SKIN DISORDERS - ULCERS & WOUND HEALING			**484**	**487**
CARTILAGE Team Leader - Reddi				
REGENERATION & BONE REPAIR				
Office Space				
Administrative Staff Workstation (Shared)	0.25	80	20	23
Graduate Student/Fellow Carrel (Shared)	0.25	45	11	13
Subtotal Office			***31***	***36***
Laboratory Space				
Open Laboratory Modules				
	2.00	154	308	285
Laboratory Support Modules				
Equipment	0.50	70	35	48
Cell Culture	0.50	110	55	57
Shared Laboratory Support	0.50	110	55	63
Subtotal Open Laboratory / Laboratory Support			***453***	***452***
TOTAL CARTILAGE REGENERATION & BONE REPAIR			**484**	**488**

SPACE PROGRAM-PROJECT DESCRIPTION

Function/Room	***Qty***	***ASF Each***	***Total Design ASF***	***Total Actual ASF***
NEURAL Team Leaders - DeCarli - Hagerman - Rogawski				
Office Space				
Administrative Staff Workstation (Shared)	0.25	80	20	23
Graduate Student/Fellow Carrel (Shared)	0.25	45	11	13
Subtotal Office			***31***	***36***
Laboratory Space				
Open Laboratory Modules				
	2.00	154	308	285
Laboratory Support Modules				
Equipment	0.50	70	35	48
Cell Culture	0.50	110	55	57
Shared Laboratory Support	0.50	110	55	63
Subtotal Open Laboratory / Laboratory Support			***453***	***452***
TOTAL NEURAL			**484**	**488**
NEW RECRUIT-3 Team Leader - To-Be-Named				
Office Space				
Administrative Staff Workstation (Shared)	0.25	80	20	23
Graduate Student/Fellow Carrel (Shared)	0.25	45	11	13
Subtotal Office			***31***	***36***
Laboratory Space				
Open Laboratory Modules				
	2.00	154	308	285
Laboratory Support Modules				
Equipment	0.50	70	35	48
Cell Culture	0.50	110	55	57
Shared Laboratory Support	0.50	110	55	63
Subtotal Open Laboratory / Laboratory Support			***453***	***452***
TOTAL NEW RECRUIT-3			**484**	**488**
TOTAL - TRANSLATIONAL RESEARCH SPACE (Y AREA)			**7,400**	**7,638**
TOTAL UC DAVIS CIRM STEM CELL INSTITUTE SPACE			**36,087**	**38,947**

ASF-GSF TAKE OFF
FROM DRAWINGS
BY FUNCTION

RM. #	A. Administration/Building Support Spaces	ASF	GSF
1306	Administrative Manager	118	164
1304x	Adminstrative Support Staff Open Office (1/3 of Room 1304)	136	189
1502	Glass Wash/Autoclave	414	576
1502A	Glass Wash/Autoclave-Service	149	207
1503	Laboratory Programs Supply Storage	505	703
1506	LN2 Stem Cell Bank	761	1,060
1507	Building Receiving	408	568
	Subtotal	**2,491**	**3,468**
RM. #	**B. GMP Facility**	**ASF**	**GSF**
1358	GMP Autoclave	85	118
1350	GMP Restricted Corridor	686	955
1504	GMP CO2 Manifold Room	55	77
1508	GMP LN2 Dewar Storage	56	78
1360	Degowning	108	150
1344	GMP Open Office	365	508
1345	GMP Shared Director/Staff Office	214	298
1346	GMP Testing Lab	509	709
1347	GMP Testing Lab Support (Storage)	118	164
1364	Gowning 1	90	125
1352	Gowning 2	90	125
1365	Intermediate Entry Lab 1	332	462
1353	Intermediate Entry Lab 2	332	462
1361	Intermediate Exit	758	1,055
1368	Manufacturing Lab 1	243	338
1367	Manufacturing Lab 2	233	324
1366	Manufacturing Lab 3	260	362
1356	Manufacturing Lab 4	243	338
1355	Manufacturing Lab 5	260	362
1354	Manufacturing Lab 6	243	338
1362	Shared Imaging	216	301
	Subtotal	**5,496**	**7,652**
RM. #	**C. SPF Barrier-Vivarium**	**ASF**	**GSF**
1512	Air Shower	42	58
1541	Animal Alcove (Transfer Station)	132	184
1519	Break Room	137	191
1545	Cage Staging	151	210
1543	Clean Storage	132	184
1530	Animal Corridor	1,042	1,451
1539	Equipment Alcove (Transfer Station)	111	155
1521	Feed	136	189

1515	Vivarium File Room	116	162
1517	Shared Staff Office	116	162
1510	Secure Interior Hallway	451	628
1575	Holding 1	241	336
1571	Holding 2	241	336
1576	Holding 3	241	336
1572	Holding 4	241	336
1565	Holding 5	255	355
1561	Holding 6	255	355
1566	Holding 7	255	355
1562	Holding 8	255	355
1554	Holding/ Manipulation 1	446	621
1552	Holding/ Manipulation 2	446	621
1535	Imaging Room 1	227	316
1533	Imaging Room 2	227	316
1531	Imaging Room 3	208	290
1537	Irradiator	148	206
1511	Men Locker/ Shower	331	461
1520A	Open Storage	154	214
1573	Procedure Room 1	241	336
1574	Procedure Room 2	241	336
1563	Procedure Room 3	255	355
1564	Procedure Room 4	255	355
1570	Vestibule 1	311	433
1560	Vestibule 2	315	439
1550	Vestibule 3	311	433
1520	Vivarium Receiving	489	681
1505	Vivarium Manifold/ Cylinder Storage	102	142
1513	Women Locker/ Shower	331	461
	Subtotal	**9,588**	**13,350**
RM. #	**D. Core Laboratory Space**	**ASF**	**GSF**
1681	Cell Sorter	331	461
1670	FACS Room	390	543
	Subtotal	**721**	**1,004**
	Translational Research Space ("Y" Area)		
RM. #	**E. Laboratory / Laboratory Support**	**ASF**	**GSF**
1300	Open Lab	3,063	4,265
1333	Bacteria Prep	114	159
1333A	Bacteria Room	101	141
1315	Animal Procedure	119	166
1329	Control Rate Freezer	116	162
1311	Microscopy	198	276

1330	Gel Room	493	686
1327	Imaging	244	340
1317	Immunology Histology Cryo Prep	179	249
1332	Large Equipment Storage	490	682
1310	Equipment Space 1	337	469
1312	Cell Culture 1	113	157
1314	Cell Culture 2	113	157
1316	Cell Culture 3	113	157
1320	Equipment Space 2	462	643
1321	Cell Culture 4	113	157
1322	Cell Culture 5	113	157
1325	Cell Culture 6	113	157
	Subtotal	**6,594**	**9,181**
RM. #	**F. Office / Building Support**	**ASF**	**GSF**
1305	Director Office	175	244
1304y	Adminstrative Support Staff Open Office (2/3 of Room 1304)	272	379
1309	Graduate Student\Fellow Carrel	184	256
1307	Stem Cell Program Manager	103	143
1308	Stem Cell Clinical Trials Director	127	177
1301	Conference	182	253
	Subtotal	**1,043**	**1,452**
	Total Translational Laboratory Space	**7,637**	**10,633**
	Basic & Discovery Research Space ("X" Area)		
RM. #	**G. Laboratory / Laboratory Support**	**ASF**	**GSF**
1630	Open Lab	5,895	8,208
1680	Large Equipment Storage	1,432	1,994
1640	Equipment Space 1	368	512
1650	Equipment Space 2	379	528
1660	Equipment Space 3	342	476
1645	Biomaterials	121	168
1643	Biophotonics	110	153
1641	Combinatorial Chemistry	112	156
1646	Lab Support	110	153
1644	Lab Support	109	152
1642	Lab Support	110	153
1655	Cell Culture	110	153
1653	Cell Culture	110	153
1651	Cell Culture	110	153
1656	Cell Culture	112	156
1654	Cell Culture	110	153
1652	Cell Culture	112	156

ASF-GSF TAKE OFF
FROM DRAWINGS
BY FUNCTION

1665	Cell Culture	112	156
1663	Cell Culture	110	153
1661	Cell Culture	112	156
1666	Cell Culture	111	155
1664	Cell Culture	109	152
1662	Cell Culture	111	155
	Subtotal	**10,417**	**14,504**
RM. #	**H. Office / Building Support**	**ASF**	**GSF**
1613	Open Office	1,261	1,756
1614	PI Office	122	170
1615	PI Office	122	170
1616	PI Office	122	170
1617	PI Office	122	170
1618	PI Office	122	170
1620	PI Office	120	167
1620	Graduate Student\Fellow Carrel	314	437
1612	Conference Room	292	407
	Subtotal	**2,597**	**3,616**
	Total Discovery Laboratory Space	**13,014**	**18,120**
	Total Assignable Areas	**38,947**	**54,227**
	Project Area GSF	**54,227**	**54,227**
	Building Efficiency	**71.8%**	**100.0%**

Item #	Category	ASF	GSF
1	Research Laboratory Space (to be assigned to individual P.I.)	8,958	12,472
2	Research Laboratory Support Space (to be assigned to individual P.I.)	6,146	8,557
3	Shared (common) Laboratory Space	-	-
4	Shared (common) Laboratory Support Space	3,587	4,994
5	Core Laboratory Space	14,857	20,686
6	Offices for P.I.' S	905	1,260
7	Other Offices	3,072	4,277
8	Administration and other Support Spaces	1,422	1,980
	Total	**38,947**	**54,227**

CAPITAL BUDGET
Major Facilities Grant Program

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

CIRM Application # **FA1-0611-1**

Project Title:	**Number:**	Prepared by: Tom Rush
UC Davis/CIRM Stem Cell Institute	Applicant Reference # 9553600	Phone #: (916)734-3811
		Email: thomas.rush@ucdmc.ucdavis.edu

line	COSTS/FUNDING	CIRM	Matching	Other	Total	%
1	Construction	$25,623,275	$5,211,855	$13,797,385	$44,632,515	79.5%
2	Construction support	$436,000		$168,092	$604,092	1.1%
3	Design, struct/seismic			$511,085	$511,085	0.9%
4	Design, Other			$4,794,476	$4,794,476	8.5%
5	Proj Mgmt & admin			$2,848,179	$2,848,179	5.1%
6	SUBTOTAL	$26,059,275	$5,211,855	$22,119,217	$53,390,347	95.1%
7	Contingency %			$2,746,551	$2,746,551	4.9%
8	TOTAL P_W_C	$26,059,275	$5,211,855	$24,865,768	$56,136,898	100%
9	Group 2 Equipment			$5,633,690	$5,633,690	
10	TOTAL PROJECT	$26,059,275	$5,211,855 *	$30,499,458	$61,770,588	

ANAYTICAL DATA	CIRM funds		Match & Other Funds	Total
Assignable square feet				38,947 ASF
Gross square feet				54,227 OGSF
Ratio (ASF Current / OGSF)				71.8% to 1.00
Construction Cost Per ASF				$1,441 /ASF
Construction Cost Per OGSF				$1,035 /OGSF
Total Cost Per ASF	$669 /ASF		$783 /ASF	$1,586 /ASF
Total Cost Per OGSF	$481 /OGSF		$562 /OGSF	$1,139 /OGSF

NOTES (line number):

1 Prime contract and subcontracts for construction work subject to prevailing wage requirements
2 Construction support activities are performed by other than prime contractor or subcontractors such as institutional service (e.g. utility shutdowns,locksmith, commissioning, etc).
3 The portion of design fees related to structural engineering and seismic safety plan check
4 The remaining design fees (i.e. total design fees less line 3 amount)
5 The amount budgeted for project management inspections, testing, permits
7 The amount budgeted for change orders during construction
9 The amount budgeted for inventorial (Group 2) equipment to be capitalized as part of the project
10* The amount budgeted for matching funds must equal 20 percent of the CIRM funding.

CIRM RFA 07-03
UC DAVIS CIRM Stem Cell Institute
APPLICATION # FA1-00611-1

COST PLAN SUMMARY
P or W Submittal

		Construction Cost ($X1,000)
1. Foundations		64
2. Vertical Structure		260
3. Floor & Roof Structures		1,280
4. Exterior Cladding		275
5. Roofing & Waterproofing		742
Shell (1-5)		*2,621*
6. Interior Partitions, Doors & Glazing		2,457
7. Floor, Wall & Ceiling Finishes		1,558
Interiors (6-7)		*4,015*
8. Function Equipment & Specialties		3,322
9. Stairs & Vertical Transportation		40
Equipment &Vertical Transportation		*3,362*
10. Plumbing Systems		2,789
1 1. Heating, Ventilating & Air Conditioning		7,336
12. Electric Lighting, Power & Communications		4,158
13. Fire Protection Systems		423
Mechanical & Electrical		*14,706*
Total Building Construction (1-13)		**24,704**
14. Site Preparation & Demolition		270
15. Site Paving, Structures & Landscaping		0
16. Utilities on Site		0
Total Site Construction (14-16)		**270**
TOTAL BUILDING & SITE (1-16)		**24,974**
General Conditions	***7.80%***	**1,959**
Contractor's Overhead & Profit or Fee	***18.90%***	**5,096**
ESTIMATED CONSTRUCTION BUDGET		**32,029**

(at time of award)

CUMMING CORPORATION

BUILDING VALUE THROUGH EXPERTISE

UCDMC Stockton Boulevard Research Center
Sacramento, California

Statement of Probable Cost
February 12, 2008
Cumming Corp Project No. 06-00700.00

Prepared for Stafford King Weise

2495 NATOMAS PARK DRIVE, SUITE 640 • SACRAMENTO • CALIFORNIA • 95833
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INTRODUCTION

1. Basis Of Estimate

This statement is based on the following documents:

Phase 2	100% Construction Documents - August 16, 2007
Phase 2A	100% Design Development - December 10, 2007
Phase 2B	100% Schematic Design - November 30, 2007

2. Items Not Included Within Estimate

The following cost items are excluded from this estimate.

A Professional fees, inspections and testing.
B Escalation beyond start of construction
C Plan check fees and building permit fees.
D Furnishings, fixtures and equipment (FF&E), except built-in cabinets, counters and other casework indicated.
E Major site and building structures demolition unless noted in body of estimate.
F Costs of hazardous material surveys, abatements, and disposals unless noted in estimate.
G Costs of offsite construction unless noted in estimate.
H Construction contingency costs.
I Classroom, Laboratory and special use equipment

3 . Notes

We recommend that the client review this statement, and that any interpretations contrary to those intended by the design documents be fully addressed. The statement is based upon a detailed measurement of quantities when possible, and reasonable allowances for items not clearly defined in the documents.

The statement reflects probable construction costs obtainable in a competitive and stable bidding market. This estimate is based upon a minimum of four (4) competitive bids from qualified general contractors, with bids from a minimum of three (3) subcontractors per trade. This statement is a determination of fair market value for the construction of the project and is not intended to be a prediction of low bid. Experience indicates that a fewer number of bidders may result in a higher bid amount, and more bidders may result in a lower bid result.

In accordance with industry standard, it has been determined that the number of competitive bids obtained from qualified General Contractor's has the following effect:

1 bidder:	add	15% to 40%
2 to 3 bids:	add	8% to 12%
4 to 5 bids:		-4% to +4%
7 to 8 bids:	deduct	5% to 7%

Construction Cost Summary

Element		Total
A) Shell (1-5)		
1 Foundations		**$64,056**
2 Vertical Structure		**$260,064**
3 Floor & Roof Structures		**$1,280,262**
4 Exterior Cladding		**$274,928**
5 Roofing and Waterproofing		**$741,948**
B) Interiors (6-7)		
6 Interior Partitions, Doors and Glazing		**$2,456,670**
7 Floor, Wall and Ceiling Finishes		**$1,557,875**
C) Equipment and Vertical Transportation (8-9)		
8 Function Equipment and Specialties		**$3,322,078**
9 Stairs and Vertical Transportation		**$40,395**
D) Mechanical and Electrical (10-13)		
10 Plumbing Systems		**$2,788,714**
11 Heating, Ventilation and Air Conditioning		**$7,336,021**
12 Electrical Lighting, Power and Communications		**$4,158,466**
13 Fire Protection Systems		**$422,562**
E) Site Construction (14-16)		
14 Site Preparation and Demolition		**$269,686**
15 Site Paving, Structures & Landscaping		
16 Utilities on Site		
Subtotal		**$24,973,725**
General Conditions	7.8%	**$1,959,327**
Subtotal		**$26,933,052**
Contractor Fee	18.9%	**$5,096,042**
TOTAL ESTIMATED CONSTRUCTION COST		**$32,029,094**

Construction Cost Summary

Element		Phase 2	Phase 2A	Phase 2B	Total
A) Shell (1-5)					
1 Foundations		$32,897	$7,660	$23,499	**$64,056**
2 Vertical Structure		$137,186	$45,733	$77,145	**$260,064**
3 Floor & Roof Structures		$918,166	$164,613	$197,484	**$1,280,262**
4 Exterior Cladding		$104,333	$55,501	$115,094	**$274,928**
5 Roofing and Waterproofing		$665,146	$53,247	$23,555	**$741,948**
B) Interiors (6-7)					
6 Interior Partitions, Doors and Glazing		$1,540,177	$331,289	$585,203	**$2,456,670**
7 Floor, Wall and Ceiling Finishes		$935,654	$247,673	$374,548	**$1,557,875**
C) Equipment and Vertical Transportation (8-9)					
8 Function Equipment and Specialties		$1,271,293	$737,214	$1,313,571	**$3,322,078**
9 Stairs and Vertical Transportation		$40,395			**$40,395**
D) Mechanical and Electrical (10-13)					
10 Plumbing Systems		$1,100,447	$853,233	$835,034	**$2,788,714**
11 Heating, Ventilation and Air Conditioning		$4,357,901	$1,117,143	$1,860,976	**$7,336,021**
12 Electrical Lighting, Power and Communications		$2,235,618	$522,808	$1,400,040	**$4,158,466**
13 Fire Protection Systems		$243,838	$85,847	$92,877	**$422,562**
E) Site Construction (14-16)					
14 Site Preparation and Demolition		$152,866	$52,668	$64,153	**$269,686**
15 Site Paving, Structures & Landscaping					
16 Utilities on Site					
Subtotal		$13,735,918	$4,274,628	$6,963,179	**$24,973,725**
General Conditions	7.8%	$1,127,894	$331,402	$500,031	**$1,959,327**
Subtotal		$14,863,812	$4,606,030	$7,463,210	**$26,933,052**
Contractor Fee	18.9%	$2,491,867	$1,040,819	$1,563,356	**$5,096,042**
TOTAL ESTIMATED CONSTRUCTION COST		$17,355,679	$5,646,849	$9,026,566	**$32,029,094**
	Area:	30,154 SF	8,500 SF	16,110 SF	54,764 SF

Phase 2

Phase 2 Construction Cost Summary

Element		Subtotal	Total	Cost / SF	Cost / SF
A) Shell (1-5)			**$1,857,727**		**$61.61**
1 Foundations		$32,897		$1.09	
2 Vertical Structure		$137,186		$4.55	
3 Floor & Roof Structures		$918,166		$30.45	
4 Exterior Cladding		$104,333		$3.46	
5 Roofing and Waterproofing		$665,146		$22.06	
B) Interiors (6-7)			**$2,475,831**		**$82.11**
6 Interior Partitions, Doors and Glazing		$1,540,177		$51.08	
7 Floor, Wall and Ceiling Finishes		$935,654		$31.03	
C) Equipment and Vertical Transportation (8-9)			**$1,311,688**		**$43.50**
8 Function Equipment and Specialties		$1,271,293		$42.16	
9 Stairs and Vertical Transportation		$40,395		$1.34	
D) Mechanical and Electrical (10-13)			**$7,937,806**		**$263.24**
10 Plumbing Systems		$1,100,447		$36.49	
11 Heating, Ventilation and Air Conditioning		$4,357,901		$144.52	
12 Electrical Lighting, Power and Communications		$2,235,618		$74.14	
13 Fire Protection Systems		$243,838		$8.09	
E) Site Construction (14-16)			**$152,866**		**$5.07**
14 Site Preparation and Demolition		$152,866		$5.07	
15 Site Paving, Structures & Landscaping					
16 Utilities on Site					
Subtotal			**$13,735,918**		$455.53
General Conditions	8.2%		**$1,127,894**		$37.40
Subtotal			**$14,863,812**		$492.93
Contractor Fee	16.8%		**$2,491,867**		$82.64
TOTAL ESTIMATED CONSTRUCTION COST			**$17,355,679**		**$575.57**

Total Area: 30,154 SF

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
1 Foundations				
Spread footings, 3' x 3' x 1.5'				
Excavation, hand dug, 1" around footing perimeter	30	cy	$162.45	$4,874
Reinforcing steel, including doweling into existing slab	2,250	lb	$3.79	$8,529
Concrete, 3500 psi, to 1'-0" below finished floor	30	cy	$433.21	$12,996
Haul excess	30	cy	$32.49	$975
Additional concrete at column blockouts	17	cy	$324.91	$5,523
Total - 1 Foundations				***$32,897***
2 Vertical Structure				
Columns				
Structural steel columns, tube steel	15	tn	$7,038.81	$102,907
Structural steel strongback columns, wide flange	2	tn	$6,758.08	$13,516
Base plates	54	ea	$384.49	$20,762
Total - 2 Vertical Structure				***$137,186***
3 Floor & Roof Structures				
Slab on grade, 12", infill at utility demolition				
Aggregate base, sand, or other sub-base material				Not Required
Reinforcing steel, including doweling into existing slab	2,170	lb	$3.79	$8,229
Concrete, 4000 psi	71	cy	$433.21	$30,641
Miscellaneous patching, repairing, and finishing of existing slab	30,154	sf	$1.26	$38,117
Interstitial floor structure				
Joists, 8", 24" oc, 18 ga	5,438	sf	$16.25	$88,342
Joists, 8", 24" oc, 16 ga	14,051	sf	$16.79	$235,873
Joists, 8", 24" oc, 12 ga	1,384	sf	$17.33	$23,983
Plywood sheathing, T & G, 5/8"	20,873	sf	$5.42	$113,030
Roof structure				
Structural steel beams, wide flange	26	tn	$6,758.08	$178,616
Structural steel beams, wide flange, anchored to wall	3	tn	$7,773.01	$21,531
Unistrut P1000 / P1001 channel	1,197	lf	$23.70	$28,371
Nailing at select areas	17,008	sf	$0.27	$4,605
Sheathing replacement- allow at 10% of re-roof	3,223	sf	$4.74	$15,278
Mansard shear wall structural enhancements	1	ls	$38,361.89	$38,362
Miscellaneous rough carpentry allowance, including rough hardw	1	ls	$21,921.08	$21,921
Miscellaneous steel fabrications				
Utility supports at corridor, steel framed, 8'-0" oc	75	ea	$526.70	$39,502
Miscellaneous steel - allow 1/2 lb / sf	15,077	lb	$2.11	$31,764
Total - 3 Floor & Roof Structures				***$918,166***
4 Exterior Cladding				

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Exterior wall framing and furring				
Metal stud infill at exterior wall demolition	120	sf	$13.00	$1,560
Metal stud furring, 3 5/8", 18 ga, 16" oc	1,237	sf	$7.58	$9,382
Exterior sheathing				
Plywood sheathing, 1/2	120	sf	$4.74	$569
Interior finish to exterior walls				
Gypsum board, taped, sanded and painted	756	sf	$6.50	$4,913
Glass fiber reinforced composite panel	481	sf	$18.68	$8,986
Exterior finish to exterior walls				
Cement plaster	120	sf	$32.49	$3,899
Patch and repair allowance to existing finishes	1	ls	$10,960.54	$10,961
CMU at parapet				
Precision, 6"	169	lf	$43.84	$7,424
Insulation				
Exterior walls and furred walls				
Batt insulation	3,280	sf	$2.17	$7,105
Exterior glazing and louvers				
Installation of clear glazing in existing frame	110	sf	$63.20	$6,952
Installation of spandrel glazing in existing frame	53	sf	$71.10	$3,769
Exterior doors, frames and hardware				
Aluminum storefront entries, glazed				
Double leaf	1	pr	$8,122.70	$8,123
Automatic door opener	1	pr	$4,332.10	$4,332
Hollow metal entries				
Single leaf	2	ea	$2,382.66	$4,765
Overhead coiling door, motorized operation				
8'-0" x 8'-0", painted	1	ea	$7,637.14	$7,637
12'-0" x 9'-0", painted	1	ea	$12,904.14	$12,904
Specialty hardware				
Electromagnetic lock	1	ea	$579.37	$579
Fire exit hardware	1	ea	$474.03	$474
Total - 4 Exterior Cladding				***$104,333***
5 Roofing and Waterproofing				
Roofing				
Rigid insulation and tapering, 2 1/2", 2 layers	39,672	sf	$4.74	$188,057
Single ply membrane, including underlayment	44,306	sf	$8.66	$383,876
Roof upstands and sheet metal				
Flashings and counterflashings	1,972	lf	$21.12	$41,647

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Parapet copings at separation wall	556	lf	$21.12	$11,743
Roof or deck traffic surfaces				
Pedestrian roof pads, polyester reinforced PVC, 1"	1,000	sf	$7.90	$7,900
Roof access and ventilation				
Roof access hatch, including flashings and curb	2	ea	$4,476.95	$8,954
Skylights, tubular, including curb, flashings, and extension tube				
1'-10 5/8" diameter	6	ea	$1,975.12	$11,851
Miscellaneous caulking and sealants	30,154	sf	$0.37	$11,117
Total - 5 Roofing and Waterproofing				***$665,146***
6 Interior Partitions, Doors and Glazing				
Partition framing and furring				
Metal stud framing, 3 5/8", 18 ga, 16" oc.	3,445	sf	$8.27	$28,487
Metal stud furring, 3 5/8", 18 ga, 16" oc.	8,355	sf	$8.27	$69,089
Metal stud framing, 6", 16 ga, 16" oc.	16,527	sf	$9.14	$151,115
Metal stud framing, 6", 16 ga, 16" oc., double stud wall	420	sf	$18.29	$7,681
Metal stud furring, 6", 16 ga, 16" oc.	279	sf	$9.14	$2,551
Metal stud framing, 8", 14 ga, 16" oc.	16,053	sf	$13.17	$211,378
Metal stud furring, 8", 14 ga, 16" oc.	1,640	sf	$13.17	$21,595
Chainlink fencing, 8'-0" high	70	lf	$45.82	$3,208
Miscellaneous backing, blocking, and bracing	1	ls	$27,401.35	$27,401
Partition surfacing				
Gypsum board, 5/8", taped, sanded and painted	70,100	sf	$6.50	$455,613
Gypsum board, 5/8", unfinished	1,211	sf	$3.37	$4,082
Gypsum board, 1", unfinished	279	sf	$5.79	$1,616
Glass fiber reinforced composite panel	11,784	sf	$18.68	$220,151
Miscellaneous fire safing, sealants, shafts, and rated enclosures	1	ls	$27,401.35	$27,401
Insulation				
Sound batt insulation	25,680	sf	$1.30	$33,375
Mineral wool insulation	20,759	sf	$0.82	$17,065
Interior doors, frames and hardware				
Solid core wood				
Single leaf	1	ea	$1,949.45	$1,949
Double leaf	1	pr	$3,736.44	$3,736
Hollow metal				
Single leaf	83	ea	$1,786.99	$148,320
Double leaf	10	pr	$3,465.68	$34,657
Fiberglass reinforced polyester				
Single leaf	3	ea	$4,873.62	$14,621
Installation of existing single leaf door	3	ea	$368.69	$1,106
Chainlink gates				

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Single leaf	5	ea	$935.68	$4,678
Specialty hardware and glazing				
Premium for vision glazing in doors	125	sf	$63.20	$7,900
Hold-open devices	3	ea	$579.37	$1,738
Automatic door opener, per double leaf set	1	pr	$3,950.25	$3,950
Miscellaneous hardware, including panic hardware, kick plates, lc	106	ea	$263.35	$27,915
Interior glazing				
Office and observation glazing	120	sf	$64.98	$7,798
Laboratory pass-through windows				FF&E
Total - 6 Interior Partitions, Doors and Glazing				***$1,540,177***
7 Floor, Wall and Ceiling Finishes				
Floor finishes				
Carpet	590	sf	$5.25	$3,099
Epoxy flooring, chemical resistant, including base	12,042	sf	$12.45	$149,937
Epoxy flooring, chemical resistant, non-skid, including base	398	sf	$13.69	$5,450
Ceramic tile	2,626	sf	$20.58	$54,037
VCT	3,178	sf	$4.87	$15,488
VCT, chemical resistant	837	sf	$7.58	$6,345
Sealed concrete	2,893	sf	$2.71	$7,833
Solid vinyl flooring	6,377	sf	$9.75	$62,158
Safety striping- interstitial space	2,846	sf	$2.21	$6,296
Patch and repair existing finishes- Janitor, Storage, and Data Roc	1,213	sf	$1.58	$1,917
Sealer to existing slab prior to floor finishes				Not Anticipated
Base				
Ceramic tile	514	lf	$17.33	$8,907
Rubber base	2,903	lf	$3.79	$11,004
Sheer vinyl, 6"	128	lf	$5.07	$649
Wall finishes				
Epoxy paint, premium	16,605	sf	$7.58	$125,886
Ceramic tile, including cementitious backerboard	1,720	sf	$21.66	$37,256
Fiberglass reinforced panel	3,824	sf	$13.27	$50,733
Metal panel at Corridors	500	sf	$26.33	$13,167
Ceiling finishes				
Suspended acoustical ceiling tile	6,848	sf	$4.60	$31,520
Applied acoustical ceiling tile	1,666	sf	$3.90	$6,493
Gypsum board to underside of interstitial framing, including paint	6,946	sf	$8.66	$60,182
Gypsum board to underside of interstitial framing, including epoxy	6,926	sf	$11.06	$76,606
Clean room ceiling system panel	4,056	sf	$19.49	$79,070
Suspended gypsum board, including framing and paint	1,422	sf	$14.08	$20,021
Suspended wood veneer acoustical tile	720	sf	$26.33	$18,961
Additional gypsum board at rated egress corridors, unfinished	3,300	sf	$5.42	$17,870
Gypsum board soffits and risers				
Metal stud framing, 3 5/8", 18 ga, 16" oc.	1,476	sf	$10.32	$15,237

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Gypsum board, 5/8", taped, sanded and painted	1,476	sf	$8.11	$11,972
Batt insulation at gypsum board ceilings	13,872	sf	$2.71	$37,559
Total - 7 Floor, Wall and Ceiling Finishes				***$935,654***
8 Function Equipment and Specialties				
Millwork				
Base cabinets, including plastic laminate countertops	9	lf	$368.69	$3,318
Upper cabinets	9	lf	$210.68	$1,896
Protective guards, barriers, and bumpers	1	ls	$10,960.54	$10,961
Toilet compartments and accessories				
Toilet / shower cubicles	5	ea	$1,580.10	$7,900
Bathroom mirrors	19	sf	$44.24	$841
Grab bars	8	ea	$202.25	$1,618
Recessed paper towel dispenser and waste receptacle combo ur	4	ea	$427.15	$1,709
Feminine napkin dispenser / disposal	1	ea	$574.10	$574
Seat cover dispenser	7	ea	$160.12	$1,121
Shower accessories per stall	2	ea	$1,158.74	$2,317
Soap dispenser	5	ea	$110.08	$550
Toilet paper dispenser	7	ea	$96.18	$673
Stainless steel shelf	4	lf	$158.01	$632
Restroom gowning benches	12	lf	$263.35	$3,160
Building specialties				
Interior signage, code required	30,154	sf	$0.70	$21,227
Fire extinguisher and cabinet	10	ea	$471.12	$4,711
Lockers, metal, 2 tier	16	ea	$406.13	$6,498
Display cases				FF&E
High density storage units				Not Anticipated
Laboratory casework and specialties				
Laboratory equipment- per 50% CD estimate allowance	1	ls	$1,198,425	$1,198,425
Window treatments				
Blackout curtains at observation windows	120	sf	$26.33	$3,160
Total - 8 Function Equipment and Specialties				***$1,271,293***
9 Stairs and Vertical Transportation				
Interstitial access				
Aluminum ladder, heavy duty				Not Anticipated
Stairs to Interstitial Space	2	fl	$12,454.80	$24,910
Railing	84	lf	$184.34	$15,485
Total - 9 Stairs and Vertical Transportation				***$40,395***

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
10 Plumbing Systems				
Sanitary fixtures				
Water closet, fv	2	ea	$1,221.94	$2,444
Lavatory, wall	5	ea	$991.25	$4,956
Sink wall - S.S.	10	ea	$1,148.21	$11,482
Shower fiberglass	2	ea	$1,695.97	$3,392
Service sink, floor	3	ea	$1,063.93	$3,192
Sinks provided and installed by others	11	ea	$57.94	$637
Drinking fountain, dbl	1	ea	$2,349.08	$2,349
Emergency shower	1	ea	$2,507.09	$2,507
Emergency eye / face wash	8	ea	$586.74	$4,694
Floor drain	11	ea	$212.79	$2,341
Floor sink	5	ea	$431.89	$2,159
Hose bibb	6	ea	$184.34	$1,106
Valved water connection for portable sink	22	ea	$440.32	$9,687
Rough-ins				
Local rough-in at fixture	35	ea	$1,026.01	$35,910
Rough-in at floor sink or floor drain	16	ea	$526.70	$8,427
Waste / vent				
2" pipe, ci, H&S, below grade	125	lf	$25.28	$3,160
4" pipe, ci, H&S, below grade	215	lf	$33.71	$7,247
Trench excavate, backfill, compact	120	cy	$52.88	$6,346
Sand bedding in trench	44	cy	$32.87	$1,446
2" pipe, ci, no-hub, in bldg	205	lf	$39.92	$8,184
3-4" vent through roof	2	ea	$432.95	$866
Cleanouts / misc	1	ls	$2,475.49	$2,475
Domestic water				
<=1" branch piping	1,550	lf	$24.02	$37,227
1-1/4 to 1-1/2" pipe, cu type L	880	lf	$43.08	$37,914
2" pipe, cu type L	295	lf	$66.05	$19,484
2-1/2" pipe, cu type L	300	lf	$96.49	$28,947
3" pipe, cu type L	165	lf	$123.25	$20,336
Valves / misc	1	ls	$8,768.43	$8,768
1-1/4" thermostatic mixing valve	1	ea	$423.47	$282
Connections to autoclave / glassware washer equip	1	ls	$5,096.65	$5,097
Trap primer w/ water piping to drain	7	ea	$544.61	$3,812
Shock absorber	2	ea	$187.51	$375
Pipe insulation, 1"	1,550	lf	$11.59	$17,960
Pipe insulation, 1-1/2"	880	lf	$13.69	$12,051
Pipe insulation, 2"	295	lf	$14.54	$4,288
Pipe insulation, 2-1/2"	300	lf	$15.38	$4,614
Pipe insulation, 3"	165	lf	$16.22	$2,677
Roof drainage				
Roof drain	8	ea	$323.39	$2,587

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
4" pipe, cast iron, no-hub, in bldg	180	lf	$51.20	$9,215
6" pipe, cast iron, no-hub, in bldg	35	lf	$66.89	$2,341
Condensate drainage				
Trap and equipment connect	21	ea	$326.55	$6,858
1" pipe, cu type M	610	lf	$25.49	$15,550
Pipe insulation, 1"	610	lf	$11.90	$7,261
Medical / lab equipment				
MG certification	105	ea	$23.17	$2,433
Nitrogen / NO2 / CO2 / MG gas manifold	3	ea	$7,710.88	$23,133
Compressed / lab air piping				
Air outlet	14	ea	$165.38	$2,315
1" Type L hard drawn Copper	370	lf	$58.46	$21,632
1-1/2" Type L hard drawn Copper	420	lf	$88.38	$37,120
2" Type L hard drawn Copper	290	lf	$109.55	$31,771
Vacuum system				
Vacuum outlet	31	ea	$165.38	$5,127
1" Type L hard drawn Copper	725	lf	$58.46	$42,386
1-1/2" Type L hard drawn Copper	285	lf	$88.38	$25,188
2" Type L hard drawn Copper	290	lf	$109.55	$31,771
LN2 system				
1/2" Valved stubs	16	ea	$716.31	$11,461
1/2" conn to freezer	6	ea	$2,422.82	$14,537
Fill port	1	ea	$7,268.45	$7,268
Transfer/fill pipe	1	ls	$876.84	$877
1/2" LN2 piping vacuum jacketed	260	lf	$221.21	$57,516
Special gases				
Outlet	30	ea	$165.38	$4,962
3/4" Type L hard drawn Copper	460	lf	$56.57	$26,021
1" Type L hard drawn Copper	1,325	lf	$58.46	$77,464
CO2 system				
Co2 outlet	30	ea	$165.38	$4,962
1" Type L hard drawn Copper	720	lf	$58.46	$42,094
R / O di piping system				
Certification and testing of DI system	1	ls	$23,017.13	$23,017
DI water outlet	11	ea	$522.49	$5,747
1" Sch 80 PVDF HF pipe	170	lf	$80.16	$13,628
1-1/2" Sch 80 PVDF HF pipe	545	lf	$107.45	$58,558
2" Sch 80 PVDF HF Pipe	205	lf	$129.57	$26,561
Acid waste piping				
Rough-in / connection to Lab sink	3	ea	$1,000.73	$3,002
2" pipe, PP sch 40, below ground	180	lf	$31.29	$5,631

