Oversight Procedure 30 – Value Engineering and/or Constructability Review

1.0 PURPOSE

The purpose of this Oversight Procedure is to describe the review, analysis and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects the Project Management Oversight Contractor (PMOC) with regards to the completeness and reliability of the results of the Project Sponsor's Value Engineering (VE) and/or Constructability Review (CR) programs; and to assess the respective program's usefulness as a management tool for controlling project costs and improving the overall value of the FTA's investment in the project.

2.0 BACKGROUND

2.1 VALUE ENGINEERING

The value methodology is a systematic process that follows the Job Plan[1]. A value methodology is applied by a multidisciplinary team to improve the value of a project through the analysis of functions.

A Value Study is the formal application of a value methodology to a project in order to improve its value. This application is also referred to as value engineering, value analysis, value planning, or value management.

(1) Applicability:

a) Major Capital Projects. VE must be used on major capital projects. A major capital project is usually identified early in the grant application process. FTA guidance requires VE on all projects unless an approved waiver is obtained by FTA.
b) Non-Major Capital Projects. Project Sponsors are encouraged to conduct VE on all construction projects including but not limited to bus maintenance and storage facilities, intermodal facilities, transfer facilities, revenue railcar acquisition and rehabilitation, and offices, with the level of VE study to be commensurate with the size of the project.

(2) Timing:

VE on a project should be performed early in the design process before major decisions have been completely incorporated into the design. This could be as early as FTA's evaluation of the project's entry to project development (PD) or near the end of project development (PD) and prior to a project's Entry to Engineering. For Design-Build projects, the VE should be conducted prior to completion and release of the Request for Proposal (RFP).

Some large or complex projects, generally with costs surpassing $500 million, may need to conduct two VE studies, one prior to entry into engineering and a second at approximately 60

[1] For a discussion of the Job Plan see Appendix B.

percent design. Project Sponsors should make this determination early in the project's life-cycle and clearly document the VE plan and timing in the PMP.

(3) Reporting:

Project Sponsors with major capital projects are required to submit a VE report to the appropriate FTA Regional Office at the end of each Federal fiscal year (FY) (October 1) indicating the results of their VE efforts. Copies of the VE report form are available in each Regional Office. **Note: This requirement is independent of the recommendations and guidance contained in the Oversight Procedure.**

(4) Expected Results:

Well conducted VE studies should generally return $20 dollars in savings for every $1 invested in the study. Many studies will realize higher ratios and some will be less. Greater savings are possible during Planning, Conceptual Design and Project Development because the potential to implement planning-level design changes is possible without affecting the schedule. Ideally, these changes would occur prior to Entry into Engineering.

(5) Other Applications

VE may also be required in cases where the project is found to exceed budget prior to award of a Full Funding Grant Agreement (FFGA); a Small Starts Grant Agreement (SSGA); at 100 percent design; or after the receipt of bids. In these cases, the intent of the VE is to reduce cost to the point of affordability. The PMOC may also be required to review Value Engineering Change Proposals (VECP)[2] initiated by the construction contractor or vehicle supplier. Value Engineering proposals may also take the form of Alternative Technical Concepts (ATCs) submitted (if allowed) by design-build teams during the proposal process. If ATCs are permitted by the procurement process, they are normally evaluated by the Project Sponsor's staff and consultants and the Project Sponsor normally has no obligation to accept any ATC.

2.2 CONSTRUCTABILITY REVIEWS

A Constructability Review (CR) is a structured review of the project and design documents to ensure that construction of the project is feasible and that the design as represented in the plans and specifications or bridging documents[3] is biddable and constructible in a safe manner.

(1) Applicability:

a) Major Capital Projects. Constructability Reviews are encouraged on major capital projects. A major capital project is usually identified early in the grant application process.

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[2]VECPs involve recommendations made by the construction contractor for saving cost after the award of their contract. Generally, the cost savings are split on a 50:50 basis between the owner and the construction contractor. Specific language must be included in construction or procurement contracts to incorporate the VECP process and define the sharing of any resultant savings.

