

CapitalBudgetRequest

Construct University Data Center

Overview

Agency	Virginia Polytechnic Institute and State University (208)
Project Code	none
Project Type	New Construction
Biennium	2016-2018
Budget Round	Initial Bill
Request Origin	Previously Submitted
Project Location	Roanoke Area
Facility/Campus	Blacksburg Main Campus
Source of Request	Agency Request
Infrastructure Element	Multi-Purpose

Contains significant technology costs? No

Contains significant energy costs? No

Agency Narrative

Agency Description

This is a new project on the University's plan to construct a 40,000 gross square foot data center to facilitate high-performance computing and large scale data storage in support of the university's advanced research and instructional programs. The existing data center was constructed in 1988 in the 51,000 square-foot Andrews Information Systems Building (AISB) in the Virginia Tech Corporate Research Center. This building contains office areas, the computer Data Center, a 12,000 square-foot facility that houses ARC's research computing systems, as well as the university's main computing systems and a telecommunications switch center. Even with recent upgrades in power and cooling capacities and reliance on other storage computing resources, the current data center is not sufficient to meet the goals for computing and storage needs over the next six years.

Justification

Program description:
 This project will construct a new data and computing facility to meet the growing data capacity and computing demands for research, teaching and outreach by university institutes, colleges departments and administrative units. To increase organizational efficiency and flexibility, the new facility will facilitate computing and networking innovation. In addition to controlled environments housing computer equipment, the center will include collaborative work spaces, conference rooms, visualization spaces and commons area. The facility is desired to be located close to the central campus to facilitate usage by faculty, student, researchers and IT personnel across the university.

- The university strategic plan, A Plan for a New Horizon includes the following principal strategies that will be supported by this project:
- Ensuring competency in data analysis and computational methods as a component of general education for all students
 - Developing an appropriate infrastructure for e-learning
 - Developing an appropriate infrastructure for high performance computing
 - Building upon existing and emerging strengths
 - Reviewing and revise current business practices for opportunities to optimize efficiency, flexibility, and accountability without sacrificing need to remain innovated and competitive
 - Maintaining growth in research expenditures toward a target of \$680 million by 2018.
 - Creating meaningful partnerships with businesses and government entities to address complex problems by co-locating researchers and practitioners in "living labs"
 - Developing ways to integrate computational science/informatics and digital fluency for managing and analyzing complex data sets across a wide range of disciplines.
 - Supporting a sustainable workplace

Existing facilities:
 The existing data center, constructed in 1988, is located in the 51,000 square-foot Andrews Information Systems Building (AISB) in the Virginia

Tech Corporate Research Center. This building contains office areas, the computer Data Center, a 12,000 square-foot facility that houses ARC's research computing systems, as well as the university's main computing systems and a telecommunications switch center.

Funding Plan:

The program for this project is 50 percent research and 50 percent instruction; thus, the funding plan for this \$30.8 million Data Center facility calls for 75 percent state general fund support and 25 percent nongeneral fund authorization that is being requested as a debt authorization that will be supported by overhead revenues generated from the research program.

Options considered:

An option considered includes an expansion of the existing facility. This option is not preferred as security, operating and utility costs associated with a non-purpose built site will require additional long-term expenditures not currently supported. A purpose built facility should result in operating budget savings while allowing the needed computing expansion. Expansion of the existing facility also offers no opportunities for improved resilience and disaster recovery.

Another option considered is the migration from on-premises equipment through the use of remotely-provided hosted or cloud services for computing and storage. While the University will seek opportunities to leverage hosted or cloud services to enhance capabilities and efficiencies, we will continue to require on-premises compute, storage, and network services to meet our statutory, performance, and leading edge innovation requirements.

Alternatives Considered

Costing Methodology

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. The estimate includes the cost of specialized building infrastructure for cooling, electricity, and water that are needed for a modern, robust, energy-efficient data center. Our estimates also include the cost of technology, specialized instruction, and energy efficiency goals of the institution.

The cost of the building is based on the following general allocation of space in the 40,000 square-foot building.

Use SF

Data center floor 14,000
Data center mechanical and support 14,000
Administrative and technical work space 1,000
Teaching laboratory space 1,250
Research laboratory space 1,250
Shared meeting room space 500
Common areas, general mechanical 8,000
Total 40,000

Mechanical equipment and building automation systems will be designed to maximize energy efficiency and minimize operations and maintenance costs. Specialized building systems to support the cooling, electrical distribution, and electrical backup needs of the data center will be designed using current best practices that place such equipment under or over the data center floor housing the computing, storage, and networking equipment. Mechanical equipment will be located inside the building. Electrical systems for work, teaching, research, meeting, and common areas will support current academic technologies and increased student and researcher use of individual technology equipment. Effective use of exterior and interior glazing is necessary for energy efficiency lighting for academic work. Design priorities will include flexibility and modularity in all interior spaces to maximize the long-term programmatic functionality of the building. Building location and site design will focus on maintaining and creating that sense of place that is unique to Virginia Tech.

The University's role as the leading producer of technology intensive degrees relies upon a system of classrooms and instructional laboratories and research spaces that support technology driven work in engineering, physical sciences, life sciences, and advanced mathematics. All buildings must have high-capacity wireless networks to support multiple devices (laptop computer, tablet computer, smartphone) used simultaneously by students and faculty to retrieve information and to communicate and to connect digitally with sites around campus and around the world. The use of electronic equipment by students and faculty requires dedicated power outlets corresponding to the seat/station count and power outlets in common areas. This requires automated audiovisual and classroom lighting controls, which also rely on wireless networks. The university operates its own communications network using primarily internet connectivity which requires accessible, climate controlled server rooms in lieu of the traditional phone closet. Because the communications infrastructure is installed by our own university operated auxiliary it is carried as a project (soft) cost outside of the normal construction budget.

