CapitalBudgetRequest

Renovate Robeson Hall	
Overview	
Agency	Virginia Polytechnic Institute and State University (208)
Project Code	none
Project Type	Improvements-Other
Biennium	2018-2020
Budget Round	Initial Bill
Request Origin	Previously Submitted
Project Location	Roanoke Area
Facility/Campus	Blacksburg Main Campus
Source of Request	Agency Request
Infrastructure Element	Classroom / Laboratory
Contains significant technology costs? No	
Contains significant energy costs? No	
Project will be used by other than a state or local governmental entity? No	

Agency Narrative

Agency Description

Executive Summary:

The Department of Physics currently ranks in the top 15 nationwide in terms of the number of physics bachelors degrees awarded per year. Sponsored research of this program has grown from $1.3 million to $3.4 million annually. In support of the “Top Jobs Act” of 2011, renovating Robeson Hall will help to prepare Virginians for a knowledge-based economy by providing STEM instructional excellence, accomplished through cost efficient operation and technological, and pedagogical innovation. It also promotes University-based research that produces outside investment in the commonwealth of Virginia.

Robeson Hall is approximately 67,000 gross square feet and houses the Department of Physics, which has a growing number of undergraduate and graduate majors. This project request addresses the need for a major renovation to the building and its systems. To meet the needs of a 21st Century instruction and research building, Robeson’s HVAC systems, air conditioning, electrical, and plumbing systems need to be updated. These renovations will extend the useful life of the facility as a critical science building on the University’s campus.

Through major renovations and the reconfiguration of classrooms, seminar rooms, and research laboratories, this project will allow the department to provide an instructional home for programs within the Economical and Sustainable Materials Strategic Growth Area. Strategic Growth Areas (SGA) provide faculty and students with new tools to identify and solve complex, 21st-century problems in which Virginia Tech already has significant strengths and can take a global leadership role. The initiative represents the next step in the evolution of the land-grant University to meet economic and societal needs of the world.

The Economical and Sustainable Materials strategic growth area will prepare students for today’s jobs that extend beyond traditional materials science. A renovated Robeson will create an environment that allows faculty to instill within students the skills and subject knowledge necessary to make fundamental materials discoveries. Materials scientists have a key role in the implementation of material discoveries into the real world and their integration into multiple cross-cutting fields.

Project Description

This project request is for a full renovation of the entire Robeson Hall building, 67,000 gross square feet. A renovation of Robeson Hall will create modern teaching and laboratory spaces to support new pedagogical practices such as problem based learning and undergraduate research opportunities and allow the incorporation of hybrid, informal, unscheduled learning spaces.

Specifically, the partially below grade lower level will continue to house approximately 5,600 assignable square feet of renovated research laboratories (dry), laboratory service shop, and support spaces. The three upper level floors will become state-of-the-art classrooms (approximately 13,000 assignable square feet) and instructional dry labs (approximately 6,200 assignable square feet) for physics and the materials sciences instructional programs. Conference rooms and offices for faculty, staff, post-doctorate, and graduate student will be located on the upper levels. A small amount of study area will also be provided on the upper levels in close proximity to faculty offices.

The renovation will include an upgrade of all building systems and infrastructure to support modern instrumentation that is now the standard expectation for instruction and research. This includes sophisticated mechanical, electrical, and low vibration structural environments. The infrastructure to support advanced instrumentation is essential because it supports competiveness for externally funded research thereby promoting outside investment in Virginia and provides essential training experience for students to learn the latest available technologies to better prepare them for job placement upon graduation.

The project scope, site development, and building configuration shall be consistent with the 2017 master plan update and include universal accessibility design principles as appropriate. The proposed building is expected to provide a strong connection to the site including landscaping for outdoor classroom sections.

Justification

Program Description:

The Department of Physics (Department) is comprised of 32 tenure-track faculty, part-time and full-time instructors, 19 postdoctoral research fellows, and 15 staff members. At present, the department has a total enrollment of 346 undergraduate students and 86 graduate students. The department graduated a record number of 47 B.S. and B.A. students in 2017, placing it in the top 20 departments in the country in physics bachelor's degree production. The department currently ranks in the top 15 nationwide in terms of the number of physics bachelor degrees awarded per year, and its sponsored research activity has grown from $1.3 million to $3.2 million annually.