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
4" pipe, PP sch 40, below ground	860	lf	$51.83	$44,571
Trench excavation, backfill and compaction	280	cy	$52.88	$14,807
Sand bedding in trench	99	cy	$32.87	$3,254
2" pipe, PP sch 40	200	lf	$54.67	$10,934
C.O. Acid Resistant	6	ea	$643.63	$3,862
Neutralization tank - allowance	1	ea	$7,373.79	$7,374
Miscellaneous plumbing				
Access panels	1	ls	$328.82	$329
Purge gas	1	ls	$8,878.04	$8,878
Clean & test	28	ea	$48.88	$1,369
Seismic supports	1	ls	$13,371.86	$13,372
Sleeves	42	ea	$59.73	$2,509
Fire stopping	30,154	sf	$0.23	$6,988
Piping identification	9,125	lf	$0.37	$3,364
Pharmacal system				Not Anticipated
Automated animal watering system				Not Anticipated
Total - 10 Plumbing Systems				***$1,100,447***
11 Heating, Ventilation and Air Conditioning				
Heating hot water equipment				
HW pump, 3 hp, Heat reclaim	2	ea	$4,203.06	$8,406
HW pump, 5 hp, Heat reclaim	2	ea	$5,941.17	$11,882
Heat reclaim expansion tank	1	ea	$2,775.71	$2,776
Chilled water distribution				
CHW coil connection, 1-1/2"	1	ea	$3,160.20	$3,160
CHW coil connection, 2"	2	ea	$3,729.03	$7,458
CHW coil connection, 3"	2	ea	$9,343.65	$18,687
CHW coil connection, 4"	1	ea	$11,376.71	$11,377
1" FCU AHU Coil Conn Assem	13	ea	$1,927.72	$25,060
1" pipe, blk steel, schd 40, thrd	360	lf	$22.86	$8,229
1-1/4" pipe, blk steel, schd 40, thrd	360	lf	$27.60	$9,936
1-1/2" pipe, blk steel, schd 40, thrd	130	lf	$30.86	$4,012
2" pipe, blk steel, schd 40, thrd	70	lf	$38.87	$2,721
2-1/2" pipe, blk steel, schd 40, welded	10	lf	$54.46	$545
3" pipe, blk steel, schd 40, welded	140	lf	$60.78	$8,509
4" pipe, blk steel, schd 40, welded	300	lf	$79.74	$23,923
6" pipe, blk steel, schd 40, welded	140	lf	$139.05	$19,467
8" pipe, blk steel, schd 40, welded	320	lf	$189.61	$60,676
10" pipe, blk steel, schd 40, welded	375	lf	$258.08	$96,781
CHW valves and specialties	1	ls	$9,864.49	$9,864
Pipe insulation, 1" pipe	360	lf	$11.59	$4,171
Pipe insulation, 1-1/4" pipe	360	lf	$14.12	$5,082
Pipe insulation, 1-1/2" pipe	130	lf	$14.22	$1,849
Pipe insulation, 2" pipe	70	lf	$15.06	$1,054
Pipe insulation, 2-1/2" pipe	10	lf	$16.12	$161
Pipe insulation, 3" pipe	140	lf	$17.80	$2,492

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Pipe insulation, 4" pipe	300	lf	$23.70	$7,110
Pipe insulation, 6" pipe	140	lf	$30.02	$4,203
Pipe insulation, 8" pipe	320	lf	$37.92	$12,135
Pipe insulation, 10" pipe	375	lf	$43.19	$16,196
Hot water distribution				
HW rough-in at pump, 2"	3	ea	$3,887.04	$11,661
HW coil connection, 1-1/2"	6	ea	$3,160.20	$18,961
HW Heat recovery coil connection, 1-1/2"	7	ea	$3,160.20	$22,121
3/4" VAV / cv coil conn assembly	38	ea	$1,643.30	$62,446
1" pipe, cu type L	1,605	lf	$30.23	$48,523
1-1/4" pipe, cu type L	410	lf	$38.55	$15,807
2" pipe, cu type L	105	lf	$66.05	$6,935
4" pipe, blk steel, schd 40, welded	320	lf	$79.74	$25,518
6" pipe, blk steel, schd 40, welded	375	lf	$139.05	$52,143
HHW valves and specialties	1	ls	$9,261.66	$9,262
Pipe insulation, 1" pipe	1,605	lf	$11.59	$18,598
Pipe insulation, 1-1/4" pipe	410	lf	$14.12	$5,787
Pipe insulation, 2" pipe	105	lf	$15.06	$1,582
Pipe insulation, 4" pipe	320	lf	$23.70	$7,584
Pipe insulation, 6" pipe	375	lf	$30.02	$11,258
1-1/4" pipe, cu type L (Heat recovery)	480	lf	$38.55	$18,506
Pipe insulation, 1-1/4" pipe (Heat recovery)	480	lf	$14.12	$6,775
Air-side equipment				
Air handling unit, VAV - Temtrol (6 each)	71,780	cfm	$8.33	$598,099
Air handling fancoil unit, VAV - Temtrol (11 each)	26,890	cfm	$9.71	$261,165
Air handling fancoil unit, VAV - Trane (3 each)	8,400	cfm	$3.03	$25,484
Heat reclaim coil	7	ea	$5,393.40	$37,754
CV box	60	ea	$1,063.93	$63,836
CV box w/ reheat	38	ea	$1,211.41	$46,034
High Plume exhaust fan (6 each)	46,455	cfm	$3.12	$144,850
Exhaust fan (1 each)	1,360	cfm	$1.32	$1,791
Duct sound attenuation	109,600	cfm	$0.23	$25,400
Air distribution				
Ductwork, galvanized steel	91,500	lb	$11.27	$1,031,330
Ductwork, stainless steel, welded	2,400	lb	$25.70	$61,687
Duct insulation, wrap / liner	39,220	sf	$3.34	$130,966
Flexible duct, insulated, various sizes	40	lf	$19.49	$780
Combination fire / smoke damper	4	ea	$1,306.22	$5,225
Manual volume damper	135	ea	$79.85	$10,779
Conn to Hood cabinets	29	ea	$737.38	$21,384
Conn to rack ventilator	24	ea	$231.75	$5,562
Ceiling diffusers 2x2	52	ea	$152.74	$7,943
Ceiling diffusers 2x4	45	ea	$205.41	$9,244
Ceiling registers	24	ea	$166.44	$3,994
Ceiling grilles	65	ea	$149.58	$9,723
Iris damper	15	ea	$306.54	$4,598
24" x 48" Laminar Diffuser SS w/hepa filter	57	ea	$1,885.58	$107,478

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Phoenix control valve	9	ea	$4,002.92	$36,026
HVAC controls (Quoted per Johnson Controls)				
DDC controls to fancoil	14	ea	$13,378.17	$187,294
DDC controls to ahu	6	ea	$24,017.50	$144,105
DDC controls to exhaust fans	6	ea	$969.13	$5,815
DDC controls to pumps	4	ea	$2,665.10	$10,660
DDC VAV/CV Box Controller	98	ea	$1,590.63	$155,882
DDC controls to misc equip	2	ea	$3,476.22	$6,952
DDC controls to fire/smoke dampers	17	ea	$547.77	$9,073
DDC Lab control panel				
DDC misc	1	ls	$210,679.84	$210,680
Additional Lab controls / hood allowance	15	ea	$5,267.00	$79,005
Miscellaneous				
Test / balance HVAC	172	hr	$127.46	$21,957
3rd Party Commissioning	1	ls	$39,457.94	$39,458
Seismic supports	1	ls	$37,375.44	$37,375
3D coordination drwgs	1	ls	$32,881.62	$32,882
Rigging of major equipment	1	ls	$16,769.63	$16,770
Fire stopping, allowance	30,154	sf	$0.58	$17,470
Total - 11 Heating, Ventilation and Air Conditioning				***$4,357,901***
12 Electrical Lighting, Power and Communications				
Service and distribution				
Distribution bd "HEAC", 400a 277/480v 3ph 4w 3R	1	ea	$7,394.86	$7,395
Distribution bd "HB", 600a 277/480v 3ph 4w	1	ea	$12,286.85	$12,287
Distribution bd "HC", 600a 277/480v 3ph 4w	1	ea	$12,286.85	$12,287
Panel "HBA", 225a 277/480v 3ph 4w	1	ea	$3,287.87	$3,288
Panel "HCA", 225a 277/480v 3ph 4w	1	ea	$3,287.87	$3,288
Grounding electrode "HB", #2/0	1	ea	$1,365.21	$1,365
Grounding electrode "HC", #2/0	1	ea	$1,365.21	$1,365
Transformer "TX", 225kva 480 - 120/208v 3ph 4w K13	1	ea	$23,037.84	$23,038
Transformer "TB", 225kva 480 - 120/208v 3ph 4w K13	1	ea	$23,037.84	$23,038
Transformer "TC", 225kva 480 - 120/208v 3ph 4w K13	1	ea	$23,037.84	$23,038
Grounding electrode "TX", #3/0	1	ea	$1,080.79	$1,081
Grounding electrode "TB", #3/0	1	ea	$1,080.79	$1,081
Grounding electrode "TB", #3/0	1	ea	$1,080.79	$1,081
Enclosed circuit breaker, 800 amp 208v 3p	1	ea	$4,721.34	$4,721
Connect to existing "CTSC", 800a 120/208v 3ph 4w	1	ea	$1,706.51	$1,707
Distribution bd "LB", 800a 120/208v 3ph 4w	1	ea	$16,382.46	$16,382
Distribution bd "LC", 800a 120/208v 3ph 4w	1	ea	$16,382.46	$16,382
Distribution bd "HEB", 600a 277/480v 3ph 4w	1	ea	$12,286.85	$12,287
Distribution bd "HEC", 600a 277/480v 3ph 4w	1	ea	$12,286.85	$12,287
Panel "HEBA", 225a 277/480v 3ph 4w	1	ea	$3,287.87	$3,288
Panel "HECA", 225a 277/480v 3ph 4w	1	ea	$3,287.87	$3,288
Transformer "TEB", 225kva 480 - 120/208v 3ph 4w K13	1	ea	$23,037.84	$23,038
Transformer "TEC", 225kva 480 - 120/208v 3ph 4w K13	1	ea	$23,037.84	$23,038

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Panel "LBA", 225a 120/208v 3ph 4w	1	ea	$3,043.27	$3,043
Panel "LBB", 225a 120/208v 3ph 4w	1	ea	$3,043.27	$3,043
Panel "LBC", 225a 120/208v 3ph 4w	1	ea	$3,043.27	$3,043
Panel "LCA", 225a 120/208v 3ph 4w	1	ea	$3,043.27	$3,043
Grounding electrode "HEB", #2/0	1	ea	$1,080.79	$1,081
Grounding electrode "HEC", #2/0	1	ea	$1,080.79	$1,081
Grounding electrode "TEB", #3/0	1	ea	$1,080.79	$1,081
Grounding electrode "TEC", #3/0	1	ea	$1,080.79	$1,081
Distribution bd "LEB", 800a 120/208v 3ph 4w	1	ea	$16,382.46	$16,382
Distribution bd "LEC", 800a 120/208v 3ph 4w	1	ea	$16,382.46	$16,382
Panel "LEBA", 225a 120/208v 3ph 4w	1	ea	$3,043.27	$3,043
Panel "LECA", 225a 120/208v 3ph 4w	1	ea	$3,043.27	$3,043
Panel "LECB", 225a 120/208v 3ph 4w	1	ea	$3,043.27	$3,043
Conduit, 2" emt	2,300	lf	$14.06	$32,342
Conduit, 2" grc	360	lf	$27.71	$9,977
Conduit, 2-1/2" emt	1,450	lf	$20.07	$29,099
Conduit, 2-1/2" grc	270	lf	$49.66	$13,408
Conduit, 3" emt	3,580	lf	$24.48	$87,648
Conduit, 3" grc	400	lf	$59.86	$23,946
Copper wire, #4 thhn	27	clf	$185.45	$4,933
Copper wire, #2 thhn	17	clf	$265.01	$4,399
Copper wire, #1 thhn	8	clf	$314.54	$2,516
Copper wire, #1/0 thhn	8	clf	$351.86	$2,744
Copper wire, #2/0 thhn	34	clf	$415.57	$13,963
Copper wire, #3/0 thhn	38	clf	$492.54	$18,520
Copper wire, #4/0 thhn	73	clf	$592.44	$42,952
Copper wire, #350 kcmil thhn	32	clf	$893.11	$28,579
HVAC equipment power				
AHU-1,1A,2,4 connection, 30 amp 480v	4	ea	$199.09	$796
Combo disconnect, 30 amp 480v 3p	4	ea	$1,308.32	$5,233
AHU-3,3A connection, 60 amp 480v	1	ea	$199.09	$199
Combo disconnect, 60 amp 480v 3p	1	ea	$1,649.62	$1,650
VAV connection, 20 amp 120v	35	ea	$142.21	$4,977
Switch 1P, single motor rated	35	ea	$199.09	$6,968
FCU-1-14 connection, 30amp	14	ea	$199.09	$2,787
Disconnect, 30 amp 480v 3p	14	ea	$483.51	$6,769
EF-1-5 connection, 30 amp 480v	5	ea	$199.09	$995
Disconnect, 30 amp 480v 3p	5	ea	$483.51	$2,418
Fume hood connection, 60 amp 480v	1	ea	$335.61	$336
Disconnect, exp proof 60 amp 480v 3p	1	ea	$2,559.76	$2,560
Controls / alarm fume hood unit	1	ea	$511.95	$512
Glass washer connection, 60 amp 208v	1	ea	$398.18	$398
Disconnect, 60 amp 208v 3p	1	ea	$853.25	$853
Autoclave steam connection, 60 amp 480v	1	ea	$455.07	$455
Disconnect shunt trip unit, 60 amp 480v 3p	1	ea	$1,422.09	$1,422
EPO auto clave unit	1	ea	$511.95	$512
Bio cabinet connection	27	ea	$511.95	$13,823
Autoclave steam connection, 100 amp 480v	1	ea	$455.07	$455
Disconnect shunt trip unit, 100 amp 480v 3p	1	ea	$1,649.62	$1,650

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
EPO auto clave unit	1	ea	$511.95	$512
Control circuit (2) to AHU, 20 amp 120v	5	ea	$284.42	$1,422
Duplex outlet, roof top 20a 120v GFI wp	8	ea	$119.46	$956
Conduit, 3/4" emt	14,520	lf	$5.26	$76,318
Conduit, 3/4" grc	3,300	lf	$11.00	$36,304
Conduit, 1" emt	2,050	lf	$7.42	$15,206
Conduit, 1" grc	1,250	lf	$15.14	$18,928
Conduit, 1-1/4" grc	150	lf	$19.69	$2,954
Conduit, 1-1/2" grc	150	lf	$22.48	$3,372
Copper wire, #12 thhn	107	clf	$67.76	$7,264
Copper wire, #10 thhn	740	clf	$75.94	$56,195
Copper wire, #8 thhn	45	clf	$105.81	$4,783
Copper wire, #6 thhn	106	clf	$147.08	$15,590
Copper wire, #4 thhn	6	clf	$185.45	$1,113
Copper wire, #2 thhn	6	clf	$265.01	$1,590
Convenience power				
Dedicated equipment outlet, 20a 120v	62	ea	$142.21	$8,817
Dedicated equipment outlet, 20a 120v IG	8	ea	$188.85	$1,511
Power outlet 20 amp 208v 1ph	19	ea	$312.86	$5,944
Power outlet 30 amp 208v 1ph	1	ea	$346.99	$347
Power outlet 30 amp 208v 3ph	2	ea	$453.93	$908
Duplex outlet, 20a 120v	305	ea	$85.33	$26,024
Duplex outlet, 20a 120v GFI	42	ea	$96.70	$4,061
Duplex outlet, 20a 120v GFI wp	20	ea	$119.46	$2,389
Double duplex outlet, 20a 120v	3	ea	$93.29	$280
Conduit, 3/4" emt	9,570	lf	$5.26	$50,300
Conduit, 3/4" grc	3,180	lf	$11.00	$34,984
Copper wire #12, thhn	378	clf	$67.76	$25,613
Copper wire, #10 thhn	132	clf	$75.94	$10,024
Lighting				
Fixture A, recessed flanged 2x4 troffer 3L fluorescent	118	ea	$221.85	$26,178
Fixture B, recessed flanged 2x4 troffer 2L fluorescent	19	ea	$210.47	$3,999
Fixture C, recessed 2x4 troffer 3L fluorescent	24	ea	$187.72	$4,505
Fixture D, recessed 2x4 troffer 2L fluorescent	35	ea	$176.34	$6,172
Fixture E, surface 2x4 modular 3L fluorescent	22	ea	$312.86	$6,883
Fixture F, surface 2x4 modular 2L fluorescent	10	ea	$312.86	$3,129
Fixture G, surface 4' wrap fluorescent	9	ea	$176.34	$1,587
Fixture H, recessed downlight fluorescent	100	ea	$301.48	$30,148
Fixture K, pendant 8' industrial 4L fluorescent	90	ea	$346.99	$31,229
Fixture L, surface 4' stairwell, motion and dimming	6	ea	$505.13	$3,031
Fixture M, recessed flanged 2x2 troffer fluorescent	26	ea	$193.40	$5,029
Fixture N, asymmetric LED cove light	440	lf	$92.15	$40,547
Fixture P, sconce TBD (allowance)	2	ea	$1,131.98	$2,264
Fixture Q, 175w mh wedge sconce	7	ea	$790.68	$5,535
Fixture TBD, in-use warning light	5	ea	$415.25	$2,076
Fixture X, exit sign LED	20	ea	$342.44	$6,849
Lighting control panel	4	ea	$6,257.19	$25,029
Occupancy sensor, wall	16	ea	$233.22	$3,732

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Occupancy sensor, ceiling	45	ea	$346.99	$15,615
Switch, 1P dimmer fluorescent	1	ea	$483.51	$484
Switch 1P, single	35	ea	$73.95	$2,588
Switch 1P, single low voltage touch screen	10	ea	$1,109.23	$11,092
Switch 1P, 3-way	16	ea	$102.39	$1,638
Switch 1P, double	21	ea	$85.33	$1,792
Switch 1P, 3-way triple	8	ea	$233.22	$1,866
Conduit, 3/4" emt	23,150	lf	$5.26	$121,677
Conduit, 1" emt	1,010	lf	$7.42	$7,492
Copper wire, #12 thhn	1,179	clf	$67.76	$79,855
Copper wire, #10 thhn	40	clf	$75.94	$3,053
Fire alarm system				
Fire alarm control panel	1	ea	$31,489.14	$31,489
Fire alarm annunciator	2	ea	$3,640.55	$7,281
F/A terminal cabinet	6	ea	$676.91	$4,061
F/A extender panel	2	ea	$1,990.92	$3,982
F/A smoke detector	5	ea	$346.99	$1,735
F/A smoke duct detector	6	ea	$517.64	$3,106
F/A strobe	36	ea	$312.86	$11,263
F/A door hold	5	ea	$335.61	$1,678
F/A horn / strobe	28	ea	$318.55	$8,919
F/A pull station	17	ea	$301.48	$5,125
F/A module	8	ea	$301.48	$2,412
Flow switch	6	ea	$455.07	$2,730
Tamper switch	6	ea	$455.07	$2,730
F/A smoke damper	20	ea	$284.42	$5,688
Conduit, 3/4" emt	5,520	lf	$5.26	$29,013
Conduit, 1" emt	2,250	lf	$7.42	$16,690
Copper wire, #12 thhn	311	clf	$67.76	$21,060
FA cable	7,770	lf	$1.25	$9,724
Telephone / data system				
Telephone / data MDF rack and cable management				
Cable tray	750	lf	$36.97	$27,731
Wall outlet (2) tel (2) data	36	ea	$96.70	$3,481
Wall telephone outlet	22	ea	$85.33	$1,877
Wall outlet (2) data	57	ea	$85.33	$4,864
Conduit, 1-1/2" emt	2,870	lf	$11.96	$34,316
Cable, category 6 rated				
Security / controlled access / CCTV system				
Vendor quoted equipment, wiring and installation	1	ls	$307,223.93	$307,224
Boxes and conduit system with bio rated conduit	30,154	sf	$2.11	$63,528
Audio / visual systems (conduit and wire only)	30,154	sf	$0.53	$15,882
CATV / MATV system				
Clock / intercom / PA system				

Phase 2 Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Miscellaneous				
Commissioning 3rd Party Assist	1	ls	$25,757.27	$25,757
Fireproofing and caulking	1	ls	$11,508.57	$11,509
Site management and supervision	1	ls	$24,661.21	$24,661
Demo (allowance)	1	ls	$18,084.89	$18,085
Total - 12 Electrical Lighting, Power and Communications				***$2,235,618***
13 Fire Protection Systems				
Automatic wet pipe sprinkler system				
Ground floor	30,154	sf	$4.95	$149,292
Interstitial space	20,873	sf	$4.53	$94,547
Total - 13 Fire Protection Systems				***$243,838***
14 Site Preparation and Demolition				
Exterior building demolition				
Remove storefront window glazing	326	sf	$5.00	$1,631
Remove hm door and frame	2	ea	$541.51	$1,083
Sawcut and remove portion of existing wall for future door	1	ea	$2,633.50	$2,633
Remove and dispose of existing roofing, plywood crickets, skylig	43,008	sf	$1.16	$49,835
Remove HVAC equipment from roof	5	ea	$1,053.40	$5,267
Remove roof and overflow drains	8	ea	$579.37	$4,635
Interior building demolition				
Sawcut concrete paving for spread footings	684	lf	$5.42	$3,704
Sawcut concrete paving for utility work	1,874	lf	$5.41	$10,147
Remove concrete paving and dispose	2,278	sf	$16.25	$37,007
Remove existing walls, base, and wall finishes	5,012	sf	$2.63	$13,199
Remove existing floor finishes down to slab	525	sf	$2.11	$1,106
Remove existing ceiling finishes	904	sf	$2.11	$1,905
Remove existing FRP wall finish from restroom	600	sf	$1.32	$790
Remove existing toilet specialties for future use	27	ea	$33.71	$910
Remove existing overhead coiling door and assembly	2	ea	$812.27	$1,625
Remove existing casework	30	lf	$31.60	$948
Hazardous material abatement				
Protection of existing finishes, barriers, dust control, etc.	1	ls	$16,440.81	$16,441
Total - 14 Site Preparation and Demolition				***$152,866***

Phase 2A

Phase 2A Construction Cost Summary

Element		Subtotal	Total	Cost / SF	Cost / SF
A) Shell (1-5)			**$326,754**		**$38.44**
1 Foundations		$7,660		$0.90	
2 Vertical Structure		$45,733		$5.38	
3 Floor & Roof Structures		$164,613		$19.37	
4 Exterior Cladding		$55,501		$6.53	
5 Roofing and Waterproofing		$53,247		$6.26	
B) Interiors (6-7)			**$578,962**		**$68.11**
6 Interior Partitions, Doors and Glazing		$331,289		$38.98	
7 Floor, Wall and Ceiling Finishes		$247,673		$29.14	
C) Equipment and Vertical Transportation (8-9)			**$737,214**		**$86.73**
8 Function Equipment and Specialties		$737,214		$86.73	
9 Stairs and Vertical Transportation					
D) Mechanical and Electrical (10-13)			**$2,579,031**		**$303.42**
10 Plumbing Systems		$853,233		$100.38	
11 Heating, Ventilation and Air Conditioning		$1,117,143		$131.43	
12 Electrical Lighting, Power and Communications		$522,808		$61.51	
13 Fire Protection Systems		$85,847		$10.10	
E) Site Construction (14-16)			**$52,668**		**$6.20**
14 Site Preparation and Demolition		$52,668		$6.20	
15 Site Paving, Structures & Landscaping					
16 Utilities on Site					
Subtotal			**$4,274,628**		$502.90
General Conditions	7.8%		**$331,402**		$38.99
Subtotal			**$4,606,030**		$541.89
Contractor Fee	22.6%		**$1,040,819**		$122.45
TOTAL ESTIMATED CONSTRUCTION COST			**$5,646,849**		**$664.34**

Total Area: 8,500 SF

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
1 Foundations				
Spread footings				
Excavation, hand dug, 1" around footing perimeter	10	cy	$92.87	$883
Reinforcing steel, including doweling into existing slab	302	lb	$4.64	$1,404
Concrete, 3500 psi, to 1'-0" below finished floor	10	cy	$464.35	$4,415
Haul excess	10	cy	$58.04	$552
Additional concrete at column blockouts	1	cy	$406.31	$406
Total - 1 Foundations				***$7,660***
2 Vertical Structure				
Columns				
Structural steel columns, standard pipe, 5"	5	tn	$7,197.43	$37,607
Base plates	20	ea	$406.31	$8,126
Total - 2 Vertical Structure				***$45,733***
3 Floor & Roof Structures				
Slab on grade, infill at utility demolition				
Aggregate base, sand, or other sub-base material				Not Required
Reinforcing steel, including doweling into existing slab	786	lb	$4.64	$3,648
Concrete, 4000 psi	25	cy	$464.35	$11,767
Accessible ramp at North entrance				
Including doweling into existing surface, formwork, concrete, sloped ramp finish, and concrete curb	130	sf	$46.44	$6,037
Metal handrail- allow	23	lf	$232.18	$5,340
Roof structure				
Structural steel beams, wide flange	7	tn	$6,733.08	$45,455
Rod bracing, 1/2" diameter	152	lf	$17.41	$2,647
Miscellaneous steel fabrications				
Grip strut safety grating, 14 Ga, 1 1/2" deep, galvanized	630	sf	$34.83	$21,954
Metal guardrail, 3'-6" high	180	lf	$290.22	$52,094
Miscellaneous steel - allow 1/2 lb / sf	4,250	lb	$2.32	$9,867
Miscellaneous				
Rough hardware and blocking allowance	1	ls	$5,804.38	$5,804
Total - 3 Floor & Roof Structures				***$164,613***
4 Exterior Cladding				
Exterior wall framing and furring				
Metal stud infill at exterior wall demolition	203	sf	$13.93	$2,828
Metal stud furring, 3 5/8", 18 ga, 16" oc	2,058	sf	$8.03	$16,532

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Interior finish to exterior walls				
Gypsum board, taped, sanded and painted	2,425	sf	$6.97	$16,891
Exterior finish to exterior walls				
Cement plaster	315	sf	$29.02	$9,142
Patch and repair allowance to existing finishes	1	ls	$5,804.38	$5,804
Insulation				
Exterior walls and furred walls				
Batt insulation	315	sf	$2.32	$731
Exterior sheathing				
Plywood sheathing, 1/2"	203	sf	$5.02	$1,019
Exterior doors, frames and hardware				
Hollow metal entries				
Single leaf	1	ea	$2,553.93	$2,554
Total - 4 Exterior Cladding				***$55,501***
5 Roofing and Waterproofing				
Roof framing				
LVL framing, 1 3/4" x 9", including hardware	1,030	lf	$23.22	$23,914
Mansard shear wall framing				
Wood stud, 2" x 4"	96	sf	$9.29	$892
Sheathing, 1/2"	320	sf	$6.97	$2,229
Roofing				
Patch and repair at new equipment and mansards	1,225	sf	$10.45	$12,799
PVC walkways, new	858	sf	$11.61	$9,960
Miscellaneous caulking and sealants	8,500	sf	$0.41	$3,454
Total - 5 Roofing and Waterproofing				***$53,247***
6 Interior Partitions, Doors and Glazing				
Partition framing and furring				
Metal stud framing and furring, 3 5/8", 18 ga, 16" oc	4,950	sf	$8.03	$39,765
Metal stud framing, 6", 18 ga, 16" oc- draft stop walls	1,674	sf	$11.61	$19,433
Metal stud framing, 6", 18 ga, 16" oc	3,586	sf	$11.61	$41,629
Miscellaneous backing, blocking, and bracing	1	ls	$5,804.38	$5,804
Partition surfacing				
Gypsum board, 5/8", taped, sanded and painted	17,072	sf	$6.97	$118,911
Gypsum board, 5/8", unfinished	1,674	sf	$3.60	$6,024
Miscellaneous fire safing, sealants, shafts, and rated enclosures	1	ls	$5,804.38	$5,804

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Interior walls				
Sound batt insulation	8,536	sf	$1.39	$11,891
Interior glazing				
Office glazing and vision panels	70	sf	$81.26	$5,688
Interior doors, frames and hardware				
Solid core wood and hollow metal doors				
Single leaf	25	ea	$2,321.75	$58,044
Sliding glass door				
4'-0" x 7'-0"	1	ea	$5,804.38	$5,804
Specialty hardware and glazing				
Premium for vision glazing in doors	96	sf	$69.65	$6,687
Miscellaneous hardware, including panic hardware, kick plates, locks, closers, special hinges, etc.	1	ls	$5,804.38	$5,804
Total - 6 Interior Partitions, Doors and Glazing				***$331,289***
7 Floor, Wall and Ceiling Finishes				
Floor finishes				
Carpet	1,214	sf	$5.80	$7,047
VCT	3,580	sf	$5.22	$18,702
Sheet vinyl flooring, including base	3,563	sf	$10.45	$37,226
Sealed concrete	143	sf	$2.90	$415
Base				
Rubber base	483	lf	$5.22	$2,523
Wall finishes				
Epoxy paint, premium	11,907	sf	$8.13	$96,758
Ceiling finishes				
Suspended acoustical ceiling tile	6,461	sf	$5.80	$37,502
Suspended gypsum board ceiling, including framing / finishes	1,896	sf	$18.57	$35,216
Paint to underside of structure and services	143	sf	$2.32	$332
Patch and repair ceiling at Corridor at new mechanical work	657	sf	$9.29	$6,102
Gypsum board soffits and risers	10	sf	$34.83	$348
Batt insulation at gypsum board ceilings- allow	1,896	sf	$2.90	$5,503
Total - 7 Floor, Wall and Ceiling Finishes				***$247,673***
8 Function Equipment and Specialties				
Millwork				
Miscellaneous millwork allowance	1	ls	$2,902.19	$2,902
Protective guards, barriers, and bumpers	1	ls	$2,902.19	$2,902

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Office specialties allowance				
Including markerboards, tack boards, etc.	1,214	sf	$17.41	$21,140
Building specialties				
Interior signage, code required	8,500	sf	$1.16	$9,867
Fire extinguisher and cabinet	3	ea	$522.39	$1,567
High density storage units				
Laboratory casework and specialties				
Base cabinetry w/ epoxy resin countertops	542	lf	$580.44	$314,597
Upper cabinets / upper shelving	218	lf	$232.18	$50,614
Chemical fume hoods, 6'-0"	3	ea	$17,413.13	$52,239
Adjustable wall shelves	10	lf	$116.09	$1,103
Wire shelving racks	30	lf	$232.18	$6,965
Moveable table, 6'-0"	1	ea	$1,451.09	$1,451
Moveable table, 5'-0"	3	ea	$1,364.03	$4,092
Moveable table, 4'-0"	5	ea	$1,218.92	$6,095
Moveable table, 3'-6"	1	ea	$1,160.88	$1,161
Moveable table, 3'-0"	2	ea	$1,073.81	$2,148
Biological safety cabinets, 4'-0"	6	ea	$15,671.82	$94,031
Biological safety cabinets, 6'-0"	1	ea	$17,993.57	$17,994
Tall cabinets, 3'-0"	7	ea	$1,567.18	$10,970
Tall cabinets, 2'-6"	1	ea	$1,305.99	$1,306
Tank storage racks	6	ea	$2,902.19	$17,413
Cell sorter				
Ice machine				
Dry ice				
Refrigerator, small				
Refrigerator, large				
Freezer, 20				
Freezer, 30- ultra				
Freezer, -20				
Freezer, -80				
Liquid nitrogen tanks				
Incubators				
Water polisher				
Owner furnished contractor installed equipment	1	ls	$58,043.78	$58,044
Miscellaneous laboratory equipment	1	ls	$58,043.78	$58,044
Office furniture and equipment				
Window treatments				
Horizontal mini-blinds- allow at interior glazing	70	sf	$8.13	$569
Total - 8 Function Equipment and Specialties				***$737,214***
9 Stairs and Vertical Transportation				
				Not Anticipated

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Total - 9 Stairs and Vertical Transportation				
10 Plumbing Systems				
Sanitary fixtures				
Sinks provided and installed by others	17	ea	$63.85	$1,085
Emergency shower	4	ea	$2,762.88	$11,052
Emergency eye / face wash	7	ea	$646.61	$4,526
Floor drain	2	ea	$234.50	$469
Floor sink	1	ea	$475.96	$476
Hose bibb	2	ea	$203.15	$406
Valved water connection for portable sink	2	ea	$485.25	$970
Rough-ins				
Local rough-in at fixture	28	ea	$1,130.69	$31,659
Rough-in at floor sink or floor drain	3	ea	$580.44	$1,741
Domestic water				
<=1" branch piping	900	lf	$25.44	$22,894
1-1/4 to 1-1/2" pipe, cu type L	190	lf	$45.63	$8,670
2" pipe, cu type L	20	lf	$69.95	$1,399
2-1/2" pipe, cu type L	190	lf	$102.20	$19,418
Valves / misc	1	ls	$1,509.14	$1,509
Trap primer w/ water piping to drain	1	ea	$576.82	$577
Pipe insulation, 1"	900	lf	$12.27	$11,045
Pipe insulation, 1-1/2"	190	lf	$14.50	$2,756
Pipe insulation, 2"	20	lf	$15.40	$308
Pipe insulation, 2-1/2"	190	lf	$16.29	$3,095
Roof drainage				Not Anticipated
Condensate drainage				
Trap and equipment connect	4	ea	$345.87	$1,383
1" pipe, cu type M	200	lf	$27.00	$5,400
Pipe insulation, 1"	200	lf	$12.61	$2,521
Medical / lab equipment				
MG certification	189	ea	$24.55	$4,639
Nitrogen / NO2 / CO2 / MG gas manifold	2	ea	$8,166.91	$16,334
Compressed / lab air piping				
Air outlet	41	ea	$175.16	$7,182
1" Type L hard drawn copper	750	lf	$61.92	$46,441
1-1/2" Type L hard drawn copper	75	lf	$93.61	$7,021
2" Type L hard drawn copper	190	lf	$116.03	$22,046
Vacuum system				
Vacuum outlet	69	ea	$175.16	$12,086
1" Type L hard drawn copper	820	lf	$61.92	$50,775

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
1-1/2" Type L hard drawn copper	200	lf	$93.61	$18,721
2" Type L hard drawn copper	190	lf	$116.03	$22,046
La gas system				
Gas outlet	27	ea	$175.16	$4,729
1" Type L hard drawn copper	850	lf	$61.92	$52,633
1-1/2" Type L hard drawn copper	250	lf	$93.61	$23,402
2" Type L hard drawn copper	380	lf	$116.03	$44,092
3" Type L hard drawn copper	200	lf	$268.16	$53,632
LN2 system - allowance	1	ls	$23,217.51	$23,218
Special gases				
Outlet	34	ea	$175.16	$5,956
3/4" Type L hard drawn copper	380	lf	$59.91	$22,767
1" Type L hard drawn copper	200	lf	$61.92	$12,384
CO2 system				Excluded
R / O di piping system				
Certification and testing of DI system	1	ls	$3,482.63	$3,483
DI water outlet	18	ea	$553.39	$9,961
2" Sch 80 PVDF HF Pipe	1,210	lf	$137.23	$166,049
Acid waste piping				
Rough-in / connection to Lab sink	17	ea	$1,059.91	$18,019
2" pipe, PP sch 40, below ground	165	lf	$33.14	$5,467
4" pipe, PP sch 40, below ground	250	lf	$54.89	$13,723
Trench excavation, backfill and compaction	122	cy	$56.01	$6,833
Sand bedding in trench	52	cy	$34.81	$1,810
2" pipe, PP sch 40	200	lf	$57.90	$11,581
C.O. acid resistant	15	ea	$681.69	$10,225
Neutralization tank				Not Anticipated
Miscellaneous plumbing				
Access panels	7	ls	$348.26	$2,438
Purge gas	1	ls	$9,403.09	$9,403
Clean & test	28	ea	$51.77	$1,450
Seismic supports	1	ls	$3,482.63	$3,483
Sleeves	30	ea	$63.26	$1,898
Fire stopping	8,500	sf	$0.25	$2,086
Piping identification	1	ls	$1,857.40	$1,857
Pharmacal system				Not Anticipated
Automated animal watering system				Not Anticipated
Total - 10 Plumbing Systems				***$853,233***
11 Heating, Ventilation and Air Conditioning				
Heating hot water equipment				Not Anticipated

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Chilled water distribution				
CHW coil connection, 1	1	ea	$2,252.10	$2,252
CHW coil connection, 3"	1	ea	$9,896.24	$9,896
1" FCU AHU coil conn assem	2	ea	$2,041.73	$4,083
1" pipe, blk steel, schd 40, thrd	220	lf	$32.02	$7,044
3" pipe, blk steel, schd 40, welded	340	lf	$64.38	$21,888
CHW valves and specialties	1	ls	$1,044.79	$1,045
Pipe insulation, 1" pipe	220	lf	$12.27	$2,700
Pipe insulation, 3" pipe	340	lf	$18.86	$6,411
Hot water distribution				
HW coil connection, 1	1	ea	$2,252.10	$2,252
HW coil connection, 1-1/2"	1	ea	$3,347.09	$3,347
3/4" VAV / cv coil conn assembly	25	ea	$1,740.49	$43,512
1" pipe, cu type L	720	lf	$32.02	$23,055
1-1/4" pipe, cu type L	100	lf	$40.83	$4,083
2" pipe, cu type L	20	lf	$69.95	$1,399
2-1/2" pipe, blk steel, schd 40, welded	220	lf	$55.72	$12,259
HHW valves and specialties	1	ls	$4,643.50	$4,644
Pipe insulation, 1" pipe	720	lf	$12.27	$8,836
Pipe insulation, 1-1/4" pipe	100	lf	$14.95	$1,495
Pipe insulation, 2" pipe	20	lf	$15.95	$319
Pipe insulation, 2-1/2" pipe	220	lf	$16.83	$3,703
1-1/4" pipe, cu type L (heat recovery)				Not Anticipated
Pipe insulation, 1-1/4" pipe (heat recovery)				Not Anticipated
Air-side equipment				
Air handling unit, VAV - Temtrol (2 each)	19,580	cfm	$8.83	$172,797
Air handling fancoil unit, VAV - Trane (2 each)	2,600	cfm	$3.21	$8,354
VAV box w/ reheat	7	ea	$1,532.36	$10,726
CV box w/ reheat	18	ea	$1,283.05	$23,095
High Plume exhaust fan (2 each)	21,340	cfm	$3.30	$70,475
Duct sound attenuation	40,000	cfm	$0.25	$9,818
Heat reclaim coil				Not Anticipated
Air distribution				
Ductwork, galvanized steel	20,100	lb	$11.94	$239,953
Ductwork, stainless steel, welded	700	lb	$27.22	$19,056
Duct insulation, wrap / liner	11,600	sf	$3.54	$41,026
Combination fire / smoke damper	2	ea	$1,383.47	$2,767
Manual volume damper	67	ea	$84.57	$5,666
Conn to Hood cabinets	10	ea	$780.99	$7,810
Ceiling diffusers 2x2	32	ea	$161.78	$5,177
Ceiling diffusers 2x4	4	ea	$217.56	$870
Ceiling registers	31	ea	$176.28	$5,465
Ceiling grilles	2	ea	$158.43	$317
Iris damper	10	ea	$324.67	$3,247
24" x 48" Laminar Diffuser SS w/hepa filter	6	ea	$1,997.10	$11,983
Flexible duct, insulated, various sizes				Not Anticipated

