

**Value Engineering**  
**of**  
**State Agency Capital Outlay Projects**  
**for**  
**Fiscal Year 2003**

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## **EXECUTIVE SUMMARY**

### **I. Introduction**

The Director of the Department of General Services is required by Section 2.2-1133 of the Code of Virginia to report to the Governor and the General Assembly on or before September 15 of each year the (i) number and value of the state capital projects where value engineering (VE) was employed and (ii) identity of the capital projects for which a waiver of the requirements of Section 2.2-1133.B was granted, including a statement of the compelling reasons for granting the waiver. This report provides information for the period from July 1, 2002 through June 30, 2003.

### **II. Projects**

Seventeen (17) projects with a combined estimated construction value of approximately \$347 million qualified for the Value Engineering process. The requirements for Value Engineering are defined in Section 2.2-1133 of the *Code of Virginia*. The associated administrative procedures are provided in the Commonwealth of Virginia *Construction and Professional Services Manual for Agencies*, December 1996 (CPSM).

### **III. Savings**

Estimated savings for owner-accepted VE items were provided for eleven (11) of these projects. These projects had a total combined estimated construction value of approximately \$285 million. The estimated savings recommended by the value engineering teams and accepted by state agencies for these projects totaled \$83 million. These results are significantly skewed by the large UVa Arena project. Excluding the Arena, the VE savings accepted for the remaining ten (10) projects totaled \$5.2 million or 4.1% of the estimated construction value.

### **IV. Waivers Granted / Projects Excluded**

The six (6) projects granted waivers or otherwise excluded from the VE process are identified in Table 2.

## VALUE ENGINEERING OF STATE CAPITAL OUTLAY PROJECTS FOR THE PERIOD JULY 1, 2002 - JUNE 30, 2003

### 1. Introduction

The Director of the Department of General Services is required by Section 2.2-1133 of the Code of Virginia to report by September 15 each year to the Governor and the General Assembly on the (i) number and value of the capital projects where value engineering (VE) was employed and (ii) identity of the capital projects for which a waiver of the requirements of Section 2.2-1133.B was granted, including a statement of the compelling reasons for granting the waiver. This report provides the information for the period from July 1, 2002 - June 30, 2003.

### 2. Background

Section 2.2-1133.A of the Code of Virginia establishes the requirement for use of value engineering on any capital project costing more than five million (\$5,000,000) dollars. This requirement became effective in 1994 and procedures for implementing a value engineering program were developed and issued to state agencies in July 1994. The procedures for implementing the VE process are contained Section 814.0 of the Commonwealth of Virginia's *Construction and Professional Services Manual for Agencies*, December 1996 (CPSM).

Value engineering is a systematic process of review and analysis of a project design performed by an independent team of persons not originally involved in the design of the project. The team members are themselves licensed design professionals and the team leader is specially trained in conducting the team study process.

The purpose of the review and analysis of the design is to offer suggestions to the project owner and project design firm that improve project quality and reduce total project cost by combining or eliminating inefficient or expensive parts or steps in the original design or recommending redesign of the project using different technologies, materials or methods. Value engineering is often used to deal with "cost growth" during the project design phase. In some cases, a VE study may result in an increase in cost for a portion of a project. This generally occurs when the team recommends a design change that may involve a higher initial investment during construction, but is more cost effective when measured on a life cycle basis (construction cost plus long term operating costs).

Not all projects are candidates for VE. Where an initial analysis of a project indicates that the cost of conducting the VE study may not produce sufficient recommendations of cost savings to cover study costs, there is no potential net benefit in conducting the study.

Current state procedures require any capital project with an estimated construction cost greater than **\$5,000,000** to be value engineered, unless waived by the Director of the Department of General Services. The VE study is conducted at the preliminary design stage of the project. The project design is approximately **35% complete** at the preliminary design stage.

The Commonwealth's process involves a **40-hour study** of the project by the VE team. The team is composed of registered design professionals that practice architecture and the engineering disciplines (civil, electrical, mechanical, etc.) involved in the project design and a certified value specialist who is the VE team leader. The A/E firm that designed the project is a part-time participant in the VE study. Building shape, floor plan layout and building systems components are sufficiently developed at the preliminary stage of design for all VE team disciplines to evaluate the essential elements of the design and suggest alternatives where appropriate.

The recommendations produced by the VE team are reviewed by the project owner and the design A/E firm. Recommendations are selected or rejected by the project owner in consultation with the design A/E based on program requirements, cost, technical feasibility, aesthetics, and other related considerations.

Recommendations dealing with technical design issues must ultimately be accepted or rejected by the design A/E firm since the design A/E is the party with ultimate liability for the design and is required by law to professionally seal the design documents.

Accepted recommendations must be incorporated into the project design and most often this will require additional work on the part of the design A/E. Since the nature and scope of this additional work is not known when the A/E design contract and price are negotiated, the A/E is entitled to a fee for this additional design service.

Several projects evaluated during this report period were designed using abbreviated procedures for capital outlay projects authorized by Section 4-5.08.b. of the 1997 Acts of Assembly, Chapter 924. These projects are commonly referred to as HECO (Higher Education Capital Outlay) projects. Under the HECO process, several colleges and universities have been delegated all post-appropriation review, approval, administrative and policy and procedure functions performed by the Department of Planning and Budget, Department of General Services and the Division of Engineering and Buildings for projects which do not have a general fund component in their project funding.

