U.S. DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

Order

Subject
FHWA Value Engineering (VE) Policy

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Par.

1. **What is the purpose of this directive?** The purpose of this directive is to provide additional explanation and guidance on the implementation of the requirements in 23 U.S.C. 106(e) or the regulatory provisions at 23 CFR Part 627. These requirements include: conducting a VE analysis on applicable Federal-aid highway projects, establishing a VE Program, providing VE program oversight, and reporting performance results annually.

2. **Does this directive cancel an existing FHWA directive?** Yes. This directive cancels FHWA Order 1311.1A, FHWA Value Engineering Policy, issued on May 25, 2010.

3. **What authorities govern this directive?**

   a. Title 23, United States Code (U.S.C.), Section 106(e);

   b. Moving Ahead for Progress in the 21st Century (MAP-21), Section 1503(a)(3);

   c. Title 23, Code of Federal Regulations (CFR), Part 627;

d. Title 23 U.S.C., Section 101(a)(20); and

e. The Office of Management and Budget's (OMB) Value Engineering Circular A-131, Paragraph 9, dated May 21, 1993.

4. **What definitions are used in this directive?** All definitions contained in 23 CFR Part 627.3 along with the following are applicable to this directive.

a. **Final design.** Any design activities following preliminary design, expressly including the preparation of final construction plans and detailed specifications for the performance of construction work.

b. **Life-cycle cost.** The total cost of a project or item over its useful life. This includes all of the relevant costs that occur throughout the life of a project or item, including initial acquisition costs (such as right-of-way, planning, design, and construction), operation, maintenance, modification, replacement, demolition, financing, taxes, disposal, and salvage value as applicable (as defined in 23 U.S.C. 106(f)(2)).

c. **Major project.** A project receiving Federal financial assistance:

1) With an estimated cost of $500 million or more, or

2) That has been identified by the Secretary of Transportation as being "Major" as a result of special interest (23 U.S.C 106 (h)).

5. **What projects require a VE analysis?**

a. Section 1503(a)(3) of MAP-21 amended the applicable project thresholds for conducting VE analyses that are reflected in 23 CFR 627.5(b). These regulations will be updated to reflect these statutory changes. Accordingly, as a result of these statutory changes, applicable projects requiring a VE analysis (as defined in 23 CFR 627.3) are:

(1) Each project located on the National Highway System (NHS) (as specified in 23 U.S.C. 103) with an estimated total project cost of $50 million or more that utilizes Federal-aid highway program (FAHP) funding;

(2) Each bridge project located on the NHS with an estimated total project cost of $40 million or more that utilizes FAHP funding;

(3) Any major project located on or off of the NHS that utilizes FAHP funding in any contract or phase comprising the major project;

(4) Any project where a VE analysis has not been conducted and a change is made to the project's scope or design between the final design and the construction letting which results in an increase in the project's total cost exceeding the thresholds as identified in 5a(1) or (2) of this section; and

(5) Any other project FHWA determines to be appropriate that utilizes FAHP funding.

b. In addition to all projects described in paragraph 5a, FHWA encourages State Transportation Agencies (STA) or local public agencies (LPA) to conduct VE analyses on other projects where there is a high potential for cost savings in comparison to the cost of the VE analysis, or the potential exists to improve the projects' performance or quality. Projects involving complex technical issues, challenging project constraints, unique requirements, and competing community and stakeholder objectives offer opportunities for improved value by conducting VE analyses.

c. Any use of FAHP funding on a major project requires that a VE analysis be conducted, regardless of the amount of FAHP funding that may be used on the project. While only one VE analysis is required for a major project, FHWA encourages additional VE analyses be conducted during the planning and design phases. Even if a VE analysis was conducted during the planning or preliminary design of a major project, FHWA encourages conducting an additional VE analysis if the major project is split into individual contracts and their costs meet or exceed the threshold values defined in paragraph 5a of this directive.

d. STAs and LPAs may encounter situations when the design of a project has been completed but the project does not immediately proceed to construction.

(1) A VE analysis is not required if a project's estimated total cost during the planning and design phases was below the threshold for conducting a VE analysis as identified in paragraph 5a of this directive, where a delay occurs when the project advances from design to a construction letting, and the total project cost is above the threshold due to construction cost escalation, updating the project to current design standards, or updating the contract to current specifications (as discussed in the preamble to the final rule establishing the VE regulations (77 FR15250)).

