



# COMMONWEALTH of VIRGINIA

*Department of General Services*

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August 31, 2007

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The Honorable Timothy M. Kaine  
Governor of Virginia  
Patrick Henry Building, 3<sup>rd</sup> Floor  
1111 East Broad Street  
Richmond, Virginia 23219

Dear Governor Kaine:

As required by Section 2.2-1133 of the Code of Virginia, the attached report, "Value Engineering of State Agency Capital Outlay Projects for Fiscal Year 2007", is submitted for your information and review.

Sincerely,

  
Richard F. Sliwoski, P.E.

Attachment

- c. The Honorable Viola O. Baskerville  
Mr. Robert B. Jones  
Mr. W. Michael Coppa



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Ms. Angi Murphy  
Division of Legislative Automated Systems  
910 Capitol Square, Suite 660  
General Assembly Building  
Richmond, Virginia 23219

Dear Ms. Murphy:

As required by Section 2.2-1133 of the Code of Virginia, the attached report, "Value Engineering of State Agency Capital Outlay Projects for Fiscal Year 2007", is submitted for printing and distribution.

Additional information or clarification may be obtained by contacting Mr. W. Michael Coppa of the Department of General Services' Bureau of Capital Outlay Management at 786-4398.

Sincerely,

  
Richard F. Sliwoski, P.E.

Attachment

- c. The Honorable Viola O. Baskerville  
Mr. Robert B. Jones  
Mr. W. Michael Coppa

**Value Engineering**  
**of**  
**State Agency Capital Outlay Projects**  
**for**  
**Fiscal Year 2007**

Department of General Services  
Division of Engineering & Buildings  
Bureau of Capital Outlay Management

August 31, 2007

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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 following:

- (i) the number and value of the state capital projects where value engineering (VE) was employed
- (ii) the 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, 2006 through June 30, 2007.

### II. Projects

Thirteen (13) projects with a combined estimated construction value of approximately \$203 million were reported by Agencies as undergoing the Value Engineering process during Fiscal Year 2007. 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's *Construction and Professional Services Manual*.

### III. Savings / Cost

Estimated savings for owner-accepted VE items were provided for these projects by the applicable agencies and institutions. The estimated savings recommended by the value engineering teams and accepted by state agencies for these projects totaled approximately \$13.6 million. The average VE savings were 6.7% of the estimated construction value.

The average cost of a VE Study was \$39,000. The average savings in construction value was \$1,044,000. The aggregate costs of the VE studies as a percent of aggregate savings were 3.7%. This is equivalent to a payback ratio of 27:1 for employing the VE process.

### IV. Waivers Granted / Projects Excluded

Fourteen (14) reported projects were granted waivers or otherwise excluded from the VE process. These fourteen projects and the associated reasons for exclusion are identified in Table 3. Projects approved for procurement using the "Design Build" methodology are typically excluded from the standard VE process as the Design Build Contractor provides a lump sum fixed price prior to design and contract award. Projects procured using Construction Management at Risk (CM at Risk or CM/GC) are also typically exempted from the VE process. Projects procured under the provisions of the *Public-Private Education Facilities and Infrastructure Act of 2002* (PPEA) are specifically exempted from the value engineering requirements defined in Code of Virginia Section 2.2-1133.

# VALUE ENGINEERING OF STATE CAPITAL OUTLAY PROJECTS FOR THE PERIOD JULY 1, 2006 - JUNE 30, 2007

## 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 Fiscal Year 2007 which encompasses the period from July 1, 2006 - June 30, 2007.

## 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 (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 Value Engineering 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 initial 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. Also, projects which are site adaptations or reuse of previously value-engineered projects are not typically cost-effective for another VE study.

Current state procedures require capital projects with an estimated construction cost exceeding **\$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 after the design concept has been selected and the various building systems evaluated and selected by the designer. 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 (architect/engineer) 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 A/E firm employed to design the project. Recommendations are selected or rejected by the project owner in consultation with the design firm 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 owner's design consultant as the designer of record 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 consultant. 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.

