

## **Value Engineering Job Plan**

### **Introduction**

Value Engineering studies are conducted according to a standard series of steps known as the Job Plan, recognized by AASHTO and codified by FHWA in 23 CFR 627. All WisDOT VE studies shall follow the VE Job Plan. A summary is provided below for reference, but is not meant to substitute the requirements of AASHTO or Federal Law. A trained and CVS-certified VE Team Leader must be experienced in the Job Plan described below.

The level of effort spent on each phase varies depending on the anticipated scope and complexity of the VE study being performed.

### **1. Information**

*Gather project information including project commitments and constraints.*

Determine what needs to be known from readily available information about the project or element being studied, and what needs to be known to define and/or solve the potential problems.

The key questions to answer in this phase are:

- What must this project do to be successful?
- What are the problems?
- What do we know?
- What do we need to know?

This phase is meant to familiarize the team with the project and develop an understanding of the project's purpose, needs, history, circumstances and objectives. This phase requires background information, technical reports (such as concept definition, design study, traffic, soils, hydraulics, environmental, or crash reports), design plans, alternatives considered, estimates, field data, and often a site visit. It redefines focus areas and objectives in addition to determining what are the issues, what is known and what still needs to be known.

All available information, including stakeholder constraints and commitments, should be collected during this phase. The VE team should become thoroughly knowledgeable about the project or anticipated problem.

### **2. Function Analysis**

*Analyze the project to understand the required functions.*

Identify the elements with the greatest potential for value improvement. This phase brings the three fundamental concepts of VE (function, cost, and worth) to bear on the problem.

The key questions to answer in this phase are:

- What is the element?
- What does it do? (What is the function?)
- What must it do? (Is its function basic?)
- What is it worth?
- What does it cost?

By the end of the function analysis phase, the VE team has identified the high-cost elements, functionally analyzed them, and assessed their cost/worth relationships.

### **3. Creative**

*Generate ideas about how to accomplish the required functions which improve the project's performance, enhance quality, and lower costs.*

Use brainstorming and other creative techniques to develop alternatives to the proposed design. These techniques usually generate a list of potential creative solutions to the problems identified in the investigation phase, and the function/cost/worth determinations made during the analysis phase. In order for the creative phase to be successful, the team must avoid evaluating the ideas while they are being generated.

The key questions to answer in this phase are:

- What else will perform the function?
- Where else may the function be performed?
- How else may the function be performed?

#### 4. Evaluation (Judgment)

*Evaluate and select feasible ideas for development.*

Determine the best alternatives by listing the advantages and disadvantages of each. The objective is to identify the best blend of performance, life-cycle cost, and schedule, while maintaining safety, quality, and environmental constraints. If the disadvantages far outweigh the advantages of an alternative, it is dropped from further consideration.

The key questions to answer in this phase are:

- How might each alternative work?
- What might be the cost?
- Will the alternative perform the basic function?

#### 5. Development

*Develop the selected alternatives into fully-supported recommendations.*

Select the best alternatives and fully develop them through sketches, cost estimates, validation of test data and other technical work to determine if the assumptions made during the study are valid. The team develops final recommendations and formulates an implementation plan.

The key questions to answer in this phase are:

- Will the recommendations meet the requirements?
- Why is the recommended change better than the original design?
- What will be the total cost?

The team develops final recommendations for long-term and interim solutions, defines how each recommendation will meet the requirements, and describes why each recommendation is advantageous to the original design. Often the team develops mutually exclusive recommendations; in this case, the team should present both alternatives, but select a preferred alternative.

The number of recommendations made is not as important as their ability to be implemented.

#### 6. Presentation

*Present the VE recommendations to the project stakeholders.*

Make a brief and concise presentation of the recommendations, with ample time allocated for questions. The audience includes agency executives, managers, stakeholders, appropriate staff, and project team, who are collectively authorized and responsible for evaluating and determining whether to implement the findings. In many cases, the way the findings are presented is as important as the findings themselves.

The key questions to answer in this phase are:

- To whom should the findings be presented?
- How should the recommendations be presented?
- What were the problems?
- What are the recommendations?
- What is needed to implement the recommendations?

All recommendations should receive serious consideration by management. However, it may not be possible to implement all recommendations. Unless documented in the final VE Study Report, Management should separately document all decisions on the recommendations. If a decision on all the recommendations is not reached during the presentation, the Region project manager should set a timeline for final decisions. A written report is provided following the completion of the VE study.

#### 7. Resolution

*Evaluate, resolve, document, and implement all approved recommendations.*

At the completion of every VE study, complete WisDOT Form [DT1342](#). Submit electronic copies to the State VEPM and region VE coordinator. Form DT1342 enables statewide consistency in the documentation of VE cost savings. The State VEPM summarizes all VE results into the annual report to FHWA, as per Federal requirements.

