

**University of Colorado at Boulder  
Department of Facilities Management  
Office of Facilities Planning**

## **Feasibility Study for the Biotechnology Building**

**November 9, 2005**

### **1. Introduction**

The College of Arts and Sciences and the College of Engineering and Applied Science are jointly proposing the construction of a major new facility at the University of Colorado at Boulder Research Park. This new facility will support the advancement and application of the University's biotechnology initiatives. It will significantly enhance the research infrastructure and bring together faculty and research groups involved in the Colorado Initiative in Molecular Biotechnology. The building will also provide laboratory and office space for the growing needs of the Chemical and Biological Engineering Department and the Biochemistry faculty in the Chemistry and Biochemistry Department.

Advances in biology exemplified by the completion of the human genome project are leading to an explosion of new information that is redefining our understanding of life at the molecular level. CU-Boulder is taking the bold steps to build the visionary, interdisciplinary educational and research environment needed to achieve breakthrough contributions in fields such as engineering human tissues, new pharmaceuticals based on RNA enzymes and aptamers, and understanding the genetic basis for numerous diseases.

Colorado is home for approximately 300 biosciences firms and is one of the fastest growing states for life sciences and biotechnology industries. Between 1998 and 2003, the number of companies grew by 35%, outpacing the national growth rate. Colorado's total bioscience academic research funding of \$300 million reported by the National Science Foundation grew 31% from FY 1998 to FY 2002, compared to 27% for the nation.<sup>1</sup>

#### *A. Purpose*

The plan is to build a new research and teaching facility on Pod I of the Research Park space, just east of the intersection of Colorado and 30<sup>th</sup> Street. This building will be the starting point of a new science and research campus for CU-Boulder. It will initially house the Colorado Initiative in Molecular Biotechnology, the biochemistry faculty in the Chemistry and Biochemistry Department, and the Chemical and Biological Engineering Department. The Program Plan will include research and office space, as well as space for educational needs; construction of the educational space will likely depend on the availability of state capital construction funds.

The Colorado Initiative in Molecular Biotechnology (CIMB) is an initiative to foster new research, teaching, and technology development at the interface of life sciences, physical sciences, applied mathematics, computational sciences, and engineering. The focus of this initiative is to understand and manipulate living cells and control cellular behavior through a global analysis of molecular events using methods that span a continuum from basic to applied research. The area referred to as "molecular biotechnology" includes new methods in genomics, proteomics,

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<sup>1</sup> "Biotech is Booming in Colorado", State of Colorado, 2003,  
[http://www.oit.state.co.us/initiatives/biotech\\_brochure.asp](http://www.oit.state.co.us/initiatives/biotech_brochure.asp).

molecular and cellular imaging, biosensors, biorenewable energy, biophysics, mathematical analysis, biomaterials engineering, tissue engineering, biorefining, and biochemical synthesis. The CIMB builds on the extraordinary history of CU's biotechnology breakthroughs, including Marvin Caruthers' methods for facile DNA synthesis, Tom Cech's discovery of catalytic RNA, and Larry Gold's discovery and commercialization of aptamers. The synergistic linkage of the basic sciences, engineering, and industry in this exciting, high-impact field will lead to the development of additional technologies, drugs, and techniques for improving human lives.

In addition to faculty from many science Departments on the CU Boulder campus, faculty from Molecular and Cellular Developmental Biology (MCDB), Chemistry and Biochemistry, and Chemical and Biological Engineering (ChBE) have been the driving force for this initiative. Professor Leslie Leinwand of MCDB is the Director of the CIMB, and Professors Natalie Ahn of Chemistry and Biochemistry and Kristi Anseth of ChBE are the Associate Directors. From the College of Engineering and Applied Science, faculty from ChBE and Computer Science have been active participants in the nucleation and establishment of this initiative, and additional participation is expected from other engineering departments. Arts and Sciences faculty from MCDB, Physics, Chemistry/Biochemistry, Applied Math, Ecology and Evolutionary Biology, and Integrative Physiology have also been involved in CIMB. The primary goals of the CIMB are to enhance core research areas at the forefront of molecular technologies applied to biosciences, to create a magnet for attracting outstanding students and faculty, to bridge disciplines by integrating research and teaching and promoting interdisciplinary collaborations, and to support biotechnology industrial development in Colorado, particularly along the Front Range.