The Department provides a wide range of courses, including large service courses at the introductory level and a complete set of courses providing preparation for physics undergraduate and graduate students. Physics is a required core course for all undergraduates majoring in engineering and many of those majoring in the life sciences. The department won (along with the departments of Chemistry and Biological Sciences) a University Exemplary Department Award in 2017 for "developing and sustaining effective large-class instruction." For physics undergraduate majors, the department offers programs leading to the B.S. and B.A. degrees, with graduates going on to a wide range of options including graduate education and immediate employment in the private sector. One program (PhysTEC – Physics Teachers Education Coalition) prepares students to be high school physics teachers.

In the most recent fiscal year (2016-17), the department delivered 28,855 student credit hours (SCH) of undergraduate instruction and 2653 SCH of graduate instruction. For fiscal year 2016-17, the department's total research expenditures were $3.2 million.

The Physics department promotes University-based research that produces outside investment in the commonwealth of Virginia. Recent research accomplishments from the department include: a rare three projects approved on the Hubble space telescope in one year to study quasars and black holes, initial deployment of a "mobile neutrino detector" to North Anna Nuclear Generating Station with potential applications to nuclear reactor monitoring for security reasons, and the recent completion of an electron scattering experiment on the argon nucleus at the Thomas Jefferson National Accelerator Facility to help in understanding large next generation neutrino detectors.

In support of the "Top Jobs Act" of 2011, renovating Robeson Hall will help to prepare Virginians for a knowledge-based economy by providing STEM instructional excellence, accomplished through cost efficient operation and technological, and pedagogical innovation.

The University's strategic plan includes the following principle strategies that will be supported by this important project:

- Increasing the number of our programs recognized as among the best internationally.
- Ensuring competency in data analysis and computational methods as a component of general education for all students.
- Developing an appropriate infrastructure for e-learning.
- Emphasizing translational research and scholarship.
- Building upon existing and emerging strengths.
- Maintaining growth in research expenditures toward a target of $680 million by 2018.
- Increasing the number of post-doctoral positions in STEM-H research areas.
- Increasing undergraduate involvement in meaningful research experiences and experiential learning through hands on minds on.
- Developing ways to integrate computational science/informatics and digital fluency for managing and analyzing complex data sets across a wide range of disciplines.
- Continuing to investigate, develop, and utilize current and emerging technologies to enhance traditional classrooms, provide mobile access, and expand high-quality distance -learning opportunities.
- Identifying opportunities during construction and renovation to create flexible classroom spaces that fully support e-learning components.
- Pursuing quality-of-life initiatives in support of the University as a vibrant, dynamic, and sustainable workplace.
- Supporting a sustainable workplace.
- Promoting life-long learning.
- Implementing the Climate Action Commitment and Sustainability Plan as appropriate.

Existing Facilities:

Robeson Hall is approximately 67,000 gross square and was constructed in 1960 with no major improvements or renovations since the original construction was completed. The building has extensive egress and ADA deficiencies, deteriorated building systems, and a facility condition index of 31 percent in the FICAS system as of June 9, 2017. The use of scientific equipment, including computing and specialized laboratory equipment, is exceeding the capabilities of the existing mechanical, electrical, plumbing, and environmental control systems.

With a facility condition index of 31 percent in the FICAS system, Robeson's condition has progressed beyond the scope of normal operations and maintenance reserve repairs. In its current deteriorated condition Robeson Hall no longer provides the instructional and research infrastructure needed in the 21st Century. Renovating the existing building is the most efficient and cost effective option for providing functional space for the Department of Physics.

Funding Plan:

The program for this project is entirely Educational and General academic support and instructional programs; thus, the funding plan calls for 100 percent General Fund support for this $44.6 million project.

Options Considered:

Option considered but not pursued is new construction of additional space. This approach would cost more than the proposed renovation and would unnecessarily increase the University's space inventory and leave a significant space asset not serviceable. In addition, dispersion of instructional and research programs across multiple buildings would negatively impact students and faculty.

