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|  <p style="text-align: center;"><b>STATE OF ALASKA</b><br/><b>DEPARTMENT OF TRANSPORTATION</b><br/><b>AND PUBLIC FACILITIES</b></p> <p style="text-align: center;"><b>Policy and Procedure</b></p> | POLICY AND PROCEDURE<br>NUMBER<br><b>05.01.030</b>    | PAGE<br><br>1 of 11                  |
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| SUBJECT<br><br><b>Value Engineering Program</b>   |   | SUPERSEDES<br><br><b>05.01.030</b>   |
|   |   | DATED<br><br>April 12, 2013          |
| CHAPTER<br><br><b>Design and Construction</b>   | SECTION<br><br><b>General Design and Construction</b> | APPROVED BY<br><br>Signature on File |

## PURPOSE

This formalizes the policy and procedure (P&P) of the department on a Value Engineering (VE) Program for capital improvement projects in order to maximize the use of limited funds for their construction and operation.

## POLICY

It is the policy of the department to utilize VE techniques in the pre-construction, construction, and operation of selected projects that provide the necessary function, safety, and maintenance of the facility and reduce cost.

1. Every program and activity of the department may use the VE program. The primary emphasis, however, is in the design and construction of selected projects that fall under the Statewide Transportation Improvements Program (STIP). Projects that are solely state funded and meet the criteria for a VE analysis shall be included in the VE program.
2. Conduct all VE activities authorized under this policy in accordance with these procedures.
3. Activities of a similar nature, whether performed by DOT&PF employees or consultants, but not in accordance with this procedure, shall not be referred to as "value engineering."

## PROCEDURE

This procedure establishes the organization, implementation, and evaluation of a program for using recognized techniques of VE in order to reduce costs and to increase quality and function of selected projects or activities.

### A. Definitions

*Bridge Project:* A bridge project shall include any project where the primary purpose is to construct, reconstruct, rehabilitate, resurface, or restore a bridge.

*Design Study Report:* The Design Study Report (DSR) is the formal report that documents the basis for the preferred design alternative being selected.

*Final Design:* Any design activities following preliminary design and expressly includes the preparation of final construction plans and detailed specifications for the performance of construction work.

*Final Plans, Specifications and Estimates (PS&E):* The final plans, specifications, and estimate assembly, with corrections made from the PS&E review, ready for advertisement.

*Function:* The performance feature of a project, item, or activity. Its purpose or what it is designed to do.

*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, utilities, design, and construction), operation, maintenance, modification, replacement, demolition, financing, taxes, disposal, and salvage value as applicable.

*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 the U.S. Department of Transportation as being "Major" as a result of special interest.

*Primary Airport:* A commercial service airport with more than 10,000 annual passenger boardings per 49 USC § 47102(16).

*Project:* A portion of a highway, airport or facility that the department or public authority proposes to construct, reconstruct, or improve as described in the preliminary design report or applicable environmental document. A project is defined as the logical termini in the environmental document and may consist of several contracts, or phases of a project or contract, which are implemented over several years.

*Region/System:* Refers to the Central Region, Northern Region, Southcoast Region, and Alaska Marine Highway System (AMHS).

*Total Project Costs:* The estimated costs of all phases of work to be conducted on a project: design including environmental costs, right-of-way, utilities, and construction.

*Value Engineering (VE) Analysis:* The systematic process of reviewing and assessing a project by a multidisciplinary team not directly involved in the planning

and development phases of a specific project that follows the VE Job Plan and is conducted to provide recommendations for:

1. Providing the needed functions, considering community and environmental commitments, safety, reliability, efficiency, and overall life-cycle cost.
2. Improving the value and quality of the project.
3. Reducing the time to develop and deliver the project.

*Value Engineering (VE) Job Plan:* A systematic and structured action plan for conducting and documenting the results of the VE analysis. While each VE analysis shall address each phase in the VE Job Plan, the level of analysis conducted and effort expended for each phase should be scaled to meet the needs of each individual project. The VE Job Plan shall include and document the following seven phases:

1. *Information Phase* - gather project information including project commitments and constraints.
2. *Function Analysis Phase* - analyze the project to understand the required functions.
3. *Creative Phase* - generate ideas on ways to accomplish the required functions which improve the project's performance, enhance its quality, and lower project costs.
4. *Evaluation Phase* - evaluate and select feasible ideas for development.
5. *Development Phase* - develop the selected alternatives into fully supported recommendations.
6. *Presentation Phase* - present the VE recommendations to the project stakeholders.
7. *Resolution Phase* – evaluate, resolve, document and implement all approved recommendations.