The Chemical and Biological Engineering Department has been recognized nationally and internationally. Its graduate program is ranked in the top 20 of public universities by US News and World Report. Within the past four years the department faculty have received two AIChE Allan P. Colburn Awards, one AIChE Professional Progress Award, two ASEE Curtis W. McGraw Awards, and one ASEE Dow Lectureship Award. Each of these awards is given nationally to a single person each year. The ChBE faculty, when compared to chemical engineering faculty nationwide, are ranked:

- Eighth in research publication citations per faculty,
- Fourth in publications per faculty,
- Seventh in ASEE research funding per faculty,
- Eighth in citations per publication.

The University of Colorado established a semi-independent Biochemistry Division within the Department of Chemistry and Biochemistry in 1986. Undergraduate and graduate teaching and research in the division span the fields of cellular and molecular biology to synthetic and biophysical chemistry. The research laboratories utilize state-of-the-art experimental techniques to study a wide range of chemical and biological systems. Specific areas of focus in the Biochemistry Division are: RNA structure and function, nucleic acid chemistry, protein structure and dynamics, signal transduction, proteomics, and X-ray and NMR structural biology. The faculty are highly recognized for their research and include a Nobel laureate, two National Academy members, two HHMI investigators, one Damon Runyon Scholar, Two Pew Scholars, Two Searle scholars, one NSF new investigator, and one Beckman investigator.

## *B. Program and Facilities Needs*

CIMB has successfully hired five faculty members in new growth lines, including one senior hire and four junior faculty, each focused on interdisciplinary research in the biological sciences and engineering. The Initiative has also already been very successful in bringing together a highly productive, interdisciplinary core group of current CU faculty to focus on critical problems in these fields. They have received sponsored research grants, educated students of all levels, established training programs, hosted scientific meetings, performed outreach and established a vision and organization for the future of the initiative.

To foster the goal of promoting interdisciplinary interactions, it is critical to provide a physical infrastructure and intellectual environment that stimulates research exchange and growth. While the focus is on facilitating research efforts, it will also enrich the education of students. At the same time, it is imperative to provide space for the growing faculty and research of the Chemical and Biological Engineering Department and for Biochemistry. The campus leadership and CIMB fully endorse pursuing a new building to house the entire ChBE faculty and their research labs, along with members of the faculty who encompass research in the Life Sciences at the University of Colorado.

The facility plan is visionary: design research labs that will foster interdisciplinary research and research with corporate partners, build teaching labs to support current and new interdisciplinary degree programs, provide meeting and communication facilities that will help bridge the physical distances between this new building and existing buildings and between the University and industry, and construct utility infrastructure that will support the growing demands of our leading-edge research. This facility will catalyze Colorado's pre-eminence in molecular biotechnology and foster continued success of Chemical and Biological Engineering and Chemistry and Biochemistry departments.

## *C. Space Needs Analysis*

A summary of the total space needs of the CIMB, the ChBE Department, and the Biochemistry Division is as follows:

<b>Space Category</b>	<b>Number</b>	<b>Sq. Ft.</b>
# of Rostered Faculty (to determine # offices and to calculate/validate lab space needs)	66	7,920
# Other faculty needing offices but not lab space	8	960
# of Senior Researcher/Post-Doc Offices	46	3,680
# of Grad Student Offices	240	14,400
Wet Lab Modules (11' x 22' each) per faculty member	~4	
Sq. Ft of Wet Lab Modules		58,806
Sq. Ft of Wet Lab Service Modules		14,702
Mass Spectrometer Facility		1,210
NMR Facility		726

X-Ray Facility		968
Tissue Culture Facility		726
FACS/Single Molecule Spectroscopy Facility		726
Service Module Area for NMR, MS, X-Ray, Tissue Culture, FACS		1,089
Animal Facility		2,500
Computer/Dry Lab Sq. Ft.		3,450
Research Technicians/Lab Managers Offices	9	720
Instrument/Machining Shop, Office		2,000
Electronics Shop/Office		800
Chemical Stores		250
# Staff Offices	20	1,600
Mail/Copier/Reception		500
Departmental Computer Server		350
Archives		400
Storage		
Student Hourly Office Space	5	250
Number of Large Meeting Rooms (Occupancy 20-50)	2	1,000
Number of Small Meeting Rooms (Occupancy 10-20)	4	1,000
Telecommunication equipment		960
Custodial Storage		100
Recycle Area(s)		160
Storage for records, salvage equip.		500
Break/Lunch/Informal Gathering Space		1,000
Lobby Space (open meeting area)		2,000
Gas Receiving Area		200
<b>TOTAL SQ. FT.</b>		<b>125,653</b>