[3]Bridging documents are those materials (plans, performance requirements, specifications, etc.) prepared by the Project Sponsor (or one or more consultants retained by the Sponsor) to guide the design-build contractors in the preparation of their design-build proposals. The objective of the bridging documents is to accurately communicate the Sponsor's (including relevant third-parties) responsibilities and expectations to the prospective design-build contractors so that parties' objectives are well aligned.

b) Non-Major Capital Projects. Project Sponsors are encouraged to conduct CR on all substantial construction projects including but not limited to bus or rail maintenance and storage facilities, intermodal facilities, transfer facilities, and offices, with the extent of the CR to be commensurate with the size and complexity of the project.

c) Projects Using Alternative Delivery Methods. Project Sponsors are strongly encouraged to conduct a CR for any project that is being considered for use of an alternate delivery method or for any contract that is being considered for an alternate delivery method. Alternate delivery methods are those other than competitive low-bid and may include design-build, construction manager/general contractor (CM/GC) or construction manager at risk (CMAR); design-build-operate and maintain (DBOM); or Public Private Partnership (P3).

(2) Timing:

A CR conducted early in the project development cycle should focus on (a) site constraints; (b) schedule constraints; and (c) resource constraints. Site constraints include the presence of existing underground and overhead utilities, access, availability of lay down and storage areas, availability of utility services and height or clearance restrictions. Schedule constraints include time of year, weather restrictions, seasonal environmental restrictions, local construction moratoria, and permissible work hours. CRs conducted prior to the advertisement of a project or contract for bids or proposals focus on whether the project or contract is biddable and whether the contract documents are complete, clear and unambiguous.

CR on a project should be performed relatively early in the design process before design concepts are fixed and while there is still an opportunity to influence factors such as location, access, etc. This may near the end of project development (PD) and prior to a project's Entry to Engineering. For Alternate Delivery projects or contracts such as Design-Build, the CR should be conducted before the Request for Proposal (RFP) is finalized and released. In design-build procurement that uses a Request for Qualifications (RFQ) process to pre-qualify design-build teams, it may be advantageous to perform the CR after qualifications have been received and evaluated but before the RFP is completed.

(3) Expected Results:

An effective CR early in the project development process may identify situations where conditions restrict access, limit the use of certain construction techniques or equipment, or result in unsafe working conditions. Late stage CRs will point out gaps or inconsistencies in the contract and design documents or missing information that, if not corrected, might cause contractors to prepare inaccurate bids with excessive contingency. In all cases, a CR should identify risks specifically associated with the constructability of the project or contract. Among the risks that should be considered are unusually complex or "signature" structures incorporating expensive materials, glazing or coating systems that may be costly to construct and/or mantain. As in the case of VE reviews, greater benefits accrue early in the project development process by avoiding changes during later stages of design or potential construction change orders.

(4) Other Applications:

A CR may also be indicated in situations where a project or contract package is met with resistance in the marketplace as evidenced by no bids or proposals, or extremely high bids or proposals. In these cases, the Project Sponsor is well advised to conduct de-briefings of the contractors to determine the probable cause before proceeding with additional actions such as re-

scoping or re-design. Re-bidding a job will result in delays in all cases; an alternative approach is to advertise the pre-final design documents for industry review in an effort to avoid an unsatisfactory procurement outcome.

3.0 OBJECTIVE

The objective of this review is to provide the FTA with the PMOC's professional opinions regarding the overall effectiveness of the Project Sponsor's Value Engineering or Constructability Review programs. Value Engineering is a required activity for Major Capital Projects. VE workshops are expected to identify alternative approaches to meeting project requirements that result in capital and/or operating cost savings to the project sponsor. Constructability Reviews are designed to avoid problems and resulting cost increases resulting from inadequate consideration of factors likely to affect a contractor's ability to efficiently construct a project, or problems inherent to the Project Sponsor's plans, specifications and contract documents.

4.0 REFERENCES

The PMOC should be familiar with the statutes, regulations, policies, guidance documents and circulars listed in OP 01. These are the principal, but by no means the only, references to Federal legislation, regulation and guidance that apply to the project work being reviewed under this OP.

Value Engineering Reviews Only - The PMOC should refer to SAVE International Value Standard, 2007 or current Edition and the material describing the VE process contained in Appendix B.

5.0 PROJECT SPONSOR SUBMITTALS

The PMOC shall obtain the following from the Project Sponsor in advance of performing the review.

5.1 VALUE ENGINEERING

Prior to conduct of the VE Workshop, the PMOC shall obtain the following from the Project Sponsor:

- Value Engineering work plan including proposed list of participants/disciplines and estimated labor hours for the analysis; and
- Orientation Memoranda including logistics, assumptions, any scope limitations applicable to the study, cost models if used and materials, e.g., plans, specifications, materials list, and cost estimates to be reviewed by participants prior to the study.

