Value Engineering

of

State Agency Capital Outlay Projects

for

Fiscal Year 2010

September 10, 2010

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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.C was granted, including a statement of the compelling reasons for granting the waiver.

II. Projects

Sixteen (16) projects with a combined estimated construction value of approximately $240 million were reported by Agencies as undergoing the Value Engineering process during Fiscal Year 2010. 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 $8.6 million. The average VE savings were 3.6% of the estimated construction value.

The average cost of a VE Study was $51,000. The average savings in construction value was $536,000. The aggregate costs of the VE studies as a percent of aggregate savings were 9.5%. This is equivalent to a payback ratio of 11:1 for employing the VE process.

IV. Waivers Granted / Projects Excluded

Thirty-five (35) reported projects were granted waivers or otherwise excluded from the VE process. These 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. The average "value" savings reported by agencies as being incorporated in the design for these thirty-five projects were 4.0% of the estimated construction value.

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, 2009 - JUNE 30, 2010

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 2009 which encompasses the period from July 1, 2009 - June 30, 2010.

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.

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 a second 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, structural, electrical, and mechanical) 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

Sixteen (16) projects with a combined estimated construction value of approximately $240 million were reported by Agencies as undergoing the VE process during Fiscal Year 2010. 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 $8.6 million. (See Table 1.)

The aggregate VE savings reported are equivalent to 3.6% of the combined preliminary budgets of these sixteen projects.

4. Study Costs

The aggregate cost for preparing studies for these 16 projects was $809,000. Study costs ranged from a low of $30,000 to a high of $95,000. The average study cost was $51,000. The median cost was $46,500. Deducting the study costs, the Commonwealth realized a net savings in estimated construction value of approximately $7,768,000 by employing the Value Engineering process. The VE Cost as a percent of the VE Savings as an aggregate for these 16 projects was 9.5%. Stated otherwise, this represents a payback ratio of 11 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.

Thirty-five (35) projects exceeding the $5,000,000 threshold were identified by agencies as being granted waivers or otherwise excluded from the VE process. These thirty-five projects and the associated reasons for exclusion from the VE process are identified in Table 3.

Projects approved for procurement using the "Design Build" (D/B) 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 formal VE process continue to expand due to the use of these alternative procurement methods for major projects. Agencies did, however, report "value" savings of approximately $32.3 million for these exempted projects. Based on an aggregate construction value of approximately $812 million, the savings reported represent 4.0% of the total construction value.

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)	156-17541	Department of State Police	Driver Training Facility	$646,000	$23,209,000	2.8%
2)	203-15824	Woodrow Wilson Rehabilitation Center	Renovate Barnett Hall Dormitory	$260,000	$8,109,000	3.2%
3)	207-B1025-001	University of Virginia Academic	ITC Data Center	$429,000	$14,800,000	2.9%
4)	212-17306	Virginia State University	Singleton Hall Renovation	$264,000	$7,959,000	3.3%
5)	216-17562	James Madison University	Port Republic Road Athletic/Recreation Fields	$330,000	$24,082,000	1.4%
6)	221-17678	Old Dominion University	Systems Research and Academic Building	$1,544,000	$21,023,000	7.3%
7)	221-17678	Old Dominion University	Consolidated Arts Complex, New Arts Bldg	$194,000	$8,577,000	2.3%
8)	247-16607-001	George Mason University	Renovate Thompson	$520,000	$14,158,000	3.7%
9)	247-17366	George Mason University	Renovate Student Union II Building	$112,000	$7,500,000	1.5%
10)	260-17701	VCCS / GCC	Academic Services Building	$369,000	$18,717,000	2.0%
11)	260-17701	VCCS / SSVCC - Daniel Campus	Learning Resources Building	$390,000	$9,542,000	4.1%
12)	260-17709	VCCS / NVCC - Woodbridge Campus	Phase III Academic Building	$314,000	$33,832,000	0.9%
13)	260-17709	VCCS / MECC	Renovate Dalton-Cantrell Hall	$331,000	$7,983,000	4.1%
14)	260-17716	VCCS / SWVCC	Renovate Russell Hall	$358,000	$5,828,000	6.1%
15)	260-17718	VCCS / DSLCC	Renovate Warren & Scott Halls	$157,000	$5,361,000	2.9%
16)	501-17086	Virginia Department of Transportation	Northern Virginia District Office Building	$2,359,000	$29,500,000	8.0%
			TOTAL	**$8,577,000**	**$240,180,000**	
			AVERAGE	**$536,000**	**$15,011,000**	**3.6%**
			MEDIAN	**$344,500**	**$11,850,000**	