(2) A VE analysis is required if a project's estimated total cost during the planning and design phases was below the threshold for conducting a VE analysis as identified in paragraph 5a of this

directive, where a delay occurs when the project advances from design to a construction letting, and the total cost of the project is above the threshold due to a change in the project's scope or design (as specified in 23 CFR 627.5(b)(4)). A scope or design change results in the project moving back to the design phase, and, since the project is over the threshold identified in paragraph 5a of this directive, a VE analysis is required.

e. Section 1503(a)(3) of MAP-21 added a provision to 23 U.S.C. 106(e)(5) specifying that a VE analysis is not required for design-build projects. This provision supersedes existing provisions in 23 CFR Part 627 stating that a VE analysis is required for design-build projects. The VE regulations will be updated to reflect the provisions of MAP-21. While not required, FHWA encourages conducting a VE analysis during the preliminary design phase of design-build projects if the project meets the requirements described in paragraph 5a of this directive.

f. A VE analysis is required on projects delivered using the Construction Manager/General Contractor (CM/GC) contracting method if the project meets the requirements described in paragraph 5a of this directive.

6. **When should a VE analysis be conducted?**

a. The STA's VE program, policies, and procedures should include a process for the identification of projects requiring a VE analysis contained in the State's multi-year Statewide Transportation Improvement Plan. This list of potential VE analysis projects should be coordinated, managed, and maintained by the STA to ensure all VE analyses are conducted on all applicable projects as defined in paragraph 5 of this directive and to ensure the VE analysis is conducted at the appropriate time in the planning and design phases of the project.

b. 23 CFR 627.5(a) requires that the VE analysis be conducted prior to the completion of final design. While there is no set time to conduct the VE analysis prior to the completion of final design, for maximum benefit, the VE analysis should be conducted as early as reasonable in the planning or design phase of a project. Conducting the VE analysis early in the planning and design phases helps ensure that approved VE recommendations can be incorporated into the plans prior to construction.

c. The VE analysis should be closely coordinated with other project development activities to minimize the impact approved VE recommendations might have on previous agency, community, and environmental commitments or the project's development and construction schedule. For projects involving alignment changes, major right of way purchases, environmental mitigation, major grade changes, or other type

of improvements, it may be appropriate to conduct a VE analysis when project alternatives are being considered and evaluated. For projects that do not contain major, complex issues, it may be appropriate to conduct the VE analysis prior to completing the preliminary design. For simple projects, such as pavement rehabilitation projects, it may be appropriate to conduct the VE analysis after completing preliminary design. VE analyses should generally not be completed after 60% final design.

d. For projects utilizing the design-build project delivery method, the STA or LPA is encouraged to conduct a VE analysis prior to the release of the final Request for Proposals (RFP). Generally, for design-build projects, the optimum time to conduct the VE analysis is during the development or evaluation of alternatives in the development of the preliminary design or environmental review of the project. Conducting the VE analysis at this phase of the project will help ensure the most effective and appropriate recommendations are included in the project's preliminary design and the RFPs prior to procuring a design-build contractor.

e. For projects delivered using the CM/GC contracting method, a VE analysis is not required prior to the preparation and release of the RFP for a CM/GC contract. The VE analysis should be completed and approved recommendations incorporated into the project plans prior to requesting a construction price proposal from the CM/GC contractor. Staff from the CM/GC contractor or its subcontractors, such as estimator or construction superintendent, may serve as a member of the multidiscipline VE team as long as their participation does not create a conflict of interest.

7. **What actions should an STA and LPA take to ensure qualified individuals are available to serve on VE analyses teams?** A multidisciplinary team is composed of individuals who are not directly involved in the planning or design of the project, with at least one individual who has the training and experience required to lead the VE analysis (as specified in 23 CFR 627.9(d)(1)). There are several actions, practices, and methods an STA or LPA may take in order to ensure they have qualified and experienced VE team members and team leaders available to serve on VE analyses teams. These actions may include training efforts to ensure staff are prepared and available to serve on VE teams. These actions may also include the use of consultants to serve as team leader or specialized discipline necessary to ensure an effective team is assembled to conduct the VE analysis.

a. VE Team Leader Qualifications. The individual identified to serve as the lead of a VE analysis should be responsible for ensuring the VE analysis is consistent with the VE Job Plan requirements (as defined in 23 CFR 627.3), incorporating VE recommended practices, tools, and concepts determined to be appropriate based on the conditions unique to the project. These tools and concepts may include:

1) Team building;

2) Innovative technologies and techniques;

3) VE analysis methods and tools (such as evaluation matrix, functional analysis, Function Analysis System Technique (FAST) diagramming);

4) Evaluation and analysis (e.g., cost, safety, operations); and

5) Time management.

