Virginia Department of Planning and Budget
Project Request Justification

2008-2010   **Biennium**   **Date:**   **September 7, 2007**

A. General Information

1. **Agency Name:**   Virginia Tech   2. **Agency Code:**   **208**

3. **Project Title:**   Construct Engineering Signature Building   4. **Agency Priority:**   **3**

5. **Name of Person to Contact about this Form:**   Robert R. Broyden

6. **Contact Person's Telephone Number:**   (540) 231-8782

7. **Contact Person's E-mail Address:**   rbroyden@vt.edu

B. Proposed Project

1. **Description (include project size, capacity, and purpose):**

This is a new project on the University's plan, and is included as a priority item in the first biennium to address severely deteriorated undergraduate academic space for the College of Engineering. The proposed 160,000 gross square foot facility will be a combination of classrooms, class laboratories, and research laboratories to house a number of departments and programs in the college. This will be a state-of-the-art instruction facility focused on undergraduates with highly specialized laboratories that will support hands-on, problem solving oriented learning in the engineering disciplines. The life expectancy of the proposed project is approximately 80 years with proper maintenance.

The project scope of 160,000 gross square feet (104,000 assignable square feet) is based on peer comparisons of space, the College of Engineering's academic strategic plan, and an innovative space use concept that minimizes the amount of new construction needed to be competitive with peers. The College currently operates at about 330 faculty members and 590,000 assignable square feet (ASF), or about 1,800 ASF per faculty member. The College's peers have moved to about 3,000-3,500 ASF per faculty member. An equivalent amount of space at Virginia Tech would require up to 1.15 million ASF, at the rate of its peers. By optimizing the use of existing space through realignments of department locations (aided by future renovations), the College can be competitive at a lower rate of space than its peers – about 2,500 ASF per faculty member – for a total space need of about 825,000 ASF. Thus, the innovative plan requires incremental space of about 235,000 ASF, much more efficient than the incremental 565,000 ASF amount needed based on peer rates.

The state has funded two critical projects for the College (ICTAS-1 and ICTAS-2) that address about 115,000 ASF of the 235,000 ASF deficit, and the University has addressed about 20,000 ASF though creative partnerships with the Corporate Research Center. Thus, the net space need for the College is about 104,000 ASF, or 160,000 gross square feet at the state's required 65 percent efficiency rate.

The estimated total project cost is $80.25 million, and the program for the project is 100 percent educational and general, with an estimated 50 percent instruction and 50 percent research. While the normal state funding guidelines would compute a 75 percent General Fund support and 25 percent nongeneral fund support for the project, the University is proposing $45.25 million of General Fund support and $35 million of nongeneral fund support from private gifts. The project is a high priority, and the University is willing to provide more than the guideline share of the project costs to expedite the project funding. The project is not envisioned to impact student fees.

2. **In approved Master Site Plan:**   **Yes** [x] **No** [ ]
    If not, explain:

3. **In current Strategic Plan:**   **Yes** [x] **No** [ ]
    If not, explain:

C. Project Justification

1. **Programmatic:**

    Background on the Virginia Tech College of Engineering:

    Virginia Tech's College of Engineering is a comprehensive instruction and research program, including 12 departments with approximately 330 faculty, 5,500 undergraduate majors, and almost 2,000 graduate students. "America's Best Colleges 2007" survey released by *U.S. News & World Report* in August 2007 ranked the Virginia Tech College of Engineering's undergraduate program 14th in the nation among all accredited engineering schools that offer doctorates, and eighth among those at public universities. Seven of the College's undergraduate engineering programs were ranked among the top 25 in the nation.

    In the most recent survey (2006) of the Engineering Workforce Commission of the American Association of Engineering Societies, Inc., the Virginia Tech College of Engineering ranked sixth nationally for the total number of degrees awarded, fourth for the number of undergraduate degrees awarded, 17th for the number of master's degrees, and 13th for the number of Ph.D.s. The College ranked 13th for the total number of degrees awarded to women and 10th for the number of undergraduate degrees awarded to women. Approximately half of all new engineers trained in the Commonwealth of Virginia receive their education from Virginia Tech.

    Competition From Peer Institutions

    The College of Engineering needs this "Signature Building" in order to remain competitive with the engineering educational facilities that already exist at peer institutions. For example, the University of Maryland has its Jeong Kim Building, the University of Michigan features an Advanced Graphics and Media Classroom, the University of Colorado at Boulder created an Integrated Teaching and Learning Laboratory, and the University of Illinois is powerful with its Beckman Institute.

In the last ten years, Purdue's College of Engineering has built or started construction on eight new buildings, and even they rank second to Georgia Tech, which has brought forth *twelve* new buildings in the last decade.

At a time when there is urgent need for new graduates to enter the engineering workforce in the Commonwealth of Virginia, it is imperative that Virginia Tech – the State's senior Land Grant Institution and key supplier of engineers – improve the quality of its engineering educational facilities and thereby improve its ability to attract and train future generations of engineers that live and work in Virginia.

