CapitalBudgetRequest

Construct Vivarium and Research Laboratory	
Overview	
Agency	Virginia Polytechnic Institute and State University (208)
Project Code	none
Project Type	New Construction
Biennium	2012-2014
Budget Round	Amended Bill
Request Origin	Previously Submitted
Six-Year Plan Status	
Budget Bill Status	
Building Name	
Project Location	Roanoke Area
Facility/Campus	Other
Source of Request	Agency Request
Building Function	Higher Education Vivarium and Research Laboratory -- 100% E&G
Infrastructure Element	Laboratory
Contains significant technology costs? No	
Contains significant energy costs? No	

Agency Narrative

Agency Description

This project has been on university's plan since 2011 (originally titled Vivarium and Research Laboratory) and is a high priority request to construct a four-story building for biomedical research and vivarium. The facility is envisioned as a 45,500 gross square foot addition to the existing Virginia Tech-Carilion School of Medicine and Research Institute in Roanoke and will be connected to the north side of the Research Institute. The addition will add approximately 12,800 gross square feet to the facility footprint and is envisioned to match the existing facility with primarily brick veneer and precast concrete accents. A glass and aluminum curtain wall vertical circulation enclosure will connect the addition to the existing building.

Justification

Program Description:
The Virginia Tech-Carilion Research Institute (VTCRI) has recruited 20 faculty research leaders and their teams to Roanoke in the first 24 months of its operation. These investigators include some of the most highly recognized senior scientists in the world, particularly in the area of neuroscience or brain and cognitive sciences. The teams already have achieved over $10 million per year in extramural research funding, as well as major national media attention for their published discoveries from media such as the New York Times, Time, Newsweek, CNN, BBC, Wall Street Journal, etc. The brain group has established the worldwide hub in Roanoke for the global interactive functional brain imaging network. This network links brain scanning facilities in 12 cities and 6 countries on 3 continents in a highly interactive and high throughput analysis network that is able to address issues of complex brain function in decision making in health and disease at an unprecedented level of resolution. Moreover, this "Roanoke Brain Study," that is worldwide is also marrying the world's first longitudinal deep human brain study with the power of combined genomics and next generation informatics in collaboration with the Virginia Bioinformatics Institute. The VTCRI neuroscience program has brought interdisciplinary teams together, consisting of biologists, psychologist, physicists, mathematicians, computer scientists and engineers to address problems such as Alzheimer's disease, traumatic brain injury, addiction, neuropsychiatric disorders including autism, developmental disorders including cerebral palsy, and neurodegenerative disorders including Parkinson's disease. Investigators from this program have recently won a prestigious McKnight Neuroscience Foundation award in technological innovation for ultrasound neuromodulation research, been selected as the US/China National Academies of Science Kavli brain machine lecture, been selected by TedGlobal to speak to their worldwide program from Edinburgh, established a spin-off company in Roanoke on developing ultrasound technology, and discovered new molecular targets for memory disorders. In addition, the VTCRI has developed a heart and regenerative medicine program working on repair of damaged heart, wound healing and sudden cardiac death. The leader of this group was selected as a Commonwealth eminent scholar in heart and regenerative medicine that has spun out a company developing new compounds for wound healing. The cancer group has already filed several new patents on potential cancer therapeutics for malignancies of brain and breast and new microfluidic devices for visualizing these molecules as they interact with targets on cancer cells. In addition, members of this group have discovered a new molecular pathway for targeting signals to cause malignant brain tumor cells to self-destruct. The group also has a senior team that is pushing the boundaries of

simultaneously diagnosing and treating brain tumors.

The proposed project will serve as a fully operational and contained research facility. The biomedical procedures laboratory and vivarium space co-located in close proximity with the existing research facility and laboratories will support specialized research protocols for advanced neurological, cancer, cardiovascular, regenerative medicine and infectious disease. The success and growth of the VTCRI programs in brain (neuro-) science, cardiovascular and regenerative sciences, in particular, require new facilities with large instrumentation located proximal to where laboratory animals are housed such as high field magnetic resonance imaging (MRI), in vivo optical imaging, porcine surgery suites with cardiac monitoring and tissue incubation/regeneration facilities. In addition to the porcine surgical suites, large animal surgical bays with specialized monitoring equipment will be part of the research protocols. Some procedural suites and holding spaces are expected to be designed to biosafety level three (BSL3). Moreover, the growth of these programs along with the growth of the cancer and infectious disease groups over the next three years will require additional investigator laboratory facilities as well as specialized human subject evaluation/interview and behavioral phenotyping rooms. The new building will house staff that includes biomedical and behavioral scientists, veterinarians, facility management, special instrumentation technicians, shared core research facilities laboratory animal technicians. The approximate animal capacity will be 5,000 mouse cages and facilities for other animal models of human disease including porcine, but these quantities could adjust as the design for the new building develops. There will be flexibility in some animal rooms to support other types of specialized animal research including experimental surgical procedures and imaging. The building location will require design elements that accommodate periodic access for removal and replacement of MRI units located on the second floor.