b. Because of the specialized skills and experience needed to lead an effective and successful VE analysis, STAs and LPAs should have team leaders experienced with conducting and leading VE analyses (i.e., has participated in several VE analyses as a team member and as a team leader), and has completed specialized VE training or obtained certification such as Certified Value Specialist by SAVE International.

c. VE Team Member Qualifications. STAs, through their VE Program Coordinators, should provide or make available the training or resources to ensure staff and LPAs are prepared and have the capacity needed to participate in or lead VE Teams and analyses. The STA VE programs should identify and support the training, guidance, technical assistance, and other resources that may be needed to ensure the successful completion of VE analyses. The STAs or LPAs may contract for these services, if staff with the necessary qualifications are not available, to serve on or lead the VE analysis.

d. The STAs and LPAs should ensure that the individuals who contribute to or participate on teams responsible for completing VE analysis have an awareness of VE concepts, methods, and practices. The STA VE program should have a plan and the ability to obtain or provide capacity building (e.g., awareness building, training, specialized training), technical assistance, and resources to ensure STA and LPA staff are adequately prepared and have the necessary resources, tools, and assistance needed to successfully conduct VE analyses.

e. The VE Coordinator may be able to include the requirement to obtain an independent technical expert to conduct VE analyses as a part of a consultant service contract, obtain VE technical assistance and training through an on-call contract, and procure the VE-specific services or training the STA staff may not be positioned to support. Additionally, the VE Coordinator should have the resources and ability to obtain

recommended VE training that may be available from SAVE International, the National Highway Institute (NHI) or other industry sources.

f. The STA VE Coordinator should maintain a list of STA VE trained staff to ensure the necessary staff resources are available to meet future VE training, technical assistance, and project-specific needs for conducting VE analyses.

8. **What are the STA responsibilities?** While the scope of the VE programs will vary based on the size of the highway programs and number of VE analyses that are conducted, each STA is required to comply with the VE program responsibilities specified in 23 CFR Part 627. The following guidance further clarifies these responsibilities:

a. The person identified to serve as the VE program coordinator should be knowledgeable of recommended industry practices in conducting VE analyses, have the capabilities to lead or conduct a VE analysis, and have the responsibility and resources to coordinate, manage, and monitor the VE program.

b. The STA should ensure individuals are available who are capable and have the resources to successfully lead, conduct, and participate in VE analyses. The STA and VE program coordinator should have the ability to procure or provide the necessary training and resources necessary to ensure project managers, Office Managers, team members, and VE Team Leaders understand the VE process and their roles and responsibilities within the VE program.

c. The VE program should include the documented policy, procedures, and resources to develop and maintain an annual list of projects which require VE analyses and other projects where VE analyses are encouraged.

d. The VE program should include the documented policies, procedures, and resources necessary to ensure all planning and coordination activities are completed and the necessary resources are available for the VE team prior to the beginning of the scheduled VE analysis. These activities may include but are not limited to:

(1) Coordinating with the project manager to identify the appropriate time to conduct the VE analysis in order to limit project schedule impacts while considering other project commitments and constraints;

(2) Coordinating with the project manager to ensure the appropriate disciplines are identified and included as members or resources of the VE team;

(3) Working with STA Office Managers to ensure qualified individuals are selected to serve on the VE team;

(4) Identifying and selecting a qualified and experienced VE Team Leader to lead the VE analysis;

(5) Ensuring the team has the necessary understanding of the VE process so the team is prepared and ready to conduct an effective VE analysis—this may require providing additional technical assistance, training, or one-on-one instruction;

(6) Scheduling the location of the VE analysis and ensuring the space is adequate and materials, supplies, and resources are available to the team during the VE analysis;

(7) Ensuring the appropriate project documents are available for the team at the start of the VE analysis;

(8) Ensuring the project manager is available to present the project to the VE team at the start of the VE analysis and is available as a resource throughout the duration of the VE analysis;

(9) Scheduling the VE analysis presentation; and

(10) Documenting pre-planning activities in a pre-planning package to ensure all activities are planned and scheduled.

e. The VE program shall include documented policies and procedures to ensure VE recommendations are acted upon in a timely manner resulting in the highest probability for acceptance and implementation into the project's design plans, specifications, and estimates (as specified in 23 CFR 627.7). These activities include the timely review, final disposition, documentation, and implementation of the VE analysis recommendations.

f. The VE program shall include documented policies and procedures to ensure approved recommendations are incorporated into the project's plans, specifications, and estimate prior to construction authorization (as specified in 23 CFR 627.7(b)).

g. The VE program shall ensure STA policies and procedures include provisions to verify that all required VE analyses are conducted and all approved VE recommendations are implemented into projects administered by an LPAs (as specified in 23 CFR 627.7(b) and 627.7(a)(5)).

h. The VE program should include requirements for VE Program Coordinators to conduct periodic program reviews to ensure the STA VE program is following their policies and procedures, meets Federal regulations, and is carried out in an efficient and effective manner, which includes identifying, documenting, reporting, and implementing VE program improvements.