The educational space needs are as follows:

<b>Space Category</b>	<b>Number</b>	<b>Sq. Ft.</b>
Student Org Office Space (Sq Ft)		200
Teaching Laboratory	1	4,840
Auditorium/Tiered Classroom (100+ seats)	1	2,000
Large Classroom (60 seats)	2	1,936
Small Classroom (30 seats)	4	1,936
Student Computer Class/Lab	1	968
Telecommunications		240
Custodial		
<b>TOTAL SQ. FT.</b>		<b>12,120</b>

#### *D. Proposed Facilities Response*

Facilities Planning has studied the impacts of such an extensive proposal. It is estimated that approximately 125,000 assignable square feet (ASF) are required for this new facility. Buildings of this type require extensive mechanical and electrical space increasing the gross square footage (GSF) over conventional office or classroom buildings; therefore the assumed conversion factor for ASF to GSF is 1.8 that is it takes 0.8 square feet of non-assignable space for every square foot of assignable space. This would yield a building in the range of 210,000 to 230,000 GSF.

Planning guides for wet laboratory facilities recommend lab modules of 11' x 22'. This creates a recommended overall width of 120' once offices and proper corridor widths are added to the outside of the building. Use of narrower floor plates only increases the height of buildings to achieve the required square footage, while wider floor plates decrease the efficiency of the building.

The recommended 120' width serves as a fixed element while the length and height of the building will vary depending on site constraints. Generally, the building will need to be 4 stories tall, potentially with one more story for a mechanical penthouse. For planning purposes, a 15' floor to floor distance was assumed.

For a building of this size, additional parking would likely be required. Parking guides for laboratory buildings recommend that one parking space be provided for every 600 to 800 square feet. Thus, this building could be expected to increase the demand for campus parking by up to 383 parking spaces.

There are only a few sites on the CU-Boulder campus suitable for such a large facility, all located within the CU-Boulder Research Park. The two most likely candidates are Pod D, located just north of the McAllister Center (Qwest Building) and Pod I, located between Smiley Court and the LSTR Center. The Pod D site is approximately 590,000 SF which would yield a floor area ratio (FAR) of .38 conforming to the existing design guidelines of the Research Park. The Pod I site is 8.75 acres (379,625 SF), which yields a floor area ratio of .60, comparable to the dense areas of the Main Campus but in excess of currently adopted density for the park.

#### *E. Conceptual Alternatives*

There have been several studies on renovation and expansion of the Chemistry and Biochemistry buildings, Christol Chemistry and Eckley Sciences. In December, 2001, a formal recommendation was presented by James Ireland Bailey, CU-Boulder Campus Planner, the options for Chemistry and Biochemistry. In that report, ten alternatives were studied. The top choice was renovation of the existing building and constructing a new building on the Sibell Wolle site. The next choice was to build a new building on Research Park property. In June, 2004, a Preliminary Site Selection Memorandum, authored by Philip Simpson, Assistant Director for Facilities Planning, identified both Pod I and Pod D at Research Park as viable locations for this building.

In February, 2004, Facilities Planning presented alternatives to the Dean and Chair for expansion of the Chemical and Biological Engineering space versus building a new facility at Research Park. The conclusion of this study was to pursue the new facility.

## F. Tentative Schedule

The following schedule assumes that the building is operated and maintained using General Funds.

Feasibility Study review by BCPC	November 10, 2005
Feasibility Study review by CEC	November 30, 2005
Initiate Program Plan	November 30, 2005
BCPC Program Plan Approval	April 13, 2006
CEC Program Plan Approval	April 26, 2006
Regents Capital Planning Committee	April 26, 2006
Board of Regents Program Plan Approval	June 29, 2006
FY 2007-08 Capital Construction Request	July 15, 2006
CCHE Program Plan Approval	September 2006
CDC Approval of Capital Request	November 2006
JBC Approval of Capital Request	February 2007
Long Bill Approval	May 2007
Architect Selection by Board of Regents	June 2007
Design Start	July 2007
Construction start	May 2008
Construction completion	July 2009
Occupancy	August 2009

## 2. Responsiveness to Boulder Campus Strategic Goals

The *Campus Master Plan* states: "Older science buildings are often deficient on suitable space." Biochemistry and Chemical and Biological Engineering facilities are an example. This project falls within the "Research Park Building(s)" category of Exhibit IV-A-4, "Proposed Capital Projects". The *Campus Master Plan* supports the underlying principle to "locate uses in functional relationship with adjoining uses" and to remodel existing facilities whenever possible. A new research and educational facility at Research Park will further the vision, mission, and strategic plan of the University of Colorado in multiple ways.