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	Payback Ratio
1)	156-17541	Department of State Police	Driver Training Facility	$52,000	$646,000	8.0%	12:1
2)	203-15824	Woodrow Wilson Rehabilitation Center	Renovate Barnett Hall Dormitory	$44,000	$260,000	16.9%	6:1
3)	207-B1025-001	University of Virginia Academic	ITC Data Center	$95,000	$429,000	22.1%	5:1
4)	212-17306	Virginia State University	Singleton Hall Renovation	$36,000	$264,000	13.6%	7:1
5)	216-17562	James Madison University	Port Republic Road Athletic/Recreation Fields	$43,000	$330,000	13.0%	8:1
6)	221-17678	Old Dominion University	Systems Research and Academic Building	$47,000	$1,544,000	3.0%	33:1
7)	221-17678	Old Dominion University	Consolidated Arts Complex, New Arts Bldg	$40,000	$194,000	20.6%	5:1
8)	247-16607-001	George Mason University	Renovate Thompson	$40,000	$520,000	7.7%	13:1
9)	247-17366	George Mason University	Renovate Student Union II Building	$30,000	$112,000	26.8%	4:1
10)	260-17701	VCCS / GCC	Academic Services Building	$46,000	$369,000	12.5%	8:1
11)	260-17701	VCCS / SSVCC - Daniel Campus	Learning Resources Building	$47,000	$390,000	12.1%	8:1
12)	260-17709	VCCS / NVCC - Woodbridge Campus	Phase III Academic Building	$49,000	$314,000	15.6%	6:1
13)	260-17709	VCCS / MECC	Renovate Dalton-Cantrell Hall	$61,000	$331,000	18.4%	5:1
14)	260-17716	VCCS / SWVCC	Renovate Russell Hall	$54,000	$358,000	15.1%	7:1
15)	260-17718	VCCS / DSLCC	Renovate Warren & Scott Halls	$42,000	$157,000	26.8%	4:1
16)	501-17086	Virginia Department of Transportation	Northern Virginia District Office Building	$83,000	$2,359,000	3.5%	28:1
			TOTAL	**$809,000**	**$8,577,000**		
			AVERAGE	**$51,000**	**$536,000**	**9.5%**	**11:1**
			MEDIAN	**$46,500**	**$344,500**		