*Value Engineering Change Proposal (VECP):* A construction contract change proposal submitted by the construction contractor based on a VECP provision in the contract. These proposals may improve the project's performance, value and/or quality, lower construction costs, or shorten the delivery time, while considering their impacts on the project's overall life-cycle cost and other applicable factors.

## **B. Organization**

1. The **State Value Engineer** will be appointed by the Chief Engineer for the Statewide Design and Engineering Services (D&ES) Division, and will:
  - a. Develop and implement statewide VE policy and procedures
  - b. Coordinate VE training
  - c. Maintain the statewide VE program files
  - d. Monitor, evaluate, and report on the VE activities of the department
2. The **VE Coordinators** will be appointed by the Regional Preconstruction Engineers for the Central Region, Northern Region, and Southcoast Region; and by the Director of the AMHS for the Alaska Marine Highway System. The VE Coordinator will:
  - a. Develop guidelines or desk manuals, as necessary, to supplement these procedures for their respective division.
  - b. Establish the Annual VE Analysis Schedule for projects to be considered for analysis, utilizing the criteria given under Section C (FHWA or FTA applicable projects), Section D (FAA Projects).
  - c. Coordinate with project manager or design engineer to establish a VE team leader and study team for each VE analysis.
  - d. Ensure each analysis is conducted in accordance with the approved VE analysis procedure under Section F (Conducting VE Analysis).
  - e. Maintain records of each VE analysis conducted and each VECP received.
  - f. Monitor projects after the VE analysis and report on the implementation of approved VE recommendations.

## **C. Federal Highways Administration (FHWA) or Federal Transit Administration (FTA) applicable projects**

1. A VE analysis shall be conducted prior to the completion of final design on each applicable project that utilizes federal-aid highway or transit funding, or is solely state-funded, and all approved recommendations shall be included in the project's plans, specifications and estimates.
2. VE studies should be considered for those projects in the department's STIP with a total project cost falling below the thresholds for applicable projects identified below, but that will likely show substantial benefits from the application of VE principles. In general, these will be high cost, complex projects or projects with budgetary problems. As a minimum, all projects with a total project cost exceeding \$40 million will be considered. Reasons for a non-selection of projects

which meet selection criteria, but are not selected, shall be documented in the Design Study Report.

3. Applicable projects shall include the following:
  - a. Each project located on the National Highway System (NHS) where the total project cost is \$50 million or more that utilizes federal-aid highway or transit funding.
  - b. Each bridge project located on the NHS where the total project cost is \$40 million or more that utilizes federal-aid highway or transit funding.
  - c. Any Major project on or off the NHS that utilizes federal-aid highway or transit funding in any contract or phase comprising the Major project.
  - d. Any project for which a VE analysis has not been conducted and a change is made to the project's scope or design between the final design and advertise which results in an increase in the project's total cost that exceeds the thresholds as identified in Subsection C.3.
  - e. Any other federal-aid project the funding agency determines to be appropriate.
4. An additional VE analysis is not required if, after conducting the VE analysis required under Subsection C.3, the project is subsequently split into small projects in the design phase or if the project is programmed to be completed by advertising multiple construction projects. However, the department may not avoid the requirement to conduct a VE analysis on an applicable project by splitting the project into smaller projects, or multiple construction projects.
5. VE analysis is required for Construction Management/General Contractor (CM/GC) projects meeting thresholds for applicable projects (Subsection C.3).
6. Design-Build projects do not require a VE analysis.
7. The FHWA or FTA may require a VE analysis, if the department or public agency encounters instances when the design of a project is complete, but the project does not immediately proceed to construction.
  - a. If a project that met the criteria identified in Section C encounters a three year delay or longer in advancing to advertise for construction, and a substantial change to the project's scope or design is identified when the required re-evaluation of the design study report or the environmental document is performed, the FHWA or FTA may encourage or require a new VE analysis or an update to the previously completed VE analysis.
  - b. If a project's total project cost is initially below the criteria identified in Subsection C.3 but the project advances to advertise for construction, and a substantial change to the project's scope or design is the basis for an

increase in the total project cost above the thresholds for applicable projects identified in Subsection C.3, then when the required re-evaluation of the environmental document is performed, the FHWA or FTA requires a VE analysis.