## 3. Health and Safety Issue

The ability to utilize safely the existing and new lab space will increase with additional space and updated utilities. The current facilities are at or under capacity for the needs of these programs.

## 4. Quality and Capacity Impacts

### A. Consequences if Project is Not Implemented

CIMB will not have the opportunity to grow as aggressive as desired, exposure of students to state of the art science and engineering methods will decline, the quality of scientific and technical staff and ability to recruit new members will decline. The university will lose overhead

generated by these programs, and CIMB will not have as stable a funding profile. In addition, Biochemistry and ChBE generate significant research funding, which could decline without this facility, which would result in lost overhead to both departments and the University and increased concern about the quality of the program.

#### *B. Alternative Solutions to Deliver Program*

If this project is not undertaken, the CIMB initiative will be severely limited. No new experimental faculty could be hired in any of the departments. It will be impossible to hire experienced faculty who would need space immediately to move their research. The campus would need to forego its goal to be a leader in biotechnology.

### **5. Evidence of State Award of Excellence**

In the 1996 report "Pursuit of Excellence Task Force", 61 UCB programs were ranked for quality; Chemistry & Biochemistry Department was rated #1.

### **6. Financial Feasibility Budget**

#### *A. Summary of Project Cost*

Attachment A is the analysis undertaken by the ChBE Department, the Biochemistry Division, and the leadership of the CIMB to assess the space needed in this building. Attachment B is the Facilities Planning Cost Summary for the Research Building and Attachment C is the Cost Summary for the Research and Educational Buildings.

#### *B. Financial Plan Model/ Source of Funds*

The preliminary cost estimate for the Biotechnology research facility is \$88 million. It is currently anticipated that this project will utilize a combination of funding sources including private contributions, indirect cost recoveries and cash reserves. Although the scope and potential success of a fundraising campaign has not been fully evaluated, it is believed that a high level of interest in the project exists among individuals, corporations, foundations and governmental entities.

#### *C. Comments from Financial Officers*

This financial analysis is dependent on preliminary assumptions regarding the various funding sources and the probability of successful fundraising efforts. While reasonable, these issues will be addressed in detail during the program planning phase.

### **7. Construction Impact Assessment**

By developing an entirely new facility, the construction activity will have no impact on current on-going operations. Since the project is on an undeveloped site (Pod I), impacts to adjacent programs will be minimal and consist of noise and dust typical for a project this size.

### **8. Assessment of Positive and Negative Issues Related to Project**

#### *A. Transportation Issues*

As noted above, the project will increase the demand for parking by approximately 383 spaces. This is within the adopted plan for the Research Park and will not have adverse impacts on any intersection. The site is also well served by the Stampede, the campus circulator bus system. In addition, the project will investigate options for a direct shuttle service to assist faculty and staff in transportation between the two campuses.

#### *B. Environmental/Ecological Issues*

Development of Pod I is covered within existing planned development for the Research Park. Environmental factors, such as flood mitigation, groundwater and wildlife issues were resolved prior to development of the park.

#### *C. Fit with Adjacent Programs and Facilities*

This project is in conformance with the proposed uses outlined in the Research Park Master Site Development Plan. The preferred location is Pod I but the density exceeds its capacity, suggesting that some modification of the guidelines may be necessary. Increasing the density on this site would not create a situation where the park as a whole exceeds its originally planned density because other sites (e.g. Greenhouse #3, McAllister Center (Qwest), LSTR) have under-built. Thus the Campus Master Plan recommends increasing the density of the Research Park.

#### *D. Compatibility with Campus and Community Neighbors*

If constructed on the Pod I site, the facility will sit adjacent to campus residential family housing and across Colorado Avenue from single family homes in the City of Boulder. Massing of the facility will need to be designed as to be compatible with the Colorado Boulevard streetscape. A Memorandum of Understanding between the Research Park System and the Department of Housing and Dining Services requires the Department of Housing to design and implement a landscape improvement plan for the land adjacent to Pod I and to maintain the improvement to the same level as the Research Park. This will require coordination between the two projects.