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Phoenix control valve				Not Anticipated
HVAC controls (Johnson Controls)				
DDC controls to fancoil	2	ea	$14,169.37	
DDC controls to ahu	2	ea	$29,602.33	
DDC controls to exhaust fans	2	ea	$1,026.44	
DDC VAV / CV box controller	25	ea	$1,684.70	
DDC controls to misc equip	1	ea	$3,681.80	
DDC controls to fire / smoke dampers	2	ea	$580.16	
DDC to freezer farm monitoring	2	ea	$3,830.89	
DDC misc	1	ls	$13,930.51	
Additional Lab controls / hood allowance	1	ea	$5,578.49	
HVAC CONTROLS PER JOHNSON (01/22/08)	1	ls	$272,805.77	$272,806
Miscellaneous				
Test / balance HVAC	90	hr	$135.00	$12,150
3rd party commissioning	1	ls	$4,643.50	$4,644
Seismic supports	1	ls	$10,215.71	$10,216
3D coordination drwgs	1	ls	$4,643.50	$4,644
Rigging of major equipment	1	ls	$4,643.50	$4,644
Fire stopping, allowance	8,500	sf	$0.61	$5,216
Total - 11 Heating, Ventilation and Air Conditioning				***$1,117,143***
12 Electrical Lighting, Power and Communications				
Service and distribution				
Distribution panel, 600A 277/480v 3ph 4w	1	ea	$11,840.93	$11,841
Distribution panel, 400A 120/208v 3ph 4w	1	ea	$9,809.40	$9,809
Panelboard, 225A 277/480v 3ph 4w	2	ea	$3,076.32	$6,153
Panelboard, 225A 120/208v 3ph 4w	5	ea	$2,873.17	$14,366
Transformer, 112.5 kva 480v - 120/208v 3ph 4w	1	ea	$11,247.72	$11,248
Transformer, 75 kva 480v - 120/208v 3ph 4w	1	ea	$4,628.41	$4,628
Grounding system	1	ls	$7,487.65	$7,488
TVSS	1	ls	$9,159.31	$9,159
Modify existing distribution board (add 600A CB)	1	ls	$6,570.56	$6,571
Modify existing distribution board (add 350A CB)	1	ls	$5,548.99	$5,549
Modify existing distribution board (add 175A CB)	1	ls	$2,722.25	$2,722
Conduit, 2" emt	1,100	lf	$15.09	$16,601
Conduit, 3" emt	1,300	lf	$25.54	$33,201
Copper wire, #6 thhn	6	clf	$150.91	$905
Copper wire, #2 thhn	20	clf	$287.90	$5,758
Copper wire, #1 thhn	4	clf	$342.46	$1,370
Copper wire, #1/0 thhn	8	clf	$383.09	$3,065
Copper wire, #2/0 thhn	20	clf	$429.52	$8,590
Copper wire, #3/0 thhn	82	clf	$510.79	$41,884
Copper wire, #4/0 thhn	4	clf	$615.26	$2,461
Copper wire, #350mcm thhn	16	clf	$1,276.96	$20,431
HVAC and equipment connections				

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Lab hood connections	1	ls	$1,741.31	$1,741
Lab bench connections	1	ls	$2,611.97	$2,612
Misc. mechanical connections	8,500	sf	$0.29	$2,467
Convenience power				
Duplex outlet, 20A 120v	290	ea	$111.44	$32,319
Quad outlet, 20A 120v	13	ea	$148.59	$1,932
Specialty receptacle, 20A 208v	7	ea	$272.81	$1,910
Duplex outlet, 20A 120v floor mounted	1	ea	$509.62	$510
Misc. convenience connections	5	ea	$290.22	$1,451
Conduit, 3/4" emt	6,500	lf	$5.80	$37,728
Copper wire, #12 thhn	260	clf	$69.65	$18,110
Copper wire, #10 thhn	130	clf	$77.78	$10,111
Lighting and lighting controls				
Fixture A, 2x4 recessed fluorescent troffer	24	ea	$335.49	$8,052
Fixture B, 2x4 recessed fluorescent troffer	61	ea	$347.10	$21,173
Fixture C, 2x4 recessed fluorescent troffer (in gyp clg)	25	ea	$381.93	$9,548
Fixture D, 1x4 recessed fluorescent troffer	2	ea	$289.06	$578
Switch, 1pole toggle	9	ea	$80.10	$721
Double switch, 1pole toggle	16	ea	$114.93	$1,839
Quad switch, 1pole toggle	1	ea	$138.14	$138
Occupancy sensor, wall mount	1	ea	$322.72	$323
Conduit, 3/4" emt	3,600	lf	$5.80	$20,896
Copper wire, #12 thhn	144	clf	$69.65	$10,030
Copper wire, #10 thhn	45	clf	$77.78	$3,500
Fire alarm system - complete, tie to existing				
Tie indicating circuit to existing	1	ls	$2,902.19	$2,902
Fire alarm horn / strobe	6	ea	$428.36	$2,570
Conduit, 3/4" emt	340	lf	$5.80	$1,973
Fire alarm cable	340	lf	$1.56	$529
Voice / data system				
Modify IDF for new equipment	1	ls	$16,484.43	$16,484
Data wall outlet	19	ea	$88.23	$1,676
Combination voice/data outlet	50	ea	$98.67	$4,934
Floor data outlet	1	ea	$509.62	$510
Cable tray (match existing)	60	lf	$27.86	$1,672
Conduit, 4" emt	150	lf	$35.99	$5,398
Conduit, 1" emt	700	lf	$8.13	$5,688
Security / access system				
Door contact	3	ea	$136.98	
Request to exit	3	ea	$136.98	
Card reader	2	ea	$204.31	
Conduit, 3/4" emt	100	lf	$5.80	
CARD KEY SYSTEM PER JOHNSON (01/22/08)	1	ls	$23,217.51	$23,218
Miscellaneous electrical requirements				

Phase 2A Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Firestop, seal penetrations	8	ea	$319.24	$2,554
Field management and supervision	200	hrs	$98.67	$19,735
Temporary construction power	1	ls	$11,608.76	$11,609
Demolition and make safe	1	ls	$9,867.44	$9,867
Total - 12 Electrical Lighting, Power and Communications				***$522,808***
13 Fire Protection Systems				
Automatic wet pipe sprinkler system- occupancy level	8,500	sf	$5.46	$46,377
Automatic wet pipe sprinkler system- above ceiling space	8,500	sf	$4.64	$39,470
Total - 13 Fire Protection Systems				***$85,847***
14 Site Preparation and Demolition				
Exterior building demolition				
Remove existing roll-up door	1	ea	$290.22	$290
Interior building demolition				
Remove portion of existing interior partitions	1,128	sf	$5.22	$5,893
Remove existing doors, per leaf	3	ea	$116.09	$348
Remove interior face of wall, including sheathing and surfacing	209	sf	$3.48	$728
Sawcut existing slab on grade- assume 12" thick	896	lf	$14.51	$13,002
Remove portion of concrete at slab on grade, 12" thick	784	sf	$5.80	$4,551
Remove and dispose of existing roofing, plywood crickets, skylights, flashings, fasteners, insulation, etc, at new equipment- allow 10% additional work to that shown	905	sf	$5.80	$5,253
Demolish existing gypsum board ceiling at existing Corridor at new mechanical work	657	sf	$3.48	$2,288
Cut existing roof structure blocking to allow LVL placement	1	ls	$2,902.19	$2,902
Trade demolition				
Hazardous material abatement				
Protection of existing finishes, temporary barriers, dust control, air quality control, etc.	1	ls	$17,413.13	$17,413
Total - 14 Site Preparation and Demolition				***$52,668***

Phase 2B

Phase 2B Construction Cost Summary

Element		Subtotal	Total	Cost / SF	Cost / SF
A) Shell (1-5)			**$436,777**		**$27.11**
1 Foundations		$23,499		$1.46	
2 Vertical Structure		$77,145		$4.79	
3 Floor & Roof Structures		$197,484		$12.26	
4 Exterior Cladding		$115,094		$7.14	
5 Roofing and Waterproofing		$23,555		$1.46	
B) Interiors (6-7)			**$959,752**		**$59.57**
6 Interior Partitions, Doors and Glazing		$585,203		$36.33	
7 Floor, Wall and Ceiling Finishes		$374,548		$23.25	
C) Equipment and Vertical Transportation (8-9)			**$1,313,571**		**$81.54**
8 Function Equipment and Specialties		$1,313,571		$81.54	
9 Stairs and Vertical Transportation					
D) Mechanical and Electrical (10-13)			**$4,188,927**		**$260.02**
10 Plumbing Systems		$835,034		$51.83	
11 Heating, Ventilation and Air Conditioning		$1,860,976		$115.52	
12 Electrical Lighting, Power and Communications		$1,400,040		$86.91	
13 Fire Protection Systems		$92,877		$5.77	
E) Site Construction (14-16)			**$64,153**		**$3.98**
14 Site Preparation and Demolition		$64,153		$3.98	
15 Site Paving, Structures & Landscaping					
16 Utilities on Site					
Subtotal			**$6,963,179**		$432.23
General Conditions	7.2%		**$500,031**		$31.04
Subtotal			**$7,463,210**		$463.27
Contractor Fee	20.9%		**$1,563,356**		$97.04
TOTAL ESTIMATED CONSTRUCTION COST			**$9,026,566**		**$560.31**

Total Area: 16,110 SF

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
1 Foundations				
Spread footings				
Including excavation, reinforcing steel, concrete, and hauling of excess spoils- allow at new columns	25	ea	$939.97	$23,499
Total - 1 Foundations				***$23,499***
2 Vertical Structure				
Columns				
Structural steel columns, standard pipe, 5", including base plates and connections	7	tn	$7,770.43	$50,857
Structural steel strong back columns, wide flange	2	tn	$7,519.77	$11,812
Base plates	33	ea	$438.65	$14,476
Total - 2 Vertical Structure				***$77,145***
3 Floor & Roof Structures				
Slab on grade, 12", infill at utility demolition				
Including sub-grade materials, reinforcing steel, concrete, and miscellaneous patching and repair to existing slab	1,268	sf	$25.07	$31,784
Patch and repair slab for floor preparation	16,110	sf	$1.88	$30,286
Mechanical equipment pads and curbs				
Concrete curb, 6"	22	lf	$31.33	$689
Equipment pad, roof mounted	795	sf	$18.80	$14,941
Roof structure				
Structural steel beams, wide flange	6	tn	$7,269.11	$45,443
Rod bracing, 1/2" diameter	170	lf	$18.80	$3,196
Structural steel strong back beams, wide flange, including premium for doweling into existing cmu wall	1	tn	$8,773.07	$7,904
Miscellaneous steel fabrications				
Grip strut safety grating, 14 Ga, 1 1/2" deep, galvanized	437	sf	$37.60	$16,412
Miscellaneous steel - allow 1 lb / sf	16,110	lb	$2.51	$40,381
Roof framing				
Wood beam, 6" x 12", including connections to existing	51	lf	$43.87	$2,237
Mansard shear wall framing				
Wood stud, 2" x 4"	168	sf	$10.03	$1,684
Sheathing, 1/2"	336	sf	$7.52	$2,527
Total - 3 Floor & Roof Structures				***$197,484***
4 Exterior Cladding				
Exterior wall framing and furring				

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Metal stud infill at exterior wall demolition	145	sf	$15.04	$2,181
Metal stud furring, 3 5/8", 18 ga, 16" oc	4,668	sf	$8.67	$40,483
Exterior sheathing				
Plywood sheathing, 3/4"	349	sf	$5.42	$1,892
Interior finish to exterior walls				
Gypsum board, taped, sanded and painted	4,813	sf	$7.52	$36,193
Exterior finish to exterior walls				
Cement plaster	494	sf	$25.07	$12,383
Patch and repair allowance to existing finishes	1	ls	$6,266.48	$6,266
Insulation				
Exterior walls and furred walls				
Batt insulation	5,162	sf	$2.51	$12,939
Exterior doors, frames and hardware				
Hollow metal entries				
Single leaf	1	ea	$2,757.25	$2,757
Total - 4 Exterior Cladding				***$115,094***
5 Roofing and Waterproofing				
Roofing				
Patch and repair at new equipment and mansards	804	sf	$11.28	$9,069
PVC walkways, new	592	sf	$12.53	$7,420
Miscellaneous caulking and sealants	16,110	sf	$0.44	$7,067
Total - 5 Roofing and Waterproofing				***$23,555***
6 Interior Partitions, Doors and Glazing				
Partition framing and furring				
Metal stud framing and furring, including draft stop walls	18,880	sf	$12.53	$236,622
Miscellaneous backing, blocking, and bracing	1	ls	$10,026.36	$10,026
Partition surfacing				
Gypsum board, 5/8", taped, sanded and painted	14,796	sf	$7.52	$111,263
Gypsum board, 5/8", unfinished- draft stop protection	4,084	sf	$3.89	$15,867
Miscellaneous fire safing, sealants, shafts, and rated enclosures	1	ls	$37,598.85	$37,599
Interior walls				
Sound batt insulation	14,796	sf	$1.50	$22,253
Interior glazing				
Office glazing and vision panels	206	sf	$87.73	$18,073
Interior doors, frames and hardware				
Solid core wood and hollow metal doors				

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Single leaf	44	ea	$2,506.59	$110,290
Specialty hardware and glazing				
Premium for vision glazing in doors	142	sf	$75.20	$10,678
Miscellaneous hardware, including panic hardware, kick plates, locks, closers, special hinges, etc.	1	ls	$12,532.95	$12,533
Total - 6 Interior Partitions, Doors and Glazing				***$585,203***
7 Floor, Wall and Ceiling Finishes				
Floor finishes, including base				
Carpet- office areas	3,020	sf	$7.52	$22,710
VCT- open laboratory area	6,610	sf	$6.27	$41,421
Sheet vinyl flooring- laboratory support spaces / restrooms	4,702	sf	$11.28	$53,037
Sealed concrete- service / storage rooms	1,778	sf	$3.13	$5,571
Wall finishes				
Epoxy paint, premium	13,914	sf	$8.77	$122,068
Miscellaneous wall finishes allowance	1	ls	$12,532.95	$12,533
Ceiling finishes				
Suspended acoustical ceiling tile	14,930	sf	$6.27	$93,558
Suspended gypsum board ceiling, including framing / finishes	940	sf	$20.05	$18,850
Paint to underside of structure and services	240	sf	$2.51	$602
Gypsum board soffits and risers- allowance	40	sf	$31.33	$1,253
Batt insulation at gypsum board ceilings- allow	940	sf	$3.13	$2,945
Total - 7 Floor, Wall and Ceiling Finishes				***$374,548***
8 Function Equipment and Specialties				
Millwork				
Base cabinetry, including plastic laminate countertop	27	lf	$501.32	$13,536
Protective guards, barriers, and bumpers	1	ls	$3,133.24	$3,133
Toilet compartments and accessories				
Stalls measured	5	ea	$2,506.59	$12,533
Office specialties allowance				
Including markerboards, tack boards, etc.	2,612	sf	$18.80	$49,104
Building specialties				
Interior signage, code required	16,110	sf	$0.25	$4,038
Fire extinguisher and cabinet- allow	6	ea	$563.98	$3,384
High density storage units				
Laboratory casework and specialties				
Base cabinetry and islands, w/ epoxy resin countertops	1,043	lf	$626.65	$653,593

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Upper cabinets / upper shelving	398	lf	$250.66	$99,762
Epoxy resin sinks	25	ea	$842.21	$21,055
Chemical fume hoods, 6'-0"	3	ea	$18,799.43	$56,398
Adjustable shelving units, 4'-0", stainless steel	6	ea	$1,253.30	$7,520
Pipe drop enclosure, small	19	ea	$626.65	$11,906
Pipe drop enclosure, large	6	ea	$1,002.64	$6,016
Wire shelving racks		lf	$250.66	
Ice machine		ea	$5,013.18	
Dry ice		ea	$6,266.48	
Refrigerator, small		ea	$6,266.48	
Refrigerator, large		ea	$8,773.07	
Freezer, 20		ea	$12,532.95	
Freezer, 30- ultra		ea	$12,532.95	
Freezer, -20		ea	$12,532.95	
Freezer, -80		ea	$12,532.95	
Liquid nitrogen tanks				
Moveable table, 6'-0"		ea	$1,566.62	
Moveable table, 5'-0"	6	ea	$1,472.62	$8,836
Moveable table, 4'-0"		ea	$1,315.96	
Moveable table, 3'-6"		ea	$1,253.30	
Moveable table, 3'-0"		ea	$1,159.30	
Biological safety cabinets, 4'-0"	12	ea	$16,919.48	$203,034
Biological safety cabinets, 6'-0"		ea	$19,426.07	
Tall cabinets, 3'-0"		ea	$1,691.95	
Tall cabinets, 2'-6"		ea	$1,409.96	
Cell sorter		ea	$12,532.95	
Tank storage racks	4	ea	$3,133.24	$12,533
Miscellaneous lab equipment and specialties	11,600	sf	$12.53	$145,382
Office furniture and equipment				
Window treatments				
Horizontal mini-blinds- allow at interior glazing	206	sf	$8.77	$1,807
Total - 8 Function Equipment and Specialties				***$1,313,571***
9 Stairs and Vertical Transportation				
N/A				
Total - 9 Stairs and Vertical Transportation				
10 Plumbing Systems				
Sanitary fixtures				
Water closet, fv	5	ea	$1,397.24	$6,986
Urinal	1	ea	$1,397.24	$1,397
Lavatory, wall	4	ea	$1,133.45	$4,534
Sink wall - S.S.	2	ea	$1,312.93	$2,626
Service sink, floor	1	ea	$1,216.57	$1,217

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Sinks provided and installed by others	25	ea	$66.25	$1,656
Drinking fountain, dbl	1	ea	$2,686.08	$2,686
Emergency shower	3	ea	$2,866.76	$8,600
Emergency eye / face wash	6	ea	$670.92	$4,026
Floor drain	3	ea	$243.31	$730
Hose bibb	1	ea	$210.79	$211
Valved water connection for portable sink				Not Anticipated
Rough-ins				
Local rough-in at fixture	42	ea	$1,173.20	$49,275
Rough-in at floor sink or floor drain	3	ea	$602.26	$1,807
Waste / vent				
2" pipe, ci, H&S, below grade	50	lf	$28.91	$1,445
4" pipe, ci, H&S, below grade	35	lf	$38.54	$1,349
Trench excavate, backfill, compact	20	cy	$60.47	$1,209
Sand bedding in trench	8	cy	$37.58	$301
2" pipe, ci, no-hub, in bldg	80	lf	$45.65	$3,652
3-4" vent through roof	1	ea	$495.06	$495
Cleanouts / misc	1	ls	$1,503.95	$1,504
Domestic water				
<=1" branch piping	270	lf	$27.46	$7,415
1-1/4 to 1-1/2" pipe, cu type L	170	lf	$49.26	$8,375
2" pipe, cu type L	50	lf	$75.52	$3,776
2-1/2" pipe, cu type L	170	lf	$110.33	$18,757
Valves / misc	1	ls	$1,629.28	$1,629
Connections to autoclave / glassware washer equip	1	ls	$1,503.95	$1,504
Trap primer w/ water piping to drain	3	ea	$622.74	$1,868
Shock absorber	2	ea	$214.40	$429
Pipe insulation, 1"	270	lf	$13.25	$3,577
Pipe insulation, 1-1/2"	170	lf	$15.66	$2,662
Pipe insulation, 2"	50	lf	$16.62	$831
Pipe insulation, 2-1/2"	170	lf	$17.59	$2,990
Roof drainage				Not Anticipated
Condensate drainage				
Trap and equipment connect	2	ea	$373.40	$747
1" pipe, cu type M	80	lf	$29.15	$2,332
Pipe insulation, 1"	80	lf	$13.61	$1,089
Medical / lab equipment				
MG certification	374	ea	$26.50	$9,911
Nitrogen / NO2 / CO2 / MG gas manifold	1	ea	$8,817.09	$8,817
Compressed / lab air piping				
Air outlet	75	ea	$189.11	$14,183
1" Type L hard drawn copper	600	lf	$66.85	$40,111
1-1/2" Type L hard drawn copper	500	lf	$101.06	$50,530

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
2" Type L hard drawn copper	170	lf	$125.27	$21,296
Vacuum system				
Vacuum outlet	130	ea	$189.11	$24,584
1" Type L hard drawn copper	600	lf	$66.85	$40,111
1-1/2" Type L hard drawn copper	500	lf	$101.06	$50,530
2" Type L hard drawn copper	170	lf	$125.27	$21,296
La gas system				
Gas outlet	87	ea	$189.11	$16,453
1" Type L hard drawn copper	400	lf	$66.85	$26,740
1-1/2" Type L hard drawn copper	500	lf	$101.06	$50,530
2" Type L hard drawn copper	170	lf	$125.27	$21,296
LN2 system				Not Anticipated
Special gases				
Outlet	10	ea	$189.11	$1,891
3/4" Type L hard drawn copper	300	lf	$64.68	$19,405
1" Type L hard drawn copper	100	lf	$66.85	$6,685
CO2 system				
Co2 outlet	72	ea	$189.11	$13,616
1" Type L hard drawn copper	550	lf	$66.85	$36,768
R / O di piping system				
Certification and testing of DI system	1	ls	$6,266.48	$6,266
DI water outlet	5	ea	$597.44	$2,987
1-1/2" Sch 80 PVDF HF pipe	400	lf	$122.86	$49,144
2" Sch 80 PVDF HF Pipe	340	lf	$148.16	$50,373
Acid waste piping				
Rough-in / connection to Lab sink	25	ea	$1,144.29	$28,607
2" pipe, PP sch 40, below ground	290	lf	$35.77	$10,375
4" pipe, PP sch 40, below ground	140	lf	$59.26	$8,297
Trench excavation, backfill and compaction	170	cy	$60.47	$10,279
Sand bedding in trench	50	cy	$37.58	$1,879
2" pipe, PP sch 40	100	lf	$62.51	$6,251
C.O. Acid Resistant	10	ea	$735.96	$7,360
Neutralization tank				Not Anticipated
Miscellaneous plumbing				
Access panels	1	ls	$375.99	$376
Purge gas	1	ls	$10,151.69	$10,152
Clean & test	42	ea	$55.89	$2,347
Seismic supports	1	ls	$6,266.48	$6,266
Sleeves	20	ea	$68.30	$1,366
Fire stopping	16,110	sf	$0.26	$4,269
Pharmacal system				Not Anticipated
Automated animal watering system				Not Anticipated

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Total - 10 Plumbing Systems				***$835,034***
11 Heating, Ventilation and Air Conditioning				
Heating hot water equipment				
HW pumps, conn - allowance	1	ls	$22,559.31	$22,559
Chilled water distribution				
CHW coil connection, 1-1/2"	1	ea	$3,613.56	$3,614
CHW coil connection, 3"	1	ea	$10,684.10	$10,684
1" FCU AHU coil conn assem	2	ea	$2,204.27	$4,409
1-1/2" pipe, blk steel, schd 40, thrd	240	lf	$35.29	$8,470
3" pipe, blk steel, schd 40, welded	300	lf	$69.50	$20,850
CHW valves and specialties	1	ls	$1,879.94	$1,880
Pipe insulation, 1-1/2" pipe	240	lf	$16.26	$3,903
Pipe insulation, 3" pipe	300	lf	$20.36	$6,107
Hot water distribution				
HW coil connection, 1-1/2"	2	ea	$3,613.56	$7,227
HW heat recovery coil connection, 1-1/2"	2	ea	$3,613.56	$7,227
3/4" VAV / cv coil conn assembly	27	ea	$1,879.05	$50,734
1" pipe, cu type L	800	lf	$34.57	$27,656
1-1/4" pipe, cu type L	520	lf	$44.09	$22,924
2" pipe, cu type L	300	lf	$75.52	$22,657
HHW valves and specialties	1	ls	$10,590.34	$10,590
Pipe insulation, 1" pipe	800	lf	$13.25	$10,600
Pipe insulation, 1-1/4" pipe	520	lf	$16.14	$8,393
Pipe insulation, 2" pipe	300	lf	$17.22	$5,167
1-1/4" pipe, cu type L (Heat recovery)	280	lf	$44.09	$12,344
Pipe insulation, 1-1/4" pipe (Heat recovery)	280	lf	$16.14	$4,519
Air-side equipment				
Air handling unit, VAV - Temtrol (2 each)	39,380	cfm	$9.53	$375,203
Air handling fancoil unit, VAV - Trane (2 each)	5,600	cfm	$3.47	$19,427
Heat reclaim coil	2	ea	$6,167.15	$12,088
VAV box w/ reheat	5	ea	$1,654.35	$8,272
CV box	3	ea	$1,216.57	$3,650
CV box w/ reheat	22	ea	$1,385.20	$30,474
High plume exhaust fan (2 each)	35,060	cfm	$3.57	$125,002
Duct sound attenuation	88,000	cfm	$0.26	$23,320
Air distribution				
Ductwork, galvanized steel	31,000	lb	$12.89	$399,540
Ductwork, stainless steel, welded	1,500	lb	$29.39	$44,085
Duct insulation, wrap / liner	18,000	sf	$3.82	$68,730
Flexible duct, insulated, various sizes				Not Anticipated
Combination fire / smoke damper	4	ea	$1,493.61	$5,974
Manual volume damper	119	ea	$91.30	$10,865
Conn to Hood cabinets	15	ea	$843.16	$12,647

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Conn to rack ventilator	3	ea	$264.99	$795
Ceiling diffusers 2x2	70	ea	$174.66	$12,226
Ceiling diffusers 2x4	3	ea	$234.88	$705
Ceiling registers	46	ea	$190.31	$8,754
Ceiling grilles	4	ea	$171.04	$684
Iris damper	3	ea	$350.52	$1,052
24" x 48" Laminar diffuser sis w/ heap filter	20	ea	$2,156.09	$43,122
Phoenix control valve	3	ea	$4,577.18	$11,534
HVAC controls (Johnson Controls)				
DDC controls to fancoil	2	ea	$15,297.42	
DDC controls to AHU	2	ea	$27,463.08	
DDC controls to exhaust fans	2	ea	$1,108.16	
DDC VAV / CV box controller	30	ea	$1,818.83	
DDC controls to misc equip	1	ea	$3,974.92	
DDC controls to fire / smoke dampers	4	ea	$626.35	
DDC misc	1	ls	$31,332.38	
Additional Lab controls / hood allowance	15	ea	$6,022.61	
HVAC CONTROLS PER JOHNSON (01/22/08)	1	ls	$294,524.35	$294,524
Miscellaneous				
Test / balance HVAC	120	hr	$145.75	$17,490
3rd party commissioning	1	ls	$10,026.36	$10,026
Seismic supports	1	ls	$25,065.90	$25,066
3D coordination drawings	1	ls	$7,519.77	$7,520
Rigging of major equipment	1	ls	$5,013.18	$5,013
Fire stopping, allowance	16,110	sf	$0.66	$10,673
Total - 11 Heating, Ventilation and Air Conditioning				***$1,860,976***
12 Electrical Lighting, Power and Communications				
Service and distribution				
Panel "HE", 600a 277/480v 3ph 4w	1	ea	$16,581.09	$16,581
Panel "HEA", 225a 277/480v 3ph 4w	1	ea	$3,520.19	$3,520
Trans "TP1", 75kva 480 - 120/208v 3ph 4w K-4	1	ea	$5,987.62	$5,988
Grounding UFER testing	2	ea	$1,579.15	$3,158
Distribution "LE", 400a 120/208v 3ph 4w	1	ea	$7,698.37	$7,698
TVSS unit	1	ea	$2,616.13	$2,616
Panel "LEA, LEB, LEC", 225a 120/208v 3ph 4w	3	ea	$3,520.19	$10,561
Conduit 2", emt	100	lf	$16.27	$1,627
Conduit 2-2", emt	60	lf	$32.53	$1,952
Conduit 2-1/2", grc	20	lf	$57.44	$1,149
Conduit 2-1/2", emt	480	lf	$23.21	$11,142
Conduit 2-3",emt	340	lf	$56.64	$19,257
Conduit 2-3", grc	20	lf	$69.25	$1,385
Copper wire #6, thhn	1	clf	$170.40	$170
Copper wire #4, thhn	3	clf	$214.51	$536
Copper wire #2, thhn	10	clf	$305.22	$2,991
Copper wire #1/0, thhn	3	clf	$407.13	$1,303

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Copper wire #3/0, thhn	21	clf	$569.73	$11,850
Copper wire #350 mcm, thhn	39	clf	$1,033.07	$40,496
Emergency service and distribution				
Panel "HEE", 400a 277/480v 3ph 4w	1	ea	$7,698.37	$7,698
Trans "TP1E", 75kva 480 - 120/208v 3ph 4w K-4	1	ea	$5,987.62	$5,988
Grounding UFER testing	1	ea	$1,579.15	$1,579
Panel "LEE, LEEA", 225a 120/208v 3ph 4w	2	ea	$3,520.19	$7,040
TVSS unit	1	ea	$2,352.94	$2,353
Conduit 2", grc	40	lf	$32.06	$1,282
Conduit 2", emt	120	lf	$16.27	$1,952
Conduit 2-2", emt	340	lf	$32.53	$11,060
Conduit 2-1/2", emt	320	lf	$23.21	$7,428
Copper wire #6, thhn	1	clf	$170.40	$204
Copper wire #4, thhn	3	clf	$214.51	$729
Copper wire #2, thhn	7	clf	$305.22	$2,076
Copper wire #1/0, thhn	2	clf	$407.13	$977
Copper wire #2/0, thhn	13	clf	$480.69	$6,153
Copper wire #4/0, thhn	39	clf	$685.29	$26,863
HVAC equipment connections				
AHU-1,1A,connection, 30 amp 480v	2	ea	$197.39	$395
Combo disconnect, 30 amp 480v 3p	2	ea	$1,300.17	$2,600
AHU-3,3A connection, 60 amp 480v	2	ea	$197.39	$395
Combo disconnect, 60 amp 480v 3p	2	ea	$1,300.17	$2,600
VAV connection, 20 amp 120v	30	ea	$164.49	$4,935
Switch 1P, single motor rated	30	ea	$230.29	$6,909
FCU-1-14 connection, 30amp	2	ea	$197.39	$395
Disconnect, 30 amp 480v 3p	2	ea	$592.18	$1,184
EF-1-5 connection, 30 amp 480v	5	ea	$197.39	$987
Disconnect, 30 amp 480v 3p	5	ea	$592.18	$2,961
Fume hood connection, 60 amp 480v	3	ea	$559.28	$1,678
Disconnect, exp proof 60 amp 480v 3p	3	ea	$1,908.14	$5,724
Controls / alarm fume hood unit	3	ea	$526.38	$1,579
Fume hood connection, 30 amp 480v	8	ea	$559.28	$4,474
Disconnect, exp proof 30 amp 480v 3p	8	ea	$1,677.85	$13,423
Controls / alarm fume hood unit	8	ea	$526.38	$4,211
Glass washer connection, 60 amp 208v	1	ea	$328.99	$329
Disconnect, 60 amp 208v 3p	1	ea	$986.97	$987
Autoclave steam connection, 60 amp 480v	1	ea	$460.59	$461
Disconnect shunt trip unit, 60 amp 480v 3p	1	ea	$1,776.55	$1,777
EPO auto clave unit	1	ea	$1,046.19	$1,046
Bio cabinet connection	20	ea	$460.59	$9,212
Autoclave steam connection, 100 amp 480v	1	ea	$723.78	$724
Disconnect shunt trip unit, 100 amp 480v 3p	1	ea	$2,493.74	$2,494
EPO auto clave unit	1	ea	$1,046.19	$1,046
Control circuit (2) to AHU, 20 amp 120v	5	ea	$394.79	$1,974
Duplex outlet, roof top 20a 120v GFI wp	8	ea	$164.49	$1,316
Conduit, 3/4" emt	9,450	lf	$6.08	$57,453
Conduit, 3/4" grc	250	lf	$12.73	$3,181

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Conduit, 1" emt	4,080	lf	$8.58	$35,007
Conduit, 1-1/4" grc	350	lf	$22.78	$7,973
Conduit, 1-1/2" emt	250	lf	$13.83	$3,458
Copper wire, #10 thhn	378	clf	$87.84	$33,204
Copper wire, #8 thhn	10	clf	$122.40	$1,224
Copper wire, #6 thhn	163	clf	$170.40	$27,810
Copper wire, #4 thhn	14	clf	$214.51	$3,003
Copper wire, #2 thhn	10	clf	$306.54	$3,065
Convenience power	16,110	sf	$12.53	$201,906
Lighting and light controls	16,110	sf	$15.04	$242,287
Low voltage systems				
Fire alarm (full system tied to existing unit)	16,110	sf	$5.01	$80,762
Tel / data systems (full system tied to existing data room)	16,110	sf	$6.27	$100,953
UPS systems allowance	16,110	sf	$2.51	$40,381
Audio visual (rough in only)	16,110	sf	$0.94	$15,143
PA systems (rough in only)	16,110	sf	$0.94	$15,143
Security systems (rough in only)	16,110	sf	$1.25	$20,191
BIO security systems (rough in only)	16,110	sf	$1.25	$20,191
CATV (rough in only)	16,110	sf	$0.63	$10,095
CCTV (rough in only)	16,110	sf	$1.88	$30,286
CARD KEY SYSTEM PER JOHNSON (01/22/08)	1	ls	$62,664.76	$62,665
Miscellaneous				
Penetrations and fireproofing	300	ea	$56.40	$16,919
Commissioning 3rd party assist testing	1	ls	$14,428.04	$14,428
Supervision and, temp power and lighting	1	ls	$31,332.38	$31,332
Demolition / safe off allowance	1	ls	$18,799.43	$18,799
Total - 12 Electrical Lighting, Power and Communications				***$1,400,040***
13 Fire Protection Systems				
Automatic wet pipe sprinkler system				
Enclosed	16,110	sf	$5.77	$92,877
Total - 13 Fire Protection Systems				***$92,877***
14 Site Preparation and Demolition				
Site demolition				
Demolish and remove existing sidewalk and landing- assume 4"	1,605	sf	$3.13	$5,029
Building demolition				
Remove portion of existing interior partitions	270	sf	$5.64	$1,523
Remove existing doors, per leaf	3	ea	$125.33	$376
Remove existing roll-up door	1	ea	$313.32	$313
Sawcut existing slab on grade- assume 12" thick	1,172	lf	$15.67	$18,361
Remove portion of concrete at slab on grade, 12" thick	1,268	sf	$6.27	$7,946

Phase 2B Detail Elements

Element	Quantity	Unit	Unit Cost	Total
Remove and dispose of existing roofing, plywood crickets, skylights, flashings, fasteners, insulation, etc, at new equipment-allow 10% additional work to that shown	468	sf	$6.27	$2,930
Miscellaneous interior building demolition allowance	16,110	sf	$0.94	$15,143
Trade demolition				See Below
Hazardous material abatement				Not Anticipated
Protection of existing finishes, barriers, dust control, etc.	1	ls	$12,532.95	$12,533
Total - 14 Site Preparation and Demolition				***$64,153***

LEVERAGE FUND CALCULATION		
Leverage Funds:		
total "other" funds from CIB Budget		$ 30,479,920
Adjustments		
Amount budgeted for fees exc struc	$ 7,642,655	
Construction Amount x 10 percent	$ 4,523,661	
Amount Admin/design exceeds 10% (deduction)		$ 3,118,994
Net Leverage funds		$ 27,360,926
CIRM Funds	$ 26,059,275	
Ratio of Leverage to CIRM Funds		**1.05**
Matching Funds	$ 5,231,393	
Leverage+ match Ratio to CIRM funds		**1.25**
Percentage of Project funded by CIRM	**44.4%**	
Percentage of Project funded by Applicant (after leverage adjustment)	**55.6%**	

DRAWDOWN SCHEDULE FOR RFA 07-03 UC DAVIS CIRM STEM CELL INSTITUTE-APPLICATION # FA1-00611-1

Project Costs $ 61,770,588 To be spent: CIRM amount: $ 26,059,275
Spent to date $ 17,950,118 Institutional Amount: $ 35,711,313
Amount to Draw $ 43,820,470

Project Award Date 01-Jul-08

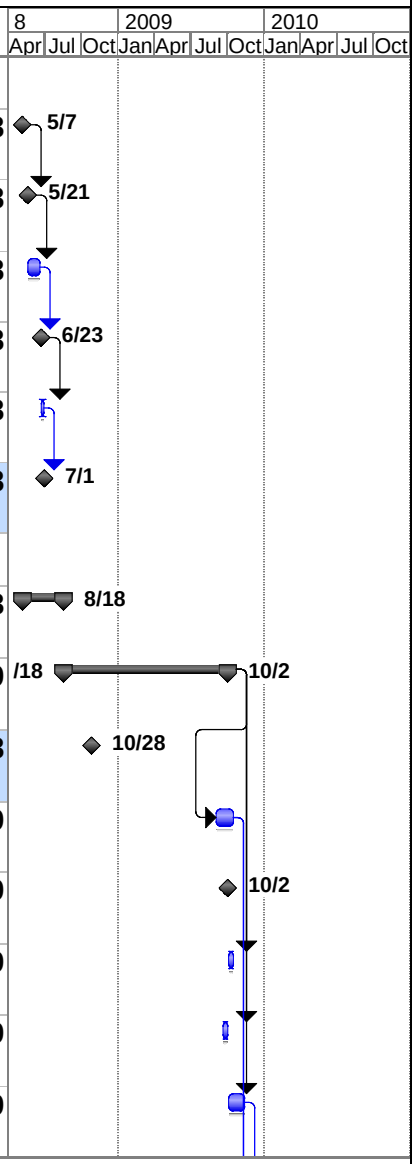
	percent draw	Monthly CIRM Funds	Cumulative CIRM Funds	Monthly Matching Funds	Cumulative Matching Funds	Monthly Other Funds	Cumulative Other Funds	Monthly Total Funds	Cumulative Total Funds
Spent Prior		$ -	$ -	$ -	$ -	$ 17,950,118	$ 17,950,118	$ 17,950,118	$ 17,950,118
Jul-08		$ -	$ -	$ -	$ -	$ 238,404	$ 18,188,522	$ 238,404	$ 18,188,522
Aug-08	1.1%	$ -	$ -	$ 347,114	$ 347,114	$ 238,404	$ 18,426,926	$ 585,518	$ 18,774,040
Sep-08	1.7%	$ -	$ -	$ 520,670	$ 867,784	$ 238,404	$ 18,665,330	$ 759,074	$ 19,533,114
Oct-08	2.2%	$ -	$ -	$ 694,227	$ 1,562,011	$ 238,404	$ 18,903,734	$ 932,631	$ 20,465,745
Dec-08	2.8%	$ -	$ -	$ 867,784	$ 2,429,795	$ 238,404	$ 19,142,138	$ 1,106,188	$ 21,571,933
Dec-08	3.3%	$ -	$ -	$ 1,041,341	$ 3,471,136	$ 1,146,826	$ 20,288,964	$ 2,188,167	$ 23,760,100
Jan-09	3.9%	$ -	$ -	$ 1,214,898	$ 4,686,033	$ 1,146,826	$ 21,435,790	$ 2,361,724	$ 26,121,823
Feb-09	4.5%	$ 891,700	$ 891,700	$ 525,822	$ 5,211,855	$ 1,146,827	$ 22,582,617	$ 2,564,348	$ 28,686,172
Mar-09	5.4%	$ 1,704,015	$ 2,595,715	$ -	$ -	$ 1,146,827	$ 23,729,444	$ 2,850,842	$ 31,537,014
Apr-09	6.4%	$ 1,990,509	$ 4,586,224	$ -	$ -	$ 238,404	$ 23,967,848	$ 2,228,913	$ 33,765,927
May-09	7.8%	$ 2,450,559	$ 7,036,783	$ -	$ -	$ 238,404	$ 24,206,252	$ 2,688,963	$ 36,454,890
Jul-09	8.2%	$ 2,570,471	$ 9,607,254	$ -	$ -	$ 238,404	$ 24,444,656	$ 2,808,875	$ 39,263,765
Jul-09	8.0%	$ 2,516,826	$ 12,124,080	$ -	$ -	$ 488,404	$ 24,933,060	$ 3,005,230	$ 42,268,995
Aug-09	7.9%	$ 2,463,180	$ 14,587,260	$ -	$ -	$ 488,404	$ 25,421,464	$ 2,951,584	$ 45,220,579
Sep-09	7.4%	$ 2,319,269	$ 16,906,529	$ -	$ -	$ 488,404	$ 25,909,868	$ 2,807,673	$ 48,028,252
Oct-09	6.0%	$ 1,888,865	$ 18,795,394	$ -	$ -	$ 488,404	$ 26,398,272	$ 2,377,269	$ 50,405,521
Dec-09	5.0%	$ 1,552,877	$ 20,348,271	$ -	$ -	$ 488,404	$ 26,886,676	$ 2,041,281	$ 52,446,802
Dec-09	5.2%	$ 1,620,471	$ 21,968,742	$ -	$ -	$ 488,404	$ 27,375,080	$ 2,108,875	$ 54,555,677
Jan-10	5.2%	$ 1,631,597	$ 23,600,340	$ -	$ -	$ 488,404	$ 27,863,484	$ 2,120,001	$ 56,675,679
Mar-10	4.3%	$ 1,338,129	$ 24,938,469	$ -	$ -	$ 488,404	$ 28,351,888	$ 1,826,533	$ 58,502,212
Mar-10	3.0%	$ 931,724	$ 25,870,192	$ -	$ -	$ 238,404	$ 28,590,292	$ 1,170,128	$ 59,672,339
Apr-10	0.6%	$ 189,083	$ 26,059,275	$ -	$ -	$ 710,243	$ 29,300,535	$ 899,326	$ 60,571,665
May-10		$ -	$ -	$ -	$ -	$ 689,732	$ 29,990,267	$ 689,732	$ 61,261,397
Jun-10		$ -	$ -	$ -	$ -	$ 509,191	$ 30,499,458	$ 509,191	$ 61,770,588
Jul-10		$ -	$ -	$ -	$ -	$ -		$ -	
Totals	**100%**	**$ 26,059,275**		**$ 5,211,855**		**$ 30,499,458**		**$ 61,770,588**	