Alternatives Considered

Costing Methodology

A. Methods Used to Estimate Costs:

The method for estimating costs for the Robeson Hall Renovation project includes: 1) using unit costs in the Bureau of Capital Outlay Management's Construction Costs Database updated October 2016 with a regional market multiplier and a multiplier for softs costs; and 2) comparables as shown in the CR-3. Both methods are escalated to a construction midpoint of 2021 at 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 $666 per gross square foot. The unit construction costs of the project are $497 per gross square foot, including self-performed construction work. The building types in this request are wet laboratory, dry laboratory, and classroom spaces in the Bureau of Capital Outlay Management's Construction Costs Database

The University's project cost estimates are derived from a database of on-campus construction costs of comparable project types. Virginia Tech building construction reflects the high level of quality, durability, and tradition that makes Virginia Tech a distinctive and memorable place for students. Our estimates also include the cost of technology, specialized instruction, and energy efficiency goals of the institution.

This project will use a Construction Manager at Risk construction delivery method appropriate for the size and complexity of this project.

B. The proposed costs include the following critical considerations to ensure the project fully meets the needs of the program and the University:

1) The building envelope will be comprised primarily of Hokie Stone with precast concrete accents consistent with University standards as affirmed by the Board of Visitors. Brick, metal panels, and siding materials are not permitted as substitutions for Hokie Stone. The stone is a four-inch thick nominal stone thickness with a two-inch nominal air barrier over moisture resistant sheathing. Stainless steel anchoring straps and load bearing shelf angles and stainless steel flashings comprise the structural support and flashings system. The University owns the stone quarries and provisions the cut material to the building; thus, the material costs are carried in the Other Costs section of the proposed budget while the construction budget carries all erection, final stone dressing, installation and intensive quality assurance inspection costs.

2) Mechanical equipment and building automation systems are designed and selected to meet performance requirements and to optimize total costs of ownership inclusive of energy costs and operations and maintenance costs. System selections are justified based on a 30-year economic life cycle analysis. Mechanical equipment will be covered and secured to maximize equipment life and service. Renovation will involve complete replacement of mechanical, plumbing, electrical systems that have exceeded their useful life. It will also require installation of sprinkler, fire alarm systems and accessibility improvements.

3) Academic buildings include interior glazing for energy efficiency, lighting for academic work, and to enhance pedagogy.

4) Ceiling heights must be a minimum of 16 feet for sound attenuation in large lecture and assembly environments as required for effective pedagogy.

5) Building structural support systems will accommodate large open and unimpeded interior spaces to maximize long-term programmatic functionality and adaptation to new program space and technology arrangements. This includes raised floor systems for maximum adaptation.

6) High-capacity wireless networks to support multiple devices (laptop computer, tablet computer, smartphone, and other WIFI devices) used simultaneously by students and faculty to retrieve information and to communicate and to connect digitally with sites around campus and around the world.

7) Power outlets corresponding to the seat/station count and power outlets in common areas will exceed the minimum code requirements by approximately 30 percent.

8) Automated audiovisual and lighting controls are included for all classroom and class laboratory spaces.

9) Climate controlled technology server rooms, 10 feet by 10 feet, on each floor of the building.

10) Communications infrastructure, wired and wireless, is installed by a University operated auxiliary; thus, these costs are shown in the Other Costs section of the proposed budget.

11) Site development costs in this region are historically in the medium to high range and require generally significant rock removal and deep foundations. Building foundation deep caissons or piers are expected to remediate unsound subsurface foundation conditions.

12) Utilities (power, steam, chilled water, gas, sanitary sewer, and storm water infrastructure) do not terminate at the building site and their extension is included the proposed budget.

13) Renovation of the historic portion of Robeson Hall will require extensive repointing of exterior masonry and installation of new windows. The costs for this are included in the construction budget line item.

14) Restricted site access in a dense and active part of campus will increase mobilization costs.

Agency Funding Request

Phase	Year	Fund	Subobject	Requested Amount
Construction	2019	01000 - General Fund	2322 - Construction, Buildings	$44,600,000
			Total	$44,600,000