The university's strategic plan includes three scholarship domains: Learning, Discovery, and Engagement; and three Foundational Strategies: Development of the Organization, Investment in the Campus Infrastructure, and Effective Resource Development, Allocation, and Management. This project supports several key domains and strategies of the strategic plan, and the specific goals of each area addressed by this project are listed below.

Learning:
Increase student involvement in discovery and engagement by creating more opportunities for undergraduates to be involved in research capstone experiences, education abroad, and experiential learning.

Enhance quality graduate and professional education.

Establish a graduate education portfolio reflective of a 21st century university.
Contribute to the holistic and transformative educational experiences of Virginia Tech undergraduate and graduate students.

Improve the capital assets that underpin student learning and support programs.

Discovery:
Strengthen research activities with a focus on the environment.

Strengthen research activities with a focus on materials.

Foundational Strategies:
Effectively manage the university's space and land resources for learning, living, and work.

Existing Facilities:
The university has some vivarium space at the Virginia Tech Carilion School of Medicine and Research Institute that can serve this program but it does not fill the increasing need for housing large numbers of colonies of genetically selected rodents to evaluate various new approaches to the diagnosis and treatment of several major groups of human diseases. In addition, many of the specialized procedures where laboratory animals are required to be adjacent to core high technology instrumentation cannot be carried out in the existing VTCRI facility. The addition will be connected to the existing Virginia Tech-Carilion Research Institute with secure connectors allowing circulation between the buildings on the second and third floors. The building location will require design elements that accommodate periodic access for removal and replacement of MRI units located on the second floor.

Funding Plan:
The program of this project request is 100 percent research. The funding plan for this $44 million project calls for $22 million of General Fund support and $22 million of non-general fund authorization. The non-general fund component is requested as a revenue bond authorization that will be repaid by overhead revenue generated from the research program and targeted fundraising that will occur in the university's capital campaign.

Alternatives Considered

To meet required testing protocols, the research, procedure and vivarium space must be an integral part of the adjacent VTCRI laboratory environment where principlal investigators have their home lab programs, support staffs, other necessary reagents and instrumentation; thus, leasing or using the Blacksburg campus facilities is not feasible because of time constraints for transporting specimens, animals and workers. The project is needed in the 2012-2014 biennium to support the rapid growth of the research institute including new hires and grants that require deliverables in 2015 which are dependent on the additional research, procedure, and integrated vivarium space.

Costing Methodology

The construction costs are based on the efforts of an external Construction Manager at Risk, which applied market costs to the program requirements. Soft cost estimates are developed by in-house university staff based on historical data costing analysis and trends over the past eight years. The project is anticipated to have high site conditions and is planned to utilize the Construction Manager at Risk delivery method.

Project costs are estimated to the mid-point of construction using three percent escalation in accordance with the instructions for developing the Six-Year Capital Outlay Plan.

On a total project cost basis, inclusive of design, construction, and equipment, the unit costs are $967 per gross square foot. The unit construction costs of the project are $683 per gross square foot. The building types in this request are integrated science center research laboratories and Biosafety Level three vivarium in the Bureau of Capital Outlay Management's Construction Costs Database.

The costs are driven above the averages in the Construction Costs Database because of foundation requirements for vibration controls near the railroad and specialized equipment in the construction budget as described below. The necessary adjacencies of this addition to the existing facility require the building be located directly adjacent to an active railroad track. No other land is available as an alternate location. Specialized building systems and features will be required to achieve maximum efficiencies in research programs. To eliminate interference of trains and other outdoor disruptions, the building will require vibration isolation achieved by a 10 inch thick concrete floor slab, additional building insulation, and reinforced structural components. Inclusion of new vivarium and supporting laboratories will require larger HVAC systems providing additional air exchanges. Specialized built-in scientific equipment utilized in these research programs will include instrumentation and equipment such as an Animal MRI, a positron emission tomography (PET) Scanner, a nuclear magnetic resonance imaging (NMRI), and a Cyclotron (particle accelerator).