UCDAVIS HEALTH SYSTEM

UC Davis/CIRM Stem Cell Institute
CIRM RFA 07-03
Application #FA1-00611-1

Mon 2/25/08

ID	Task Name	Start	Finish
1			
2	**ICOC Decision On RFA 07-03**	**Wed 5/7/08**	**Wed 5/7/08**
3	**Project funding approval**	**Wed 5/21/08**	**Wed 5/21/08**
4	**Prepare Grant Support Information**	**Thu 5/22/08**	**Fri 6/20/08**
5	**Submit Grant Support Information to CIRM**	**Mon 6/23/08**	**Mon 6/23/08**
6	**CIRM Prepares Notice of Grant Award**	**Tue 6/24/08**	**Mon 6/30/08**
7	**Sign Notice of Grant Award**	**Tue 7/1/08**	**Tue 7/1/08**
8			
9	**Phase 2 Bid Process**	**Thu 5/8/08**	**Mon 8/18/08**
20	**Phase 2 Construction**	**Mon 8/18/08**	**Fri 10/2/09**
26	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 10/28/08**	**Tue 10/28/08**
27	**GMP Validation Process**	**Fri 9/4/09**	**Fri 10/16/09**
28	**Phase 2 Beneficial Occupancy**	**Fri 10/2/09**	**Fri 10/2/09**
29	**Group 2 Equipment Installation (Phase 2)**	**Mon 10/5/09**	**Fri 10/16/09**
30	**Testing, Balancing & Commissioning**	**Mon 9/21/09**	**Fri 10/2/09**
31	**Vivarium Sentinel Mice Testing**	**Mon 10/5/09**	**Fri 11/13/09**



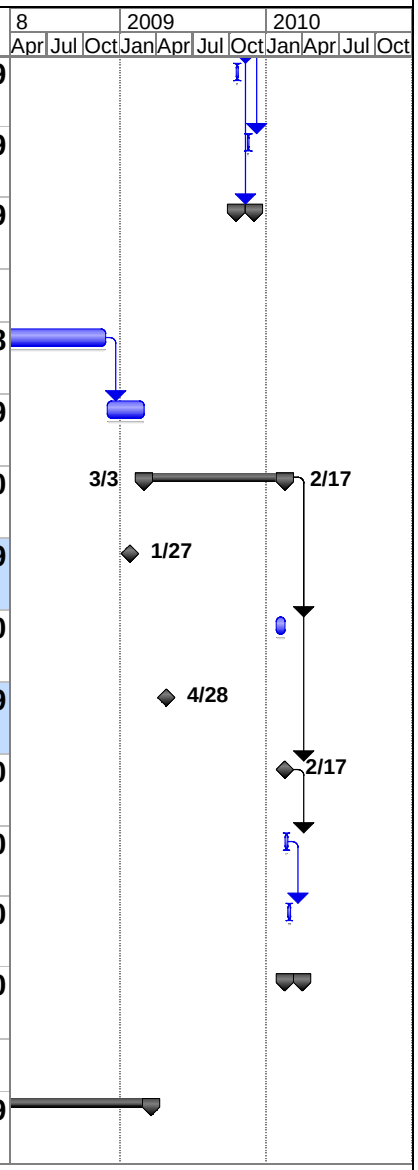
Phase 2 = "Z" Component Phase 2A = "Y" Component
Phase 2B = "X" Component

UCDAVIS HEALTH SYSTEM

UC Davis/CIRM Stem Cell Institute
CIRM RFA 07-03
Application #FA1-00611-1

Mon 2/25/08

ID	Task Name	Start	Finish
32	**GMP Move-In**	**Mon 10/19/09**	**Fri 10/23/09**
33	**Vivarium Move-In**	**Mon 11/16/09**	**Thu 11/19/09**
34	**Phase 2 Contract Close Out**	**Mon 10/19/09**	**Wed 12/2/09**
40			
41	**Phase 2A Planning**	**Tue 10/3/06**	**Wed 11/26/08**
42	**Phase 2A Bid Process**	**Mon 12/1/08**	**Mon 3/2/09**
43	**Phase 2A Construction**	**Tue 3/3/09**	**Wed 2/17/10**
56	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 1/27/09**	**Tue 1/27/09**
57	**Phase 2A Testing, Balancing & Commissioning**	**Wed 1/27/10**	**Wed 2/17/10**
58	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 4/28/09**	**Tue 4/28/09**
59	**Phase 2A Beneficial Occupancy**	**Wed 2/17/10**	**Wed 2/17/10**
60	**Group 2 Equipment Installation (Phase 2A)**	**Thu 2/18/10**	**Wed 2/24/10**
61	**Phase 2A Move-In**	**Thu 2/25/10**	**Wed 3/3/10**
62	**Phase 2A Contract Close Out**	**Thu 2/18/10**	**Thu 4/1/10**
66			
67	**Phase 2B Planning**	**Tue 10/3/06**	**Fri 3/20/09**



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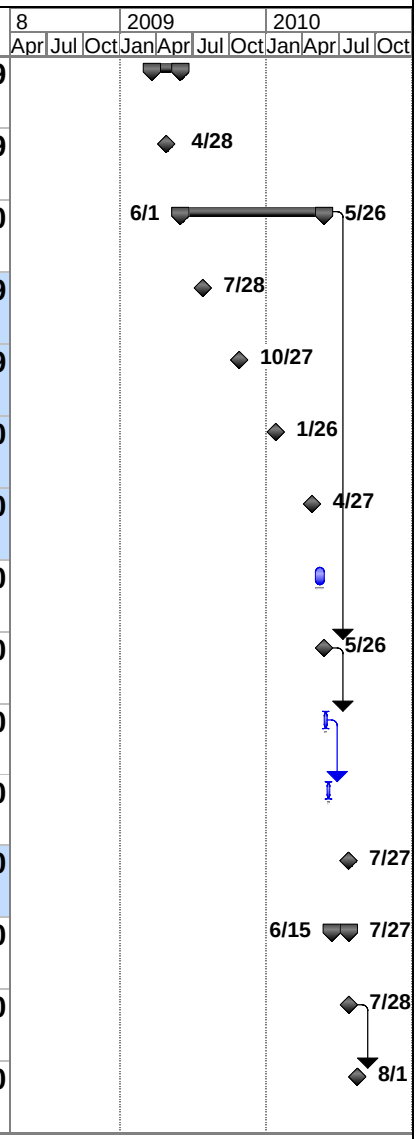
UCDAVIS HEALTH SYSTEM

UC Davis/CIRM Stem Cell Institute
CIRM RFA 07-03
Application #FA1-00611-1

Mon 2/25/08

ID	Task Name	Start	Finish
104	**Phase 2B Bid Process**	**Mon 3/23/09**	**Mon 6/1/09**
115	**Prepare Quarterly Funding request to CIRM**	**Tue 4/28/09**	**Tue 4/28/09**
116	**Phase 2B Construction**	**Mon 6/1/09**	**Wed 5/26/10**
131	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 7/28/09**	**Tue 7/28/09**
132	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 10/27/09**	**Tue 10/27/09**
133	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 1/26/10**	**Tue 1/26/10**
134	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 4/27/10**	**Tue 4/27/10**
135	**Phase 2B Testing, Balancing & Commissioning**	**Wed 5/5/10**	**Wed 5/26/10**
136	**Phase 2B Beneficial Occupancy**	**Wed 5/26/10**	**Wed 5/26/10**
137	**Group 2 Equipment Installation (Phase 2B)**	**Thu 5/27/10**	**Wed 6/2/10**
138	**Phase 2B Move-In**	**Thu 6/3/10**	**Wed 6/9/10**
139	**Prepare Quarterly Update Report & Funding request to CIRM**	**Tue 7/27/10**	**Tue 7/27/10**
140	**Phase 2B Contract Close Out**	**Tue 6/15/10**	**Tue 7/27/10**
144	**Request final construction completion amount**	**Wed 7/28/10**	**Wed 7/28/10**
145	**CIRM issues final payment (10%)**	**Wed 8/18/10**	**Wed 8/18/10**



Phase 2 = "Z" Component Phase 2A = "Y" Component
Phase 2B = "X" Component

Copies of the requested plans are submitted as an enclosed bound set (15”x22”) and the project specifications, due to their size, are being submitted electronically both by the submission of the email and the enclosed Compact Disc. Following is the index of the drawings provided:

CS.1 COVER SHEET
CS.2 SITE PLAN

ASSIGNABLE SQUARE FOOTAGES

A2.1 OVERALL FLOOR PLAN
A2.1.1 ENLARGED FLOOR PLAN- NORTH VIVARIUM
A2.1.2 ENLARGED FLOOR PLAN- SOUTH VIVARIUM
A2.1.3 ENLARGED FLOOR PLAN- NORTH GMP
A2.1.4 ENLARGED FLOOR PLAN- SOUTH GMP
A2.1.1A ENLARGED FLOOR PLAN- PH2A- NORTH
A2.1.2B ENLARGED FLOOR PLAN- PH2A- SOUTH
A2.1.1B ENLARGED FLOOR PLAN- PH2B- NORTH
A2.1.2B ENLARGED FLOOR PLAN- PH2B- SOUTH

ARCHITECTURAL (Same as ASSIGNABLE SQUARE FOOTAGE plans with color hatching)

A2.1.1 ENLARGED FLOOR PLAN- NORTH VIVARIUM
A2.1.2 ENLARGED FLOOR PLAN- SOUTH VIVARIUM
A2.1.3 ENLARGED FLOOR PLAN- NORTH GMP
A2.1.4 ENLARGED FLOOR PLAN- SOUTH GMP
A2.1.1A ENLARGED FLOOR PLAN- PH2A- NORTH
A2.1.2B ENLARGED FLOOR PLAN- PH2A- SOUTH
A2.1.1B ENLARGED FLOOR PLAN- PH2B- NORTH
A2.1.2B ENLARGED FLOOR PLAN- PH2B- SOUTH

ENLARGED EQUIPMENT PLAN-

LE2.1.1 ENLARGED FLOOR PLAN- PHASE 2 VIVARIUM
LE2.1.2 ENLARGED FLOOR PLAN- PHASE 2 VIVARIUM
LE2.1.3 ENLARGED FLOOR PLAN- PHASE 2 CORE SUPPORT
LE2.1.4 ENLARGED FLOOR PLAN-

	PHASE 2 GMP
LE2.1.4	**ENLARGED FLOOR PLAN- PHASE 2 GMP**
LE2.1.5	**ENLARGED FLOOR PLAN- PHASE 2 GMP**
LE2.1.6	**ENLARGED FLOOR PLAN- PHASE 2 GMP**
LE2.1.7	**ENLARGED FLOOR PLAN- PHASE 2A**
LE2.1.8	**ENLARGED FLOOR PLAN- PHASE 2A**
LE2.1.9	**ENLARGED FLOOR PLAN- PHASE 2A**
LE2.1.10	**ENLARGED FLOOR PLAN- PHASE 2A**
LE2.1.11	**ENLARGED FLOOR PLAN- PHASE 2A**
LE2.1.12	**ENLARGED FLOOR PLAN- PHASE 2B**
LE2.1.13	**ENLARGED FLOOR PLAN- PHASE 2B**
LE2.1.14	**ENLARGED FLOOR PLAN- PHASE 2B**

LAB FURNISHING DRAWINGS

LF 2.0	**PHASE 2 OVERALL**
LF2.0A	**LABORATORY FURNISHINGS PARTIAL PLAN**
LF2.0B	**LABORATORY FURNISHINGS PARTIAL PLAN**
LF2.0C	**LABORATORY FURNISHINGS PARTIAL PLAN**
LF2.0D	**LABORATORY FURNISHINGS PARTIAL PLAN**
LF2.0a	**PHASE 2A OVERALL FLOOR PLAN**
LF2.1a	**LABORATORY FURNISHINGS PARTIAL PLAN**
LF2.2a	**LABORATORY FURNISHINGS PARTIAL PLAN**
LF2.0b	**PHASE 2B OVERALL FLOOR PLAN**
LF2.1b	**LABORATORY FURNISHINGS PARTIAL PLAN**
LF2.2b	**LABORATORY FURNISHINGS PARTIAL PLAN**

MECHANICAL DRAWINGS

M5.1	**HVAC GMP AIRFLOW SCHEMATIC**
M5.2	**HVAC GMP AIRFLOW SCHEMATIC**
M5.3	**HVAC VIVARIUM AIRFLOW SCHEMATIC**
M5.4	**HVAC VIVARIUM AIRFLOW SCHEMATIC**

UCDAVIS
HEALTH SYSTEM

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION # FA1-00611-1

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ARCHITECTURAL
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A2.1.4 ENLARGED FLOOR PLAN- SOUTH GMP
A2.1.1A ENLARGED FLOOR PLAN- PH2A- NORTH
A2.1.2B ENLARGED FLOOR PLAN- PH2A- SOUTH
A2.1.1B ENLARGED FLOOR PLAN- PH2B- NORTH
A2.1.2B ENLARGED FLOOR PLAN- PH2B- SOUTH

ENLARGED EQUIPMENT PLAN-
LE2.1.1 ENLARGED FLOOR PLAN- PHASE 2 VIVARIUM
LE2.1.2 ENLARGED FLOOR PLAN- PHASE 2 VIVARIUM
LE2.1.3 ENLARGED FLOOR PLAN- PHASE 2 CORE SUPPORT
LE2.1.4 ENLARGED FLOOR PLAN- PHASE 2 GMP
LE2.1.4 ENLARGED FLOOR PLAN- PHASE 2 GMP
LE2.1.5 ENLARGED FLOOR PLAN- PHASE 2 GMP
LE2.1.6 ENLARGED FLOOR PLAN- PHASE 2 GMP
LE2.1.7 ENLARGED FLOOR PLAN- PHASE 2A
LE2.1.8 ENLARGED FLOOR PLAN- PHASE 2A

ENLARGED EQUIPMENT PLAN- (cont.)
LE2.1.9 ENLARGED FLOOR PLAN- PHASE 2A
LE2.1.10 ENLARGED FLOOR PLAN- PHASE 2A
LE2.1.11 ENLARGED FLOOR PLAN- PHASE 2A
LE2.1.12 ENLARGED FLOOR PLAN- PHASE 2B
LE2.1.13 ENLARGED FLOOR PLAN- PHASE 2B
LE2.1.14 ENLARGED FLOOR PLAN- PHASE 2B

LAB FURNISHING DRAWINGS
LF 2.0 PHASE 2 OVERALL
LF2.0A LABORATORY FURNISHINGS PARTIAL PLAN
LF2.0B LABORATORY FURNISHINGS PARTIAL PLAN
LF2.0C LABORATORY FURNISHINGS PARTIAL PLAN
LF2.0D LABORATORY FURNISHINGS PARTIAL PLAN

LAB FURNISHING DRAWINGS- (cont.)
LF2.0a PHASE 2A OVERALL FLOOR PLAN
LF2.1a LABORATORY FURNISHINGS PARTIAL PLAN
LF2.2a LABORATORY FURNISHINGS PARTIAL PLAN
LF2.0b PHASE 2B OVERALL FLOOR PLAN
LF2.1b LABORATORY FURNISHINGS PARTIAL PLAN
LF2.2b LABORATORY FURNISHINGS PARTIAL PLAN

MECHANICAL DRAWINGS
M5.1 HVAC GMP AIRFLOW SCHEMATIC
M5.2 HVAC GMP AIRFLOW SCHEMATIC
M5.3 HVAC VIVARIUM AIRFLOW SCHEMATIC
M5.4 HVAC VIVARIUM AIRFLOW SCHEMATIC

ARCHITECTS
STAFFORD KING WIESE

LICENSED ARCHITECT
PATRICK M. DERICKSON
LIC.# C17107
REN.
STATE OF CALIFORNIA

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STELL CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

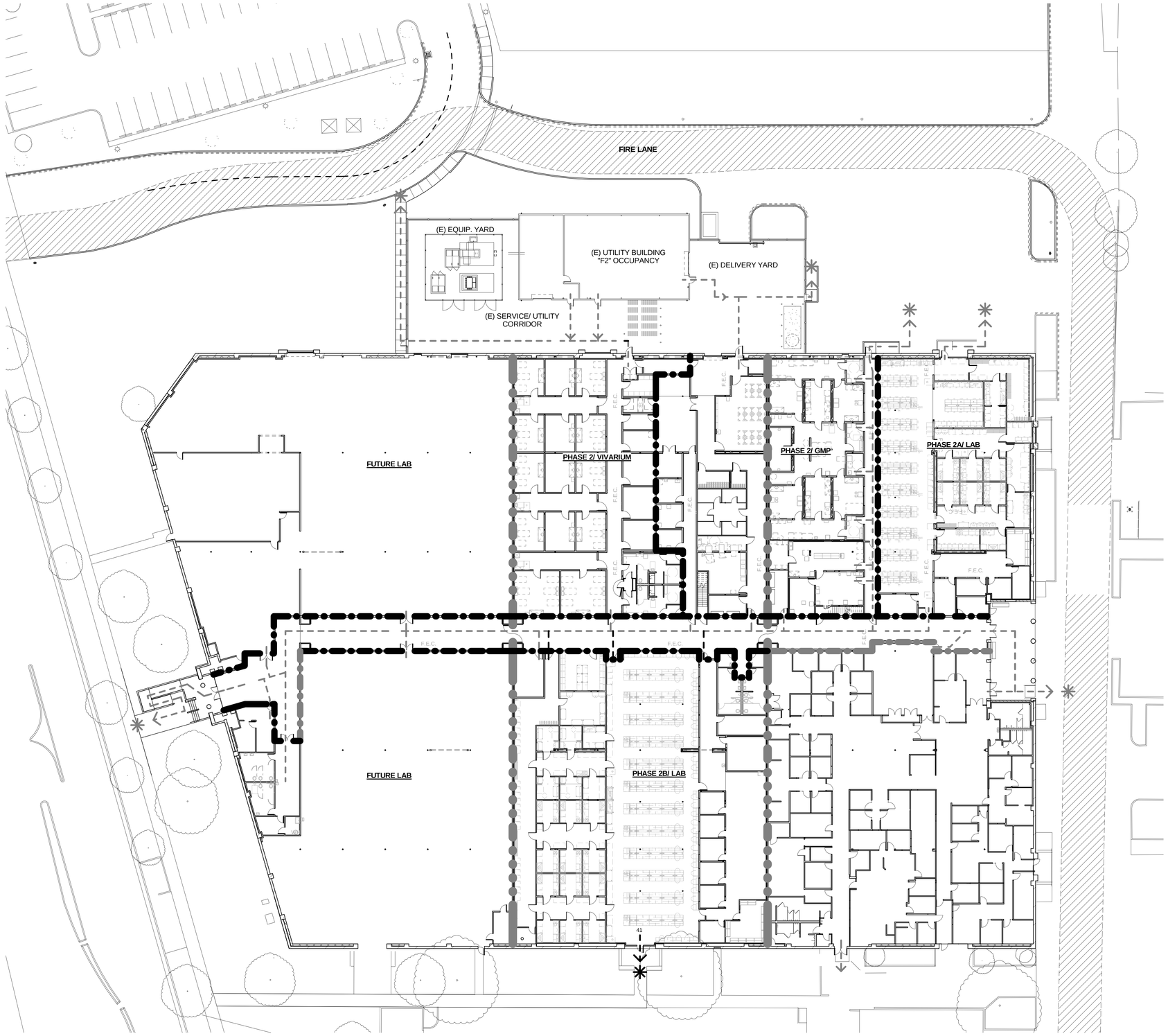
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/CODE:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: COVER SHEET

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: CS.1
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 1/31/2008 1:03:56 PM



1 **CIRM STEM CELL INSTITUTE SITE PLAN-**
1" = 20'-0"

BUILDING DATA

GROUP B OCCUPANCY (BASED 304)

BUILDING TYPE:	3-B (TABLE 503)
BASIC ALLOWABLE AREA:	19,000 SQ. FT. (TABLE 503)

AREA MODIFICATIONS:
AUTOMATIC FIRE SPRINKLER INCREASES
{19,000+[19,000X2]}= 57,000 SQ. FT.

ACTUAL AREAS WITHIN THE AREA SEPARATION WALLS

EAST	34,178 SQ. FT.
CENTER	32,940 SQ. FT.
WEST	38,744 SQ. FT.

CONSTRUCTION PER TABLE 601: STRUCTURAL FRAME, PERMANENT PARTITIONS, BEARING WALLS, ROOF & ROOF/ CEILING ASSEMBLIES N.R.

OCCUPANCY GROUP B
TYPE 3-B WITH NON-BEARING
EXTERIOR WALLS: TABLE 602 REQUIRES: NON RATED
IF FIRE SEPARATION DISTANCE > 30 FT.

MIXED OCCUPANCY CALCULATION- CENTER BAY

CENTER BAY SBRC MAX SQUARE FOOTAGE	57,000 SQ. FT.
ACTUAL AREA	
UTILITY PLANT	3,260 SQ.FT.
CENTER BAY OF SBRC	32,940 SQ. FT.
TOTAL	36,200 SQ. FT.

ALLOWABLE AREA FOR MIXED OCC. PER CBC 508.3.2 ...THE AREA OF THE BUILDING SHALL BE SUCH THAT THE SUM OF THE RATIOS OF THE ACTUAL AREA FOR EACH SEPARATE OCCUPANCY DIVIDED BY THE TOTAL ALLOWABLE AREA FOR EACH SEPARATE OCCUPANCY SHALL NOT EXCEED ONE.

$$\frac{32{,}940 \text{ SQ. FT.}}{57{,}000 \text{ SQ.FT.}} + \frac{3{,}260 \text{ SQ. FT.}}{54{,}000 \text{SQ.FT.}} = .96 < 1$$ **THEREFORE OK**

BUILDING DATA (E) UTILITY PLANT

(FOR INFORMATION ONLY)
BASED ON THE 2001 CBC

GROUP F-2 OCCUPANCY (TABLE 3-A)

FOR THE PURPOSE OF DETERMINING MAXIMUM ALLOWABLE AREA, THE UTILITY PLANT AND THE EXISTING CENTER AREA OF BUILDING 41 ARE CONSIDERED TO BE ONE BUILDING.

UTILITY PLANT

TYPE OF CONSTRUCTION:	3-N (TABLE 5-A)
OCC. GROUP	F-2
BASIC ALLOWABLE AREA:	18,000 SQ. FT. (TABLE 5-B)
SPRINKLER INCREASE:	X3
TOTAL ALLOWABLE AREA	54,000 SQ. FT.
MAX HEIGHT	55 FT.

LEGEND

- FIRE LANE
- (E) PATH OF EGRESS — # OCCUPANTS EXITING
- PATH OF EGRESS — # OCCUPANTS EXITING
- (E) 4 HR. FIRE WALL
- (E) 1 HR. FIRE BARRIER WALL — FOR LAB CONTROL AREA SEPARATION PER CBC 414.2
- 1 HR. FIRE BARRIER WALL — FOR LAB CONTROL AREA SEPARATION PER CBC 414.2

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

UNIVERSITY OF CALIFORINA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

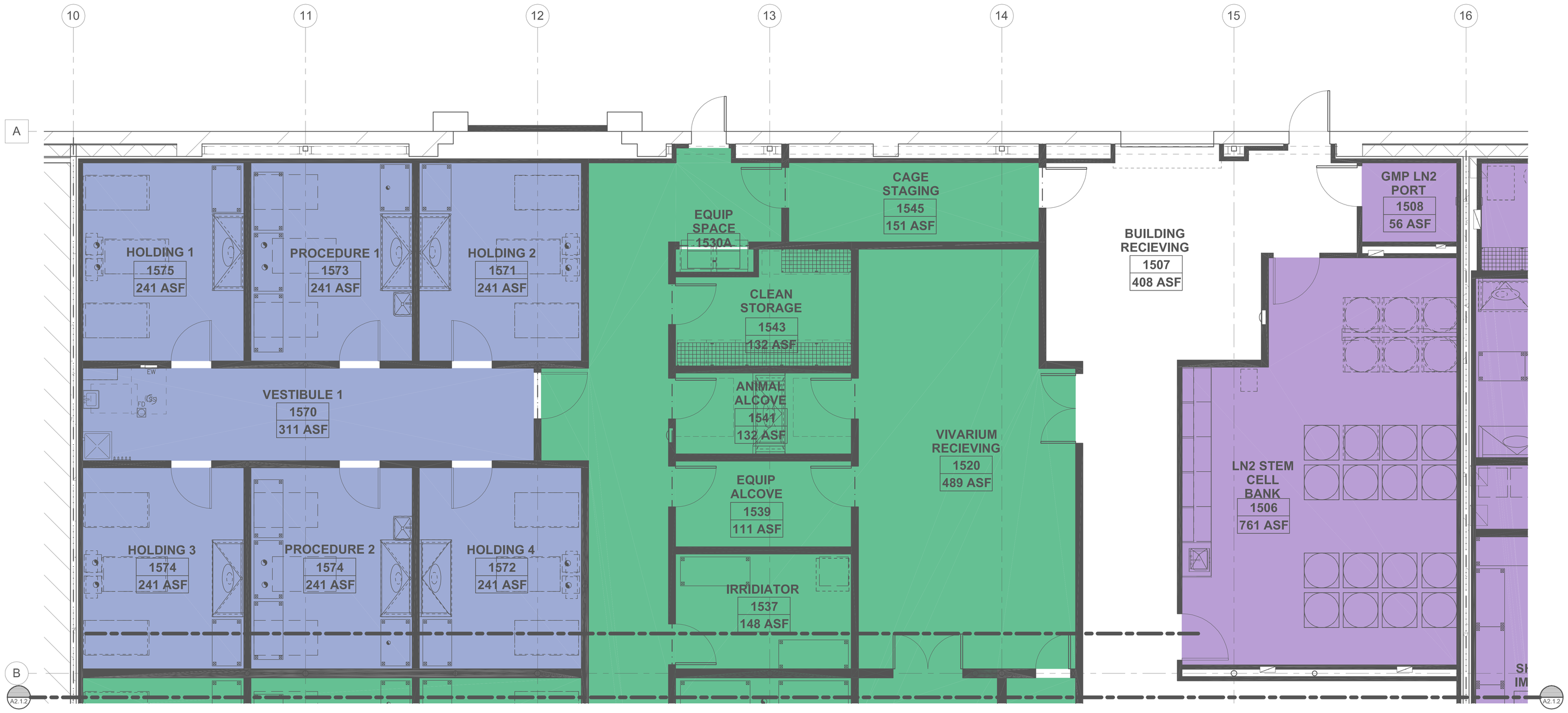
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 953600
CSI/IPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORINA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: SITE PLAN

ARCH.I. ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: CS.2
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: PMD	DATE: 01/08/08	REVISION
DRAFTER: WLR	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 2/25/2008 9:53:48 PM



1 FLOOR PLAN
1/4" = 1'-0"

EDIT DATE: 1/31/2008 1:03:56 PM

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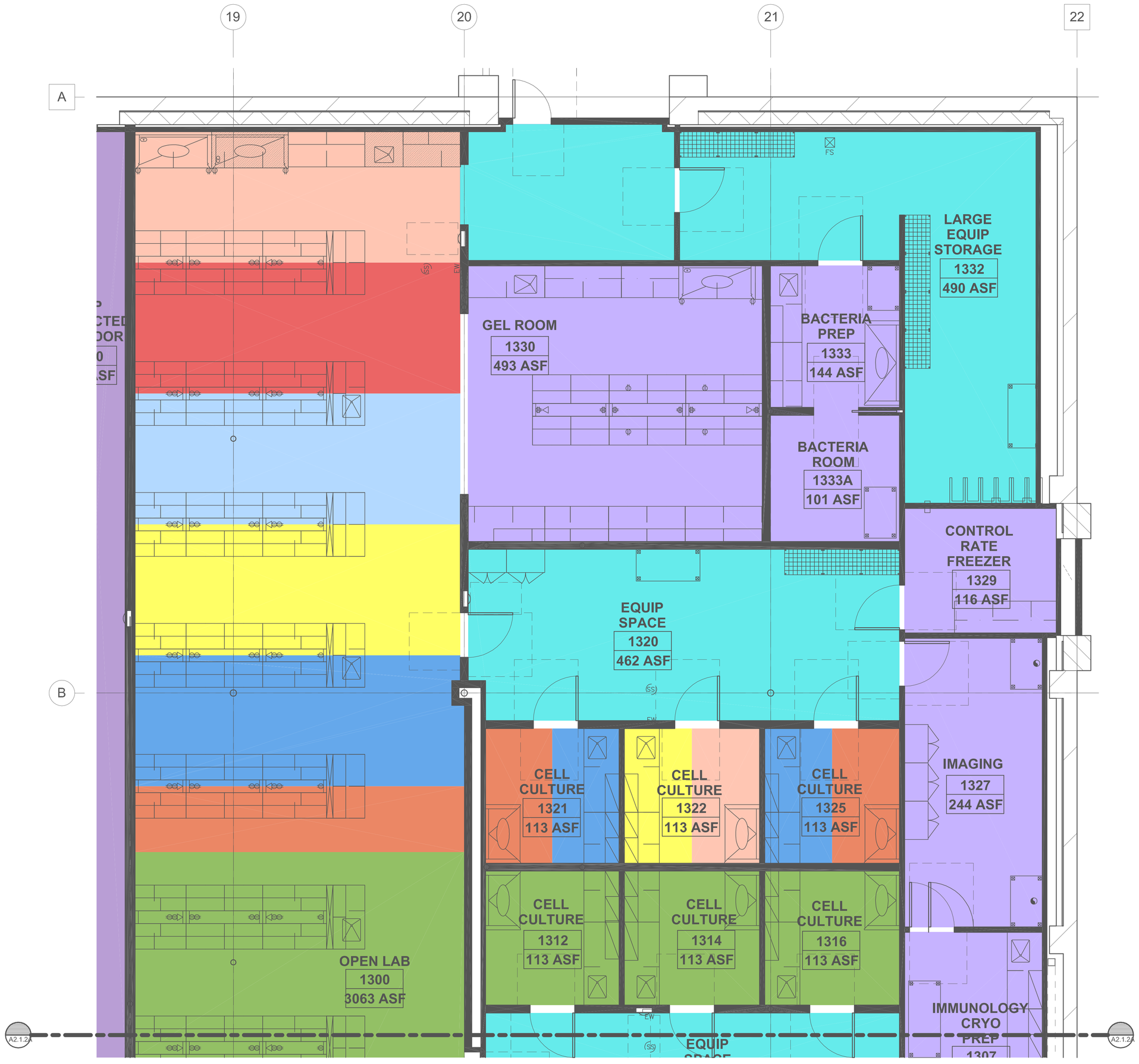
CIRM RFA 07-03
APPLICATION#FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN NORTH VIVARIUM

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.1
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		



1 **FLOOR PLAN-**
1/4" = 1'-0"

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CIRM RFA 07-03
APPLICATION#FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN PH2A - NORTH

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.1A
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

1 FLOOR PLAN-
1/4" = 1'-0"

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CIRM RFA 07-03
APPLICATION#FA1-00611-1

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NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN PH2B - NORTH

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.1B
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

1 FLOOR PLAN
1/4" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN SOUTH VIVARIUM

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.2
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

1 FLOOR PLAN-
1/4" = 1'-0"

EDIT DATE: 1/31/2008 1:03:56 PM

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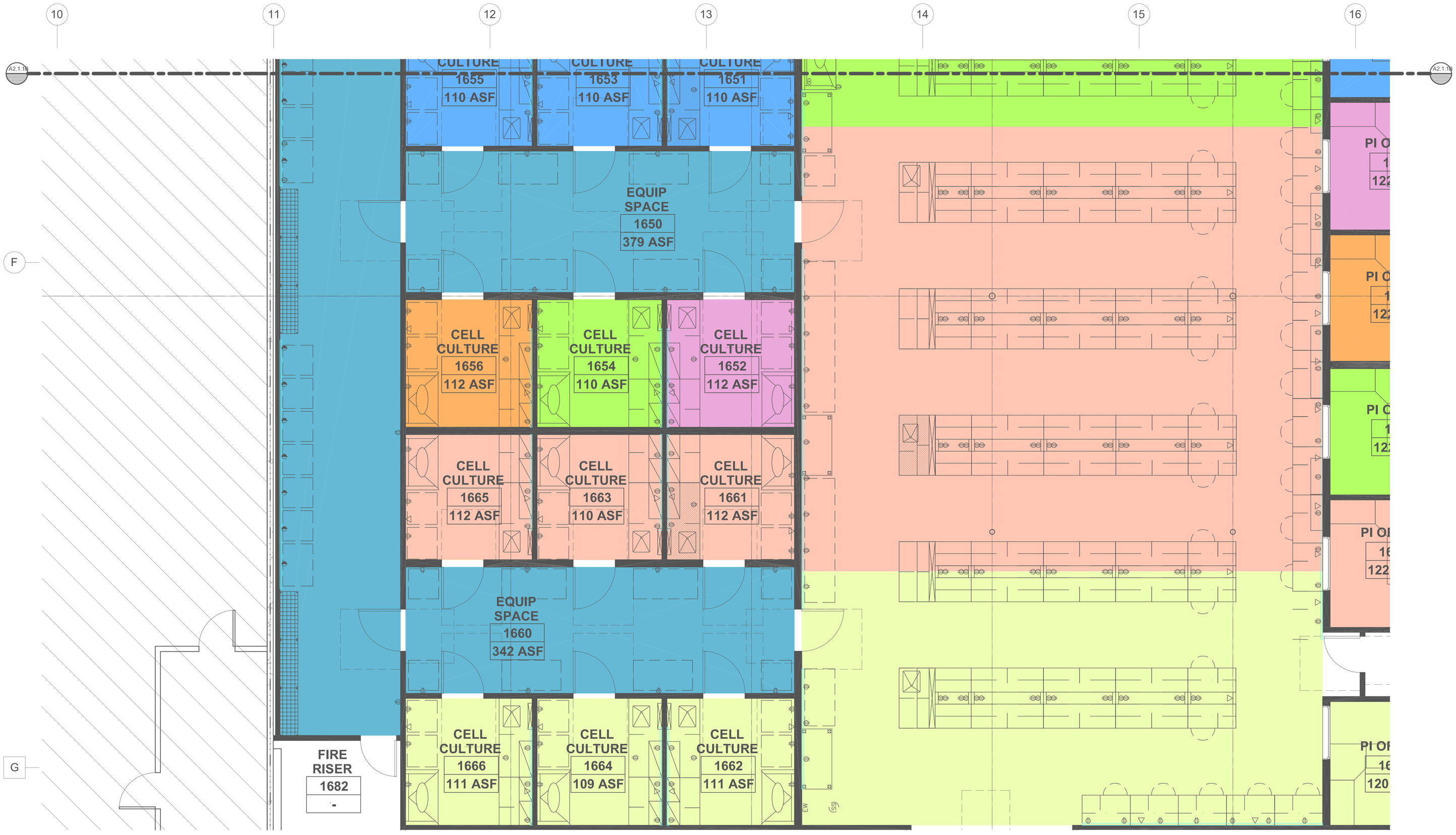
CIRM RFA 07-03
APPLICATION#FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN PH2A - SOUTH

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.2A
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		



1 **FLOOR PLAN-**
1/4" = 1'-0"

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CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION#FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCURIST NO. 9553600
OSHPD NO.:
BLDG NO.: BUILDING 41
MINOR/LOCR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN PH2B - SOUTH

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO. A2.1.2B
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

1 **FLOOR PLAN-**
1/4" = 1'-0"

EDIT DATE: 1/31/2008 1:03:56 PM

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UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