- c. When the design of a project is complete, but the project does not immediately proceed to construction, the requirement to conduct a VE analysis is considered to be satisfied, or not necessary, if:
  - (1) A project met the criteria identified in Section C and had a VE analysis conducted, and the project advances to advertise for construction without needing any substantial changes in its scope or its design; or
  - (2) A project's total project cost is initially below the criteria identified in Subsection C.3, but when advancing to advertise for construction, total project cost rises above the thresholds for applicable projects due to inflation, standard escalation of costs, or minor modifications to the project's design or contract.

#### **D. Federal Aviation Administration (FAA) Projects**

1. **Required VE analysis:** VE analysis is required for new primary airports. In addition, FAA has the option to require the department to use value engineering for unusually complex projects of greater than average costs (or require cost-benefit studies, present worth analysis, the study of alternatives, tactical planning, or other forms of technical evaluation). The department may elect to conduct VE analyses on projects not otherwise required by FAA during planning, project formulation, or construction design.
2. **VE analysis procedures:** Value engineering must follow the requirements of the current version of Advisory Circular 150/5300-15, *Use of Value Engineering for Engineering and Design of Airport Grant Projects*. In addition, the FAA Regional Office must have concurred in writing on the scope of the value engineering contract prior to the VE work commencing. FAA cautions significant advance preparation may be needed for value engineering work.

#### **E. Value Engineering Program**

1. The department shall establish and sustain a VE program under which VE analyses are conducted for all applicable projects. The department's VE program shall:
  - a. Establish and document VE program policies and procedures that ensure the required VE analysis is conducted on all applicable projects, and encourage conducting VE analysis on other projects that have the potential to benefit from this analysis.

- b. Ensure the VE analysis is conducted and all approved recommendations are implemented and documented in a final VE report prior to the project being authorized to proceed to advertise for construction.
  - c. Monitor and assess the VE program, and disseminate an annual report to the FHWA consisting of a summary of all approved recommendations implemented on applicable projects requiring a VE analysis, the accepted VECPs, and VE program functions and activities.
  - d. Establish and document policies, procedures, and contract provisions that identify the analysis, documentation, basis, and process for evaluating and accepting a VECP; and determine how the net savings of each VECP may be shared between the department or local agency and contractor.
  - e. Establish and document policies, procedures, and controls to ensure a VE analysis is conducted and all approved recommendations are implemented for all applicable projects administered by local public agencies; and ensure the results of these analyses are included in the VE program monitoring and reporting.
  - f. Provide for the review of any project where a delay occurs between when the final plans are completed and the project advances to advertise for construction to determine if a change has occurred to the project's scope or design where a VE analysis would be required to be conducted as required in Section C.
2. The department shall ensure the required VE analysis has been performed on each applicable project including those administered by sub-recipients, and shall ensure approved recommendations are implemented into the project's plans, specifications, and estimate.

## **F. Conducting VE Analysis**

1. A VE analysis should be conducted as early as practicable in the planning or development of a project, preferably before the completion of the project's preliminary design. At a minimum, the VE analysis shall be conducted prior to completing the project's final PS&E.
2. The VE analysis should be closely coordinated with other project development activities to minimize the impact of approved recommendations might have on previous agency, community, or environmental commitments; the project's scope; and the use of innovative technologies, materials, methods, plans or construction provisions.
3. For projects utilizing alternative project delivery methods:
  - a. Design-Build method: VE analysis is not required. However, if the department elects to conduct a VE analysis on a project utilizing the design-build project delivery method, the VE analysis should be performed

prior to the release of the final Request for Proposal or other applicable solicitation documents.

- b. Construction Management/General Contractor method: VE analysis is not required prior to release of the RFP for the CM/GC contractor. The VE analysis is required to be completed and approved recommendations incorporated prior to requesting a construction price proposal from the CM/GC contractor.
4. The department shall ensure the VE analysis meets the following requirements:
    - a. Use a multidisciplinary team not directly involved in the planning or design of the project, with at least one individual who has the training and experience with leading a VE analysis.
    - b. Develop and implement the VE Job Plan.
    - c. Produce a formal written report outlining, at a minimum:
      - (1) Project information.
      - (2) Identification of the VE analysis team.
      - (3) Total project cost. This is the estimated cost before the VE analysis begins and before any VE elements are incorporated into the project. Include the total project cost and break out all individual project phases.
      - (4) Background and supporting documentation, such as information obtained from other analysis conducted on the project (e.g., environmental, safety, traffic operations, and constructability).
      - (5) Documentation of the stages of the VE Job Plan which would include documentation of the life-cycle costs that were analyzed.
      - (6) Summarization of the analysis conducted.
      - (7) Documentation of the proposed recommendations and approvals received at the time the report is finalized. Include in the project VE report:
        - a. Description and estimated value of individual proposed VE recommendations,
        - b. The number of proposed VE recommendations,
        - c. The sum value of all proposed VE recommendations,
        - d. The number of approved VE recommendations, and
        - e. The sum value of all approved VE recommendations.
      - (8) The formal written report shall be retained for at least 3 years after the completion of the project.
  5. For bridge projects, in addition to the requirements in Subsection F.4, the VE analysis shall:

- a. Include bridge substructure and superstructure requirements that consider alternative construction materials.
  - b. Be conducted based on:
    - (1) An engineering and economic assessment, taking into consideration acceptable designs for bridges.
    - (2) An analysis of life-cycle costs and duration of project construction.
6. The department and local public agencies may employ qualified consultants to conduct a VE analysis. The consultant shall possess the training and experience required to lead the VE analysis. A consulting firm or individual shall not be used to conduct or support a VE analysis if they have a conflict of interest.

#### **G. VECs**

1. The department and local public agencies are encouraged to use the VEC clause in an applicable project's contract, allowing the construction contractor to propose changes to the project's plans, specifications, or other contract documents. Whenever VECs are submitted by the contractor, the department and local authority will consider changes that could improve the project's performance, value and quality, shorten the delivery time, or lower construction costs, while considering impacts on the project's overall life-cycle cost and other applicable factors. The basis for the department or local authority to consider a VEC is the analysis and documentation supporting the proposed benefits that would result from implementing the proposed change in the project's contract or project plans.
2. Proposals to accelerate construction after the award of the contract will not be considered a VEC and will not be eligible for federal-aid highway program funding participation. Where it is necessary to accelerate construction, use the appropriate incentive or disincentive clauses so that all proposers will take this into account when preparing their bids or price proposals.
3. The project engineer shall report to the Regional VE Coordinator the number and value of VECs received and the number and value of VECs approved. The value of approved VECs shall be reported.

#### **H. Review, Implementation and Verification**

1. The VE Coordinator will ensure the expedited review of all VE analysis and will facilitate the decision and implementation mechanism whenever possible.
2. The project engineer will monitor the implementation of all approved VE recommendations and report back to the VE Coordinator.

3. Where feasible, actual savings or other value improvements will be checked against those estimated during the VE analysis.

## **I. Reports**

1. Each VE Coordinator will provide the State Value Engineer:
  - a. A copy of the region/system VE guidelines and all changes.
  - b. A copy of the region/system Annual VE Analysis Schedule (due October 1<sup>st</sup>).
  - c. Copies of all VE analysis reports (due 15 days after the analysis).
  - d. An annual report for each federal fiscal year which summarizes the activities, achievements, problems, and costs of the VE program (due on October 15<sup>th</sup>). The report will summarize all VE analyses conducted and the number and value of recommendations that were proposed and approved on a summary report form provided by State Value Engineer. Document other benefits in addition to costs savings, if any, to the public, the users, or the department.
2. The State Value Engineer will prepare an annual report to the Chief Engineer, Statewide Design & Engineering Services Division summarizing the activities, achievements, and problems of the statewide program (due on November 1<sup>st</sup>).

## **J. Training**

1. The 40-hour FHWA/NHI Value Engineering Workshop or its equivalent will be offered from time to time to department employees. As an alternative, a two or three-day VE course, approved by the State Value Engineer, may be submitted when it is determined that the 40-hour workshop is unavailable or not appropriate.
2. One or two positions on each team should be available for untrained individuals, for on-the-job training.
3. A team-leader training course will be offered as deemed necessary to develop a roster of in-house VE team leaders.

## **AUTHORITY**

U.S. DOT Order 1395.1  
23 USC 106(e)(2) and (3)  
23 CFR Part 627  
23 USC 101(a)(23)  
48 CFR Parts 48 and 52

## **IMPLEMENTATION RESPONSIBILITY**

Statewide D&ES Division Chief Engineer, Regional Preconstruction Engineers, and the Director of the Alaska Marine Highway System

## **DISTRIBUTION**

All department employees via the DOT&PF website