Following completion of the VE workshop, the PMOC shall obtain the following from the Project Sponsor:

- Draft VE Report, including all VE recommendations;
- Final VE Report, including the disposition of the VE recommendations; and
- Documentation that adopted VE recommendations have been incorporated/implemented.

5.2 CONSTRUCTABILITY REVIEW

Prior to conduct of the CR Workshop, the PMOC shall obtain the following from the Project Sponsor:

- Constructability Review work plan including scope of the review, preliminary schedule, list of participants/disciplines and estimated labor hours for the analysis; and
- Orientation Memoranda including logistics and schedule; scope of the review; limitations, if any; project delivery or project execution plan; and descriptions, plans, specifications, material lists and cost estimates or other materials provided to participants for advance study.

Following completion of the Constructability Review, the PMOC shall obtain the following from the Project Sponsor:

- Draft Constructability Review Report with recommendations;
- Final Constructability Review Report, including the disposition of the Constructability recommendations; and
- Documentation that adopted recommendations have been incorporated and/or implemented in the project plans or contract documents.

6.0 SCOPE OF WORK

6.1 GENERAL REQUIREMENTS

The scope of work for the PMOC will be similar for either a Value Engineering Review or a Constructability Review and will generally require the PMOC to do the following:

- Obtain copies of the Project Sponsor's documents for review in advance of the planned activities.
- Review the VE or CR work plan to determine if the plan is complete, meets the relevant standards and if implemented as planned, is likely to produce the intended results and be beneficial to the Sponsor's team and project.
- Prepare and submit a report to FTA summarizing the work plan review including observations, comments and recommendations for improvement. Provide a copy of the report to the Project Sponsor if directed by FTA.
- If authorized by FTA, attend the Sponsor's VE or CR workshop. Active participation by the PMOC (as distinguished from attendance and observation) is encouraged only in those areas where the PMOC's knowledge and experience with relevant federal processes would be beneficial to the participants. The PMOC should use discretion and good judgment when offering professional opinions on other topics being discussed.
- Prepare and submit a Trip Report to FTA summarizing the PMOC's workshop attendance including observations and comments. Provide summaries of significant findings or conclusions and identify planned follow-on activities.
- Obtain copies of interim and final VE or CR reports and associated documentation. Review the reports and provide comments to FTA regarding the adequacy and completeness of the reports, including the PMOC's professional opinions regarding the

appropriateness of the workshop recommendations and the disposition of the recommendations.

- Follow-up with the Project Sponsor on the implementation of workshop recommendations as part of the PMOC's routine monitoring of project activities and include the relevant information as part of regular project monitoring reports.

6.2 VALUE ENGINEERING

6.2.1 Evaluation Criteria

The PMOC shall consider the following in assessing the effectiveness of the Project Sponsor's VE activities:

- That the VE study was conducted in accordance with the VE Job Plan and met the standards for Value Engineering workshops established by SAVE International (See Appendix B).
- That the design information supplied was sufficient to conduct the VE study, including:
    a. A complete cost estimate following the SCC elements corresponding to the plan set reviewed
    b. Design memoranda for key disciplines are available
    c. Design Criteria
    d. Conceptual (10%), 30, or 60 percent completed plan set
    e. Draft specifications
    f. Final Environmental Document (EIS/EA/CE) and applicable decision documents (ROD/FONSI)
    g. Milestone schedule
- The team is multidiscipline, independent from the project team and qualified to conduct the study.
- That the VE team leader is a Certified Value Specialist certified by SAVE International.
- The VE Job Plan endorsed by SAVE International has been followed.
- The Final VE Report includes the "disposition" of each VE recommendation.
- Decisions to reject VE proposals were based on reasonable criteria.
- That accepted VE proposals have been incorporated into the revised plan set and processed through the Project Sponsor's Configuration Control Board (or equivalent organization).

Under some circumstances, VE may be less formal and not strictly follow SAVE protocols, such as: 1) cost reduction efforts for specific elements of a project (e.g. high ROW costs); 2) for very small projects; or 3) for the preparation of VECPs by the construction contractor.