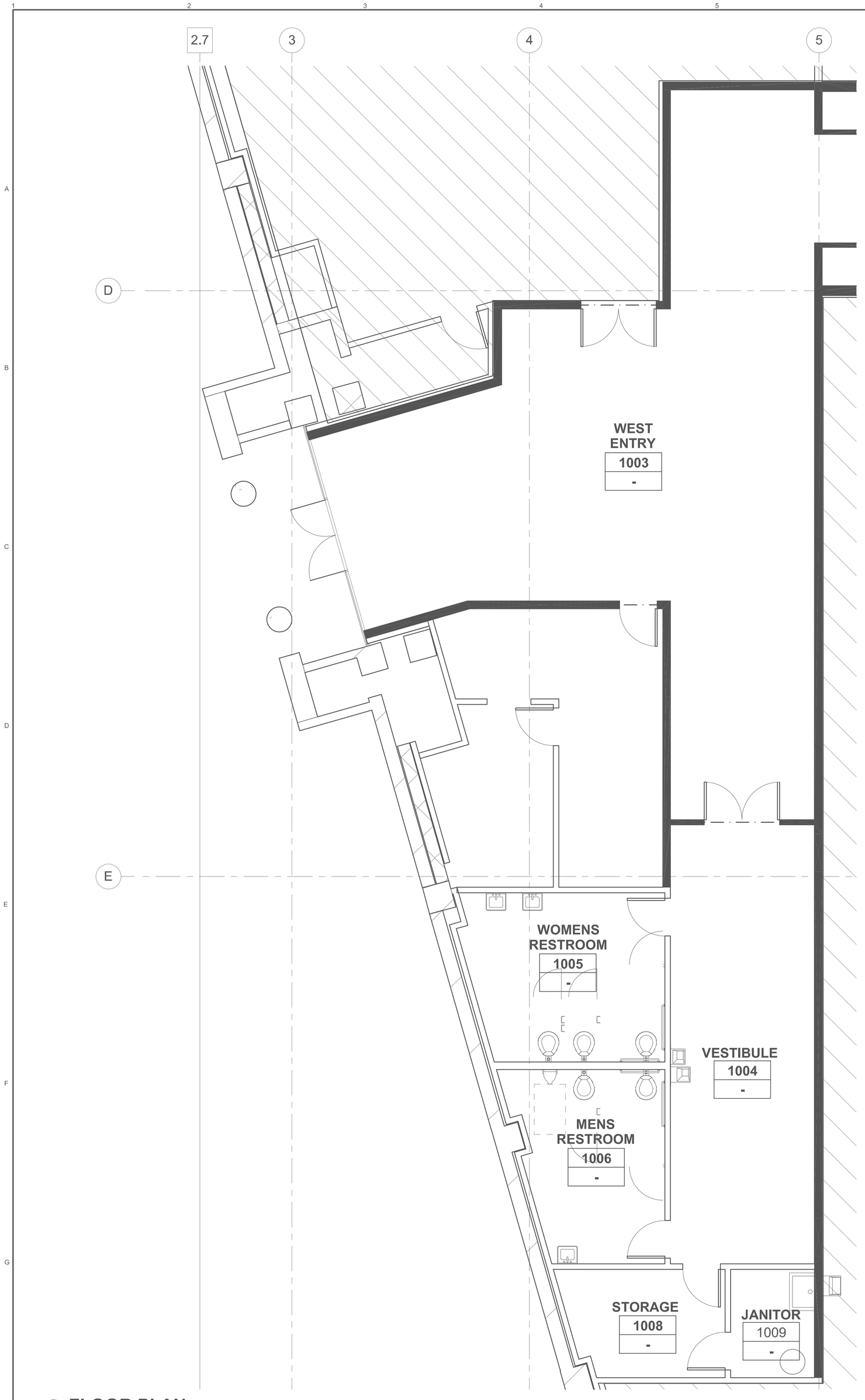
CIRM RFA 07-03
APPLICATION#FA1-00611-1

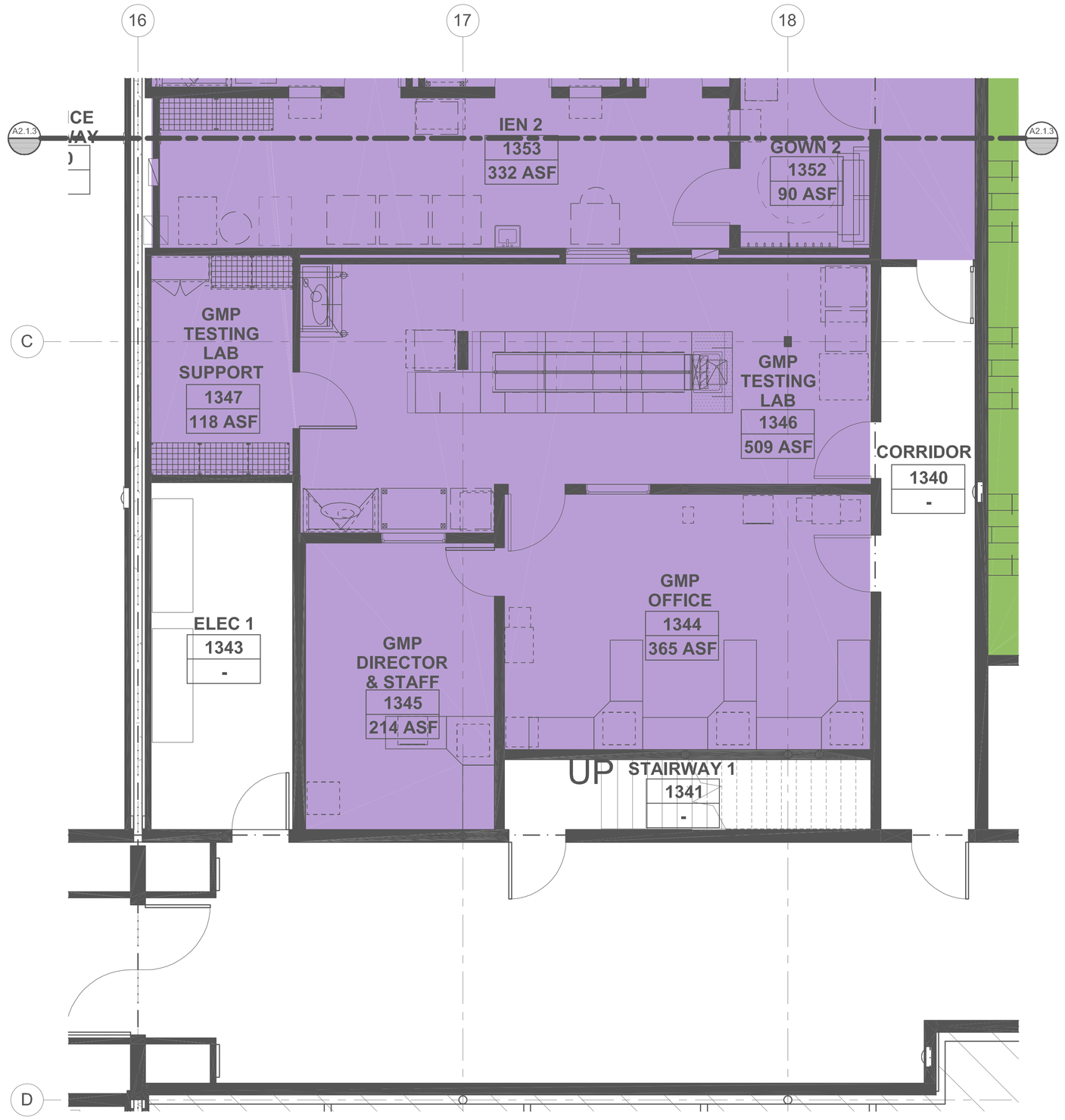
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

PROGRAM NO.: 9553600
(GMP2 NO.)
BLDG.NO.: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN
NORTH GMP

ARCH.I. ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.3
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: .	
UCDMC DRAWING NO.: .		





1 **FLOOR PLAN-**
1/4" = 1'-0"

EDIT DATE: 1/31/2008 1:03:56 PM

ARCHITECTS

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CLIENT AND PROJECT

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UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION#FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

FOCUSPRT NO. 9553600
USPRO NO.
BELDING BUILDING 41
MINOR/LOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN SOUTH GMP

ARCH.I. ENGR. OF RECORD	PROJECT NO.	SHEET NO.
PAT DERICKSON	2773	A2.1.4
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

PHASE 2- VIVARIUM

- FDA TOXICOLOGY- SAFTEY STUDIES
- VIVARIUM
- SHARED CORE SERVICES

PHASE 2- GMP LABORATORY

- GOOD MANUFACTURING PRACTICE LABORATORY

PHASE 2A- LABORATORY

- SHARED LAB EQUIPMENT SPACES. DIVIDED AMONG PROGRAMS
- NEW RECRUIT - TO BE NAMED
- NEURAL- DECARLI- HAGERMAN- ROGAWSKI
- CART. REGENERATION & BONE REPAIR- REDDI
- SKIN DISORDERS ULCERS & WOUND HEALING- ZHAO
- RETINAL DEGENERATION/ BLINDNESS- TELANDER
- HIV/ AIDS & HSC- DANDEKAR
- LIVER DISEASE- M.I. P.V.D.- NOLTA
- SHARED CORE SERVICES
- BUILDING ADMINSTRATION

PHASE 2B- LABORATORY

- KIDNEY DISEASE- TARANTAL
- LIVER DISEASE- ZERN
- BLADDER RECONSTRUCTION- KURZOCK
- HEART DISEASE- LI
- NEW RECRUIT 1 - TO BE NAMED
- NEW RECRUIT 2- TO BE NAMED
- SHARED LAB EQUIPMENT SPACES. DIVIDED AMONG PROGRAMS
- SHARED CORE SERVICES

1 **FLOOR PLAN-**
1/16" = 1'-0"

EDIT DATE: 1/31/2008 1:03:56 PM

ARCHITECTS
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CLIENT AND PROJECT

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UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION#FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: OVERALL FLOOR PLAN

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1
PROJECT MANAGER: JOHN GAMBONE	SCALE: As Indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

GENERAL NOTES

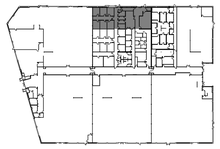
1. REFER TO A7.1 FOR WALL TYPES AND FIRE RATED ASSEMBLIES
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. REFER TO A7.3 FOR TYPICAL MOUNTING HEIGHTS SCHEDULE
4. REFER TO FINISH SCHEDULE, A7.2, FOR ADDITIONAL NOTES AND FINISHES
5. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK. U.O.N.
6. REFER TO A2.1A AND A2.1B FOR EQUIPMENT NAME & DESCRIPTION.
7. FOR PATCH & REPAIR OF SLAB- SEE 7/S1.2

SHEET NOTES

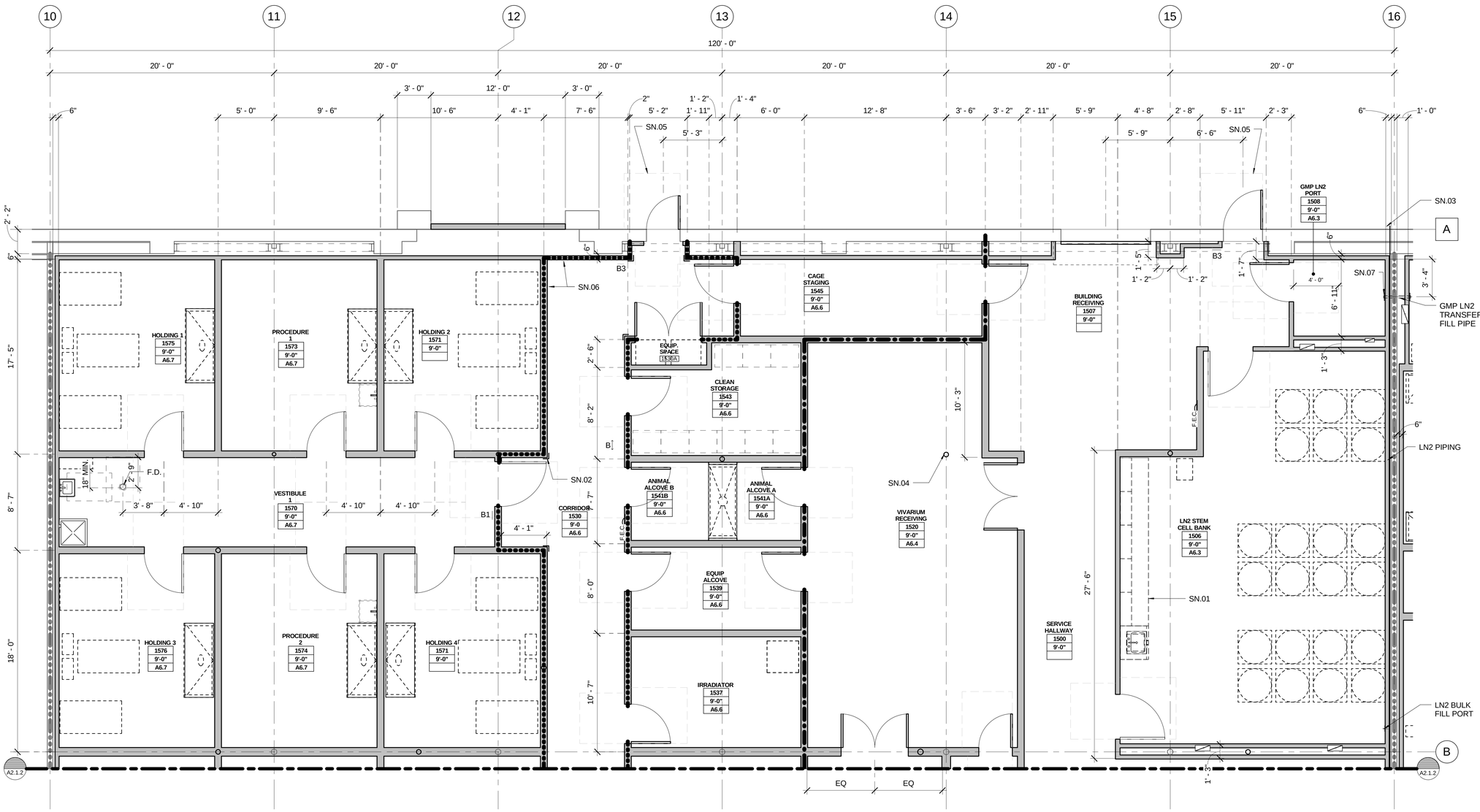
SN.01	LABORATORY CASEWORK O.F.O.I. SEE LF2.0A DRAWINGS FOR LAYOUT
SN.02	IMPACT CORNER GUARDS SEE DETAIL 6/A7.6
SN.03	LN2 POINT OF CONNECTION TO BULK FILL TANK
SN.04	EXPOSED COLUMN TO BE PAINTED, W-1-D
SN.05	(E) LANDING IN FRONT OF DOORS PROVIDE 5' CLR. IN FRONT DOORS,WITH A MAX SLOPE UNDER 2% IN EACH DIRECTION.
SN.06	IMPACT RAIL SEE 15/A7.6

LEGEND

- (E) WALL PARTITION TO REMAIN
- (E) 4HR. CONCRETE TILT UP WALL TO REMAIN
- WALL PARTITION (SEE PARTITION SCHEDULE)
- (E) 1 HR. RATED PARTITION
- 1 HR. RATED PARTITION
- 1 HR. OCCUPANCY SEPARATION
- (E) 4 HR. AREA SEPARATION
- 4 HR. AREA SEPARATION
- B- EXIT SIGNAGE, SEE 18 & 19/A7.3 (ARROW INDICATES DIRECTION OF ARROW ON SIGN, IF APPLICABLE.



KEYPLAN



1 ENLARGED FLOOR PLAN- NORTH VIVARIUM
1/4" = 1'-0"

EDIT DATE: 2/25/2008 9:32:41 PM

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

STOCKTON BOULEVARD RESEARCH CENTER

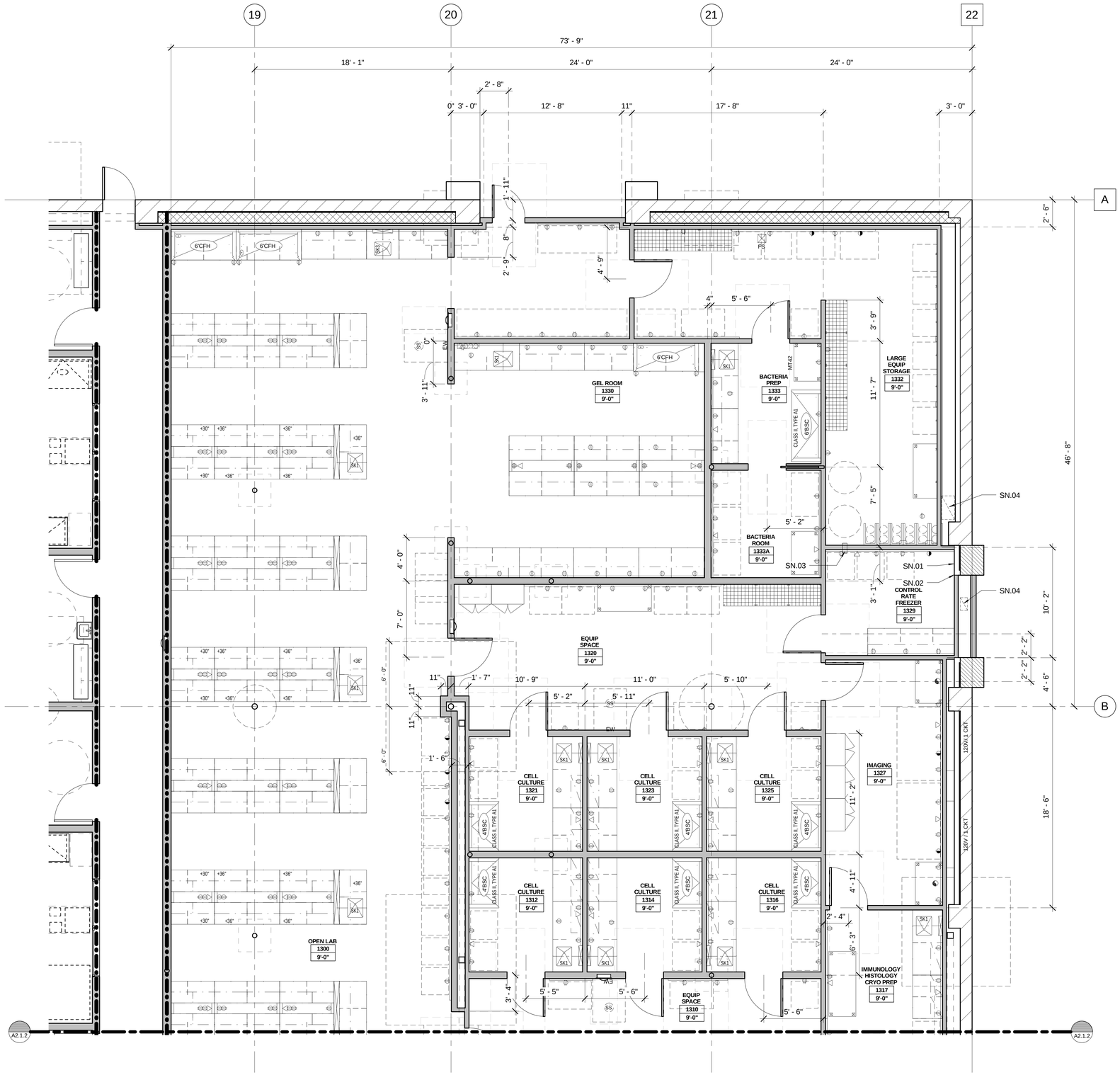
CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

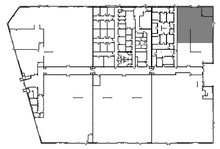
ACCOUNT NO. 9553600 / CONTROL NO.
BUILDING: BUILDING 41 / WINGFLOOR:
PROJECT TITLE: STOCKTON BOULEVARD RESEARCH CENTER
SHEET TITLE: ENLARGED FLOOR PLAN- NORTH VIVARIUM

ARCH I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO. 2773	SHEET NO. A2.1.1
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: PMD	DATE: 01/25/08	REVISION
DRAFTER: WLR	PREVIOUS DRAWING NO. -	
UCDMC DRAWING NO. -		



1 ENLARGED FLOOR PLAN- PHASE 2A NORTH LAB

1/4" = 1'-0"



KEYPLAN

SHEET NOTES

SN.01	GYPSUM BOARD o/(E) WOOD STUDS T0 11'-0" ABOVE FINISH FLOOR.
SN.02	GYPSUM BOARD TO BE FLUSH WITH ADJACENT SURFACE.
SN.03	3" DIA. SLEEVE THRU WALL @ 54" A.F.F.
SN.04	LOW WALL RETURN DUCTWORK.

GENERAL NOTES

1. REFER A7.2 FOR FINISH SCHEDULE & ADDITIONAL NOTES AND FINISHES.
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK, U.O.N.
4. LABORATORY EQUIPMENT, FURNITURE AND CASEWORK ARE OFOI, UNLESS OTHERWISE NOTED

LEGEND

- (E) WALL PARTITION TO REMAIN
- WALL PARTITION (SEE PARTITION SCHEDULE)
- (E) 1 HR. FIRE BARRIER
- 1 HR. FIRE BARRIER

ARCHITECTS

STAFFORD KING WIESE

LICENSED ARCHITECT
PATRICK M. DERICKSON
LIC.# C17107
REN. 2/28/09
STATE OF CALIFORNIA

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

UNIVERSITY OF CALIFORINA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

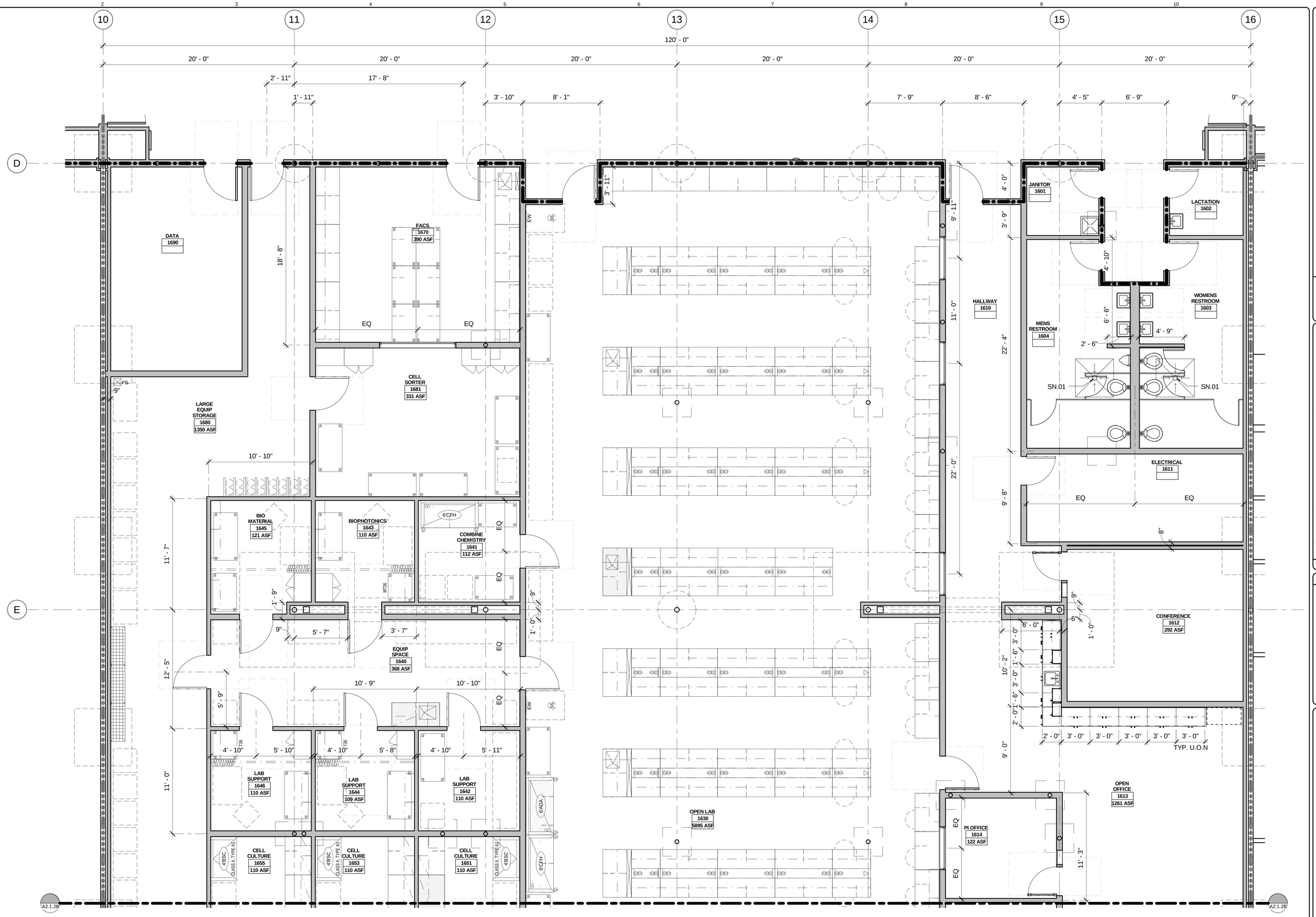
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO. 9553600 (DWG FILE)
BUILDING 41 WING/FLOOR
PROJECT TITLE: UNIVERSITY OF CALIFORINA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN- NORTH LAB

ARCH.I.ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.1A
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: PMD	DATE: 01/08/08	REVISION
DRAFTER: WLR	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 2/25/2008 9:53:25 PM



1 ENLARGED FLOOR PLAN - PHASE 2B NORTH LAB

1/4" = 1'-0"

SHEET NOTES

SN.01 FLOOR DRAIN

GENERAL NOTES

1. REFER A7.2 FOR FINISH SCHEDULE & ADDITIONAL NOTES AND FINISHES.
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK, U.O.N.
4. LABORATORY EQUIPMENT, FURNITURE AND CASEWORK ARE OFOI, UNLESS OTHERWISE NOTED

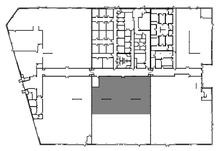
LEGEND

(E) WALL PARTITION TO REMAIN

WALL PARTITION (SEE PARTITION SCHEDULE)

(E) 1 HR. FIRE BARRIER

1 HR. FIRE BARRIER



KEYPLAN

ARCHITECTS

STAFFORD KING WIESE

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

UNIVERSITY OF CALIFORINA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO. 9553600 (SHAPE FILE)

BUILDING: BUILDING 41 (WINGS/FLOOR)

PROJECT TITLE: UNIVERSITY OF CALIFORINA DAVIS CIRM STEM CELL INSTITUTE

SHEET TITLE: ENLARGED FLOOR PLAN - PHASE 2B NORTH LAB

ARCH.I.ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.1B
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 2/25/2008 9:53:28 PM

SHEET NOTES

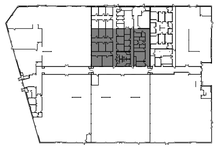
SN.01 REFER TO SHEET A7.2 FOR FLOOR TILE PATTERN
SN.02 SCULLERY SINK SEE 8/LF7.1
SN.03 WIRE MESH PARTITION POST, REFER TO 13/A7.4 SET 2" CLEAR FROM WALLS AND COLUMNS
SN.04 LABORATORY CASEWORK, O.F.O.I SEE LF2.0B
SN.05 IMPACT CORNER GUARDS SEE 6/A7.6
SN.06 IMPACT RAILS SEE 15/A7.6
SN.07 COORDINATE LOCATION OF LN2 TRANSFER PIPE WITH FILL PORT AT IEX
SN.08 COORDINATE LOCATION OF LN2 TRANSFER PIPE WITH FILL PORT LOCATION AT IEN FIRE RATED PASS THROUGH CHAMBER, UL APPROVED 20 MINUTE ASSEMBLY. SEE 11/A7.6
SN.09 COORDINATE LOCATION OF LN2 TRANSFER PIPE WITH FILL PORT AT IEX FIRE RATED PASS THROUGH CHAMBER, UL APPROVED 20 MINUTE ASSEMBLY. SEE 11/A7.6

LEGEND

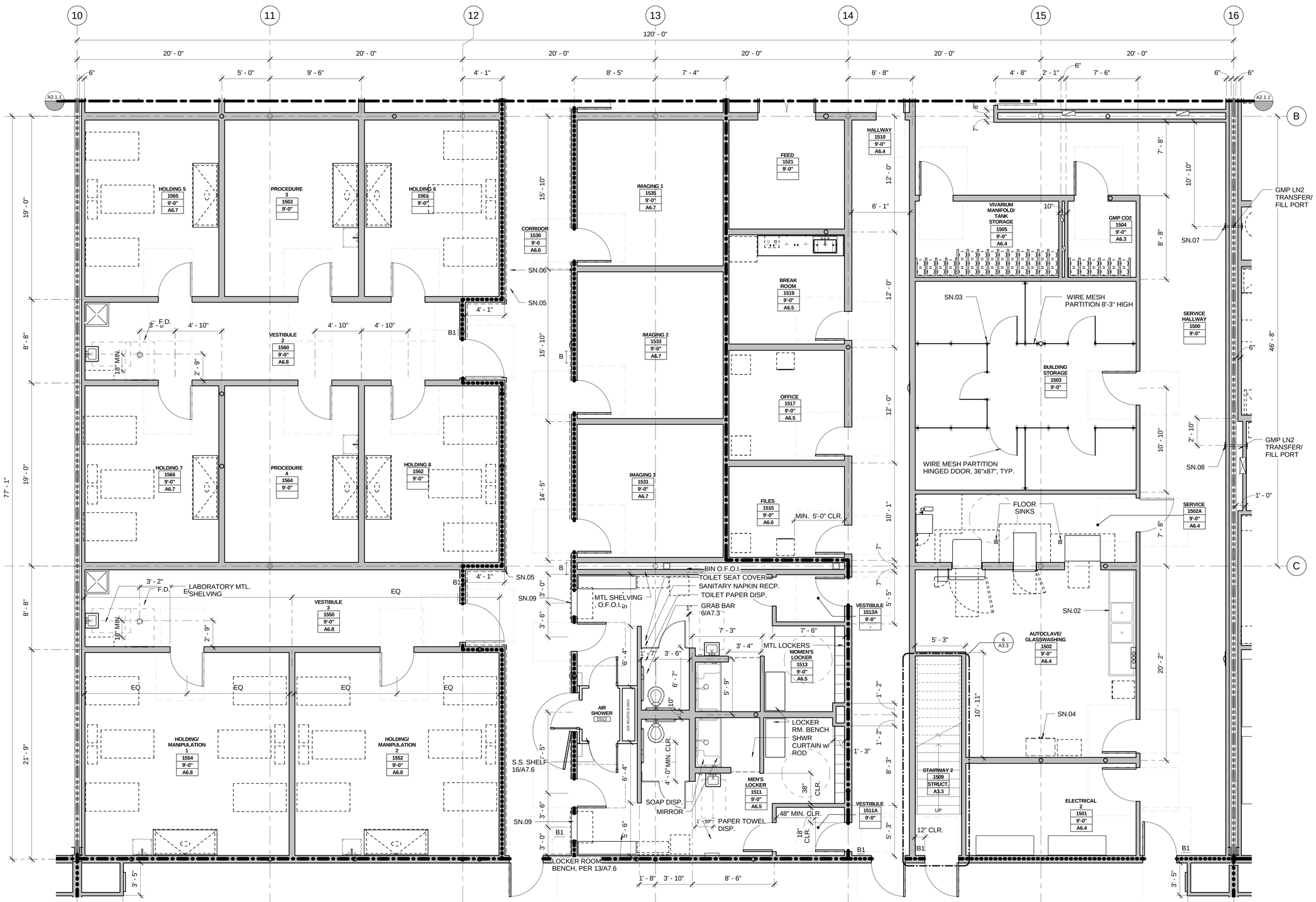
(E) WALL PARTITION TO REMAIN
(E) 4HR. CONCRETE TILT UP WALL
WALL PARTITION (SEE PARTITION SCHEDULE)
B- EXIT SIGNAGE, SEE 18 & 19/A7.3 (ARROW INDICATES DIRECTION OF ARROW ON SIGN, IF APPLICABLE.
(E) 1 HR. RATED PARTITION
1 HR. RATED PARTITION
1 HR. OCCUPANCY SEPARATION
(E) 4 HR. AREA SEPARATION
4 HR. AREA SEPARATION

GENERAL NOTES

1. REFER TO A7.1 FOR WALL TYPES AND FIRE RATED ASSEMBLIES
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. REFER TO A7.3 FOR TYPICAL MOUNTING HEIGHTS SCHEDULE
4. REFER TO FINISH SCHEDULE, A7.2, FOR ADDITIONAL NOTES AND FINISHES
5. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK. U.O.N.
6. REFER TO A2.1A AND A2.1B FOR EQUIPMENT NAME & DESCRIPTION.
7. FOR PATCH & REPAIR OF SLAB- SEE 7/S1.2
8. MIN. 1% OF LOCKERS TO BE ACCESIBLE



KEY PLAN



1 ENLARGED FLOOR PLAN- SOUTH VIVIARUM
1/4" = 1'-0"

EDIT DATE: 2/25/2008 9:32:47 PM

ARCHITECTS

STAFFORD KING WIESE

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

STOCKTON BOULEVARD RESEARCH CENTER

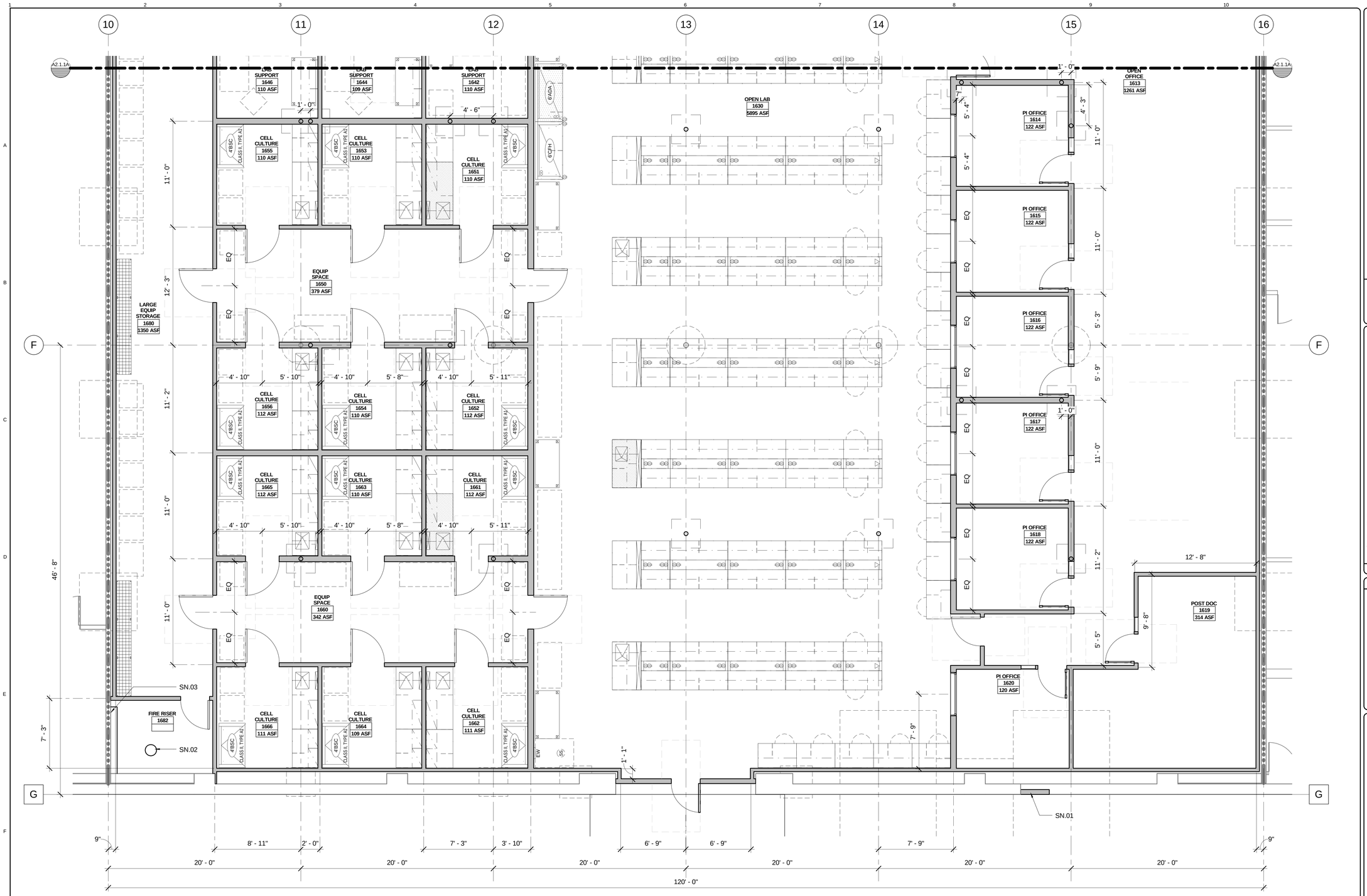
CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO. 9553600
BUILDING 41
PROJECT TITLE: STOCKTON BOULEVARD RESEARCH CENTER
SHEET TITLE: ENLARGED FLOOR PLAN SOUTH VIVARIUM

ARCH.'s ENGR. OF RECORD: PAT DERICKSON	PROJECT NO. 2773	SHEET NO. A2.1.2
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: PMD	DATE: 01/25/08	REVISION
DRAFTER: WLR	PREVIOUS DRAWING NO. -	
UCDMC DRAWING NO. -		



1 ENLARGED FLOOR PLAN - PHASE 2B SOUTH LAB

1/4" = 1'-0"

SHEET NOTES

SN.01 DOOR OPENING TO BE IN-FILLED WITH CEMENT PLASTER o/ 1/2" PLYWOOD SHEATHING & METAL STUDS

SN.02 (E) FIRE RISER TO REMAIN

SN.03 FIRESTOP (E) PENETRATION PER WJ5028

GENERAL NOTES

1. REFER A7.2 FOR FINISH SCHEDULE & ADDITIONAL NOTES AND FINISHES.
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK, U.O.N.
4. LABORATORY EQUIPMENT, FURNITURE AND CASEWORK ARE OFOI, UNLESS OTHERWISE NOTED

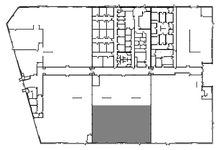
LEGEND

(E) WALL PARTITION TO REMAIN

WALL PARTITION (SEE PARTITION SCHEDULE)

(E) 1 HR. FIRE BARRIER

1 HR. FIRE BARRIER



KEYPLAN

EDIT DATE: 2/25/2008 9:53:33 PM

ARCHITECTS

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

UNIVERSITY OF CALIFORINA DAVIS
CIRM STEM CELL INSTITUTE

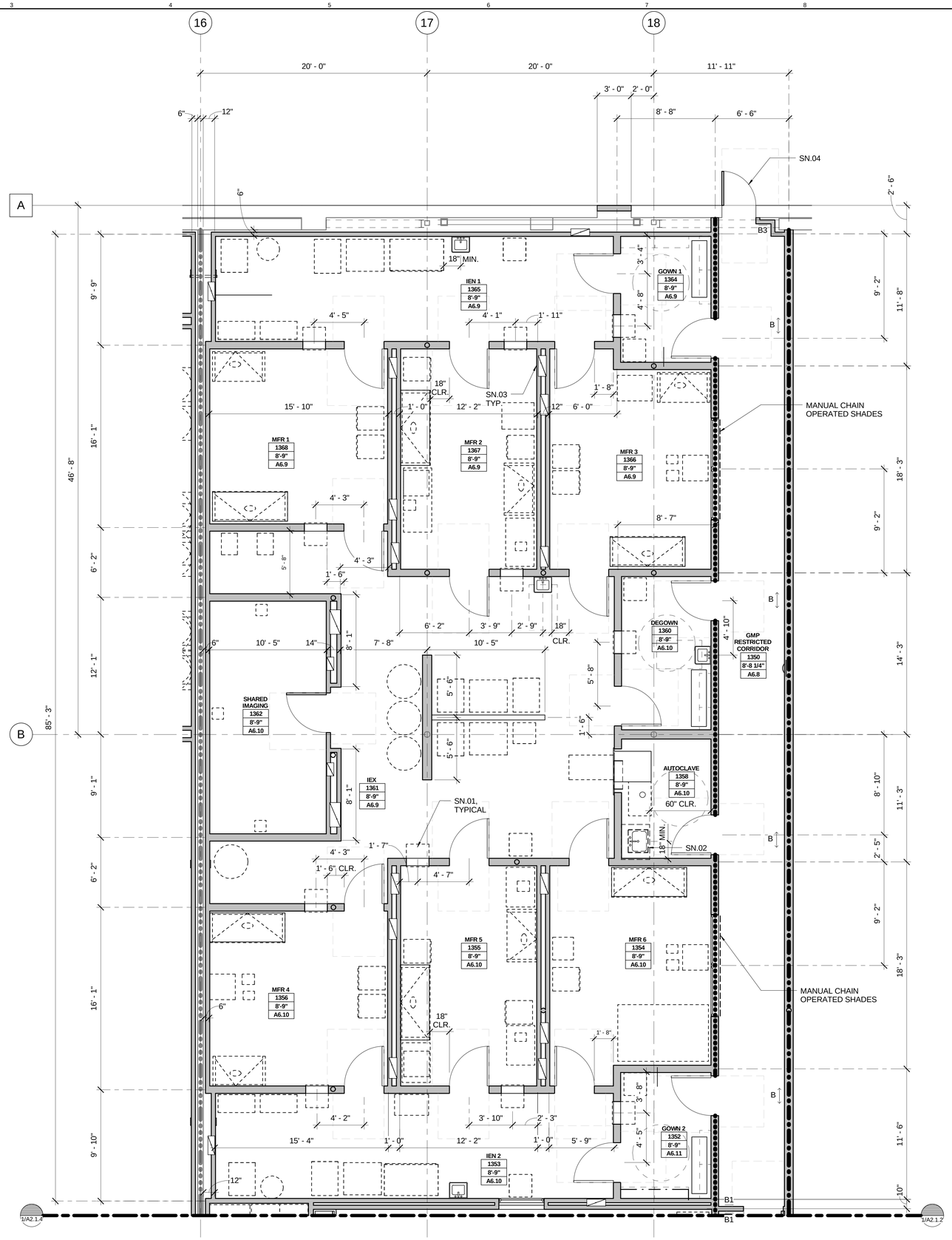
CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

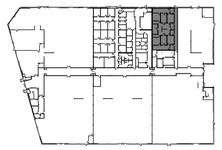
NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO. 9553600
CONTRACT:
BIA/FMG BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN - PHASE 2B SOUTH LAB

ARCH.I.ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.2B
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: Checker	DATE: 01/08/08	REVISION:
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		



1 **ENLARGED FLOOR PLAN- GMP LAB**
1/4" = 1'-0"



KEYPLAN

LEGEND

- (E) WALL PARTITION TO REMAIN
- (E) 4HR. CONCRETE TILT UP WALL TO REMAIN
- WALL PARTITION (SEE PARTITION SCHEDULE)
- (E) 1 HR. RATED PARTITION
- 1 HR. RATED PARTITION
- 1 HR. OCCUPANCY SEPARATION
- (E) 4 HR. AREA SEPARATION
- 4 HR. AREA SEPARATION
- B- EXIT SIGNAGE, SEE 18 & 19/A7.3 (ARROW INDICATES DIRECTION OF ARROW ON SIGN, IF APPLICABLE.