Facilities Envisioned for the Signature Building

Virginia Tech's College of Engineering envisions a facility that has teaching laboratories and classrooms at the core of the building. Surrounding the instructional core will be office clusters and research labs. A large auditorium will be available for high-profile visitors and events. All would be designed to foster collaboration in teaching, learning, research, and service.

Several of the Signature Building's classrooms will be equipped with the most modern communications equipment. The entire building will support wireless computers. Cameras, microphones, and computers will foster web-based communications for distance and asynchronous learning. Desks will be reconfigurable for multiple uses.

The building structure will serve as a learning laboratory with instrumentation included throughout so that students may directly study the building's structural behavior, water usage, power systems, air quality, etc. The instrumentation will include instructional displays to assist visitors, especially K-12 students.

The instructional laboratories will include specialized-use and flexible facilities for design and fabrication activities. These areas will support group work in open areas to promote on-going observation, including large window observatories for controlled work.

Faculty, staff and graduate students working in a common area will be organized in clusters to enhance communication and collaboration. Whenever possible, research labs will be open and flexible. Large windows will present opportunities for undergraduates to see the work being done inside. Interactive kiosks will provide information to visitors.

These are the types of engineering facilities that already exist at our peer institutions, and are necessary to keep Virginia Tech competitive.

Alignment with the Virginia Tech Strategic Plan

The College of Engineering has recently updated its strategic facilities plan with a proposed series of actions - renovations, new construction, and demolitions - that would serve to transform the college's old and increasingly dysfunctional space into modern facilities that will support the college's expanding programs. This project is positioned as an initial phase in this multi-biennia program to respond to the College's space needs. Without this project, the College of Engineering cannot deliver the instructional program expected by the students.

The mission statement of Virginia Tech as a public land-grant university serving the Commonwealth of Virginia, the nation, and the world community includes discovery and dissemination of new knowledge central to its mission. Through its focus on teaching and learning, research and discovery, and outreach and engagement, the University creates, conveys, and applies knowledge to expand personal growth and opportunity, advance social and community development, foster economic competitiveness, and improve the quality of life.

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.

- Strengthen and integrate all aspects of the undergraduate academic experience, including the academic experience for transfer students.

- Invest in departmental and university-level support for undergraduate education.

- Enhance quality graduate and professional education.

- Establish a graduate education portfolio reflective of a 21st century university.

- Strengthen the role of distance and distributed eLearning in achieving the university's goals in learning, discovery and engagement.

- Develop and integrate advanced technology and information systems applications that assist collaboration, reflection, assessment, and sharing among faculty members, students, and staff members.

- Strengthen the ability of the library systems to acquire, preserve, and mange research-level collections and user services that advance Virginia Tech's research capabilities.

- 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 energy.

- Strengthen research activities with a focus on materials.

- Strengthen research activities with a focus on the environment.

- Strengthen the Virginia Tech Alliance of Social, Political, Ethical and Cultural Thought (ASPECT).

- Establish the Virginia Tech Performing and Visual Arts Center.

- Initiate PK-12 enhancements in science, technology, engineering and mathematics (STEM).

- Establish research strengths in the study of infectious disease.

- Establish research strengths in the study of health, food, and nutrition.

- Achieve research strength in the areas of innovative technologies and complex systems through the strategic integration and support of critical research areas.

Engagement:

- Connect the University's discovery, learning, and engagement assets through partnerships with both the public and private sectors to advance the economic vitality of the commonwealth and the quality of life of its citizens.

- Enhance PK-12 education and its continuity with undergraduate and graduate education, especially in the key disciplines of science, technology, engineering, and mathematics (STEM).

- Engage students, at the undergraduate and graduate levels, in opportunities for service learning and experiential education that prepare them to serve a diverse and complex marketplace and society while building the capacity of communities.

Foundational Strategies:

- Effectively manage the University's space and land resources for learning, living, and work.

- Enhance health, safety, and security operations to support the University's discovery, learning, and engagement endeavors.

- Promote robust and integrated information technology strategies that advance Virginia Tech's excellence.

2. **Existing facilities:**

Randolph Hall is the current home of much of the college's undergraduate academic service with several departments, including Aerospace and Ocean Engineering, Chemical Engineering, Engineering Education, and Mechanical Engineering. Randolph Hall is a 165,000 gross square foot building constructed in 1952. The building is seriously deteriorated, outdated, and does not meet the expectations of students. The building's structural constraints (floor-ceiling heights and support widths) and environmental control

systems constrain modifying the building to adequately accommodate modern instructional practices and research instruments. The departments in Randolph Hall will largely be relocated to the proposed Signature Building and the relocation will permit Randolph Hall to undergo future renovations for other instructional uses. The inferior quality of instructional space in Randolph Hall is a serious concern and is negatively impacting engineering's educational and research programs. The Randolph Hall renovation is planned as a 2010-2102 second biennium project. Other Engineering disciplines housed in inferior facilities will also be relocated to this facility.

D. Options Considered (include as an option delaying this project until future biennia)

Other options considered but not selected include leasing, renovating existing space, or delaying the project to a later biennium. Constructing a new facility is the selected option because of the significant student discontent with the outdated academic facilities.