6.2.2 Implications of Alternate Delivery Methods on Value Engineering

Project Sponsors are increasingly using alternative project delivery methods such as Design-Build, Construction Manager/General Contractor (CM/GC), Construction Manager at Risk (CMAR), and Public Private Partnership (P3) instead of the traditional Design-Bid-Build (DBB)

approach. If an alternate delivery method is chosen, the approach to VE would be the same as for a traditional D-B-B project up until Entry into Engineering or early in the Engineering phase. The specific timing of the VE activity will vary somewhat depending on the delivery method selected and the associated schedule for implementation, i.e., VE could be done near the completion of Project Development or early in Engineering by the Project Sponsor. After a design-build contract is advertised, VE will also be performed by the prospective bidders when competing for the project and during actual construction, assuming that a VECP provision is included in the contract documents. The PMOC would not have oversight responsibility during the bidding phase, but may be required to evaluate the contractor's VECP documentation. Evaluation of contractor-initiated VE or VECP efforts would typically be performed by the Project Sponsor's internal staff and not by persons accredited by SAVE International, which is appropriate.

6.3 CONSTRUCTABILITY REVIEW

6.3.1 Evaluation Criteria

The PMOC shall consider the following in assessing the effectiveness of the Project Sponsor's Constructability Review activities.

- That the information supplied to the CR team was sufficiently complete and up-to-date to conduct the study, including:
    a. Documentation related to the Project Sponsor's selection of project delivery methods and contract packaging and any owner furnished materials
    b. One or more plan sets representing the current level of project development (conceptual, 30%, 60%, 95%, etc.)
    c. A complete cost estimate for the project or contract(s) being reviewed in native format; the estimate should also be keyed to FTA's SCC
    d. Master project schedule in sufficient detail to show the relationship between the various construction contracts or packages, contract durations including procurement activities, and major project milestones such as completion of NEPA, FFGA, right-of-way acquisition, etc.
    e. Draft contract provisions and technical specifications
    f. Draft or Final Environmental Document (EIS/EA/CE) and FTA Decision Document
- The CR team is multidiscipline, independent from the project team and qualified to conduct the study.
- That the team leader has the experience and qualifications to conduct the review.
- The Constructability Review Plan has been followed.
- The Final Constructability Review Report includes the "disposition" of each of the Constructability Review recommendations.
- That the "disposition" of the Constructability Review recommendations is reasonable and based on sound criteria.
- That the accepted recommendations have been incorporated into the Sponsor's Project Delivery Plan and the appropriate plans and other contract documents, and that these

materials have been processed through the Project Sponsor's Configuration Control Board (or equivalent organization).

6.3.2 CR Staffing

Staffing for a Constructability Review will depend on whether the scope is an entire project, a single contract or multiple contract packages. The team should be multidisciplinary including staff experienced in the construction or procurement of those SCC elements (10 through 80) that have the greatest effect on cost, operability and risk. For a fixed guideway project, these will generally include:

- CR Team Leader
- Construction Manager
- General Civil Engineer
- Structural Engineer
- Systems Engineer
- Specialty construction experts (bridges, tunnels, underground stations, and trackwork, if applicable)
- Station Architect
- Construction Cost Estimator
- Construction Scheduler
- Project Sponsor representatives, including Project Manager, Environmental Manager and Construction Manager
- The team size will vary from five persons for a small project or single contract package, to twelve or more for a complex project of $1 billion or more with multiple contract packages or delivery methods. For these large projects, the team may be divided into two or three sub-teams assigned to individual contract packages.

7.0 REPORT, PRESENTATION, RECONCILIATION

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions, including a description of the review activities undertaken, as well as other supporting information.

After FTA approval, the PMOC may share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile its findings with the Project Sponsor and provide FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may use additional software as required but documentation and report data shall be made available to FTA.

Appendix A
Acceptable Quality Level of PMOC's Performance

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1.	The PMOC shall validate the effectiveness of the Project Sponsor's project VE or CR process.	**R1a.** The PMOC shall develop and document a process for review and analysis of a Project Sponsor's VE or CR program.	NA	**Q1a.** VE process exists and has been followed according to the SAVE International Standard. CR process exists and has been followed.	**M1a.** Evidence of a documented process.	**MM1a.** Periodic review by FTA
		R1b. The PMOC shall use its professional judgment to validate the usefulness of the Project Sponsor's VE or CR program	NA	**Q1b.** Assessment must be made	**M1b.** Documented assessment of the VE or CR program	**MM1b.** Periodic review by FTA
2.	FTA and the PMOC shall have full understanding of the Project Sponsor's VE or CR program including: • Pre-Workshop Activities • Workshop • Post-Workshop Activities • Documented implementation of accepted VE or CR proposals	**R2a.** The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the **Pre-Workshop** activities.	NA	**Q2a.** Professional opinion that the Pre-workshop activities were completed per the SAVE International Standard for VE or per the plan for CR.	**M2a.** Documented evidence of a review by PMOC for completeness of the Pre-Workshop activities.	**MM2a.** Periodic review by FTA
		R2b. The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the **Workshop** activities.	NA	**Q2b.** Same as above for Workshop activities.	**M2b.** Documented evidence of a review by PMOC for completeness of the Workshop activities.	**MM2b.** Periodic review by FTA
		R2c. The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the **Post-Workshop** activities.	NA	**Q2c.** Same as above for Post-Workshop activities.	**M2c.** Documented evidence of a review by PMOC for completeness of the Post-Workshop activities.	**MM2c.** Periodic review by FTA
		R2d. The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the **implementation** of accepted VE or CR proposals. .	NA	**Q2d.** Same as above for VE or CR implementation activities.	**M2d.** Documented evidence of a review by PMOC for appropriateness of the VE or CR implementation activities.	**MM2d.** Periodic review