SHEET NOTES

SN.01	PASS THROUGH SEE 11/A7.7
SN.02	LABORATORY FURNISHINGS SEE LF2.0C FOR LAYOUT
SN.03	MECHANICAL DUCTWORK & WALL DIFFUSER SEE 6/A7.7 REFER TO INTERIOR ELEVATION FOR LOCATION
SN.04	(E) LANDING IN FRONT OF DOORS PROVIDE 5' CLEAR IN FRONT OF DOORS, WITH MAX. SLOPE 2% IN EA. DIRECTION.
SN.05	GMP WALL GROMMET PER 17/A7.7

GENERAL NOTES

1. REFER TO A7.1 FOR WALL TYPES AND FIRE RATED ASSEMBLIES
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. REFER TO A7.3 FOR TYPICAL MOUNTING HEIGHTS SCHEDULE
4. REFER TO FINISH SCHEDULE, A7.2, FOR ADDITIONAL NOTES AND FINISHES
5. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK. U.O.N.
6. REFER TO A2.1A AND A2.1B FOR EQUIPMENT NAME & DESCRIPTION.
7. FOR PATCH & REPAIR OF SLAB- SEE 7/S1.2
8. REFER TO 4/A7.7 FOR TYPICAL GMP BASE CONDITION
9. REFER TO 15/ A7.7 FOR TYPICAL WALL PANEL JOINT FOR GFRCP.

ARCHITECTS
STAFFORD KING WIESE
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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

STOCKTON BOULEVARD RESEARCH CENTER

CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
BUILDING: BUILDING 41
PROJECT TITLE: STOCKTON BOULEVARD RESEARCH CENTER
SHEET TITLE: ENLARGED FLOOR PLAN- GMP LAB

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.3
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: PMD	DATE: 01/25/08	REVISION
DRAFTER: WLR	PREVIOUS DRAWING NO.: -	
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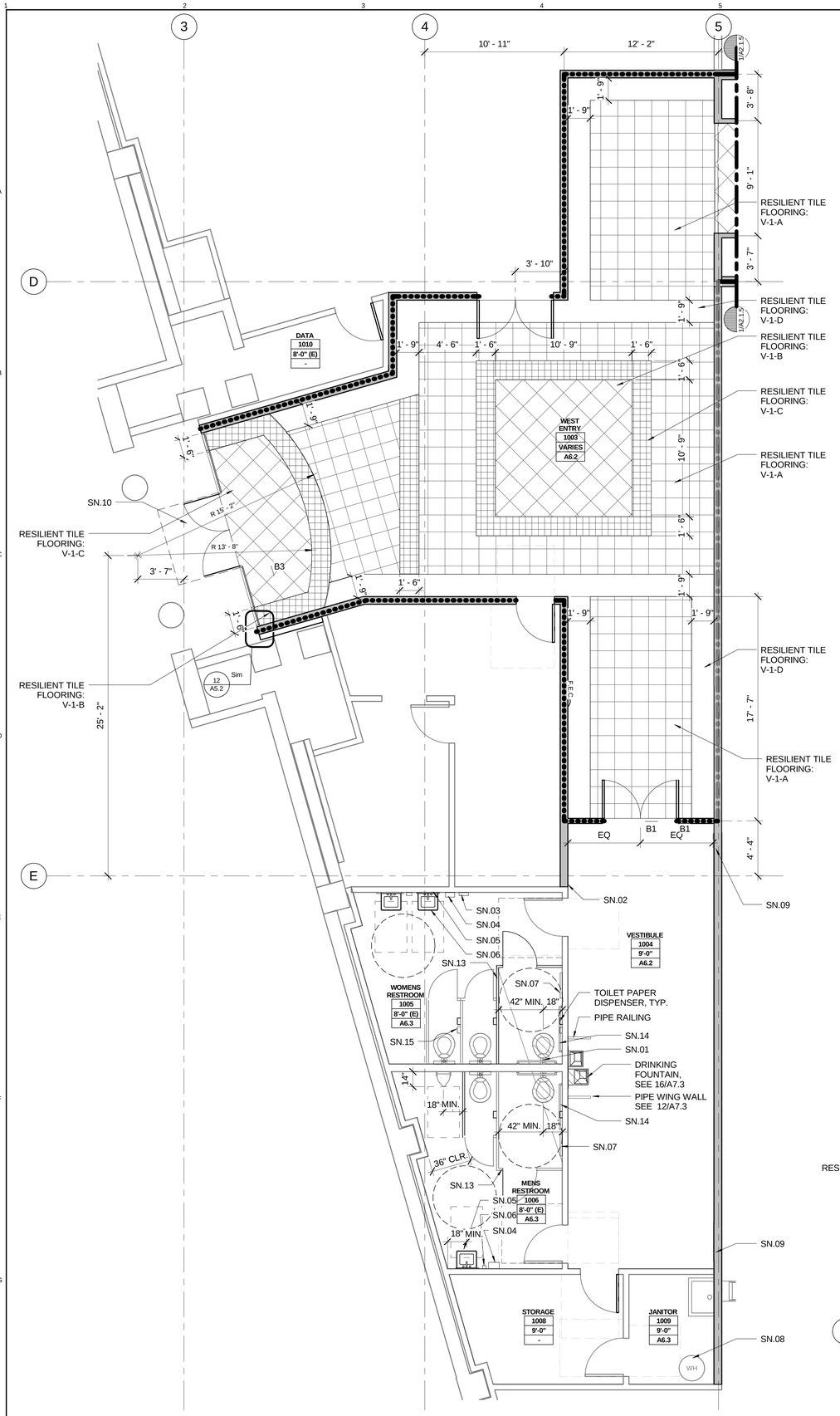
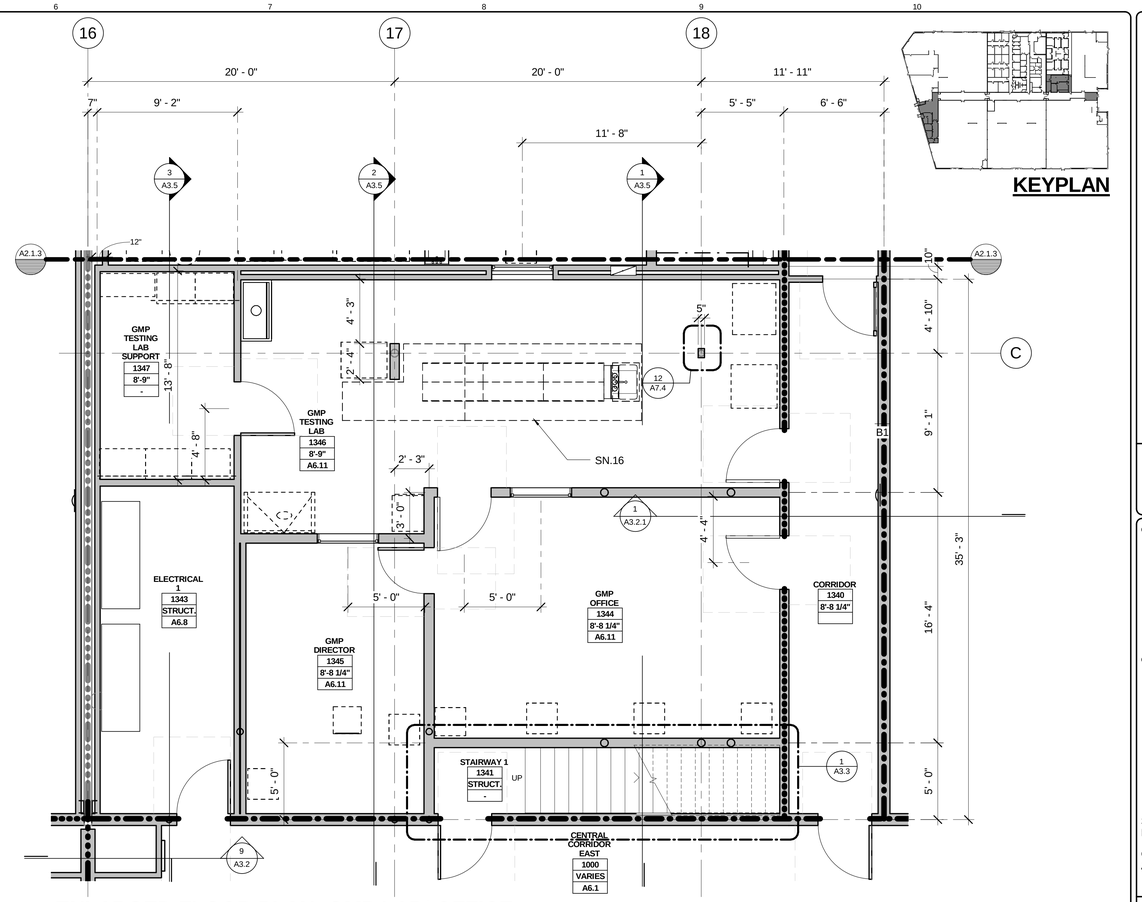
EDIT DATE: 2/25/2008 9:32:50 PM



3 ENLARGED FLOOR PLAN- WEST ENTRY & TOILET ROOMS

1/4" = 1'-0"



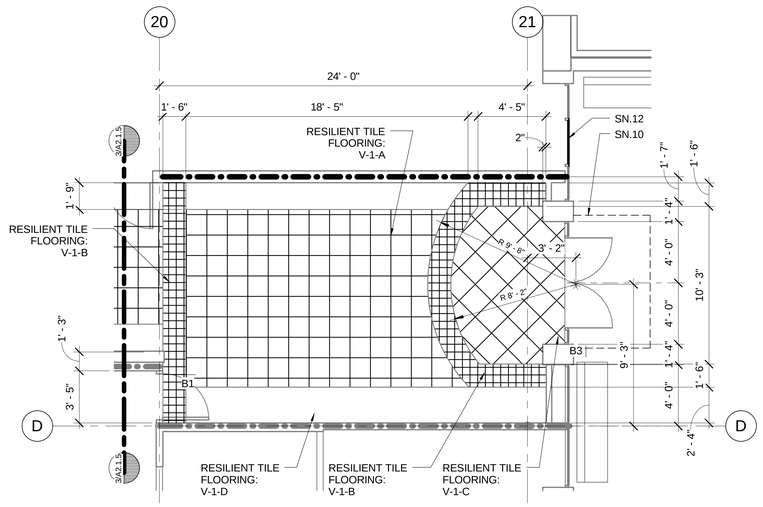
1 ENLARGED FLOOR PLAN- GMP LAB/ OFFICE

1/4" = 1'-0"

KEYPLAN

GENERAL NOTES

1. REFER TO A7.1 FOR WALL TYPES AND FIRE RATED ASSEMBLIES
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. REFER TO A7.3 FOR TYPICAL MOUNTING HEIGHTS SCHEDULE
4. REFER TO FINISH SCHEDULE, A7.2, FOR ADDITIONAL NOTES AND FINISHES
5. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK. U.O.N.
6. REFER TO A2.1A AND A2.1B FOR EQUIPMENT NAME & DESCRIPTION.
7. FOR PATCH & REPAIR OF SLAB- SEE 7/S1.2



2 ENLARGED FLOOR PLAN- EAST ENTRY

1/4" = 1'-0"

SHEET NOTES

SN.01	RECONFIGURE WATER CLOSET FLUSH VALVE ACTIVATOR TO WIDE SIDE OF STALL
SN.02	ALIGN WALL FINISHES
SN.03	SANITARY NAPKIN DISPENSER, REINSTALL PER 17/A7.3
SN.04	PAPER TOWEL DISPENSER, REINSTALL PER 17/A7.3
SN.05	MIRROR, REINSTALL PER 17/A7.3
SN.06	SOAP DISPENSER, REINSTALL PER 17/A7.3
SN.07	TOILET SEAT COVER DISPENSER, REINSTALL PER 17/A7.3
SN.08	(E) WATER HEATER TO BE RECONNECTED, MOUNTED & STRAPPED
SN.09	(E) DOOR OPENING TO BE INFILLED w/ WD. STUD FRAMING @ 24" O.C. WITH DRIVE PIN AT SILL TO MATCH (E) @ 16" O.C. & TYPE 'X' GYPSUM BOARD TO MATCH ADJACENT SURFACES.
SN.10	(E) LANDING IN FRONT OF DOORS PROVIDE 5' CLR. IN FRONT OF DOORS, WITH A MAX SLOPE UNDER 2% IN EACH DIRECTION.
SN.11	LAB CASEWORK- SEE LF2.0D FOR LAYOUT
SN.12	SPANDREL GLASS
SN.13	REINSTALL TOILET PARTITIONS
SN.14	REINSTALL 36"x42" GRAB BAR 17/A7.3
SN.15	REINSTALL SANITARY NAPKIN RECEPTACLE
SN.16	LAB CASEWORK, OFOI SEE LF2.0D FOR LAYOUT

LEGEND

- (E) WALL PARTITION TO REMAIN
- (E) 4HR. CONCRETE TILT UP WALL TO REMAIN
- WALL PARTITION (SEE PARTITION SCHEDULE)
- (E) 1 HR. RATED PARTITION
- 1 HR. RATED PARTITION
- 1 HR. OCCUPANCY SEPARATION
- (E) 4 HR. AREA SEPARATION
- 4 HR. AREA SEPARATION
- B- EXIT SIGNAGE, SEE 18 & 19/A7.3 (ARROW INDICATES DIRECTION OF ARROW ON SIGN, IF APPLICABLE.

ARCHITECTS

STAFFORD KING WIESE

LICENSED ARCHITECT PATRICK M. DERICKSON LIC.# C17107 REN. 2/28/09 STATE OF CALIFORNIA

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EMAIL: mail@skwaia.com

CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

STOCKTON BOULEVARD RESEARCH CENTER

CIRM RFA 07-03
APPLICATION #FA1-00611-1

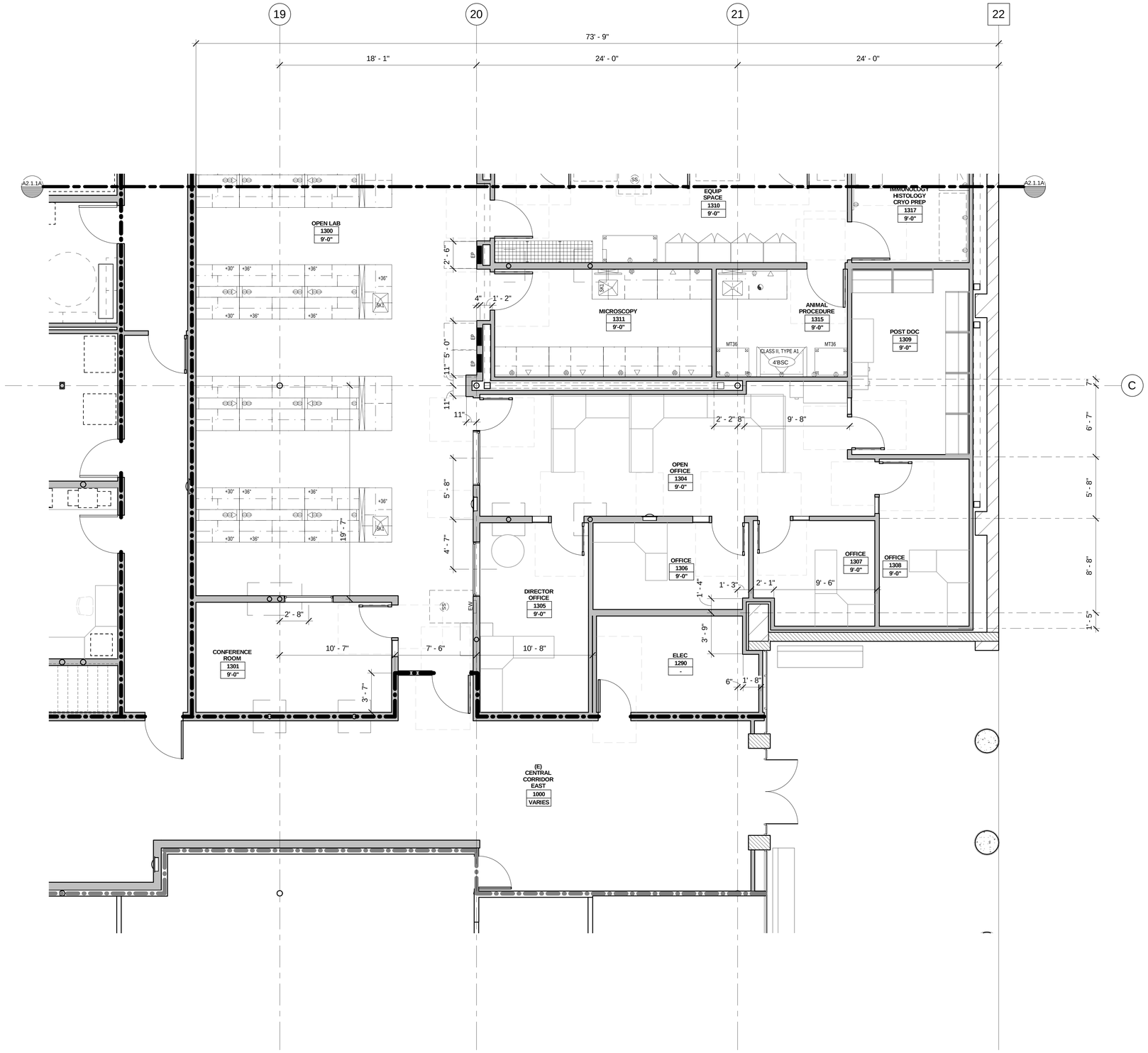
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO. 9553600
CAMPUS/ZIP/ZONE
BUILDING BUILDING 41
WING/FLOOR
PROJECT TITLE STOCKTON BOULEVARD RESEARCH CENTER
SHEET TITLE: ENLARGED FLOOR PLANS- GMP OFFICE, EAST & WEST ENTRY

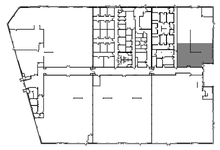
ARCH'L ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.4
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: PMD	DATE: 01/25/08	REVISION
DRAFTER: WLR	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 2/25/2008 9:32:54 PM



1 ENLARGED FLOOR PLAN- PHASE 2A SOUTH LAB/ OFFICE

1/4" = 1'-0"



KEYPLAN

SHEET NOTES

SN.01 REPAIR AND PATCH (E) TYPE 'X' GYP. BOARD TO MAINTAIN FIRE RATED ASSEMBLY.

GENERAL NOTES

1. REFER A7.2 FOR FINISH SCHEDULE & ADDITIONAL NOTES AND FINISHES.
2. CLEAN, PATCH AND MATCH ADJACENT AREAS AS REQUIRED TO REPAIR AREAS AFFECTED BY WORK PERFORMED TO COMPLETE THIS CONTRACT.
3. DIMENSIONS REFER TO FACE OF STUD AT NEW WORK AND FACE OF FINISH AT EXISTING WORK, U.O.N.
4. LABORATORY EQUIPMENT, FURNITURE AND CASEWORK ARE OFOI, UNLESS OTHERWISE NOTED

LEGEND

(E) WALL PARTITION TO REMAIN

WALL PARTITION (SEE PARTITION SCHEDULE)

(E) 1 HR. FIRE BARRIER

1 HR. FIRE BARRIER

ARCHITECTS

STAFFORD KING WIESE

LICENSED ARCHITECT PATRICK M. DERICKSON LIC.# C17107 REN. 2/28/09 STATE OF CALIFORNIA

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

UNIVERSITY OF CALIFORINA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

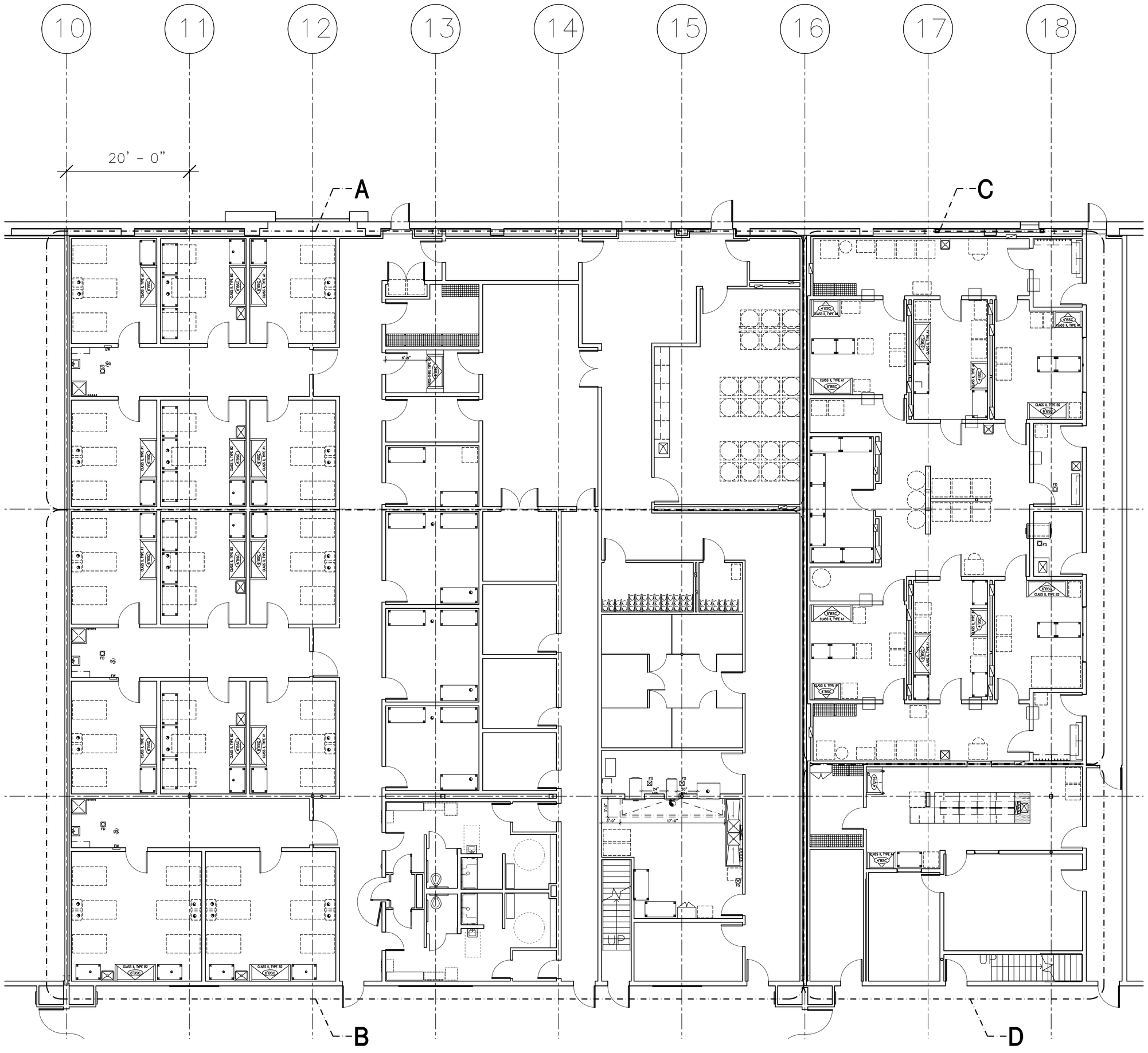
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO. 9553600
CONTRACT NO.
BUILDING NO. BUILDING 41
WINGP LOOR
PROJECT TITLE: UNIVERSITY OF CALIFORINA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: ENLARGED FLOOR PLAN SOUTH LAB

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2773	SHEET NO.: A2.1.2A
PROJECT MANAGER: JOHN GAMBONE	SCALE: As indicated	
CHECKED BY: PMD	DATE: 01/08/08	REVISION
DRAFTER: WLR	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 2/25/2008 9:53:31 PM



PHASE 2

"NOTE TO BIDDERS: ALL FUME HOODS, CASEWORK, WORKSURFACES, SHELVING, SINKS AND FITTINGS SHOWN ON THE LF DRAWINGS ARE FOR COORDINATION ONLY AND WILL BE PROVIDED BY OTHERS. FINAL MEP CONNECTIONS TO FUME HOODS, FITTINGS, SINKS AND FLEXIBLE CASEWORK ASSEMBLIES SHALL BE UNDER DIVISIONS 15 & 16."

ARCHITECTS

STAFFORD KING WIESE

LICENSED ARCHITECT
PATRICK M. DERICKSON
LIC.# C17107
REN. 2/28/09
STATE OF CALIFORNIA

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

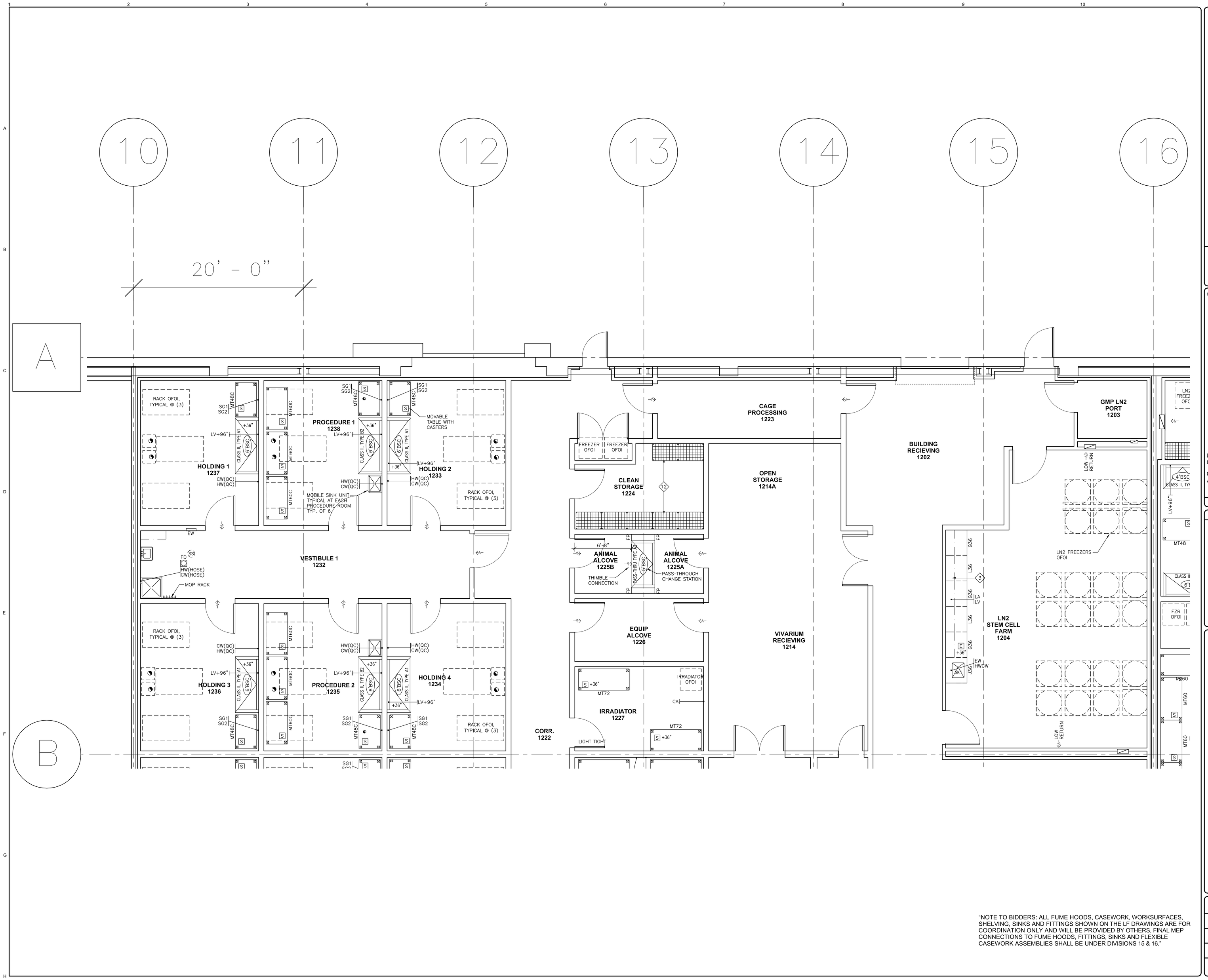
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: Laboratory Furnishings Overall Floor Plan

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.0
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1/8" = 1'-0"	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 1/28/2008 9:25:25 AM



"NOTE TO BIDDERS: ALL FUME HOODS, CASEWORK, WORKSURFACES, SHELVING, SINKS AND FITTINGS SHOWN ON THE LF DRAWINGS ARE FOR COORDINATION ONLY AND WILL BE PROVIDED BY OTHERS. FINAL MEP CONNECTIONS TO FUME HOODS, FITTINGS, SINKS AND FLEXIBLE CASEWORK ASSEMBLIES SHALL BE UNDER DIVISIONS 15 & 16."