Site development costs in this region are historically in the medium to high range and require deep foundations. 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.

Phase	Year	Fund	Subobject	Requested Amount
Construction	2021	0100 - General Fund	2322 - Construction, Buildings	\$23,100,000
Construction	2021	0815 - 9(D) Debt Service - Construction Costs	2322 - Construction, Buildings	\$7,700,000
Total				\$30,800,000

Project Costs

Cost Type	Total Project Costs	Requested Funding	DGS Rec
Acquisition Cost	\$0	\$0	
Building & Built-in Equipment	\$18,778,000	\$18,778,000	
Sitework & Utility Construction	\$2,683,000	\$2,683,000	
Construction Cost Total	\$21,461,000	\$21,461,000	
DESIGN & RELATED SERVICE ITEMS			
A/E Basic Services	\$2,683,000	\$2,683,000	
A/E Reimbursables	\$55,000	\$55,000	
Specialty Consultants (Food Service, Acoustics, etc.)	\$298,000	\$298,000	
CM Design Phase Services	\$308,000	\$308,000	
Subsurface Investigations (Geotech, Soil Borings)	\$45,000	\$45,000	
Land Survey	\$0	\$0	
Archeological Survey	\$0	\$0	
Hazmat Survey & Design	\$0	\$0	
Value Engineering Services	\$0	\$0	
Cost Estimating Services	\$18,000	\$18,000	
Other Design & Related Services	\$154,000	\$154,000	
Design & Related Services Total	\$3,561,000	\$3,561,000	
INSPECTION & TESTING SERVICE ITEMS			
Project Inspection Services (inhouse or consultant)	\$397,000	\$397,000	
Project Testing Services (conc., steel, roofing, etc.)	\$308,000	\$308,000	
Inspection & Testing Services Total	\$705,000	\$705,000	
PROJECT MANAGEMENT & OTHER COST ITEMS			
Project Management (inhouse or consultant)	\$646,000	\$646,000	
Work By Owner	\$60,000	\$60,000	
BCOM Services	\$10,000	\$10,000	
Advertisements	\$0	\$0	
Printing & Reproduction	\$0	\$0	
Moving & Relocation Expenses	\$0	\$0	
Non Built-In Data and Voice Communications	\$494,000	\$494,000	
Signage	\$30,000	\$30,000	
Demolition	\$0	\$0	
Hazardous Material Abatement	\$0	\$0	
Utility Connection Fees	\$0	\$0	
Utility Relocations	\$348,000	\$348,000	
Commissioning	\$199,000	\$199,000	
Miscellaneous Other Costs	\$1,267,000	\$1,267,000	
Project Management & Other Costs Total	\$3,054,000	\$3,054,000	
Furnishings & Movable Equipment	\$1,590,000	\$1,590,000	
Construction Contingency	\$429,000	\$429,000	
TOTAL PROJECT COST	\$30,800,000	\$30,800,000	

Capacity			
Cost Type	Unit of Measure	Units	Cost Per Unit
Acquisition Cost		0	\$0
Construction Cost	GSF	40,000	\$537
Total Project Cost	GSF	40,000	\$770

Operating and Maintenance Costs (Agency)						
Cost Type	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
GF Dollars	\$0	\$0	\$443,076	\$456,368	\$470,059	\$484,161
NGF Dollars	\$0	\$0	\$147,692	\$152,123	\$156,686	\$161,387
GF Positions	0.00	0.00	2.37	2.37	2.37	2.37
NGF Positions	0.00	0.00	0.79	0.79	0.79	0.79
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			
User Name	Claimed	Submitted	Step Name
Rob Mann	05/18/2015 11:37 PM	05/18/2015 11:37 PM	Enter Capital Budget Request
Rob Mann	05/18/2015 11:38 PM	05/18/2015 11:38 PM	Continue Drafting
Jennifer Hundley	06/12/2015 05:23 PM	06/12/2015 05:42 PM	Continue Drafting
Rob Mann	06/13/2015 10:29 AM	06/13/2015 10:32 AM	Continue Drafting
Rob Mann	06/13/2015 01:10 PM	06/13/2015 01:15 PM	Agency Review Step 1
Rob Mann	06/13/2015 07:42 PM	06/13/2015 07:52 PM	Agency Review Step 1
Bob Broyden	06/14/2015 02:18 PM	06/14/2015 02:18 PM	Ready for DPB Submission
Ruth Anderson	06/15/2015 01:14 PM	06/15/2015 01:15 PM	DPB Review
Ruth Anderson	06/15/2015 01:24 PM	06/15/2015 01:25 PM	DPB Review
Ruth Anderson	06/18/2015 10:59 AM	06/18/2015 10:59 AM	DPB Review
Anne Smith	06/19/2015 02:51 PM	06/19/2015 02:51 PM	DPB Review
Rob Mann	06/19/2015 03:23 PM	06/19/2015 03:23 PM	Agency Review Step 1
Bob Broyden	06/19/2015 03:51 PM	06/19/2015 03:51 PM	Ready for DPB Submission
			DPB Review