### **3. Projects Studied and Savings Identified**

Seventeen (17) projects with a combined estimated construction value of \$347 million qualified for Value Engineering as required by Section 2.2-1133.A of the *Code of Virginia* and Section 814.0 VALUE ENGINEERING of the Commonwealth of Virginia *Construction and Professional Services Manual for Agencies*, December 1996 (CPSM). Value Engineering Studies were conducted on eleven (11) of the seventeen projects. These eleven projects had an aggregate construction value of \$285 million. The VE teams identified design changes, which were accepted by the agencies and institutions, which produced an aggregate estimated savings in construction cost of \$83 million.

The largest single project savings, \$78 million, was reported by the University of Virginia on their new Basketball Arena project. Excluding this huge project which significantly skews the overall statistics, the aggregate estimated savings accepted by state agencies for the remaining ten (10) projects was \$5,170,000. These ten projects had an aggregate construction value of approximately \$125 million and a mean VE savings per project of \$517,000. The aggregate VE savings reported is equivalent to 4.1% of the combined preliminary budgets of these ten projects.

### **4. Study Costs**

The typical cost of a 40 hour VE study is approximately \$40,000. Excluding the UVa Arena project, which significantly skews the results, the Commonwealth realized a net savings in estimated construction cost of approximately \$4,770,000 (after deducting VE Study costs) for the remaining ten studies completed and accepted this reporting period.

### **5. Waivers Granted / Projects Excluded**

The six (6) projects granted waivers or otherwise excluded from the VE process are identified in Table 2.

**Table 1**  
**Value Engineering Studies Prepared in FY 2003**

Project Code	Agency / Institution	Project Title	Preliminary Construction Budget	Estimated VE Savings (Accepted Items)	VE Savings as a % of Budget	Remarks
194-16635-	Department of General Services	New Parking Deck	\$16,200,000	\$180,000	1.1%	
204-16410	College of William & Mary	New Parking Deck	\$6,263,000	\$567,000	9.1%	
207-16281	University of Virginia	Arena	\$160,000,000	\$78,000,000	48.8%	See Note 1.
207-16285	University of Virginia	Material Science & Nanotechnology Bldg.	\$25,860,000	\$2,458,000	9.5%	See Note 2.
211-16586-002	Virginia Military Institute	Renovate Nichols Engineering Building	\$10,817,000	\$129,000	1.2%	
214-16251	Longwood University	New Science Building	\$14,304,000	\$173,000	1.2%	
236-16578	Virginia Commonwealth University	Cary/Harrison/Parkwood Parking Deck	\$8,840,000	\$4,000	0.0%	
236-16703	Virginia Commonwealth University	Rhoads Hall II	\$21,194,000	\$978,000	4.6%	
236-16722	Virginia Commonwealth University	Dining Facility	\$9,978,000	\$241,000	2.4%	
260-16260-002	Virginia Community College System/ Germanna Community College	Culpeper Technical Center	\$5,989,000	\$154,000	2.6%	
260-16345	Virginia Community College System/ J. Sargeant Reynolds Comm. College	Downtown Campus Parking Deck	\$5,893,000	\$286,000	4.9%	
<b>TOTAL (All Projects)</b>			<b>\$285,338,000</b>	<b>\$83,170,000</b>	<b>29.1%</b>	<b>11 Projects</b>
<b>AVERAGE (All Projects)</b>			<b>\$25,940,000</b>	<b>\$7,561,000</b>		
<b>TOTAL (Excluding UVa Arena Project)</b>			<b>\$125,338,000</b>	<b>\$5,170,000</b>	<b>4.1%</b>	<b>10 Projects</b>
<b>AVERAGE (Excluding UVa Arena Project)</b>			<b>\$12,534,000</b>	<b>\$517,000</b>		

**Notes:**

- 1) The University based the VE Study savings on the original A/E estimate of \$160,000,000 rather than the preliminary construction budget of \$95,000,000.
- 2) This is an update to a project reported last year. The reported VE Savings also include Construction Management items evaluated at 75% completion of construction documents.

**Table 2**  
**Other Projects Exceeding \$5,000,000 Threshold**

Project Code	Agency / Institution	Project Title	Preliminary Construction Budget	Remarks
131-16274-002	Department of Veterans' Affairs	Hampton Roads Veterans' Cemetery	\$5,191,000	See Note 1.
207-16559	University of Virginia	South Parking Garage Expansion	\$5,357,000	See Note 2.
207-16645	University of Virginia	Emmet Street Parking Garage	\$11,474,000	See Note 3.
242-16707	Christopher Newport University	Parking Deck	\$7,253,000	See Note 4.
242-16742	Christopher Newport University	Residence Hall IV	\$18,225,000	See Note 5.
268-16522-001	Virginia Institute of Marine Science	Marine Research Laboratory	\$14,551,000	See Note 6.
<b>TOTAL (All Projects)</b>			<b>\$62,051,000</b>	<b>6 Projects</b>

**Notes:**

- 1) At the time the preliminaries were submitted, the Independent Cost Estimate was \$3,701,927 and the A/E estimate was \$3,519,000. Project scope was reduced below the \$5.2 million preliminary budget as Federal Government would not provide funding for pre-installation of vaults. This significant scope adjustment brought the project below the threshold amount for preparation of a VE Study.
- 2) The University stated that a VE Study was not prepared for this project as the the expansion matched an existing garage that had undergone a VE Study. A waiver of the requirements for preparing a VE Study was not requested by the University.
- 3) This was a design/build project. A waiver of the requirements for preparing a VE Study was not requested by the University.
- 4) A waiver of CNU's Parking Deck from the requirements for a VE Study was granted based on justifications provided by the University.
- 5) A waiver of CNU's Residence Hall IV project from the requirements for a VE Study was granted based on justifications provided by the University. This project was a "site adaption" of the Residence Hall III project.
- 6) The Institute stated that project scope is undergoing revised preliminary design due to programmatic changes. The VE Study results will be included in next year's report.