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
3	The PMOC shall document that VE or CR changes have beneficial impact to the Project Sponsor's overall scope, schedule, and budget in its reports to the FTA.	**R3a.** The PMOC shall clearly identify potential benefits of VE or CR recommendations to the Project Sponsor's program/project based on its professional opinion	NA	**Q3a.** Potential benefits identified by the implementation of accepted VE or CR recommendations are documented.	**M3a.** Identified risks and potential project impacts on safety and security, project scope, cost, and schedule.	**MM3a.** Periodic review by FTA
4	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	**R4a.** The PMOC shall present its findings, conclusions, and recommendations to FTA and reconcile other reports and those recommendations with the Project Sponsor to the extent possible.	NA	**Q4a.** Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	**M4a.** PMOC's findings, conclusions, recommendations, and presentation.	**MM4a.** Periodic review by FTA

Appendix B
SAVE Standards for Value Engineering Workshops

The Standard for conducting VE workshops is provided through guidance published by SAVE International. Federal agencies, including FTA, FHWA, EPA, DOD, DOE etc., base their value programs on the SAVE Standard. The PMOC shall evaluate the Project Sponsor's VE program against the SAVE Standard (the "standard") formally referenced as the *Value Standard and Body of Knowledge,* June 2007 (or the latest edition) SAVE International.

1. Minimum Standards

According to the SAVE Standard, the following conditions must be met in order to represent an acceptable VE Study:

- The Value Study Team follows an organized Job Plan that includes the six phases identified in this standard. Function Analysis, is performed on the project.
- The Value Study Team is a multidisciplinary group of experienced professionals and project stakeholders. Team members are chosen based on their expertise and relevant experience.
- The Value Study Team Leader is trained in value methodology techniques and is qualified to lead a study team using the Job Plan. The SAVE International Certification Board certifies, with the designation Certified Value Specialists (CVS), those individuals who have met specified training requirements and have demonstrated competency in the application of the Job Plan. The Team Facilitator shall be a CVS, or an Associate Value Specialist (AVS) serving under the guidance of a CVS as defined by SAVE Certification criteria, or shall be the holder of another active certification recognized by SAVE International.

2. SAVE Job Plan

2.1 Pre-Workshop Phase

In this phase the Project Sponsor prepares for the VE study. This typically involves obtaining management support for the VE, selecting the appropriate team members, developing the scope of work and objectives for the study, and collecting the required background information for the work. This latter task includes transmittal of the project discipline support memoranda, plan set, draft specifications, project schedule and capital cost estimate. The logistics for the study are defined and distributed to the team. The main deliverable for the Pre-Workshop activities includes an Orientation Memorandum, which will suffice as a work plan for the study.

2.2 Workshop Phase

The workshop includes the six-step process, typically held over five consecutive days, as shown on Figure 1 and described below.

Step 1: Information Phase - The team reviews and defines the current conditions of the project and identifies the goals of the study.

Step 2: Function Analysis Phase - The team defines the project functions using a two-word active verb/measurable noun context. The team reviews and analyzes these functions to determine which need improvement, elimination, or creation to meet the project's goals.