Each VE study required per [FDM 1-15-1.3.1](#) must complete a VE study report. Compile the VE study report as a

step-by-step record of the VE analysis, including documentation of the team's deliberations, assumptions, and rationale for recommendations. The report aids in implementing recommendations, and can be referenced for future VE studies or design efforts. The VE report should describe the analysis procedures used, the changes recommended, the recommendations incorporated into the project, the estimated cost-savings or improved quality of all changes recommended, and the resources/costs incurred to perform the study. Typically, this report is developed by the VE team leader. Copies of the VE report shall be furnished to the WisDOT project manager and the State VEPM, as PDF files, and paper copies if requested.

For smaller, ad-hoc or non-mandatory VE studies, a working file should be established to support the completed WisDOT VE Summary Form [DT1342](#).

## **Roles and Responsibilities**

### **Region Project Development Chief**

- Ensures that Project Manager applies VE study at appropriate time
- Evaluates and determines whether to implement VE Study recommendations
- For any VE recommendation not implemented, ensures rationale is documented

### **Region Project Manager**

- Defines study scope and focus
- Consults with VE Team Leader, State VEPM, and Supervisor/Manager to select and approve VE team members
- Supplies all available project data and cost estimates to VE Study Team, and works with VE team as a technical advisor
- Ensures that interested Statewide Bureau representatives have an opportunity to attend relevant portions of the VE study
- Assures VE study report is accurate and completed
- Works with management to implement VE recommendations (ensures plans are updated)

### **VE Team Leader**

- Recommends study scope and focal areas, and VE team members
- Manages all aspects of the required VE Job Plan
- Responsible for meeting all Federal VE requirements
- Presents VE recommendations and makes any resulting changes to the VE report
- Completes VE report and VE Summary forms [DT1342](#) for each study, and sends them to region project manager and State VEPM

### **State VE program manager (VEPM)**

- Assists Regions and central office in VE coordination efforts as needed
- Solicits and manages Master Contracts with VE consultants for statewide use; assists with selection of VE Team Leaders and VE team members
- Collects Summary forms DT1342 and Reports for all VE studies
- Develops and submits Annual FHWA VE report to FHWA; distributes report to Bureau Directors, Oversight Engineers, and other interested stakeholders
- Receives and compiles feedback on the VE program for ongoing evaluation and revisions
- Meets periodically to review practices and programs with Region VE coordinators, Central Office Project Oversight Engineers, and FHWA

### **Region VE Coordinator**

- Assists region personnel in identifying projects requiring VE
- Assesses other projects (below the required cost thresholds) for possible VE studies
- Offers ideas and guidance for VE studies on projects
- Reviews/evaluates VE program and cost savings with Region management
- Makes recommendations for VE program improvements to State VE Coordinator

### **Central Office Project Oversight Engineer**

- Helps identify candidate projects and coordinate VE project efforts with Region and central office staff
- Ensures that VE is performed on required projects, as a condition for DSR approval
- Reviews/evaluates VE cost savings achieved on each project for application statewide
- Makes project and program VE recommendations as needed
- Shares VE best practices with region and central office staff

### **FHWA VE Coordinator**

- Reviews and comments on VE study reports and VE Summary results
- Evaluates projects below required thresholds for possible VE needs
- Evaluates Annual FHWA VE report and program for quality and cost effectiveness
- Recommends VE program improvements as needed
- Provides national VE perspective and information to State VEPM and individual project teams

### **Value Engineering Studies on Major Projects**

WisDOT Major projects are large and complex, and offer numerous opportunities for the effective application of Value Engineering. Work with Central Office and FHWA to determine the specific requirements, timing, and content for each study.

Following are three examples of timing and content for VE studies on WisDOT Major projects:

#### **Major Project Value Engineering/Value Planning Study # 1**

An early study can be held for a projects being considered for recommendation to the Transportation Projects Commission (TPC) to begin the EIS. The purpose of this study is to validate the scope of the project and initial estimate.

Objectives:

- Review anticipated scope
- Clearly define the measures of project success
- Validate economic and business decisions on the project need
- Identify and assess elements for inclusion/exclusion
- Review initial estimate

#### **Major Project Value Engineering/Value Planning Study # 2**

On a project that has been recommended by the TPC for environmental study, a VE Study can be performed at the Draft EIS/EA stage of the project, before any environmental commitments have been made. The study could be used to determine alternatives or to evaluate alternatives in the Draft EIS/EA, or review and analyze technical improvements to the design.

Objectives:

- Develop and review project functional needs
- Determine whether functional needs are met
- Remove extraneous project elements
- Investigate different approaches to project elements

#### **Major Project Value Engineering/Value Planning Study # 3**

This VE study can be used on a project that has completed environmental study and is being considered for recommendation to the TPC for enumeration. The study is performed primarily to validate the project estimate (design, real estate and construction) but may also review technical improvements and construction staging.

Objectives:

- Review preliminary quantities and estimate
- Review design changes within the recommended alignment
- Review construction staging and relationship of construction contracts
- Consider long-term maintenance of project

