

Highway Directive

Number DES-01-03	Supersedes N/A	Effective Date 01/02/2020	Validation Date 01/02/2021	Authoring Branch Statewide Project Delivery Branch	Page Number Page 1 of 8
Subject Value Engineering Program For Transportation Projects			References Title 23 United States Code (U.S.C.), Section 106(e); Title 23, Code of Federal Regulations (CFR), Part 627.		
Approved Signature 			AASHTO Guidelines for Value Engineering 2017 Edition		

Purpose

Value engineering is a project analysis technique which often generates significant cost reduction, however the primary focus is value improvement. The purpose of this highway directive for Oregon Department of Transportation (ODOT) is to:

- Enhance project and program delivery performance through application of the Value Engineering (VE) methodology on select highway Statewide Transportation Improvement Program (STIP) projects and project delivery programs.
- Define the roles, responsibilities, and activities of ODOT personnel in the VE process.
- Improve the value, quality, and cost-effectiveness of projects, operations, and processes improving the productivity and efficiency of ODOT.

Background

The VE methodology is a systematic approach used to identify opportunities for reductions in cost, schedule, and risk, while increasing lifecycle performance. The Federal Highway Administration (FHWA) states that VE is “the most effective technique for identifying and eliminating unnecessary costs and enhancing value”. VE can be utilized in all aspects of transportation such as design, traffic operations, construction, maintenance, specifications, standard drawings, and planning.



Highway Directive

The benefits ODOT will gain from performing VE include:

- Improved value, quality, and cost effectiveness of projects, operations, and processes.
- Opportunity for innovation.
- Unbiased and in-depth multi-disciplinary review of the project by Subject Matter Experts.
- Stabilize the project scope and provides a validation of the costs.

Direction

- This directive applies to all STIP projects, including projects that are delivered by ODOT on behalf of a Non-Certified Local Public Agency, with the following exemptions:
 - STIP Projects that are delivered by a Certified Local Public Agency are exempt from these requirements.
 - STIP Projects that are delivered by a Non-Certified Local Public Agency using state funds are exempt from these requirements.
 - STIP projects delivered by ODOT on behalf of a Local Public Agency when the project is not on a state facility are exempt from these requirements.
 - STIP projects that are only a transfer of funds are exempt from these requirements.
 - STIP projects that are delivered using the Design-Build (DB) delivery method are exempt from these requirements.
 - STIP projects that are delivered using the Construction Manager/General Contractor (CM/GC) delivery method, and don't meet FHWA requirements for a VE study, are exempt from the requirements.
- All applicable STIP projects shall be evaluated based upon established criteria to determine the need to conduct a formal VE Study.
- All applicable STIP projects with an estimated total cost of \$25 million or more are required to conduct a VE study regardless of funding source or National Highway System (NHS) designation.



Highway Directive

- Regions have the discretion to utilize VE on projects with an estimated total project cost of less than \$25 million.
- This directive does not supersede or replace Section 00140.70 (Cost Reduction Proposals) of the ODOT Standard Specifications for Construction.

Guidelines

All applicable STIP projects that have an estimated total cost of \$25 million or more are required to conduct a VE study regardless of the number of phases or unit breakdowns that have occurred on the project. For example, an urban interchange project, with an initial cost estimate of \$40 million that has been separated into four \$10 million projects due to funding shortages, would still be required to have a VE study. Estimated total project cost includes the estimate total of all financial cost to deliver the project as programmed in the STIP including planning, development, preliminary engineering, design, utility relocation, and construction, including but not limited to, the costs for environmental considerations, right of way acquisition, permitting, geo-environmental considerations, internal ODOT resources, consultant contracts and construction contracts.

VE Study Criteria

All STIP projects shall be evaluated for a VE study. Planning level studies can also benefit from VE studies. Projects that typically benefit from a VE study have one or more of the following attributes:

- Projects that exceed \$25 million in estimated total project cost.
- Projects that have major structures.
- Projects that are complex.
- Projects that are designed by consultants.
- Projects that have largely exceeded preliminary cost estimates.



Highway Directive

- Projects with alternative solutions to documented problems.
- Projects using critical or high cost materials and procedures.
- Projects with complex traffic staging.
- Projects that include extensive or expensive environmental or geotechnical requirements.
- Projects being considered for alternative contracting methods.

VE Study Exemption

Certain projects that do exceed \$25 million in estimated total project cost, but do not include one or more of the other attributes listed in the VE study criteria may not be good candidates for a VE study. For these projects, the Transportation Project Manager (TPM) and/or Resident Engineer-Consultant Projects (RE-CP) may submit a written request to the VE/Project Risk Engineer to waive the VE study requirement for a project. No exemption will be granted for projects that meet the following FHWA criteria requiring a VE study:

- Projects utilizing Federal-aid highway funding, and;
- Projects that are on the NHS, and;
- Projects exceeding \$50 million in total project cost, and/or;
- Bridge projects exceeding \$40 million in total project cost.