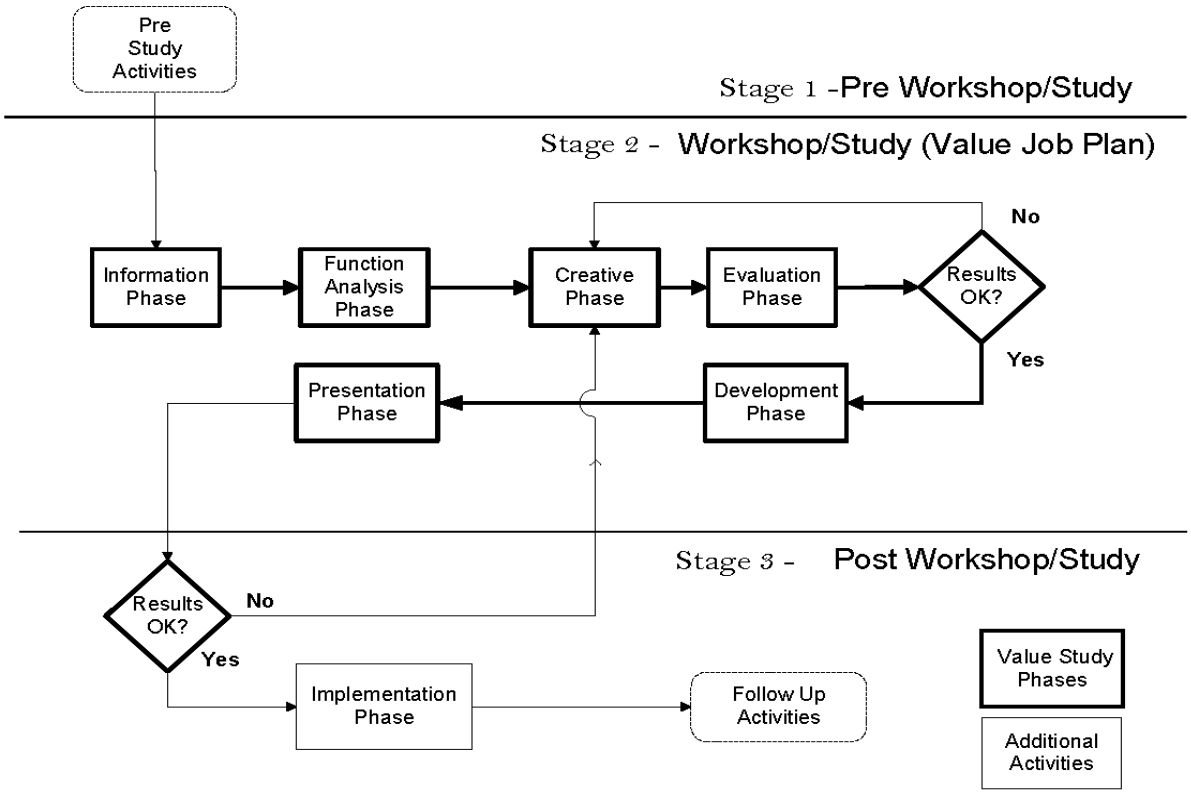
Step 3: Creative Phase - The team employs creative techniques to identify other ways to perform the project's function(s).

Step 4: Evaluation Phase - The team follows a structured evaluation process to select those ideas that offer the potential for value improvement while delivering the project's function(s) and considering performance requirements and resource limits.

Step 5: Development Phase - The team develops the selected ideas into alternatives (or proposals) with a sufficient level of documentation to allow decision makers to determine if the alternative should be implemented.

Step 6: Presentation Phase - The team leader develops a report and/or presentation that documents and conveys the adequacy of the alternative(s) developed by the team and the associated value improvement opportunity.

Figure 1 – Value Study Process Flow Diagram



2.3 Post-Workshop Phase

The purpose of the Post-Workshop activities is to confirm the disposition and benefits of the accepted VE recommendations. The benefits should be documented in a revised cost estimate. This shall be performed through review of the modified plan set and through tracking the changes in the Project Sponsor's Configuration Management process.

2.4 VE Participants

VE workshops should be multidisciplinary including staff representing those SCC elements (10 through 80) that have the greatest effect on cost, operability and risk. For a fixed guideway project, these will generally include:

- Value Engineering Team Leader (CVS)
- General civil engineer
- Track engineer
- Structural engineer
- Traction Power engineer
- Vehicle specialist
- Construction expert
- Station Architect
- Cost estimator
- Owner representatives

The team size will vary from five persons for a small project to fifteen of more for a project of $1 billion and above. For these large projects, the team may be divided into two or three sub-teams; for example: one team covering the civil, architectural and guideway elements; a second team covering the systems elements; and a third team evaluating project risks and mitigation measures. In most instances, the hours estimate for a VE evaluation will range between 300 (small project) to 800 (large project), with some projects exceeding 1,000 hours.