There are fewer issues between the adjacent community and Pod D. On this site, the prominence of the building from Foothills Parkway will be the largest issue. It may also be necessary to negotiate with Qwest regarding options that they have on portions of Pod D and E to free as much land as possible for this project.

#### *E. Political and Legal Issues*

As noted above, this project may require some deviation from a strict interpretation of the Research Park Master Site Development Plan and Design Guidelines. Specific deviations will be identified in the program plan and any required adjustments will be proposed at that time. This project is in conformance with densification goals of the Campus Master Plan and discussion is underway about updating the RP MSDP and Design Guidelines to reflect a higher density.

Prepared by:

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## Planning Estimates for Biotechnology Building

Space Category	Chemical and Biological Engineering			Biochemistry			Biotechnology			Total for Feasibility Plan			Space Type
	Current	Plan in New Building <sup>1</sup>	Additional Comments	Current	Plan in New Building <sup>1</sup>	Additional Comments	In ChBE	In Biochemistry	In Other Departments (10) & Matches (6)	Number	Sq. Ft.	Assumptions Used	
	<sup>1</sup> Not including new Biotech faculty			<sup>1</sup> Not including new Biotech faculty									
<b>RESEARCH SPACE</b>													
# of Rostered Faculty (to determine # offices and to calculate/validate lab space needs)	17	20	Current includes 2 searches; does not include Mahoney	20	20	Current includes 2 searches and 4 research prof.	5	5	16	66	7,920	120 sq. ft./ person	D
# Other faculty needing offices but not lab space	2	4		2	2				2	8	960	120 sq. ft./ person	D
# of Senior Researcher/Post-Doc Offices	28	28		8	8	access; most desk space is in the lab	7	1	2	46	3,680	80 sq ft/person	D
# of Grad Student Offices	89	100			60	Did I record this correctly?	20	20	40	240	14,400	Assumed 4 per biotech faculty; 60 sq. ft./person	D
Wet Lab Modules (11' x 22' each) per faculty member		4 for 17 faculty, 2 for 3 faculty	Each 2 wet lab modules allocated 11' x 11' service area		5 for 16 faculty	Assumes post-docs and grad student desk/office area is in the lab	4	5	4 for 11 faculty			Only 11 of the 16 "other" faculty need wet lab space	
Sq. Ft of Wet Lab Modules	18,792	17,908		25,739	19,360		4,840	6,050	10,648		58,806		G
Sq. Ft of Wet Lab Service Modules		4,477			4,840		1,210	1,513	2,662		14,702	Service mod for most support equipment	G
Mass Spectrometer Facility					1,210	5 modules					1,210		F
NMR Facility					726	3 modules					726		F
X-Ray Facility					968	4 modules					968		F
Tissue Culture Facility					726	3 modules					726		F
FACS/Single Molecule Spectroscopy Facility					726	3 modules					726		F
Service Module Area for NMR, MS, X-Ray, Tissue Culture, FACS				9,981	1,089	This may be more than is needed					1,089	More than is needed?	F
Animal Facility									2,500		2,500		G
Computer/Dry Lab Sq. Ft.	2,449	1,250	Current includes student computer lab	1,029	1,200	Add space for new cluster			1,000		3,450		F
Research Technicians/Lab Managers Offices	4	6		3	3					9	720	80 sq. ft/erson	D
Instrument/Machining Shop, Office	2,296	2,000									2,000	Shared facility for all tenants	D
Electronics Shop/Office	257	800									800	Shared facility for all tenants	D
Chemical Stores	165	250	Chemical Storage								250	Shared facility for all tenants; is this large enough?	G
<b>DEPARTMENTAL AND ADMINISTRATIVE SUPPORT SPACE</b>													
# Staff Offices	10	10	Includes MAST center and Langmuir editorial offices		6		2		2	20	1,600	80 sq. ft. /person	D
Mail/Copier/Reception	165	250			250						500		D
Departmental Computer Server	343	350									350		F
Archives	0	400									400		A
Storage	265+hallway	250			1,500	Space for salvagable equipment						Provide in building common	
Student Hourly Office Space	2	5								5	250	50 sq ft/person?	D
<b>Assignable Space Estimate for Research/Faculty/Dept Area</b>										<b>394</b>	<b>118,733</b>	Plus Common Space (below)	