Agency Funding Request

Phase	Year	Fund	Subobject	Requested Amount
Detail Planning	2014	0100 - General Fund	2322 - Construction, Buildings	$3,080,000
Construction	2015	0100 - General Fund	2322 - Construction, Buildings	$14,114,000
Construction	2015	0815 - 9(D) Debt Service - Construction Costs	2322 - Construction, Buildings	$22,000,000
Equipment Purchase	2016	0100 - General Fund	2295 - Undistributed Equipment	$4,806,000
			Total	$44,000,000

Project Costs

Cost Type	Total Project Costs	Requested Funding	DGS Rec	DPB Rec
Acquisition Cost	$0	$0	$0	$0
Building & Built-in Equipment	$28,500,000	$28,500,000	$0	$0
Sitework & Utility Construction	$2,619,000	$2,619,000	$0	$0
Construction Cost Total	$31,119,000	$31,119,000	$0	$0
Design & related Services from Other Costs tab	$3,995,000	$3,995,000	$0	$0
Inspection & Testing Services from Other Costs tab	$936,000	$936,000	$0	$0
Project Management & Other Costs from Other Costs tab	$1,898,500	$1,898,500	$0	$0
Furnishings & Movable Equipment	$4,806,000	$4,806,000	$0	$0
Construction Contingency	$1,245,500	$1,245,500	$0	$0
Total Project Cost	$44,000,000	$44,000,000	$0	$0

Capacity

Cost Type	Unit of Measure	Units	Cost Per Unit
Acquisition Cost		0	$0
Total Project Cost	square feet	45,500	$817

Other Costs

Cost Type	Total Project Costs	RequestedFunding	DGS Rec	DPB Rec
Design & Related Service Items				
A/E Basic Services	$3,283,000	$3,283,000		
A/E Reimbursables	$29,000	$29,000		
Specialty Consultants (Food Service, Acoustics, etc.)	$0	$0		
CM Design Phase Services	$389,000	$389,000		
Subsurface Investigations (Geotech, Soil Borings)	$77,000	$77,000		
Land Survey	$0	$0		
Archeological Survey	$0	$0		

Hazmat Survey & Design	$0	$0		
Value Engineering Services	$0	$0		
Cost Estimating Services	$26,000	$26,000		
Other Design & Related Services	$191,000	$191,000		
Design & Related Services Total	$3,995,000	$3,995,000		
Inspection & Testing Service Items				
Project Inspection Services (inhouse or consultant)	$761,000	$761,000		
Project Testing Services (conc., steel, roofing, etc.)	$175,000	$175,000		
Inspection & Testing Services Total	$936,000	$936,000		
Project Management & Other Cost Items				
Project Management (inhouse or consultant)	$603,000	$603,000		
Work By Owner	$47,000	$47,000		
BCOM Services	$19,000	$19,000		
Advertisements	$3,000	$3,000		
Printing & Reproduction	$9,000	$9,000		
Moving & Relocation Expenses	$40,000	$40,000		
Data & Voice Communications	$359,000	$359,000		
Signage	$16,000	$16,000		
Demolition	$0	$0		
Hazardous Material Abatement	$0	$0		
Utility Connection Fees	$0	$0		
Utility Relocations	$0	$0		
Commissioning	$284,000	$284,000		
Miscellaneous Other Costs	$518,500	$518,500		
Project Management & Other Costs Total	$1,898,500	$1,898,500		

Operating and Maintenance Costs (Agency)

Cost Type	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
GF Dollars	$250,250	$250,250	$257,750	$265,500	$273,500	$281,500
NGF Dollars	$250,250	$250,250	$257,750	$265,500	$273,500	$281,500
GF Positions	0.88	0.88	0.88	0.88	0.88	0.88
NGF Positions	0.88	0.88	0.88	0.88	0.88	0.88
GF Transfer	$0	$0	$0	$0	$0	$0
GF Revenue	$0	$0	$0	$0	$0	$0
Layoffs	0	0	0	0	0	0

Planned start date of new O&M costs (if different than the beginning of the fiscal year):---

Supporting Documents

No supporting documents for this adjustment

Workflow History

Step Name	User Name	Claimed	Submitted
Enter Capital Budget Request	Rob Mann	09/21/2012 01:32 PM	09/21/2012 01:32 PM
Continue Drafting	Rob Mann	09/21/2012 01:32 PM	09/21/2012 05:27 PM
Agency Review Step 1	Bob Broyden	09/21/2012 05:27 PM	09/24/2012 10:29 AM
Agency Review Step 1	Bob Broyden	09/24/2012 10:29 AM	09/24/2012 10:32 AM
Agency Review Step 1	Bob Broyden	09/24/2012 10:32 AM	09/24/2012 12:03 PM
Ready for DPB Submission	Bob Broyden	09/24/2012 12:03 PM	09/24/2012 12:05 PM
DPB Review			