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

Thirteen (13) projects with a combined estimated construction value of approximately \$203 million were reported by Agencies as undergoing the VE process during Fiscal Year 2007. The Value Engineering teams identified design changes, which were accepted by the agencies and institutions, which produced an

aggregate estimated savings in construction cost of approximately \$13.6 million. (See Table 1.)

The aggregate VE savings reported is equivalent to 6.7% of the combined preliminary budgets of these twelve projects.

#### **4. Study Costs**

The aggregate cost for the VE consultants for these 13 projects was \$511,000. Costs ranged from a low of \$22,000 to a high of \$63,000. The average study cost was \$39,000. Deducting the study costs, the Commonwealth realized a net savings in estimated construction value of approximately \$13,059,000 by employing the Value Engineering process. (See Table 2.)

The VE Cost as a percent of the VE Savings as an aggregate for these 13 projects was 3.7%. Stated otherwise, this represents a payback ratio of 27 to 1. (See Table 2.)

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

Agencies are requested each year to report all projects under their purview which were at the preliminary design phase during the reporting period and which exceed the \$5,000,000 threshold, but did not undergo a formal VE process.

Fourteen (14) projects exceeding the \$5,000,000 threshold were identified by agencies as being granted waivers or otherwise excluded from the VE process. These fourteen projects and the associated reasons for exclusion from the VE process are identified in Table 3.

Projects approved for procurement using the "Design Build" methodology are typically excluded from the standard VE process as the Design Build Contractor provides a lump sum fixed price prior to design and contract award. Projects procured using Construction Management at Risk (CM at Risk or CM/GC) are also typically exempted from the VE process. Projects procured under the provisions of the Public Public-Private Education Facilities and Infrastructure Act of 2002 (PPEA) are specifically exempted from the VE provisions mandated in Section 2.2-1133 of the Code of Virginia. (The PPEA exemption from the Value Engineering process is identified in § 56-575.16 of the *Code of Virginia*.)

Exemptions from the VE process continue to expand due to the use of these alternative procurement methods for major projects.



Table 1

VE Study Savings vs. Construction Budget

Item No.	Project Code	Agency / Institution	Project Title	Estimated VE Savings (Accepted Items)	Preliminary Construction Budget	VE Savings as a % of Con. Budget
1)	207-16650	University of Virginia	New Herford College Residence Hall	\$2,482,000	\$9,500,000	26.1%
2)	207-17000	University of Virginia	Medical Education Building	\$1,031,000	\$19,500,000	5.3%
3)	207-17153-001	University of Virginia	Curry School of Education - Bavarro Hall	\$5,239,000	\$26,600,000	19.7%
4)	208-16682	Virginia Tech	New Residence Hall	\$402,000	\$17,500,000	2.3%
5)	208-16758	Virginia Tech	Henderson Hall Renovation	\$130,000	\$9,534,000	1.4%
6)	214-17017	Longwood University	Modernize Heating Plant - Phase II	\$923,000	\$9,611,000	9.6%
7)	221-16817-001	Old Dominion University	Physical Sciences Building - Phase II	\$502,000	\$11,942,000	4.2%
8)	260-16836	VCCS / TCC	Relocation of Portsmouth Campus	\$749,000	\$44,500,000	1.7%
9)	260-16837	VCCS / TNCC	Construct Historic Triangle Campus	\$217,000	\$23,800,000	0.9%
10)	260-16843	VCCS / PVCC	Construct Science & Technology Building	\$1,200,000	\$8,900,000	13.5%
11)	260-16851	VCCS / LFCC	Construct Workforce Development Center	\$386,000	\$6,800,000	5.7%
12)	260-17441	VCCS / TCC	Construct Health Sciences Building	\$131,000	\$7,373,000	1.8%
13)	501-06501-029	Department of Transportation	West Parcel Maintenance - Fairfax Facility	\$178,000	\$7,393,000	2.4%
<b>TOTAL</b>				<b>\$13,570,000</b>	<b>\$202,953,000</b>	
<b>AVERAGE</b>				<b>\$1,044,000</b>	<b>\$15,612,000</b>	<b>6.7%</b>