## Planning Estimates for Biotechnology Building

Space Category	Chemical and Biological Engineering			Biochemistry			Biotechnology			Total for Feasibility Plan			Space Type
	Current	Plan in New Building'	Additional Comments	Current	Plan in New Building'	Additional Comments	In ChBE	In Biochemistry	In Other Departments (10) & Matches (6)	Number	Sq. Ft.	Assumptions Used	
<b>BUILDING COMMON SPACE (Include in Research Building Assignable Sq. Ft.)</b>													
Number of Large Meeting Rooms (Occupancy 20-50)	0			2						2	1,000	500 sq. ft. each, configurable to 1 room of 1000 sq. ft.	D
Number of Small Meeting Rooms (Occupancy 10-20)	1		Currently have 2 additional very small rooms	4						4	1,000	1 per floor; 250 sq. ft. each	D
Telecommunication equipment											960	120 sq.ft * floors * building modules	E
Custodial Storage											100	Phil Simpson provided	E
Recycle Area(s)											160	Phil Simpson provided	E
Storage for records, salvage equip.											500	Is this needed?	A
Break/Lunch/Informal Gathering Space											1,000	JFZ estimate	D
Lobby Space (open meeting area)											2,000	JFZ estimate	E
Gas Receiving Area											200	JFZ estimate	A
<b>Total Assignable Space Estimate for Research Building</b>										<b>125,653</b>			
<b>EDUCATIONAL SPACE</b>													
Student Org Office Space (Sq Ft)	120	200									200		A
Teaching Laboratory	2,000	4,500	Incl. new Bio lab for new degree program							1	4,840	16-11 x 22 modules, 8-11 x 11 service area	F
Auditorium/Tiered Classroom (100+ seats)										1	2,000		F
Large Classroom (60 seats)										2	1,936	4-11 x 22 modules	A?
Small Classroom (30 seats)										4	1,936	2-11 x 22 modules (ECCR typical size)	A
Student Computer Class/Lab										1	968	4-11 x 22 modules	A
Telecommunications											240	2 floors, 1 room/floor	E
Custodial													
<b>Total Assignable Space Estimate for Educational Building</b>										<b>12,120</b>			

## Appendix B: Cost Model for Biotechnology Building without Educational Component

### Biotechnology Initiative - No Educational Project Cost and Financing

	Cost per GSF	Total Project Cost	Prior Appropriation	Future Request FY 2007- 2008	Future Request FY 2008- 2009	Future Request FY 2009- 2010	Other Future Requests
<b>A. Land Acquisition</b>		<b>\$0</b>					<b>\$0</b>
<b>B. Professional Services</b>							
1. Master or Program Planning		\$0		\$0			\$0
2. Architect / Engineer (bldg.)		\$7,279,669		\$7,279,669			\$0
3. Architect / Engineer (other)		\$343,211		\$343,211			\$0
4. Construction Management		\$621,431		\$621,431			\$0
5. Code Review		\$0		\$0			\$0
6. Site Information and Tests		\$1,286,002		\$1,286,002			\$0
7. Other ( )		\$2,500		\$2,500			\$0
<b>8. Total Professional Services</b>		<b>\$9,532,813</b>	<b>\$0</b>	<b>\$9,532,813</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>C. Construction</b>							
1. Building							
a. New (213,046 GSF)	\$289.02	\$61,573,686		\$61,573,686			\$0
b. Renovate ( 0 GSF)		\$0		\$0			\$0
c. Demolish ( 0 GSF)		\$0		\$0			\$0
d. Hazardous Materials		\$0		\$0			\$0
e. Other		\$1,226,433		\$1,226,433			\$0
2. Site Work		\$1,642,300		\$1,642,300			\$0
3. Landscaping		\$792,792		\$792,792			\$0
4. Utilities		\$1,537,861		\$1,537,861			\$0
5. Other (Feasibility Design Contingency)		\$1,719,762		\$1,719,762			\$0
<b>6. Total Construction Cost</b>		<b>\$68,492,835</b>	<b>\$0</b>	<b>\$68,492,835</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>D. Equipment and Furnishings</b>							
1. Equipment		\$3,565,000		\$3,565,000			\$0
2. Furnishings		\$220,730		\$220,730			\$0
3. Communications		\$1,171,755		\$1,171,755			\$0
4. Other ( )		\$495,749		\$495,749			\$0
<b>5. Total Equipment Cost</b>		<b>\$5,453,234</b>	<b>\$0</b>	<b>\$5,453,234</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>E. Miscellaneous</b>							
1. Art in Public Places		\$0		\$0			\$0
2. Relocation Costs		\$102,544		\$102,544			\$0
3. Project Contingency		\$4,173,944		\$4,173,944	\$0	\$0	\$0
<b>4. Total Miscellaneous Costs</b>		<b>\$4,276,488</b>	<b>\$0</b>	<b>\$4,276,488</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>F. Total Cost</b>		<b>\$87,755,369</b>	<b>\$0</b>	<b>\$87,755,369</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
Source of Funds:							
Capital Construction Funds							
Capital Construction Funds -- Exempt Cash Funds							
Cash Funds -- Exempt Federal		\$87,755,369	\$0	\$87,755,369	\$0	\$0	\$0