9. **What are the FHWA responsibilities?**

a. **Federal-aid Division Offices.**

(1) Ensure that copies of this directive are provided to the STA and subsequently to LPAs;

(2) Designate and develop roles and responsibilities for a Division Office VE Coordinator;

(3) Encourage STAs to develop a plan to facilitate the delivery of training that may be needed to support conducting VE analyses for specific projects or to develop the agency's capacity to conduct VE analyses;

(4) Monitor VE analyses, review VE recommendations, and review other activities of the STA VE programs for compliance with Federal requirements;

(5) Review and ensure the STA maintains and updates their annual list of applicable projects requiring a VE analysis and other projects where a VE analysis is encouraged;

(6) Ensure STA policies and procedures include provisions to verify that all required VE analyses are conducted and all approved VE recommendations are implemented into projects administered by LPAs;

(7) Encourage STAs to include a Value Engineering Change Proposal (VECP) clause (as defined in 23 CFR 627.3) in their construction contracts;

(8) Integrate the STA's VE controlling documents (i.e., policies and procedures), key coordination activities, and approval actions into the Division and STA's Stewardship and Oversight Agreement;

(9) Integrate VE into the Division's annual risk assessment process and development of their Annual Work Plan;

(10) Encourage STAs to conduct periodic VE program reviews to ensure the STA VE program is following their policies and procedures, meets Federal regulations, and is carried out in an efficient and effective manner—this includes identifying, documenting, reporting, and implementing VE program improvements; and

(11) Review, assess, and report on the STA's VE program accomplishments and VE studies conducted annually, and provide this information to the FHWA VE Program Manager as specified in paragraph 10 of this directive.

b. **Federal Lands Highway Divisions.**

(1) Follow the VE guidance established in Subsection 2-E of the Federal Lands Highway Manual.

(2) Summarize the Federal Lands Highway Program's VE accomplishments and VE studies conducted annually, and provide this information to the FHWA VE Program Manager as specified in paragraph 10 of this directive.

c. **FHWA VE Program Manager.**

(1) Promotes VE and serves as the technical expert on VE matters for FHWA, STAs, and LPAs;

(2) Provides VE briefings to FHWA, STAs, professional organizations, and other industry stakeholders;

(3) Encourages VE training; sharing of successful practices among FHWA, STAs, and LPAs; and assists FHWA Divisions with advancing the practices of STAs' VE programs;

(4) Coordinates to integrate the consideration of VE analysis with other FHWA activities and initiatives aimed at cost reduction or project performance improvement;

(5) Compiles VE data received from the FHWA Federal-aid and Federal Lands Division Offices and prepares an annual accomplishment report for the United States Department of Transportation (DOT) as specified in paragraph 10 of this directive;

(6) Represents FHWA in VE forums with other Federal and State government agencies and industry organizations; and

(7) Serves as FHWA's representative to the American Association of State Highway and Transportation Officials (AASHTO) VE Technical Committee.

10. What are the reporting procedures?

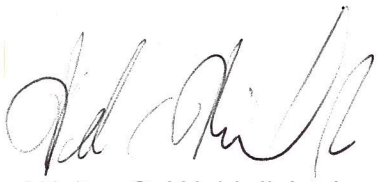
a. The results of all of the VE analyses and VECP that are conducted on projects that use FAHP funding or are administered by the Federal Lands Highway Divisions shall be used to prepare an Annual VE Performance Report. At the end of the fiscal year, the FHWA VE Program Manager will request Federal-aid and Federal Lands Highway Division Offices to compile and submit their annual report on the results of all VE analyses conducted, VECPs implemented, and VE program performance in their State or by their Division. The request will include the information and format required for submitting the VE data to the FHWA VE Program Manager.

b. The FHWA VE Program Manager shall prepare the Annual VE Performance Report including an assessment of the effectiveness of efforts to encourage VE on Federal-aid and Federal Lands Highway projects. The FHWA VE Program Manager will submit the Annual Performance Report to the DOT Acquisition Oversight Division and post results on FHWA's VE Web site.

11. Where can I find additional information?

a. Additional information about this directive and FHWA's VE program is available at http://www.fhwa.dot.gov/ve.

b. STAs and LPAs should first contact their local VE Lead in the FHWA Division Offices. They in turn will contact FHWA's Office of Infrastructure Pre-Construction Team (HIPA-20) for further technical assistance.



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