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

Item No.	Project Code	Agency / Institution	Project Title	Estimated "Value" Savings (Accepted Items)	Preliminary Construction Budget	Savings as a % of Con. Budget	Reason Reported for VE Study Exemption	See Note
1)	194-17784	Department of General Services	Main Street Centre Employee Parking Deck	$1,929,000	$20,000,000	9.6%	Design Build project.	(a)
2)	204-17651-002	College of William & Mary	Historic Campus Utilities Improvement I	$251,000	$12,285,000	2.0%	Construction Mgmt project.	
3)	207-17284	University of Virginia Academic	Renovate Jordan Hall HVAC	$1,592,000	$20,529,000	7.8%	Construction Mgmt project.	
4)	207-B0165	University of Virginia Academic	Bookstore Addition	$684,000	$7,200,000	9.5%	Construction Mgmt project.	
5)	207-B1076-000	University of Virginia Academic	Newcomb Hall Dining Expansion	$219,000	$18,000,000	1.2%	Construction Mgmt project.	
6)	207-B1092-000	University of Virginia Academic	Alderman Road Residences - Phase III	$167,000	$46,500,000	0.4%	Construction Mgmt project.	
7)	207-B1096	University of Virginia Academic	Band Rehearsal Hall	$816,000	$8,830,000	9.2%	Construction Mgmt project.	
8)	207-B1099-000	University of Virginia Academic	Newcomb Hall Renovations Phase III	$167,000	$15,200,000	1.1%	Construction Mgmt project.	
9)	207-B1130-000	University of Virginia Academic	Alderman Road Residences - Phase IV	$1,496,000	$30,000,000	5.0%	Construction Mgmt project.	
10)	208-16758-002	Virginia Tech	Center for the Arts / Creative Technologies	$3,485,000	$71,990,000	4.8%	Construction Mgmt project.	
11)	208-17662	Virginia Tech	Davidson Hall Improvements Phase I	$1,448,000	$23,400,000	6.2%	Construction Mgmt project.	
12)	208-L00007	Virginia Tech	Academic and Student Affairs Building	$2,045,000	$33,376,000	6.1%	Construction Mgmt project.	
13)	209-B1012	University of Virginia Medical Center	UH2 Heart Center / Hybrid Cath Renovation	$98,000	$11,413,000	0.9%	Construction Mgmt project.	
14)	209-B1013	University of Virginia Medical Center	UH Add Two Operating Rooms and MRI Room	$36,000	$6,071,000	0.6%	Construction Mgmt project.	
15)	209-B1014	University of Virginia Medical Center	UH Renovate Surgical Pathology Laboratory	$75,000	$5,100,000	1.5%	Construction Mgmt project.	
16)	209-B1016-006	University of Virginia Medical Center	University Hospital Radiology Department	$0	$8,000,000	0.0%	Construction Mgmt project.	
17)	209-B1066	University of Virginia Medical Center	Lee Street Connective Elements	$2,176,000	$17,000,000	12.8%	Construction Mgmt project.	
18)	212-17416-000	Virginia State University	Renovate and Expand Hunter McDaniel Hall	$148,000	$17,871,000	0.8%	Construction Mgmt project.	(a)
19)	215-17670	University of Mary Washington	Construct Dahlgren Campus	$170,000	$15,746,000	1.1%	Construction Mgmt project.	(a)
20)	217-17618	Radford University	College of Business and Economics	$1,910,000	$37,200,000	5.1%	Construction Mgmt project.	
21)	217-17863	Radford University	Renovate Madison and Jefferson Halls	$900,000	$8,000,000	11.3%	Life Safety & MEP Upgrades	(d)
22)	221-17680	Old Dominion University	Student Success Center	$481,000	$8,628,000	5.6%	Construction Mgmt project.	(a)
23)	229-17681	Virginia Tech Research Division	Human and Agricultural Biosciences Building I	$1,269,000	$41,480,000	3.1%	Construction Mgmt project.	
24)	236-17682	Virginia Commonwealth University	General Classroom Building	$283,000	$31,435,000	0.9%	Construction Mgmt project.	
25)	236-17683	Virginia Commonwealth University	New School of Medicine	$1,128,000	$99,000,000	1.1%	Construction Mgmt project.	
26)	236-17685	Virginia Commonwealth University	Massey Cancer Center - Support Lab Renovation	$911,000	$6,900,000	13.2%	Construction Mgmt project.	
27)	242-17360	Christopher Newport University	Freeman Center Expansion	$1,185,000	$21,600,000	5.5%	Construction Mgmt project.	(a)
28)	242-17484	Christopher Newport University	Construct Science Building	$1,243,000	$52,083,000	2.4%	Construction Mgmt project.	(a)
29)	247-17696	George Mason University	Krasnow Institute Addition Phase II	$569,000	$9,176,000	6.2%	Design Build project.	(a)
30)	260-17067	VCCS / TCC - Va Beach Campus	Student Center	$2,901,000	$23,500,000	12.3%	Construction Mgmt project.	(a)
31)	260-17380-003	VCCS / TNCC	Renovate Hampton III Building	$0	$5,026,000	0.0%	Interior build out; ESCO	(a)
32)	260-17704	VCCS / TCC - Va Beach Campus	Learning Resources Center	$1,796,000	$34,212,000	5.2%	Construction Mgmt project.	(a),(c)
33)	260-17707	VCCS / VWCC	New Science and Technology Building	$576,000	$18,900,000	3.0%	Construction Mgmt project.	
34)	260-17712	VCCS / RCC	Renovate Academic Classrooms & Admin Building	$69,000	$8,298,000	0.8%	Construction Mgmt project.	(a)
35)	425-17626	Jamestown-Yorktown Foundation	Yorktown Museum	$83,000	$17,850,000	0.5%	Construction Mgmt project.	(a),(b)
			TOTAL	**$32,306,000**	**$811,799,000**	**4.0%**		

Notes:

(a) Denotes waiver granted by DGS/DEB. Certain institutions have authority granted by Higher Education Management Agreements to waive requirements for projects under their purview.

(b) Preliminary Budget was not provided. GMP not yet set. $17,850,000 is the "design to" construction budget per the Agency's A/E contract.

(c) Preliminary Budget was not provided. $34,212,000 is the construction budget from the approved CO-2 (Authorization to Initiate Project).

(d) Agency conducted VE analysis with in-house personnel. Project was primarily life safety and MEP (mechanical/electrical.plumbing) upgrades. There were minimum wall and room modifications.