Leasing is not a feasible option because it is not programmatically viable for the academic programs of the college to be located away from the engineering program.

Renovating an already existing facility is not a viable option because the University currently operates with a shortage of academic space, especially engineering and science space. Thus, no existing space is available to allocate for renovation to accommodate this program.

Delaying the project to a future biennium is not a viable option because the college must address student expectations in a short time frame. A project approved in the 2008 session would most likely be on-line in 2012 and this is the outside acceptable limit for addressing the students' expectations. Further, delaying the project would add significant inflation costs; a one biennium delay would add about $8.2 million to the total costs.

E. Project Scope Changes:

None.

F. Project Cost Changes:

None.

Instructions for DPB Form CNJ
Project Request Justification

This form is to be prepared only for projects authorized for detailed budget development during the 2008-2010 biennium.

The project request justification (DPB Form CNJ) details the project's scope and justifies its need. The need must be demonstrated from several perspectives, including the agency's programs and activities and the condition of the existing facilities, in order to show why it is important to fund your request. The narrative should be as thorough and complete as necessary. The quality of your submission is extremely important. Remember who your audience is for this submission and **do not** use technical engineering terms and jargon. Decision-makers may only have your narrative as the basis for considering the merits of your request.

The justification for additional funding due to anticipated cost overruns on a currently approved and funded project must include the scope adjustments (i.e., reduction in scope) that would be needed to finish the project with existing funding.

Section A. General Information

Item 1. **Agency Name.** Enter your agency's name.

Item 2. **Agency Code.** Enter the three-digit agency code for your agency.

Item 3. **Project Title.** Give the new project a clear descriptive title.

Item 4. **Agency Priority.** Number from the DPB Form H-1.

Item 5. **Name of Person to Contact about this Form.** Enter the name of the person to contact who can answer specific questions concerning the information provided on this form.

Item 6. **Contact Person's Telephone Number.** Enter the telephone number of the contact person.

Item 7. **Contact Person's E-mail Address.** Enter the e-mail address of the contact person.

Section B. Proposed Project

Item 1. Description. The project description should be of sufficient detail to clearly define the scope of the project. This description should address the project's size and capacity. It should also describe how the project would meet specific needs. Below is some of the information that should be presented in this section, as applicable:

- The scope of the project, including type of space proposed, the square footage, and any unique or unusual features.

- Life expectancy of the new facility.

- Methods or sources used to determine the proposed scope.

CNJ_Engineering Signature Building

Item 2. **In approved Master Site Plan**. An explanation should be provided if not in master site plan.

Item 3. **In current Strategic Plan**. An explanation should be provided if not in the current strategic plan

Section C. Project justification

Item 1. Programmatic information. The justification for a project is based on how it supports your agency's strategic plan. Specifically, this section should address the following:

- Description of the current use of the facility(ies).

- Description of the relevant programmatic activities, both current and projected, that would be affected by the project. Indicate any services, operations, or activities that will be initiated, expanded, or improved because of this project.

- How the project will support your agency's mission and your current and planned program goals and objectives. How does the proposed project relate to the agency's strategic plan?

- The necessity of the project in terms of objectives, services, and customers. Be sure to indicate the number and type of clients or staff who will benefit from the proposed project. Provide numerical estimates of current and future users of the facility using quantitative data such as number of positions (FTE), average prisoner days, or full-time equivalent students. Highlight any population characteristics important to the project. Indicate and discuss projection methodologies used.

- Address whether the project is required to continue current services, to handle a workload increase, or to provide for new or better quality services.

- For institutions of higher education, be sure to include a summary of the impact of student fee increases

Item 2. Existing Facility(ies). To determine the need for a project, you must describe your present facilities. Include in this description information on the adequacy of existing facilities to meet current and projected program demands. To support the need, provide the following information, as appropriate:

- Why the existing facility is inappropriate or inadequate, such as overcrowding or the need to accommodate new programs.

- Age and condition of current facility, analysis of man-hours and expenses invested annually in repairs, interruptions of services or backlogs of services, safety hazards to customers, and health and safety code violations. (Specify which code edition.) Indicate if the request is a result of legislative (federal or state) or judicial mandate or from standards or certification requirements. Be as specific as possible. Use quantitative measures when available and applicable to demonstrate why the capital project is needed.

- Interim accommodations being used to compensate for facility deficiencies or the lack of facilities, including currently leased space.

- Information on the future use of the existing facility(ies) that could impact upon the proposed capital project, such as any future expansion or conversion of the facility.

- How the proposed project fits into the approved Master Site Plan for your agency.

Section D. Options Considered

This section should identify and discuss any alternatives to the proposed project that were considered and the rationale for selecting the requested project. Provide the estimated cost for each of the alternatives considered. **One option that must be addressed is the impact of deferring the project until a future biennium.**

Section E. Project Scope Changes

This section should identify and explain any differences between the scope on the DPB Form C-1_S-1 in this submission and those provided on the previously submitted DPB Form H-1.

Section F. Project Cost Changes

This section should identify and explain any differences between the cost estimates on the DPB Form C-1_S-1 in this submission and those provided on the previously submitted DPB Form H-1.