This number is the estimated project for scope identified at Feasibility Study.  
The estimated low range for this project is = \$86,000,000  
The estimated high range for this project is = \$94,800,000

## Appendix C: Cost Model for Biotechnology Building with Educational Component

### Biotechnology Initiative - All Project Cost and Financing

	Cost per GSF	Total Project Cost	Prior Appropriation	Future Request FY 2007- 2008	Future Request FY 2008- 2009	Future Request FY 2009- 2010	Other Future Requests
<b>A. Land Acquisition</b>		<b>\$0</b>					<b>\$0</b>
<b>B. Professional Services</b>							
1. Master or Program Planning		\$0		\$0			\$0
2. Architect / Engineer (bldg.)		\$7,680,817		\$7,680,817			\$0
3. Architect / Engineer (other)		\$343,211		\$343,211			\$0
4. Construction Management		\$662,796		\$662,796			\$0
5. Code Review		\$0		\$0			\$0
6. Site Information and Tests		\$1,360,107		\$1,360,107			\$0
7. Other (_____)		\$2,500		\$2,500			\$0
<b>8. Total Professional Services</b>		<b>\$10,049,432</b>	<b>\$0</b>	<b>\$10,049,432</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>C. Construction</b>							
1. Building							
a. New ( 230,304 GSF)	\$283.15	\$65,209,502		\$65,209,502			\$0
b. Renovate ( 0 GSF)		\$0		\$0			\$0
c. Demolish ( 0 GSF)		\$0		\$0			\$0
d. Hazardous Materials		\$0		\$0			\$0
e. Other		\$1,295,860		\$1,295,860			\$0
2. Site Work		\$1,642,300		\$1,642,300			\$0
3. Landscaping		\$792,792		\$792,792			\$0
4. Utilities		\$1,607,689		\$1,607,689			\$0
5. Other (Feasibility Contingency)		\$2,732,672		\$2,732,672			\$0
<b>6. Total Construction Cost</b>		<b>\$73,280,815</b>	<b>\$0</b>	<b>\$73,280,815</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>D. Equipment and Furnishings</b>							
1. Equipment		\$3,565,000		\$3,565,000			\$0
2. Furnishings		\$355,014		\$355,014			\$0
3. Communications		\$1,266,673		\$1,266,673			\$0
4. Other (_____)		\$518,669		\$518,669			\$0
<b>5. Total Equipment Cost</b>		<b>\$5,705,356</b>	<b>\$0</b>	<b>\$5,705,356</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>E. Miscellaneous</b>							
1. Art in Public Places		\$0		\$0			\$0
2. Relocation Costs		\$143,542		\$143,542			\$0
3. Project Contingency		\$4,451,780		\$4,451,780	\$0	\$0	\$0
<b>4. Total Miscellaneous Costs</b>		<b>\$4,595,322</b>	<b>\$0</b>	<b>\$4,595,322</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>F. Total Cost</b>		<b>\$93,630,924</b>	<b>\$0</b>	<b>\$93,630,924</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
Source of Funds:							
Capital Construction Funds							
Capital Construction Funds -- Exempt							
Cash Funds							
Cash Funds -- Exempt		\$93,630,924	\$0	\$93,630,924	\$0	\$0	\$0
Federal							

This number is the estimated project for scope identified at Feasibility Study.  
The estimated low range for this project is = \$91,800,000  
The estimated high range for this project is = \$101,100,000