ARCHITECTS

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NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: Laboratory Furnishings Area "A" Partial Plan

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.0A
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1/4" = 1'-0"	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

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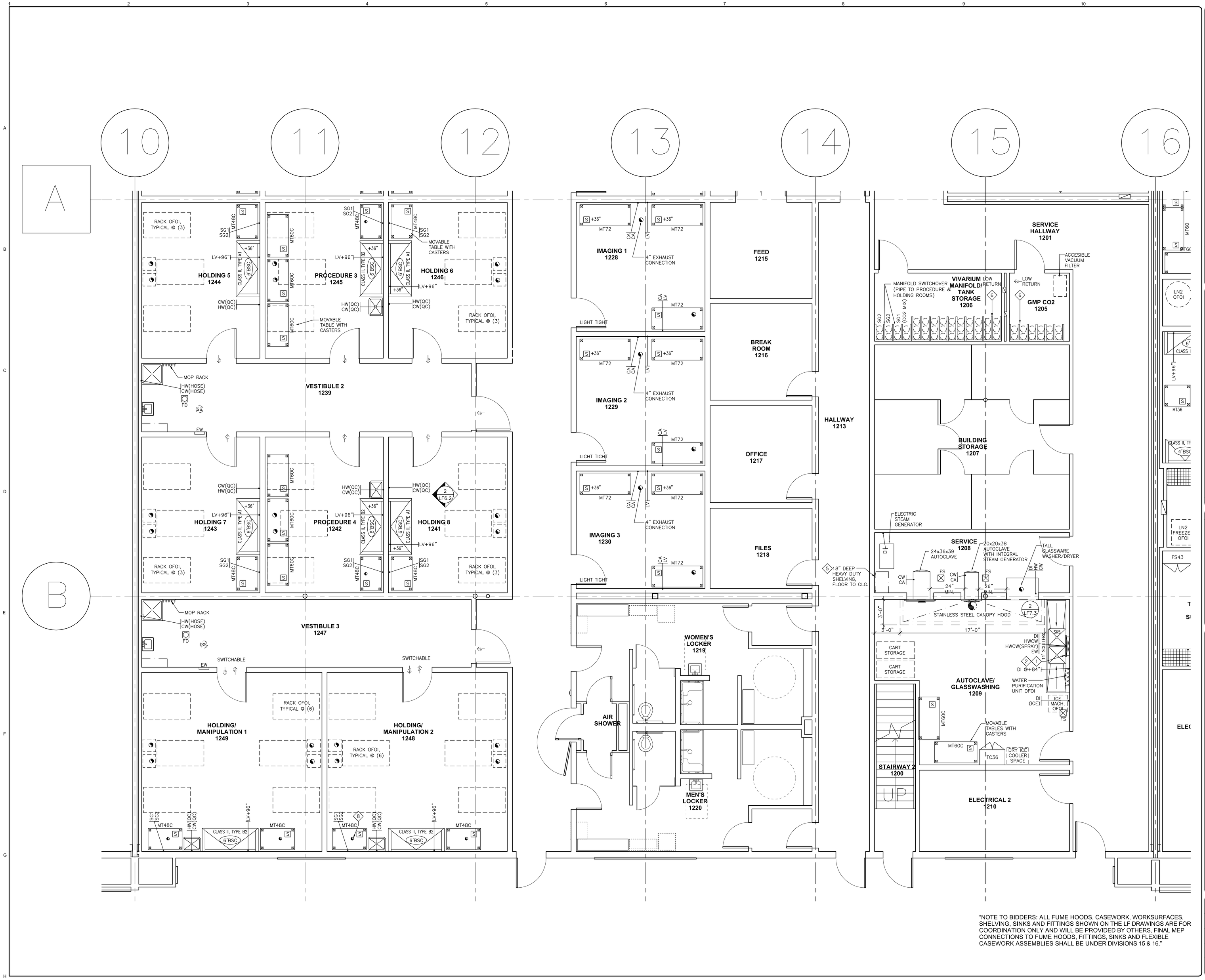

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CIRM STEM CELL INSTITUTE

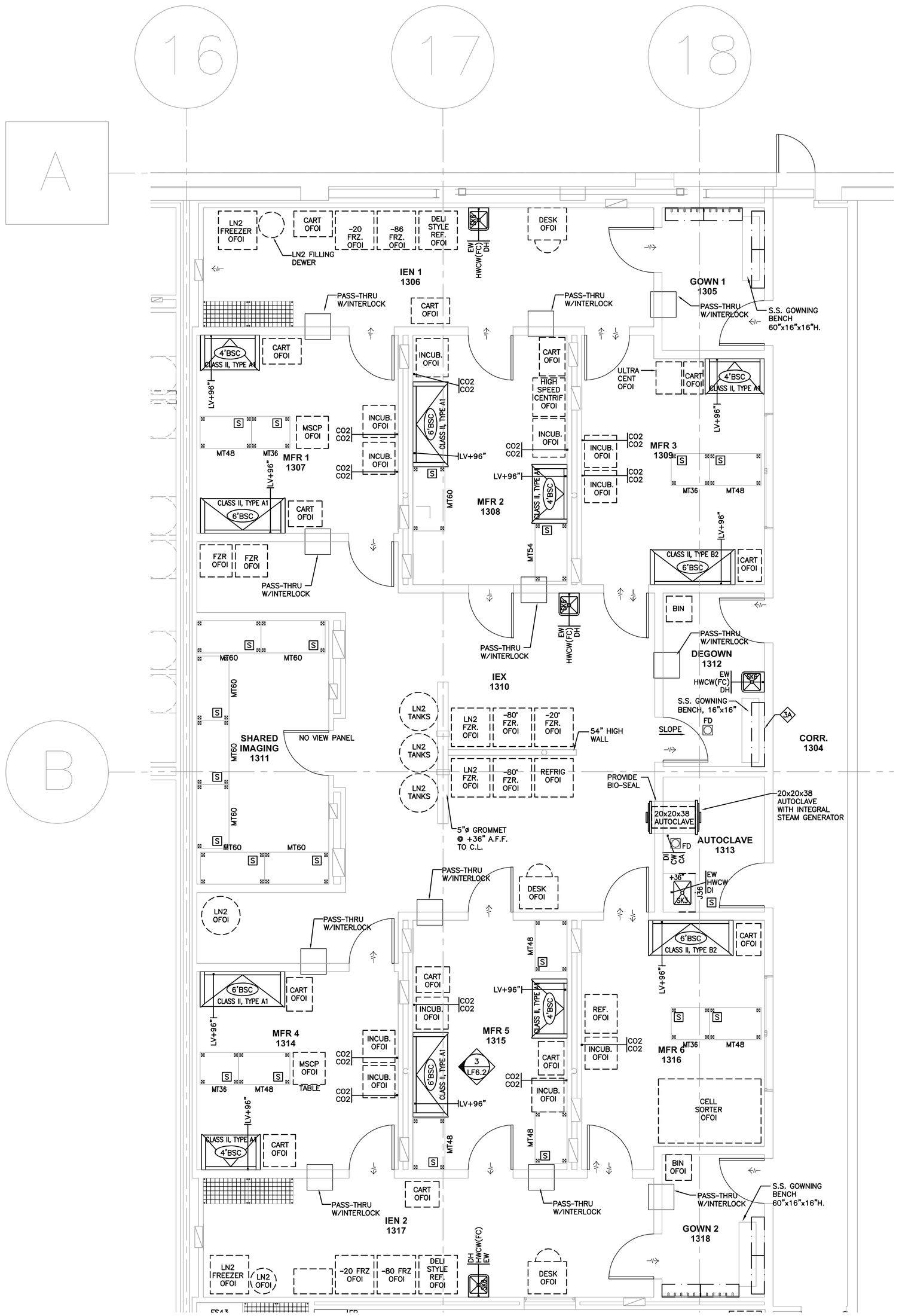
CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WINGS/CORE:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: Laboratory Furnishings Area "B" Partial Plan

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.0B
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1/4" = 1'-0"	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		



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CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
COSPO NO.:
BUILDING: BUILDING 41
WINGS/LOOP:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: Laboratory Furnishings Area "C" Partial Plan

ARCH.I ENGR.-OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.0C
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1/4" = 1'-0""	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

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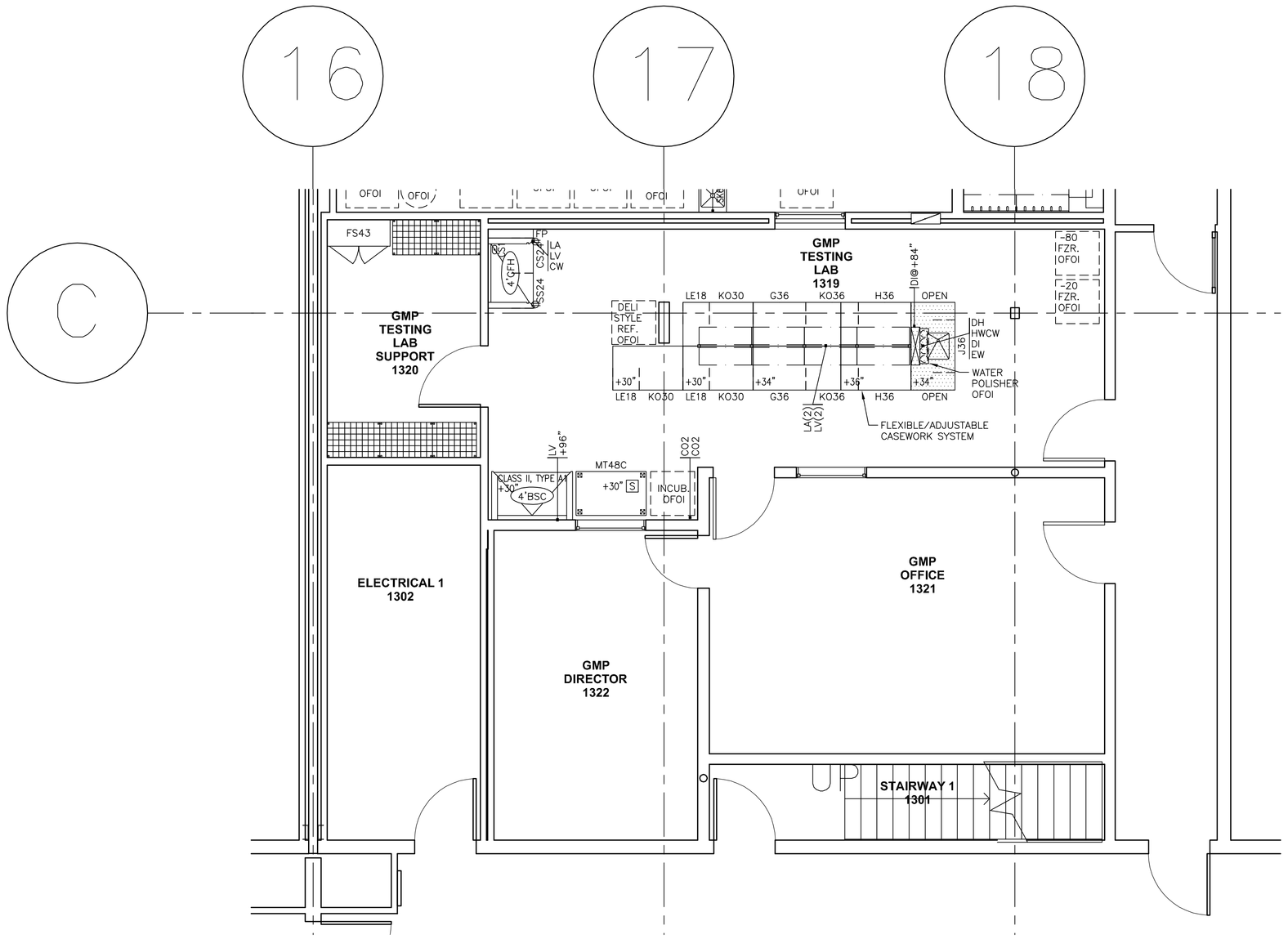

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CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: Laboratory Furnishings Area "D" Partial Plan

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.0D
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1/4" = 1'-0"	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

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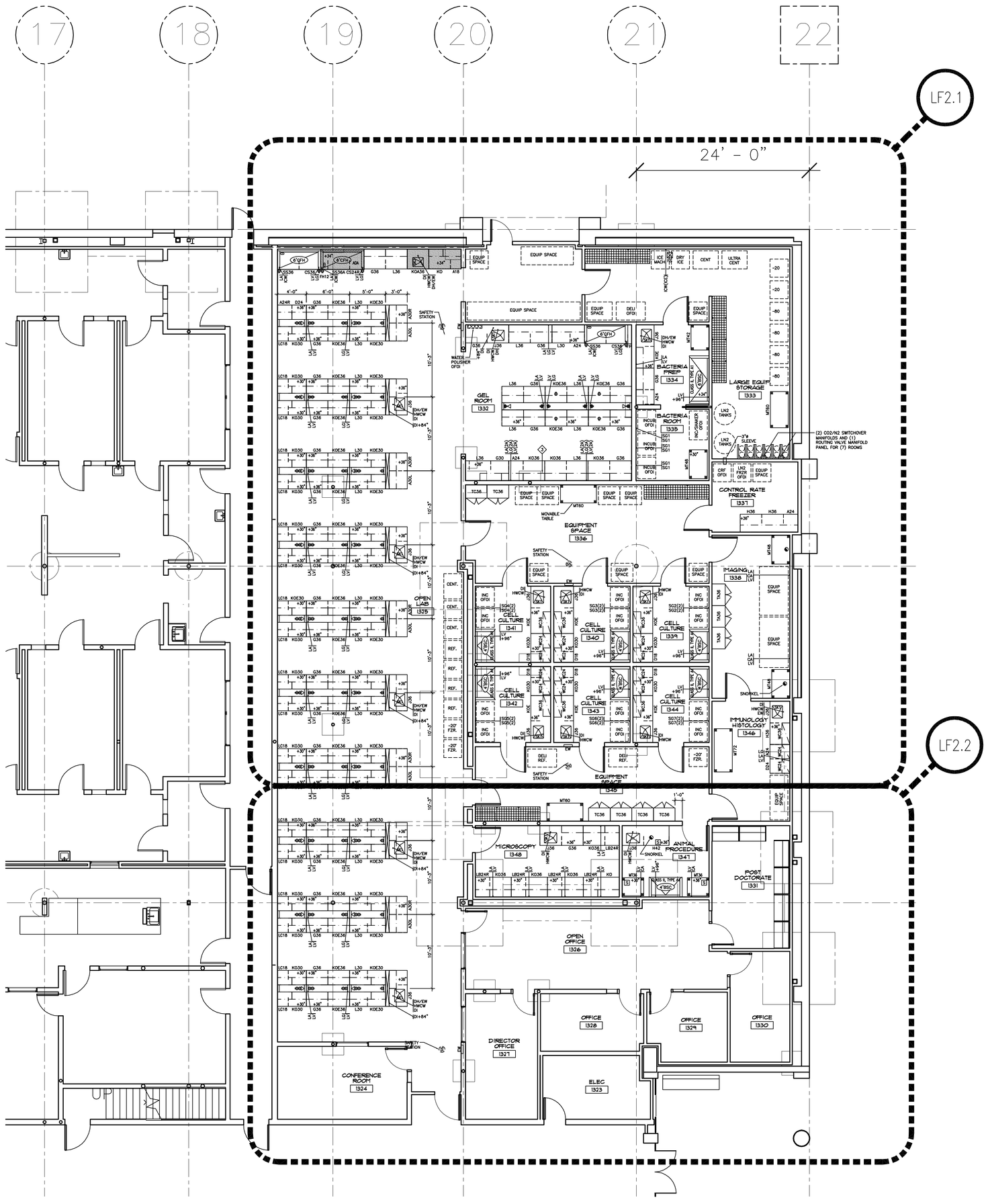

PHASE 2A

ARCHITECTS
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CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
CSI/IPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: OVERALL FLOOR PLAN

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.0a
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1'-0"= 1/8"	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
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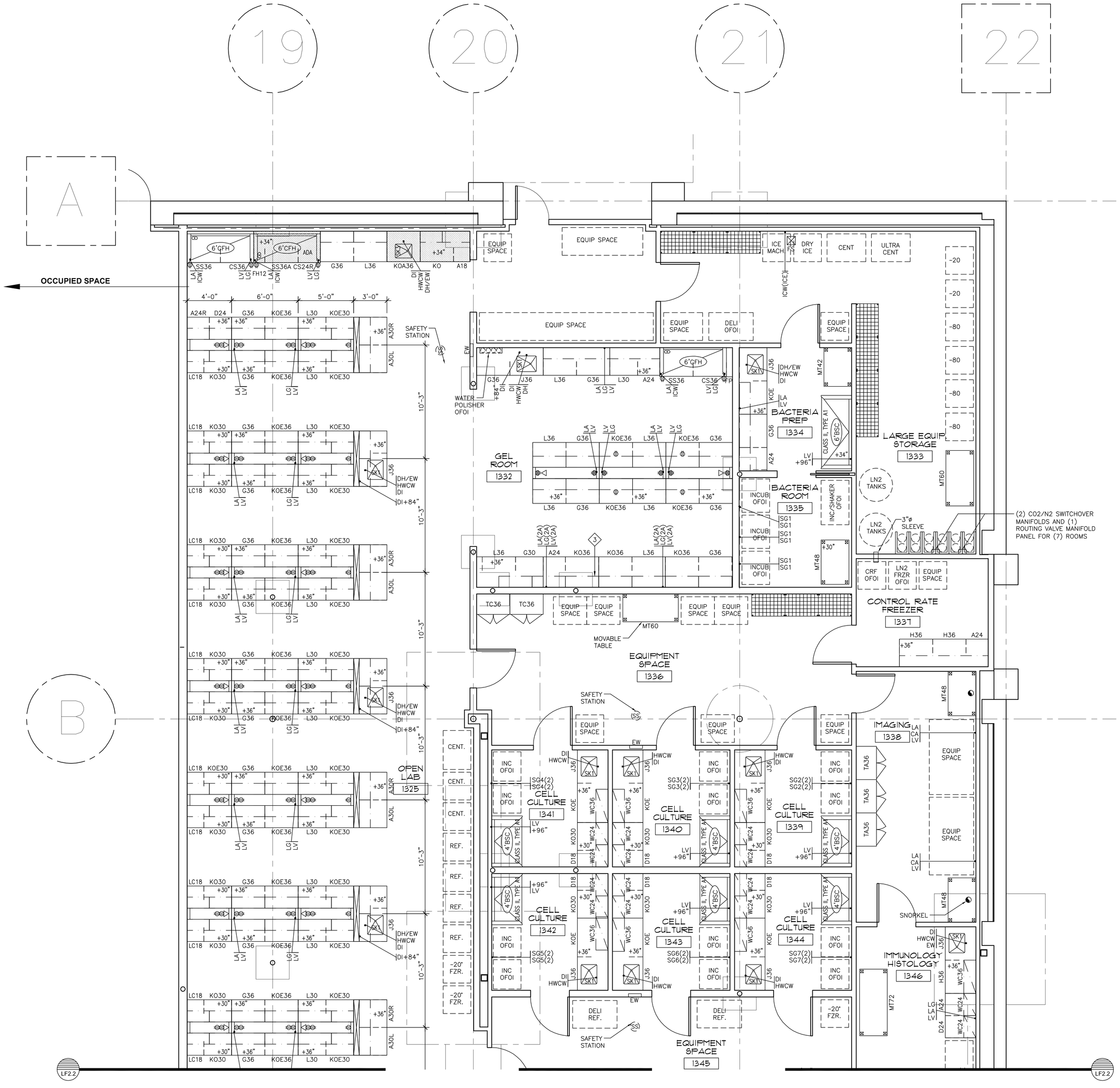

ELECTRICAL SYMBOLS

110V,30A,1ø SINGLE RECEPTACLE	EXTERNAL DISCONNECT
110V,20A,1ø DUPLEX RECEPTACLE	JUNCTION BOX
120V/208V,1ø RECEPTACLE	ELECTRICAL PANEL
208V,3ø RECEPTACLE	SINGLE POLE SWITCH
SPECIAL POWER RECEPTACLE	PLUG-IN BUS DUCT
DOUBLE DUPLEX RECEPTACLE	WEATHERPROOF OUTLET
PEDESTAL BOX	STANDBY POWER
SURFACE RACEWAY	LIGHT FIXTURE
FLOOR MTD. DUPLEX RECEPTACLE	WARNING LIGHT
FLOOR MTD. DATA BOX	SAFE LIGHT
CEILING MTD. DUPLEX RECEPTACLE	TRANSFORMER
INSTRUMENT GROUND	EXPLOSION PROOF OUTLET
DATA OUTLET	TWIST LOCK
TELEPHONE/DATA OUTLET	DEDICATED CIRCUIT
TELEPHONE OUTLET	EMERGENCY BUTTON

PLUMBING & MECHANICAL SYMBOLS

A	COMPRESSED AIR (80-100 PSIG)	LG	LABORATORY GAS
Ar	ARGON	LN	LIQUID NITROGEN
CHWS	CHILLED WATER SERVICE	LPS	STEAM, LOW PRESSURE
CHWR	CHILLED WATER RETURN	LV	LABORATORY VACUUM
CO2	CARBON DIOXIDE	MPS	STEAM, MEDIUM PRESSURE
CW	COLD WATER, POTABLE	N2	NITROGEN
CWA	COLD WATER WITH ASPIRATOR	PW	PURE WATER
DI	DEIONIZED WATER	RO	REVERSE OSMOSIS WATER
DH	DRENCH HOSE	SG#	SPECIAL GAS
DIS	DISTILLED WATER		LABORATORY SINK
EW	EYEWASH		CUP SINK
He	HELIUM		PIPE DROP ENCLOSURE
HW	HOT WATER, POTABLE	SS/EW	SAFETY SHOWER/EYEWASH
IHW	HOT WATER, INDUSTRIAL	FD	FLOOR DRAIN
ICW	COLD WATER, INDUSTRIAL	FS8	FLOOR SINK (8x8)
LA	LABORATORY AIR, (15 PSIG)	FS12	FLOOR SINK (12x12)

ARCHITECTS

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CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: SOUTH SECTION

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.1a
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1"= 1/4"	
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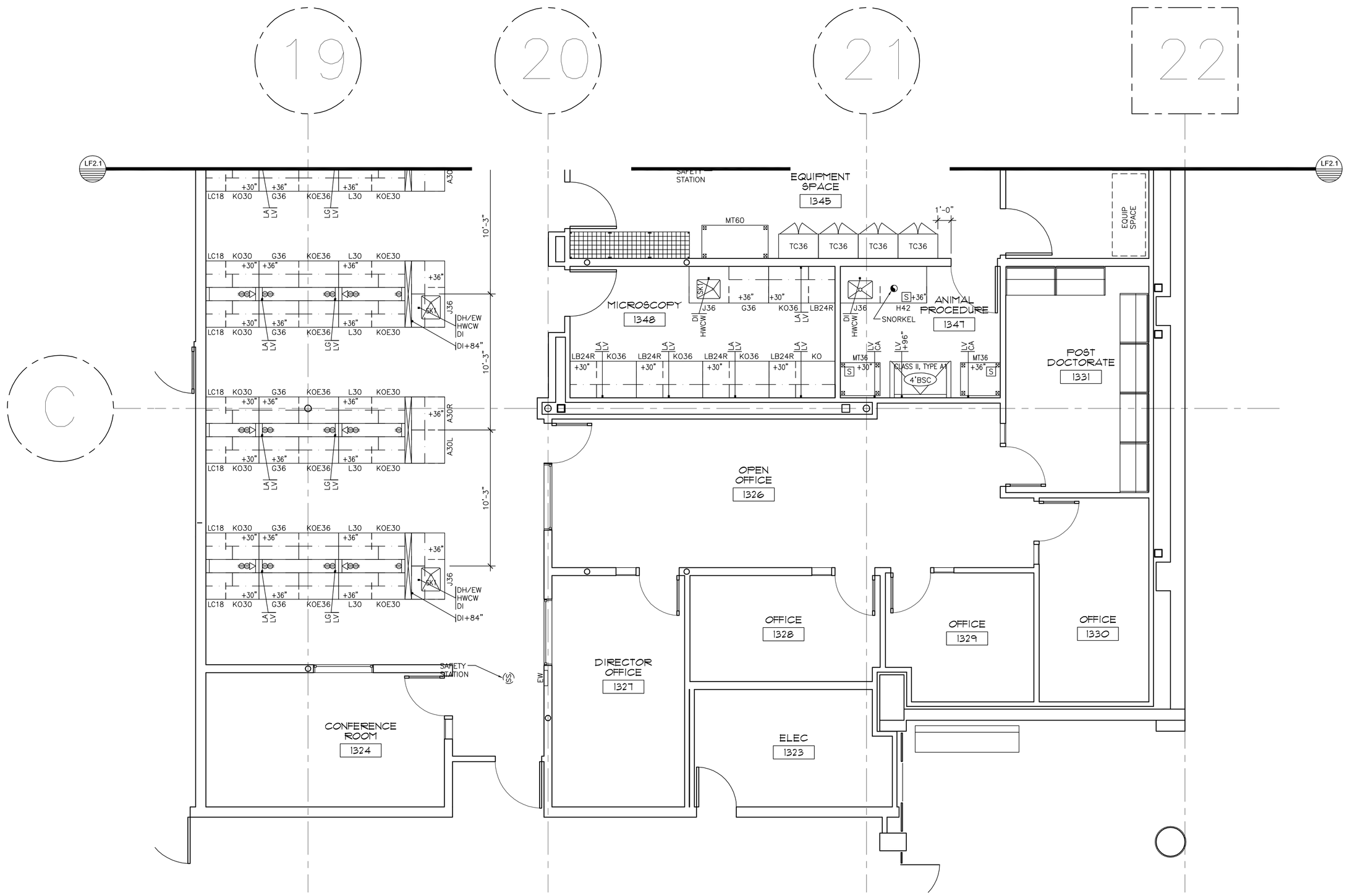

ELECTRICAL SYMBOLS

110V,30A,1ø SINGLE RECEPTACLE	EXTERNAL DISCONNECT
110V,20A,1ø DUPLEX RECEPTACLE	JUNCTION BOX
120V/208V,1ø RECEPTACLE	ELECTRICAL PANEL
208V,3ø RECEPTACLE	SINGLE POLE SWITCH
SPECIAL POWER RECEPTACLE	PLUG-IN BUS DUCT
DOUBLE DUPLEX RECEPTACLE	WEATHERPROOF OUTLET
PEDESTAL BOX	STANDBY POWER
SURFACE RACEWAY	LIGHT FIXTURE
FLOOR MTD. DUPLEX RECEPTACLE	WARNING LIGHT
FLOOR MTD. DATA BOX	SAFE LIGHT
CEILING MTD. DUPLEX RECEPTACLE	TRANSFORMER
INSTRUMENT GROUND	EXPLOSION PROOF OUTLET
DATA OUTLET	TWIST LOCK
TELEPHONE/DATA OUTLET	DEDICATED CIRCUIT
TELEPHONE OUTLET	EMERGENCY BUTTON

PLUMBING & MECHANICAL SYMBOLS

A	COMPRESSED AIR (80-100 PSIG)	LG	LABORATORY GAS
Ar	ARGON	LN	LIQUID NITROGEN
CHWS	CHILLED WATER SERVICE	LPS	STEAM, LOW PRESSURE
CHWR	CHILLED WATER RETURN	LV	LABORATORY VACUUM
CO2	CARBON DIOXIDE	MPS	STEAM, MEDIUM PRESSURE
CW	COLD WATER, POTABLE	N2	NITROGEN
CWA	COLD WATER WITH ASPIRATOR	PW	PURE WATER
DI	DEIONIZED WATER	RO	REVERSE OSMOSIS WATER
DH	DRENCH HOSE	SG#	SPECIAL GAS
DIS	DISTILLED WATER		LABORATORY SINK
EW	EYEWASH		CUP SINK
He	HELIUM		PIPE DROP ENCLOSURE
HW	HOT WATER, POTABLE	SS/EW	SAFETY SHOWER/EYEWASH
IHW	HOT WATER, INDUSTRIAL	FD	FLOOR DRAIN
ICW	COLD WATER, INDUSTRIAL	FS8	FLOOR SINK (8x8)
LA	LABORATORY AIR, (15 PSIG)	FS12	FLOOR SINK (12x12)

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ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WINGFLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: SOUTH SECTION

ARCH.I.ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.2a
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1"= 1/4"	
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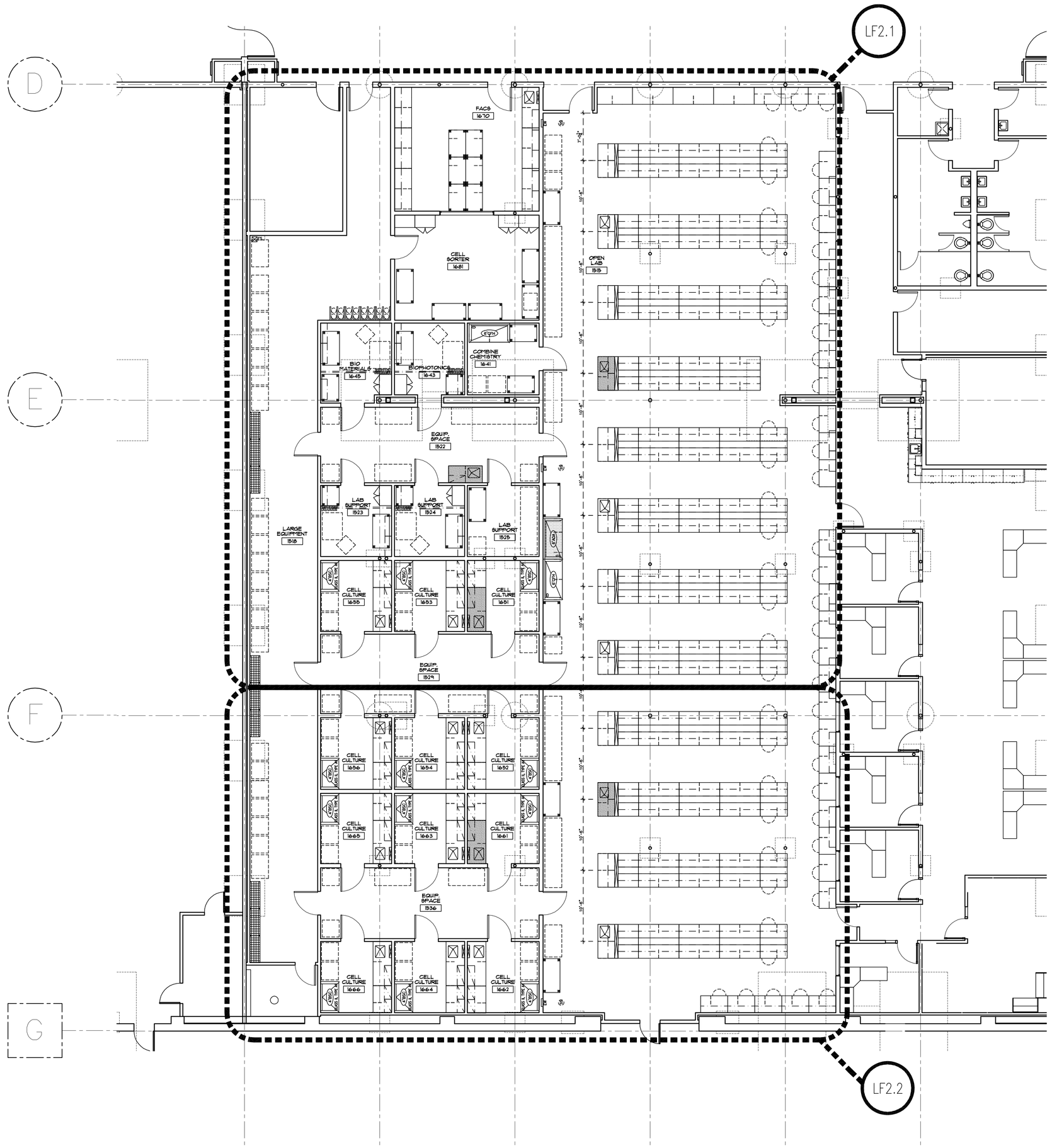

PHASE 2B

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CIRM RFA 07-03
APPLICATION #FA1-00611-1

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NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: OVERALL FLOOR PLAN

ARCH.\ ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.0b
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1'-0"= 1/8"	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
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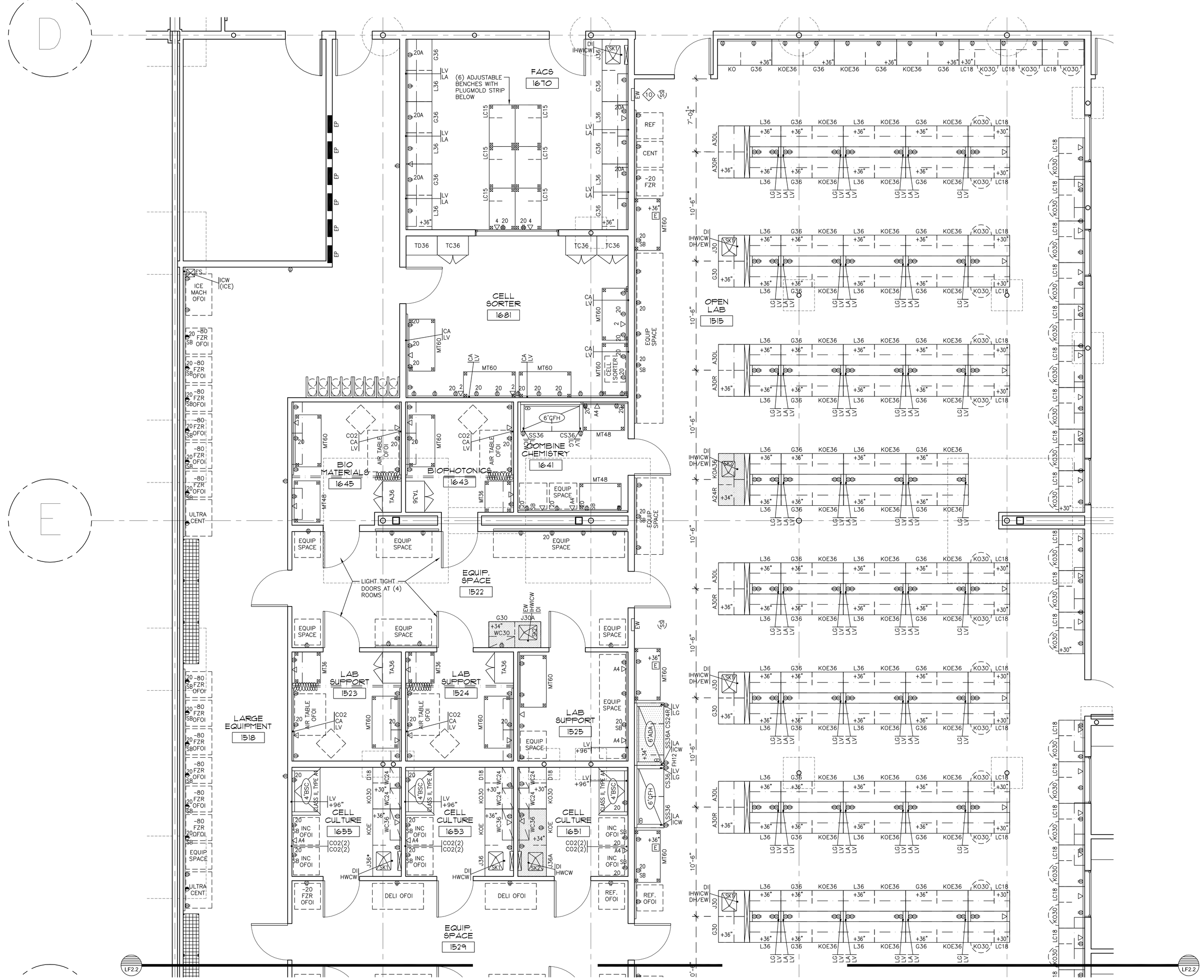

ELECTRICAL SYMBOLS

	110V,20A,1ø SINGLE RECEPTACLE		EXTERNAL DISCONNECT
	110V,20A,1ø DUPLEX RECEPTACLE		JUNCTION BOX
	120V/208V,1ø RECEPTACLE		ELECTRICAL PANEL
	208V,3ø RECEPTACLE		SINGLE POLE SWITCH
	SPECIAL POWER RECEPTACLE		PLUG-IN BUS DUCT
	DOUBLE DUPLEX RECEPTACLE	WP	WEATHERPROOF OUTLET
	PEDESTAL BOX	SB	STANDBY POWER
	SURFACE RACEWAY		LIGHT FIXTURE
	FLOOR MTD. DUPLEX RECEPTACLE		WARNING LIGHT
	FLOOR MTD. DATA BOX		SAFE LIGHT
	CEILING MTD. DUPLEX RECEPTACLE	XFMR	TRANSFORMER
	INSTRUMENT GROUND	EP	EXPLOSION PROOF OUTLET
	DATA OUTLET	TL	TWIST LOCK
	TELEPHONE/DATA OUTLET	CKT	DEDICATED CIRCUIT
	TELEPHONE OUTLET		EMERGENCY BUTTON

PLUMBING & MECHANICAL SYMBOLS

A	COMPRESSED AIR (80-100 PSIG)	LG	LABORATORY GAS
Ar	ARGON	LN	LIQUID NITROGEN
CHWS	CHILLED WATER SERVICE	LPS	STEAM, LOW PRESSURE
CHWR	CHILLED WATER RETURN	LV	LABORATORY VACUUM
CO2	CARBON DIOXIDE	MPS	STEAM, MEDIUM PRESSURE
CW	COLD WATER, POTABLE	N2	NITROGEN
CWA	COLD WATER WITH ASPIRATOR	PW	PURE WATER
DI	DEIONIZED WATER	RO	REVERSE OSMOSIS WATER
DH	DRENCH HOSE	SG#	SPECIAL GAS
DIS	DISTILLED WATER		LABORATORY SINK
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ICW	COLD WATER, INDUSTRIAL	FS8	FLOOR SINK (8x8)
LA	LABORATORY AIR, (15 PSIG)	FS12	FLOOR SINK (12x12)

ENVIRONMENTAL CONDITIONS

TEMP _____ RANGE _____

HUMIDITY _____ RANGE _____

AIR RECYCLE YES ____ NO ____

AIR PRESSURE POS ____ NEG ____

OCCUPANCY _____

ARCHITECTS

STAFFORD KING WIESE

LICENSED ARCHITECT PATRICK M. DERICKSON LIC.# C17107 REN. 2/28/09 STATE OF CALIFORNIA

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BUILDING: BUILDING 41
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: SOUTH SECTION

ARCH.I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.1b
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1/4"=1'-0"	
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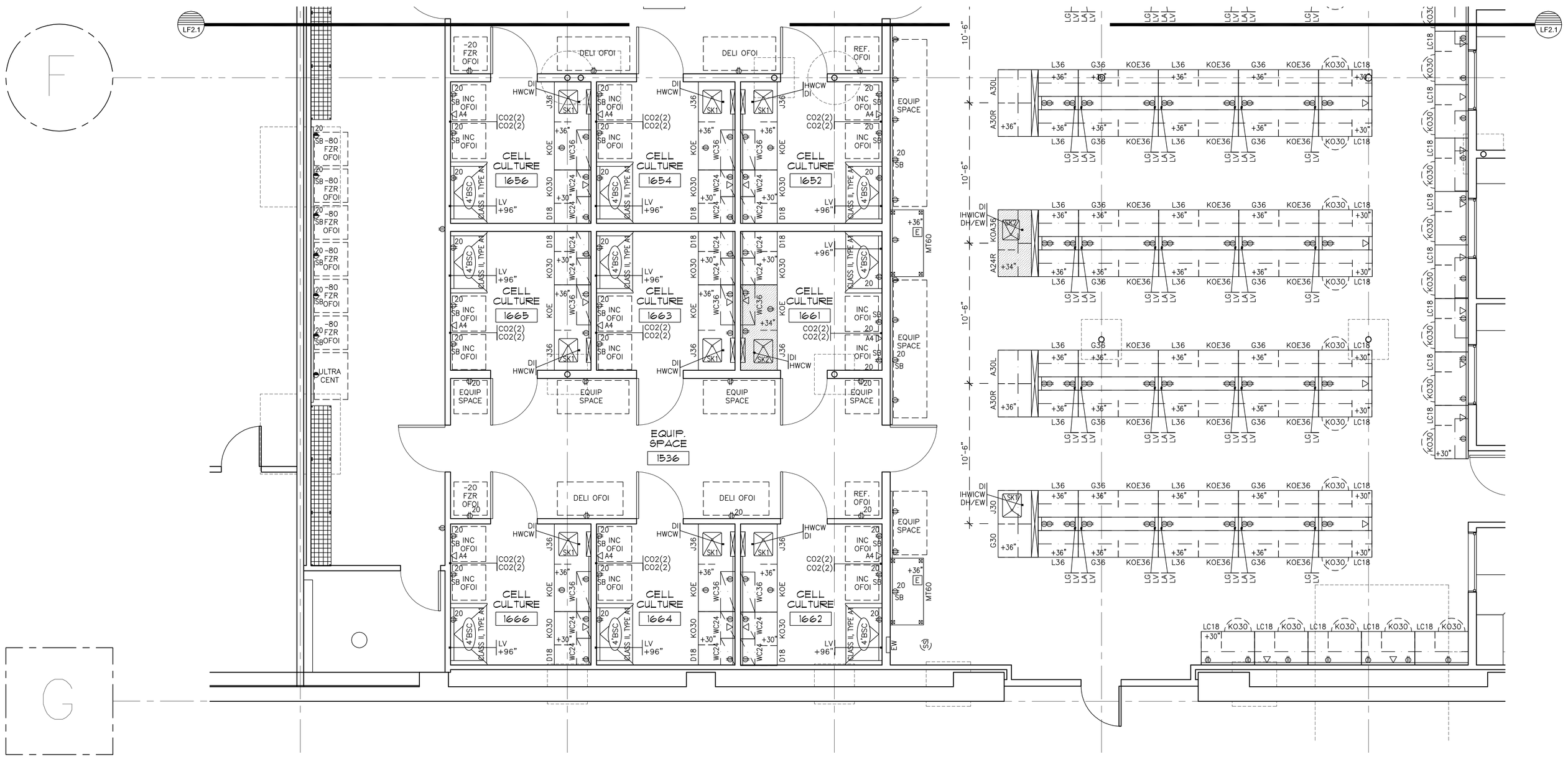

ELECTRICAL SYMBOLS

	110V,30A,1ø SINGLE RECEPTACLE		EXTERNAL DISCONNECT
	110V,20A,1ø DUPLEX RECEPTACLE	J	JUNCTION BOX
	120V/208V,1ø RECEPTACLE		ELECTRICAL PANEL
	208V,3ø RECEPTACLE		SINGLE POLE SWITCH
	SPECIAL POWER RECEPTACLE		PLUG-IN BUS DUCT
	DOUBLE DUPLEX RECEPTACLE	WP	WEATHERPROOF OUTLET
	PEDESTAL BOX	SB	STANDBY POWER
	SURFACE RACEWAY		LIGHT FIXTURE
	FLOOR MTD. DUPLEX RECEPTACLE		WARNING LIGHT
	FLOOR MTD. DATA BOX		SAFE LIGHT
	CEILING MTD. DUPLEX RECEPTACLE	XFMR	TRANSFORMER
	INSTRUMENT GROUND	EP	EXPLOSION PROOF OUTLET
	DATA OUTLET	TL	TWIST LOCK
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	TELEPHONE OUTLET		EMERGENCY BUTTON

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Ar	ARGON	LN	LIQUID NITROGEN
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CHWR	CHILLED WATER RETURN	LV	LABORATORY VACUUM
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CWA	COLD WATER WITH ASPIRATOR	PW	PURE WATER
DI	DEIONIZED WATER	RO	REVERSE OSMOSIS WATER
DH	DRENCH HOSE	SG#	SPECIAL GAS
DIS	DISTILLED WATER		LABORATORY SINK
EW	EYEWASH		CUP SINK
He	HELIUM		PIPE DROP ENCLOSURE
HW	HOT WATER, POTABLE	SS/EW	SAFETY SHOWER/EYEWASH
IHW	HOT WATER, INDUSTRIAL	FD	FLOOR DRAIN
ICW	COLD WATER, INDUSTRIAL	FS8	FLOOR SINK (8x8)
LA	LABORATORY AIR, (15 PSIG)	FS12	FLOOR SINK (12x12)