Project Costs

Cost Type	Total Project Costs	Requested Funding	DGS Rec
Acquisition Cost	$0	$0	
Building & Built-in Equipment	$33,290,532	$33,290,532	
Sitework & Utility Construction	$0	$0	
Construction Cost Total	**$33,290,532**	**$33,290,532**	
DESIGN & RELATED SERVICE ITEMS			
A/E Basic Services	$3,657,279	$3,657,279	
A/E Reimbursables	$45,619	$45,619	
Specialty Consultants (Food Service, Acoustics, etc.)	$0	$0	
CM Design Phase Services	$80,737	$80,737	
Subsurface Investigations (Geotech, Soil Borings)	$16,422	$16,422	
Land Survey	$0	$0	
Archeological Survey	$0	$0	
Hazmat Survey & Design	$9,183	$9,183	
Value Engineering Services	$0	$0	
Cost Estimating Services	$0	$0	
Other Design & Related Services	$118,216	$118,216	
Design & Related Services Total	**$3,927,456**	**$3,927,456**	
INSPECTION & TESTING SERVICE ITEMS			
Project Inspection Services (inhouse or consultant)	$235,863	$235,863	
Project Testing Services (conc., steel, roofing, etc.)	$140,034	$140,034	
Inspection & Testing Services Total	**$375,897**	**$375,897**	
PROJECT MANAGEMENT & OTHER COST ITEMS			
Project Management (inhouse or consultant)	$472,619	$472,619	
Work By Owner	$20,394	$20,394	
BCOM Services	$51,985	$51,985	
Advertisements	$2,451	$2,451	
Printing & Reproduction	$2,167	$2,167	
Moving & Relocation Expenses	$50,435	$50,435	

A/V Cabling	$0	$0	
IT Cabling	$0	$0	
Telephone Cabling	$0	$0	
A/V Equipment	$0	$0	
IT Equipment	$937,624	$937,624	
Telephone Equipment	$0	$0	
Signage	$22,423	$22,423	
Demolition	$0	$0	
Hazardous Material Abatement	$20,753	$20,753	
Utility Connection Fees	$0	$0	
Utility Relocations	$258,787	$258,787	
Commissioning	$336,335	$336,335	
Miscellaneous Other Costs	$540,466	$540,466	
Project Management & Other Costs Total	**$2,716,439**	**$2,716,439**	
Furnishings & Movable Equipment	$2,809,328	$2,809,328	
Construction Contingency	$1,480,348	$1,480,348	
TOTAL PROJECT COST	**$44,600,000**	**$44,600,000**	

Capacity

Cost Type	Unit of Measure	Units	Cost Per Unit
Acquisition Cost		0	$0
Construction Cost	GSF	67,000	$497
Total Project Cost	GSF	67,000	$666

Operating and Maintenance Costs (Agency)

Cost Type	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
GF Dollars	$0	$0	$0	$891,757	$918,510	$946,065
NGF Dollars	$0	$0	$0	$0	$0	$0
GF Positions	0.00	0.00	0.00	5.29	5.29	5.29
NGF Positions	0.00	0.00	0.00	0.00	0.00	0.00
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

File Name	File Size	Uploaded By	Upload Date	Comment
CR-3_Project Planner-05 Renovate Robeson.xlsx	421,677	Rob Mann	7/7/2017	CR-3 Form_Robeson Hall
Robeson Hall.jpg	743,019	Rob Mann	7/7/2017	Robeson Hall Picture
05_Robeson Hall Program Chart.pdf	72,794	Rob Mann	7/7/2017	Robeson Hall Program Chart

Workflow History

User Name	Claimed	Submitted	Step Name	Submit Action
Jennifer Hundley	06/06/2017 12:08 PM	06/06/2017 12:08 PM	Enter Capital Budget Request	Continue Working
Jennifer Hundley	06/06/2017 12:08 PM	06/06/2017 12:09 PM	Continue Drafting	Continue Working
Jennifer Hundley	06/09/2017 03:29 PM	06/09/2017 03:35 PM	Continue Drafting	Continue Working
Rob Mann	07/07/2017 02:25 AM	07/07/2017 02:30 AM	Continue Drafting	Continue Working

Rob Mann	07/07/2017 08:40 AM	07/07/2017 10:12 AM	Continue Drafting	Submit for Agency Review
Rob Mann	07/07/2017 11:28 AM	07/07/2017 11:29 AM	Agency Review Step 1	Ready for DPB Bulk Submit
Bob Broyden	07/07/2017 03:34 PM	07/07/2017 03:34 PM	Ready for DPB Submission	Continue Review
Bob Broyden	07/07/2017 04:35 PM	07/07/2017 04:35 PM	Ready for DPB Submission	Submit to DPB
			DPB Review	