VE Study Timing

VE studies may be conducted during one or more project phases. In general, VE studies performed during the project development phase have a greater potential for adding value than VE studies performed during the project design phase. Some projects may not benefit from a VE study, while others may benefit from several studies conducted at different times and focusing on different aspects of the project.



Highway Directive

Low Bid, Price Plus Time (A+B), or Price Plus Multi-Parameter (A+C+D) delivery methods:

- Planning Phase - VE study to evaluate, refine, or reduce alternatives before going ahead with project development. Types of projects include STIP, corridor, reconnaissance, and Transportation System Plans (TSP). VE studies conducted in this phase have the highest potential for enhancing project value.
- Development Phase – VE study prior to Design Acceptance Phase (DAP) completion. At this stage major project elements have been done. VE study to evaluate project elements and limit alternatives for advancement. Design completion is about 10-15%.
- Design Phase - VE study to evaluate design details, materials, and staged construction.
- Construction Phase – VE study to evaluate and decrease major cost elements, potential cost and schedule overruns, or to determine a triggered risk response action. A VE study in this phase should be reserved for extreme cases only.

VE Study Facilitator

VE studies shall be led by a facilitator who is accredited as a Certified Value Specialist (CVS) through SAVE International®.

VE Job Plan

VE is the systematic process of reviewing and analyzing the requirements, functions, and elements of systems, projects, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with the required levels of performance, reliability, quality, and safety. The process is generally performed in a workshop environment by a multidisciplinary team, which is facilitated by personnel that is experienced, trained and certified in leading VE teams through the following phases of the SAVE International® standard job plan:

- *Information phase* where the team gathers information to understand the project and constraints;
- *Functional analysis* phase where the team identifies basic project functions and goals and identifies any performance shortcomings or mismatches between identified functions and customer needs for further study;



Highway Directive

- *Creative phase* where the team conducts brainstorming to generate new ideas and alternatives for improvements in a project, product, or process, with particular focus on high cost variables, speed of execution, quality and performance;
- *Evaluation phase* where the team ranks ideas to find the best to meet the project value objectives;
- *Development phase* where the team develops best ideas into viable alternatives for improvement in a project, product, or process, with particular focus on high cost variables, speed of execution, quality and performance;
- *Presentation phase* where the team presents recommended alternatives to the design team
- *Implementation phase* where the design team incorporates selected recommendations into the project.

VE Study Implementation

Following the VE study, the TPM/RE-CP shall meet with the VE facilitator to discuss the implementation disposition of recommendations identified in the VE study and to develop an implementation plan for selected recommendations. Following the conclusion of this meeting, the TPM/RE-CP shall prepare a report of implementation disposition that identifies each VE recommendation as accepted, conditionally accepted, or rejected.

Rejection of VE Recommendations

The rejection of any individual VE recommendation or group of recommendations, on a single project feature that may potentially save over \$500,000, requires the signed approval of the Region Manager and/or the Funding Program Manager.

VE Training

Recommended for anyone associated with transportation projects, but not required to be on a VE study.



Highway Directive

Roles & Responsibilities

- TMP/RE-CP
 - Evaluate projects to determine if formal VE should be performed or is required.
 - Consult with the VE program in scheduling projects selected for VE study.
 - Provide project information to VE engineer needed to properly perform VE studies.
 - Review VE recommendations with project team and ODOT management. Document the disposition of each recommendation in the implementation report as accepted, conditionally accepted, or rejected.
 - Document the concurrence of project team and management of rejected recommendations.
 - Submit an approval request for the rejection of any VE recommendation(s), and/or group of recommendations, with potential savings over \$500,000, to the Region Manager and/or the Program Funding Manager.
- VE/Project Risk Engineer
 - Evaluate all ODOT STIP projects for potential VE studies based upon VE study criteria, and inform Regions when a project is required to perform a VE study.
 - Develop and maintain the VE program.
 - Review identified VE study projects with TPMs/ RE-CPs
 - As agreed upon by the Region, coordinate/facilitate all aspects of VE study, including assembling VE team and study materials, facilitating the study, facilitating VE recommendation proposal to project team, compiling the report, and tracking study results.
 - Measure the performance of the VE program.
 - Provide VE training.



Highway Directive

- Provide program coordination between ODOT and FHWA.
- Prepare and submit ODOT's annual VE summary report to FHWA.
- Region Manager/ Program Funding Manager
 - Review and approve or reject the requested rejection of any individual VE recommendation or group of recommendations, on a single project feature that may potentially save over \$500,000.