Table 2

VE Study Savings vs. VE Study Cost

Item No.	Project Code	Agency / Institution	Project Title	VE Study Cost	Estimated VE Savings (Accepted Items)	Study Cost as % of VE Savings
1)	207-16650	University of Virginia	New Herford College Residence Hall	\$22,000	\$2,482,000	0.9%
2)	207-17000	University of Virginia	Medical Education Building	\$31,000	\$1,031,000	3.0%
3)	207-17153-001	University of Virginia	Curry School of Education - Bavarro Hall	\$33,000	\$5,239,000	0.6%
4)	208-16682	Virginia Tech	New Residence Hall	\$63,000	\$402,000	15.7%
5)	208-16758	Virginia Tech	Henderson Hall Renovation	\$63,000	\$130,000	48.5%
6)	214-17017	Longwood University	Modernize Heating Plant - Phase II	\$32,000	\$923,000	3.5%
7)	221-16817-001	Old Dominion University	Physical Sciences Building - Phase II	\$38,000	\$502,000	7.6%
8)	260-16836	VCCS / TCC	Relocation of Portsmouth Campus	\$37,000	\$749,000	4.9%
9)	260-16837	VCCS / TNCC	Construct Historic Triangle Campus	\$37,000	\$217,000	17.1%
10)	260-16843	VCCS / PVCC	Construct Science & Technology Building	\$37,000	\$1,200,000	3.1%
11)	260-16851	VCCS / LFCC	Construct Workforce Development Center	\$38,000	\$386,000	9.8%
12)	260-17441	VCCS / TCC	Construct Health Sciences Building	\$38,000	\$131,000	29.0%
13)	501-06501-029	Department of Transportation	West Parcel Maintenance - Fairfax Facility	\$42,000	\$178,000	23.6%
<b>TOTAL</b>				<b>\$511,000</b>	<b>\$13,570,000</b>	
<b>AVERAGE</b>				<b>\$39,000</b>	<b>\$1,044,000</b>	<b>3.7%</b>

Payback Ratio: 27 : 1

**Table 3  
Other Projects Exceeding \$5,000,000 Threshold**

Item No.	Project Code	Agency / Institution	Project Title	Preliminary Construction Budget	Reason Reported for VE Study Exemption
1)	214-17320	Longwood University	Renovate Cox Hall	\$7,500,000	Similar to Project 16874.
2)	221-17031	Old Dominion University	Indoor Tennis Center	\$5,820,000	Design-Build project.
3)	221-17342-001	Old Dominion University	Quad Student Housing - Phase II	\$12,500,000	Second phase of previously waived D/B Project.
4)	236-16403-002	Virginia Commonwealth University	Engineering II, Health and Life Sciences	\$9,748,000	CM is doing VE.
5)	236-16721	Virginia Commonwealth University	Medical Sciences Building II	\$57,000,000	CM is doing VE.
6)	247-15812	George Mason University	Patriot Center Addition	\$10,500,000	CM-at-Risk project.
7)	247-16832	George Mason University	Academic V	\$15,500,000	CM-at-Risk project.
8)	247-17054	George Mason University	PE Building - Phase I	\$13,900,000	CM-at-Risk project.
9)	247-17365	George Mason University	Academic VI	\$37,300,000	Design-Build project.
10)	247-17368	George Mason University	PE Building - Phase I	\$9,071,000	CM-at-Risk project.
11)	501-06501-006	Department of Transportation	Winchester/Clearbrook SRA & Welcome Ctr	\$5,868,000	Design-Build project.
12)	501-06501-007	Department of Transportation	Fredericksburg SRA & Welcome Ctr	\$5,571,000	Design-Build project.
13)	501-07501-019	Department of Transportation	Traffic Field Operations Bldg - Manassas	\$8,833,000	Design-Build project.
14)	501-07501-035	Department of Transportation	Chantilly AHQ - Maintenance Facility	\$10,133,000	Design-Build project.
<b>TOTAL</b>				<b>\$209,244,000</b>	