ENVIRONMENTAL CONDITIONS

TEMP _____ RANGE _____

HUMIDITY _____ RANGE _____

AIR RECYCLE YES ____ NO ____

AIR PRESSURE POS ____ NEG ____

OCCUPANCY _____

ARCHITECTS

STAFFORD KING WIESE

LICENSED ARCHITECT PATRICK M. DERICKSON LIC.# C17107 REN. 2/28/09 STATE OF CALIFORNIA

622 20TH STREET
SACRAMENTO CALIFORNIA 95811
(916) 930-5900 FAX (916) 930-5800
EMAIL: mail@skwala.com

CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

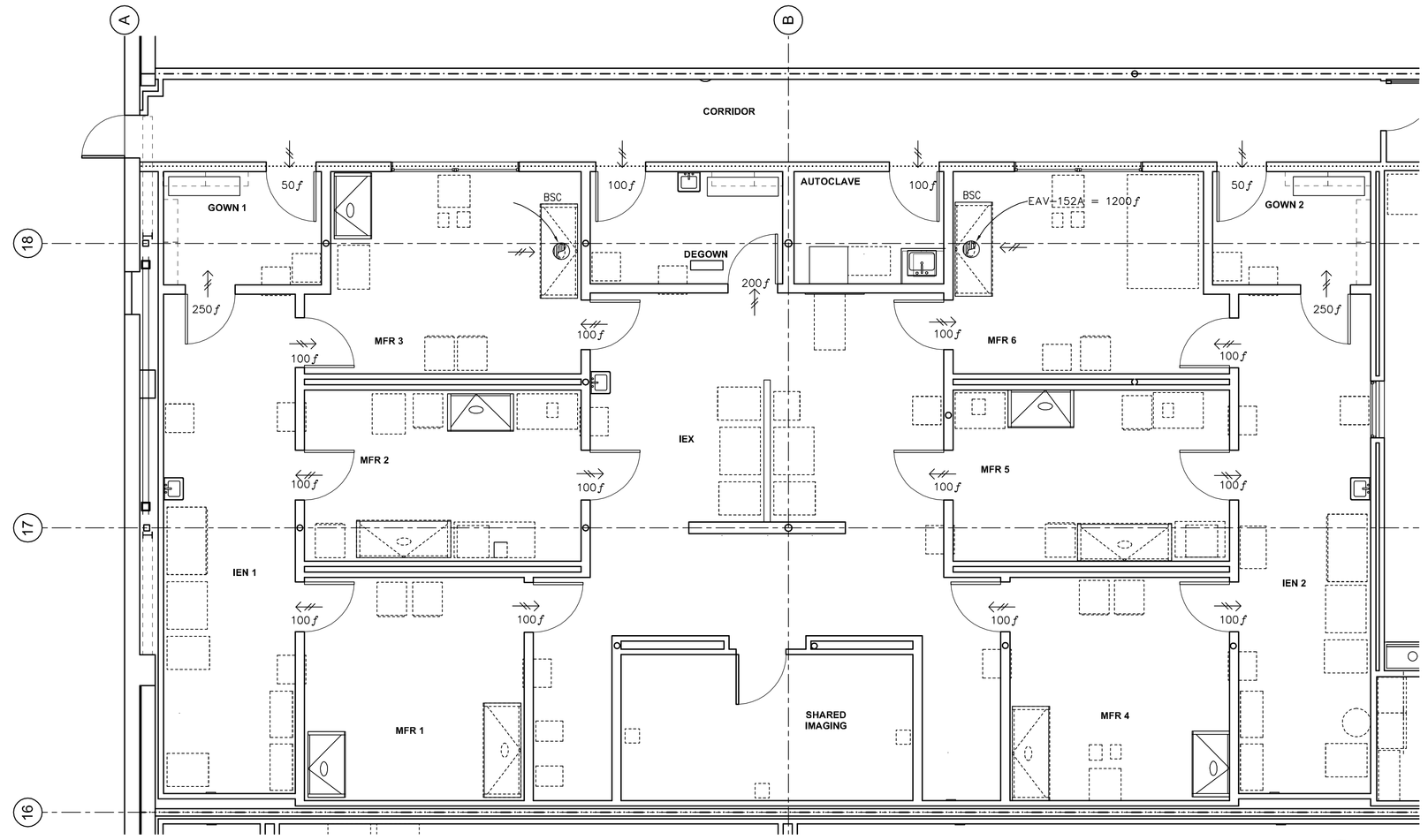
REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WINGS/CODE:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: SOUTH SECTION

ARCH I ENGR. OF RECORD: PAT DERICKSON	PROJECT NO.: 2849	SHEET NO.: LF2.2b
PROJECT MANAGER: JOHN GAMBONE	SCALE: 1/4"=1'-0"	
CHECKED BY: Checker	DATE: 01/08/08	REVISION
DRAFTER: Author	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

EDIT DATE: 1/28/2008 9:25:25 AM



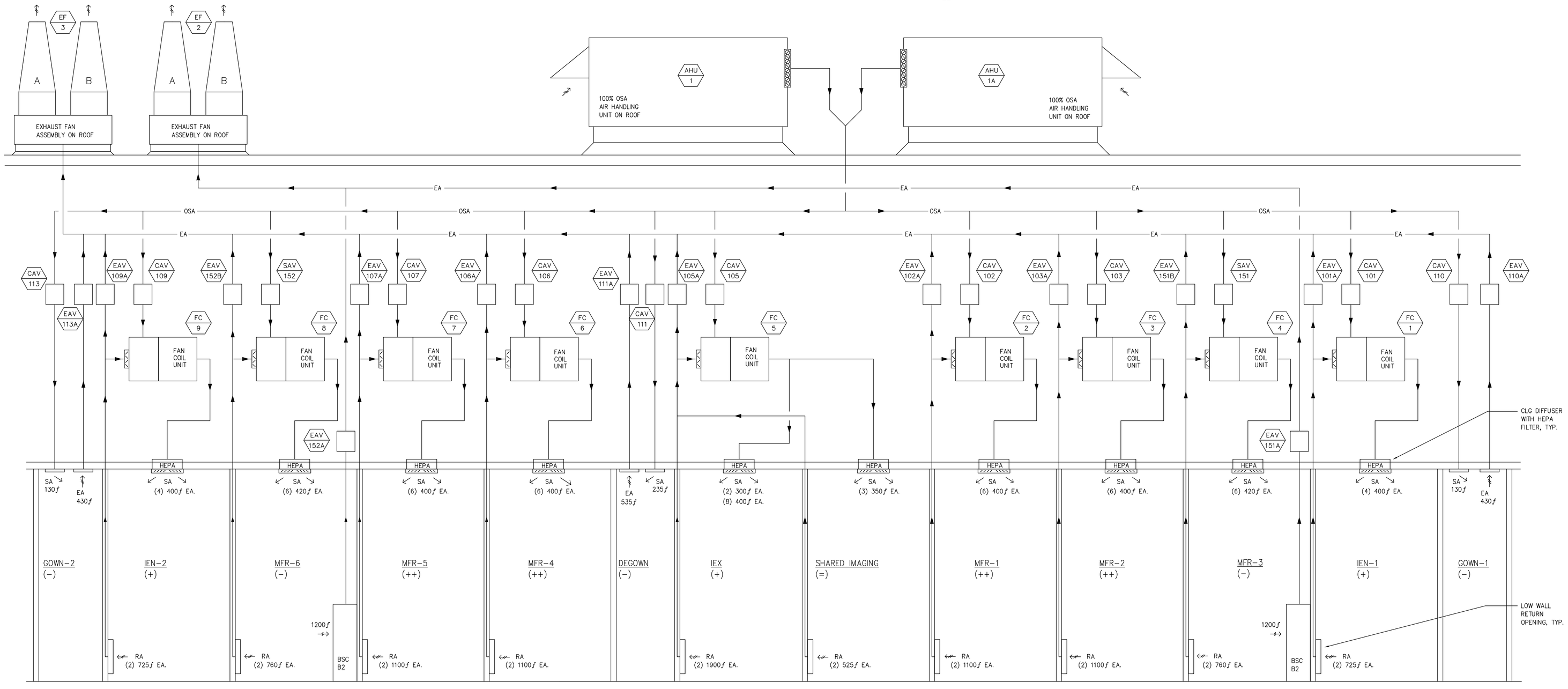
HVAC GMP PRESSURIZATION DIAGRAM (NEGATIVE PRESSURE IN MFR-3 AND MFR-6)

2 / M5.1

SCALE : NONE

NOTES:

1. SUPPLY AIR TO ALL ROOMS (EXCEPT GOWN, DEGOWN AND AUTOCLAVES) ARE SUPPLIED THRU LOW VELOCITY CEILING DIFFUSERS WITH HEPA FILTERS.
2. ALL ROOMS EXCEPT GOWN-1, GOWN-2, DEGOWN AND AUTOCLAVE HAVE LOW WALL RETURN GRILLES.
3. AT COMPLETION OF TESTING, PRESSURE SETTINGS SHALL BE REBALANCE TO PRESSURES DIRECTED BY THE UNIVERSITY'S REPRESENTATIVE.



HVAC GMP AIRFLOW SCHEMATIC (NEGATIVE PRESSURE IN MFR-3 AND MFR-6)

1 / M5.1

SCALE : NONE

ARCHITECTS

STAFFORD KING WIESE

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

CAPITAL ENGINEERING CONSULTANTS, INC.
SACRAMENTO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER STEPHEN A. MYERS M 24700 EXPIRES 3/09 MECHANICAL STATE OF CALIFORNIA

SM - JC & MJR 060701.00
TL - DESIGN TEAM PROJECT NO.
DATE SIGNED:

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

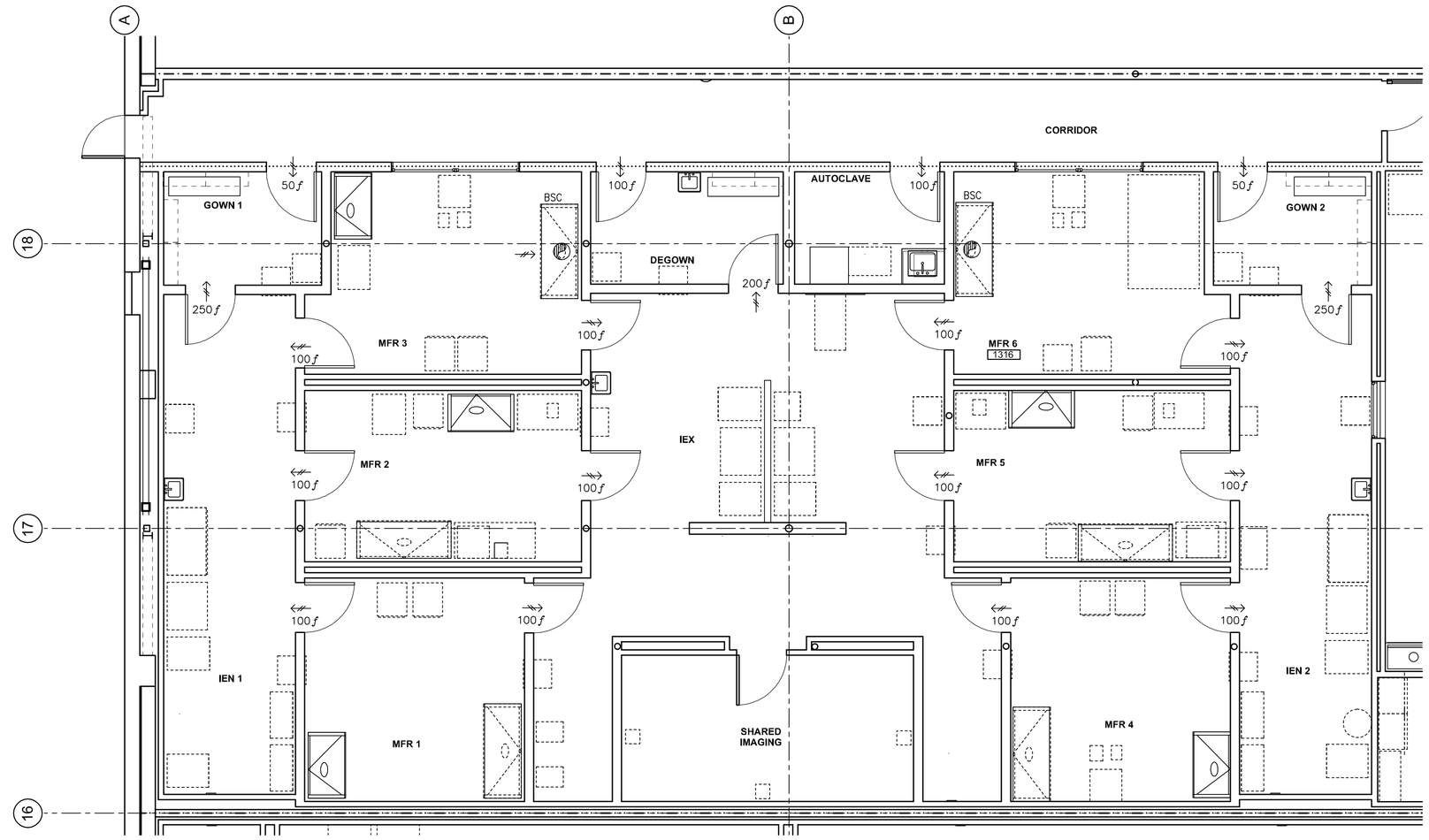
CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: HVAC GMP AIRFLOW SCHEMATIC

ARCH.\ ENGR. OF RECORD: STEPHEN A. MYERS	PROJECT NO.: 060701.00	SHEET NO.: M5.1
PROJECT MANAGER: JOHN GAMBONE	SCALE: NONE	
CHECKED BY: SM	DATE: 02/04/08	REVISION
ENGR/ DESIGNER: JC/MJR	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		



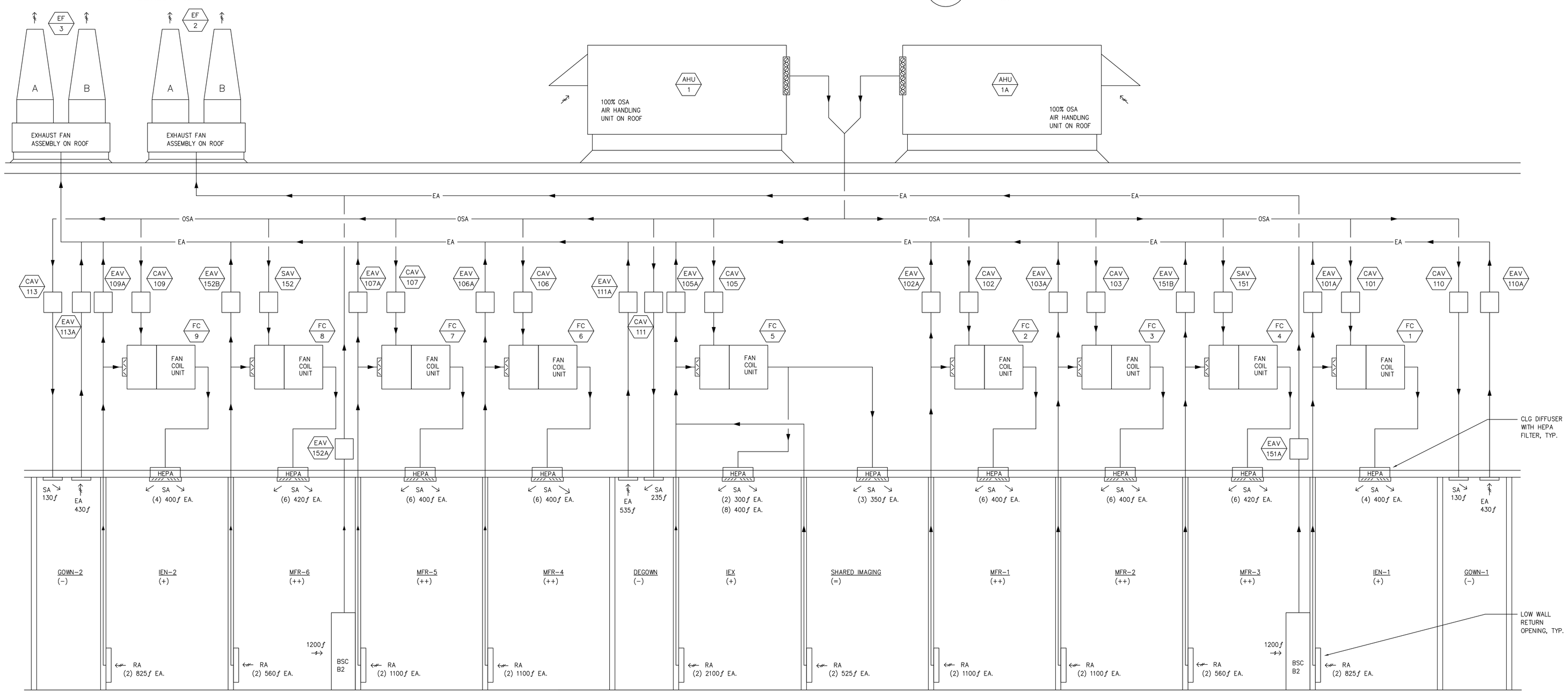
HVAC GMP PRESSURIZATION DIAGRAM (POSITIVE PRESSURE MFR ROOMS)

SCALE : NONE

2
M5.2

NOTES:

1. SUPPLY AIR TO ALL ROOMS (EXCEPT GOWN, DEGOWN AND AUTOCLAVES) ARE SUPPLIED THRU LOW VELOCITY CEILING DIFFUSERS WITH HEPA FILTERS.
2. ALL ROOMS EXCEPT GOWN-1, GOWN-2, DEGOWN AND AUTOCLAVE HAVE LOW WALL RETURN GRILLES.
3. AT COMPLETION OF TESTING, PRESSURE SETTINGS SHALL BE REBALANCE TO PRESSURES DIRECTED BY THE UNIVERSITY'S REPRESENTATIVE.



HVAC GMP AIRFLOW SCHEMATIC (POSITIVE PRESSURE MFR ROOMS)

SCALE : NONE

1
M5.2

ARCHITECTS
STAFFORD KING WIESE

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CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

CAPITAL ENGINEERING CONSULTANTS, INC.
SACRAMENTO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
STEPHEN A. MYERS
M 24700
EXPIRES 3/09
MECHANICAL
STATE OF CALIFORNIA

SM - JC & MJR 060701.00
TL - DESIGN TEAM PROJECT NO.
DATE SIGNED: _____

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO. 9553600
CSMPO NO.
BUILDING: BUILDING 41
SIMULATOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: HVAC GMP AIRFLOW SCHEMATIC

ARCH.I ENGR. OF RECORD: STEPHEN A. MYERS	PROJECT NO.: 060701.00	SHEET NO.: M5.2
PROJECT MANAGER: JOHN GAMBONE	SCALE: NONE	
CHECKED BY: SM	DATE: 02/04/08	REVISION
ENGR. DESIGNER: JC/MJR	PREVIOUS DRAWING NO.: .	
UCDMC DRAWING NO.: .		

QC
INI %

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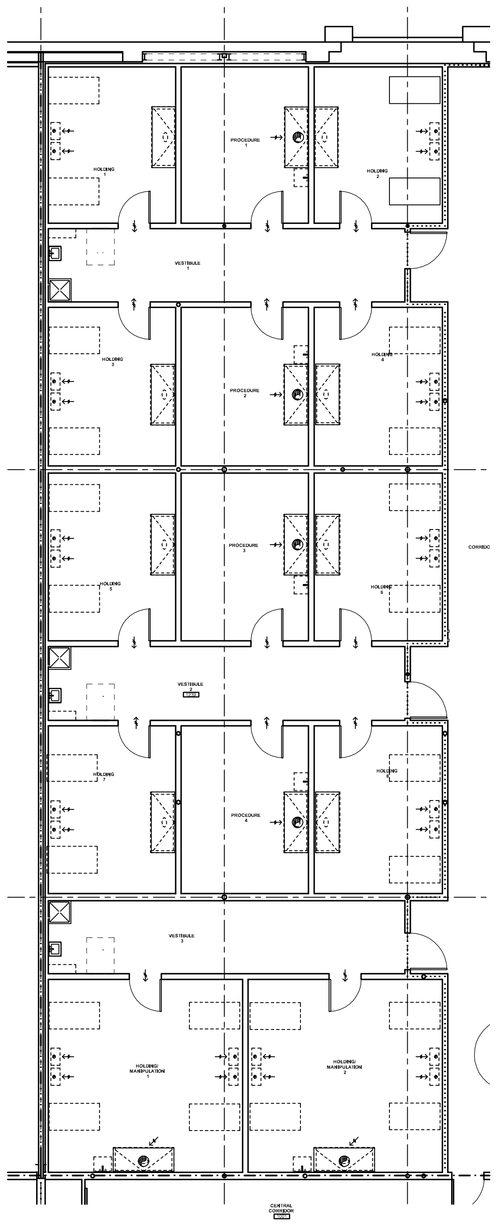
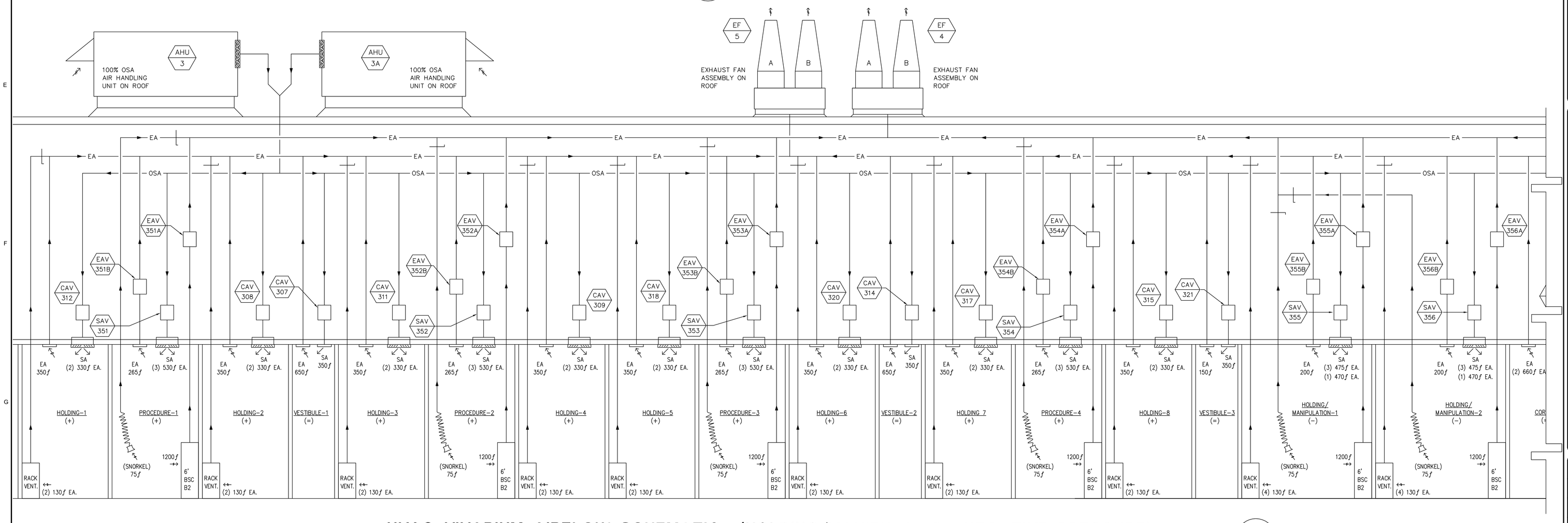


HVAC VIVARIUM AIRFLOW SCHEMATIC (NEGATIVE PRESSURE)

2
M5.3

SCALE : NONE



HVAC VIVARIUM AIRFLOW SCHEMATIC (HOLDING/MANIPULATION NEGATIVE PRESSURE)

1
M5.3

SCALE : NONE

ARCHITECTS

STAFFORD KING WIESE

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CLIENT AND PROJECT

CONSULTANT STAMP

CAPITAL ENGINEERING CONSULTANTS, INC.
SACRAMENTO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
STEPHEN A. MYERS
M 24700
EXPIRES 3/09
MECHANICAL
STATE OF CALIFORNIA

SM - JC & MJR 060701.00
TL - DESIGN TEAM PROJECT NO.
DATE SIGNED:

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

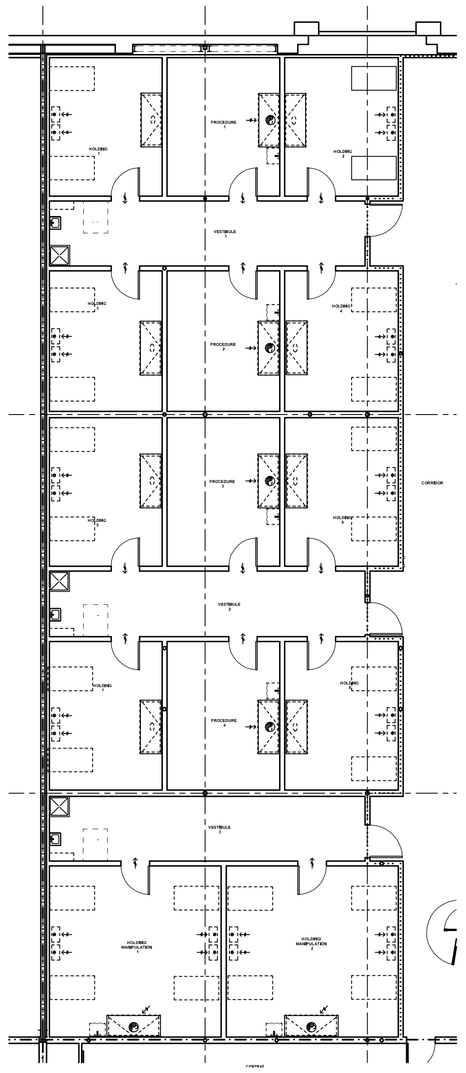
CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WINGFLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: HVAC VIVARIUIM AIRFLOW SCHEMATIC

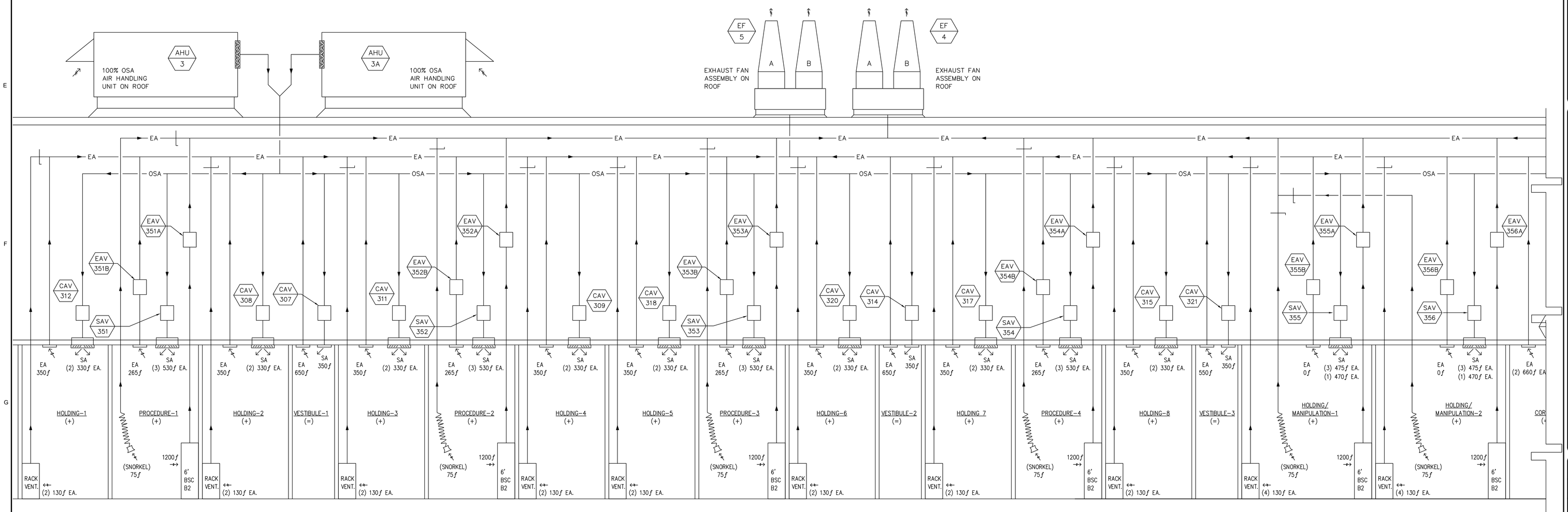
ARCH'L ENGR. OF RECORD: STEPHEN A. MYERS	PROJECT NO.: 060701.00	SHEET NO.: M5.3
PROJECT MANAGER: JOHN GAMBONE	SCALE: NONE	
CHECKED BY: SM	DATE: 02/04/08	REVISION
ENGR/ DESIGNER: JC/MJR	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		



HVAC VIVARIUM AIRFLOW SCHEMATIC (POSITIVE PRESSURE) CONT.

2 / M5.4

SCALE : NONE



HVAC VIVARIUM AIRFLOW SCHEMATIC (HOLDING/MANIPULATION POSITIVE PRESSURE)

1 / M5.4

SCALE : NONE

ARCHITECTS

STAFFORD KING WIESE

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SACRAMENTO CALIFORNIA 95811
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EMAIL: mail@skwaia.com

CLIENT AND PROJECT

UCD UC DAVIS MEDICAL CENTER MC

CONSULTANT STAMP

CAPITAL ENGINEERING CONSULTANTS, INC.
SACRAMENTO, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER STEPHEN A. MYERS M 24700 EXPIRES 3/09 MECHANICAL STATE OF CALIFORNIA

SM - JC & MJR 060701.00
TL - DESIGN TEAM PROJECT NO.
DATE SIGNED:

UNIVERSITY OF CALIFORNIA DAVIS
CIRM STEM CELL INSTITUTE

CIRM RFA 07-03
APPLICATION #FA1-00611-1

REVISIONS

NO.	DESCRIPTION	BY	CHK	DATE

ACCOUNT NO.: 9553600
OSHPD NO.:
BUILDING: BUILDING 41
WING/FLOOR:
PROJECT TITLE: UNIVERSITY OF CALIFORNIA DAVIS CIRM STEM CELL INSTITUTE
SHEET TITLE: HVAC VIVARIUIM AIRFLOW SCHEMATIC

ARCH'L ENGR. OF RECORD: STEPHEN A. MYERS	PROJECT NO.: 060701.00	SHEET NO.: M5.4
PROJECT MANAGER: JOHN GAMBONE	SCALE: NONE	
CHECKED BY: SM	DATE: 02/04/08	REVISION
ENGR/ DESIGNER: JC/MJR	PREVIOUS DRAWING NO.: -	
UCDMC DRAWING NO.: -		

DORIS O. MATSUI
5TH DISTRICT, CALIFORNIA
COMMITTEE ON RULES
COMMITTEE ON
TRANSPORTATION AND INFRASTRUCTURE

Congress of the United States
House of Representatives
Washington, DC 20515–0505

WASHINGTON OFFICE:
222 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–0505
(202) 225–7163

DISTRICT OFFICE:
ROBERT T. MATSUI U.S. COURTHOUSE
501 I STREET, SUITE 12–600
SACRAMENTO, CA 95814
(916) 498–5600

http://matsui.house.gov

February 25, 2008

Alan O. Trounson, Ph.D., President
California Institute for Regenerative Medicine
210 King Street
San Francisco, California 94107

RE: Support – UC Davis CIRM Stem Cell Institute Application

Dear Dr. Trounson:

On behalf of the 5th Congressional District, representing the City of Sacramento and the UC Davis Health System, I am pleased to support the University of California at Davis' application to the California Institute for Regenerative Medicine (CIRM) for major research facilities funding.

Over the past few years, I have met with key UC Davis scientists, researchers and physicians that are aggressively pursuing stem cell therapies in Sacramento. Recently, I toured the temporary home of the UC Davis Center for Regenerative Medicine, led by Jan Nolta, Ph.D. It was clear that there is a need for additional research space and adequate facilities to ensure the highest "Good Manufacturing Practices" can be met by UC Davis' team of researchers. With each meeting and visit, I have become more impressed by the science behind UC Davis' program.

UC Davis' research facilities, particularly those involved with advanced medical research, are truly committed to discovering and sharing knowledge to furthering health care in our nation. By investing in a major stem cell research facility in Sacramento, I am confident that new discoveries in the field of regenerative medicine will be translated to the broader community for the benefit of patients worldwide. This has been my experience with UC Davis and I have every confidence in their programs going forward.

Sincerely,

Doris O. Matsui

DORIS O. MATSUI
Member of Congress

DOM: kl
cc: Larry Vanderhoef, Chancellor, UC Davis

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STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0009
(916) 319-2009
FAX (916) 319-2109

DISTRICT OFFICE
915 L STREET, SUITE 110
SACRAMENTO, CA 95814
(916) 324-4676
FAX (916) 327-3338

Assembly
California Legislature

DAVE JONES
ASSEMBLYMEMBER, NINTH DISTRICT
CHAIR, JUDICIARY COMMITTEE

COMMITTEES:
JUDICIARY, CHAIR
HEALTH
PUBLIC EMPLOYEES RETIREMENT & SOCIAL SECURITY
REVENUE & TAXATION

E-MAIL:
assemblymember.jones@assembly.ca.gov
WEB:
www.assembly.ca.gov/jones

February 25, 2008

Alan O. Trounson, Ph.D., President
California Institute for Regenerative Medicine
210 King Street
San Francisco, CA 94107

Re: Support – UC Davis CIRM Stem Cell Institute Application

Dear Dr. Trounson:

I am writing in support of an application submitted to you by UC Davis to establish a research facility on its Sacramento campus to pursue stem cell research. Last month, I had the opportunity to serve on a stem cell panel sponsored by UC Davis Health System. I spoke of the California State Legislature's role in ensuring that Proposition 71 dollars reach all potential patients, regardless of race, ethnicity, or income. The statewide ballot initiative provides for $3 billion in state funding for stem cell research at California universities and research facilities.

During my 9 years in office representing Sacramento, I have personally come to know the people and programs of UC Davis and wholeheartedly support their effort in obtaining CIRM funding for such an important endeavor. Specifically, the UC Davis Health System, which is located in my Assembly district, has proven over its 40 year history a sincere and serious commitment to serving underrepresented patient populations. As the institution has grown to national prominence, its commitment to the community has grown accordingly. Through the university's expansive Community Hospital Network (CHN), award-winning Center for Health and Technology, and Center for Reducing Health Disparities, a well-established outreach infrastructure is in place for future stem cell research and discoveries.

I encourage you to support this esteemed university and its burgeoning stem cell program. Please contact me or Melanie Ramil of my office should you have further questions or concerns at (916) 324-4676. Thank you for your consideration.

Sincerely,

DAVE JONES
Assemblymember, 9th District

cc: Mr. Larry Vanderhoef, UC Davis Chancellor

Printed on Recycled Paper

OFFICE OF THE
MAYOR

HEATHER FARGO
MAYOR

CITY OF SACRAMENTO
CALIFORNIA

February 25, 2008

Alan O. Trounson, Ph.D., President
California Institute for Regenerative Medicine
210 King Street
San Francisco, CA 94107

Re: Support – UC Davis CIRM Stem Cell Institute Application

Dear Dr. Trounson:

As the Mayor of the City of Sacramento, I am extraordinarily proud to claim that our community is the most ethnically integrated major city in the country according to an analysis of U.S. Census date by Harvard University (*Time* magazine, September 2002). This geographic distinction – coupled with medical and scientific expertise – has made UC Davis Health System a national destination for research funded by the National Institutes of Health, the National Science Foundation and the National Cancer Institute to name just a few current sources.

Today, I am writing to encourage the CIRM application review team to strongly consider Sacramento as a destination city for a major stem cell research facility. Ours is a collaborative community, rich in cultural and ethnic diversity. UC Davis Health System and its leadership team enjoy an outstanding reputation locally, as recognized by the Association of American Medical Colleges which recently awarded the university with its "Outstanding Community Service" honor.

The $26 million grant request will allow UC Davis to accelerate and complete the Stem Cell Institute headquarters in the heart of Sacramento, just a few miles from City Hall and the State Capitol. For the thousands of local citizens who may someday benefit from stem cell therapies, I urge your support of the UC Davis application.

Sincerely,

Heather Fargo

HEATHER FARGO
MAYOR

HF:klb

c: Larry Vanderhoef, Chancellor, UC Davis

CITY HALL - FIFTH FLOOR
915 I STREET, SACRAMENTO, CA 95814-2604
PH 916-808-5300 • FAX 916-264-7680 hfargo@cityofsacramento.org

STATE CAPITOL
ROOM 4035
SACRAMENTO, CA 95814
TEL (916) 651-4006
FAX (916) 323-2263

DISTRICT OFFICE
1020 N STREET, ROOM 576
SACRAMENTO, CA 95814
TEL (916) 651-1529
FAX (916) 327-8754

California State Senate

SENATOR
DARRELL STEINBERG
SIXTH SENATORIAL DISTRICT

COMMITTEES
NATURAL RESOURCES & WATER
CHAIR
BUDGET & FISCAL REVIEW
SUBCOMMITTEE NO. 2 ON
RESOURCES, ENVIRONMENTAL
PROTECTION & ENERGY
ENVIRONMENTAL QUALITY
JUDICIARY
HEALTH

SELECT COMMITTEE
HIGH SCHOOL GRADUATION

February 25, 2008

Alan O. Trounson, Ph.D., President
California Institute for Regenerative Medicine
210 King Street
San Francisco, CA 94107

Re: Support – UC Davis CIRM Stem Cell Institute Application

Dear Dr. Trounson:

On behalf of California State Senate District 6, which includes the UC Davis Health System, I am writing in support of the University of California, Davis, application to the California Institute for Regenerative Medicine (CIRM) for major research facilities funding.

Before joining the State Senate, I worked as a private citizen – a Sacramentan of more than 15 years, to actively recruit the CIRM headquarters to the state capitol. During this process, I met with international experts in stem cell science, and I became a believer in the promise of regenerative medicine for patients afflicted with both curable and incurable diseases. Moreover, I saw a clear role for leading-edge scientific advancement in our state capitol of Sacramento. Today, I have the privilege of lending my support to an application that could result in new stem cell facilities in my district, Sacramento – the capitol city.

As you review the UC Davis application, you will discover a collaborative, multi-disciplinary research team with a sincere commitment to inclusion of diverse patient populations. Equipped with a major research facility funded by CIRM, this team can achieve excellence!

Sincerely,

DARRELL STEINBERG
Senator, 6th District

Cc: Larry Vanderhoef, Chancellor, UC Davis