

15.1 General Discussion

On all Federal Highway Administration (FHWA) funded transportation projects, local agencies must submit a report documenting the intended scope of the project and receive approval from MDT or FHWA prior to beginning the preparation of plans, specifications, and estimates (PS&E). For the majority of projects the Project Proposal will serve as the preliminary field review report.

For complex projects a preliminary field review should be considered to determine project-related issues and major design features. The review should be attended by representatives from the local agency, the MDT, the FHWA and focus groups as appropriate. A Preliminary Field Review (PFR) worksheet that summarizes the items to be addressed at the review and a format for the report are provided in the Appendix 15.74.

Local agencies must submit a Scope of Work Report and receive approval from the MDT or FHWA prior to the preparation of final plans, specifications, and estimates (PS&E). The Scope of Work Report identifies the major project issues and objectives, and how they will be addressed in the development of the project. It also includes a discussion of alternatives and the basis for the selection of the alternative that will be utilized. The report also provides an overview of the project's major design features. The project design will proceed as described in the report unless opposition is expressed within the specified comment period. Any disagreement in the scope of the project must be resolved before final approval of the report.

A project's Scope of Work shall not be approved until the project's environmental document has been approved by FHWA, and/or MDT and its public involvement requirements have been met.

When there is a subsequent change to the project design or scope, an amended scope of work approval is required.

15.2 Requirements for Scope of Work Approval

The items listed below are typically required for Scope of Work approval. The list is not all-inclusive nor will all of the areas listed be required on every project. The level of coverage for each item will also vary from project to project. Examples of Scope of Work Reports and assistance in preparing them may be obtained from the MDT CTEP Engineer.

.21 Traffic Data

Design-year ADT, Design Hourly Volume (DHV), percentage of commercial truck traffic, the average daily traffic forecast during the design year should be included. The design year may be any point within 8 to 20 years from the projected completion of construction.

Accident Data. Number and type of crashes. Locations of unexpectedly high numbers of crashes. A brief discussion of why a higher than normal number of crashes may be occurring and proposed countermeasures.

.22 Right-of-Way

Refer to Chapter 10, Right-of-Way Procedures.

Utilities. Summarize the utility conflicts on the project and any potential problems relative to railroads.

.23 Design Speed

Basis for selection of the design speed. If more than one design speed is selected for the project clearly identify the termini for each design speed selected.

.24 Horizontal-Vertical Alignment

A discussion of the proposed horizontal alignment, existing streets, and proposed intersections shall be included. A brief explanation of features that do not meet the project design criteria. Provide only sufficient detail to generally portray the characteristics of the alignment. If there is little change in the vertical alignment note the major features, stopping sight distance and vertical controls. If there is significant change, include a discussion of the existing and recommended vertical alignments. Provide a brief discussion of the need for the changes and the anticipated impacts associated with the changes.

.25 Roadway Section

Provide typical roadway sections for each general type of roadway in the project. This is not required on signal projects if the lane description has been shown.

.26 Pavement Design Criteria

Rationale for selection of the pavement type and depth of surfacing.

Grading. Discuss the grading that will be needed on the project, special excavation (street excavation, muck excavation), the need for large amounts of borrow, special soils requirements, the need for disposal of large amounts of excavated material.

.27 Hydraulics

Provide a brief summary of the proposed treatment for the hydraulic elements on the project. These may include storm drain systems, culvert replacements, irrigation facilities, and designs of facilities within the delineated floodplains.

.28 Traffic

Provide a brief summary of the traffic-related issues and how they will be addressed. The summary should include intersection improvements, turn lanes, auxiliary lanes, parking requirements and any traffic control devices (signals, lighting, signing, pavement markings).

.29 Bike/Pedestrian Features

Briefly summarize the bicycle and pedestrian features that will be incorporated into the project, including bike lanes, sidewalks and ADA accessibility requirements.

.30 Design Exceptions

Identify and briefly summarize any approved design exceptions

.31 Traffic Control

Provide a discussion on the proposed traffic control strategy. This may include the need for detours, road or lane closures, traffic shifts, construction limitations, sequencing issues, etc.

.32 Geotechnical Considerations

Identify geotechnical or subsurface problems and any techniques that will be used to address these concerns.

.33 Cost Estimate

The costs submitted shall be included for the Project Proposal and the Local Agency Agreement shall be used.

.34 Environmental Considerations

Documentation, including impacts to environmental and cultural features, avoidance and mitigation measures, treatment of hazardous waste sites and approval by FHWA.

.35 Public Involvement

Reviewing the above documentation, the local agency will determine whether the design is in conformance with all requirements. Demonstrate that the design is in conformance, the necessary environmental actions (Chapter 9) have been completed and approved by FHWA, and if public involvement requirements have been met

.36 Permits

Refer to Chapter 9, Federal Environmental Process, and Appendix 16.74 for a sample list of permits that may be required.

.37 Bridge Design Policy

The local agency shall coordinate all work with the MDT Bridge Bureau.

15.4 Value Engineering

Value Engineering may be applicable to some projects.

.41 Definition

Value Engineering (VE) is the systematic application of recognized techniques, by multidisciplined team(s). These techniques are:

- Identify a product's function or service;
- Establish a function's monetary value or worth;
- Provide alternate ways, using creative techniques, to reliably accomplish necessary functions in the most effective and efficient manner.

Reducing the scope of a project, compromising the performance of an element, or simply substituting cheaper materials is not VE. VE is not just "good engineering." It simply answers the question, "What else will accomplish the purpose of the product, service, or process we are studying?" All costs are taken into account over the entire life of the project.

.42 Authority for VE

Paragraph 4b of DOT Order 1395.1 Use of Value Engineering (VE) by the U.S. Department of Transportation, dated April 13, 1987, provides: "All DOT grant awards for major transportation projects should strongly encourage the use of VE in the planning, design, and/or construction phases. This may include the use of VE incentive clauses in construction contracts."

.43 Why VE is Needed

The costs of highway needs far exceed the funds available for improvements. As the cost of highway construction increases, more emphasis is being placed on the maintenance and rehabilitation of existing

facilities to maximize these available funds.

VE is a tool that can counteract these growing problems by providing (1) cost reduction, (2) product or process improvement, and (3) alternative means and materials for highway construction and maintenance.

.44 VE Application (General)

VE may be applied at any point in highway development, operation, and maintenance. For maximum effectiveness, however, VE should be undertaken as early as possible (during the first 30 percent of design) when decisions on life-cycle costs are being made and valid project development recommendations can be implemented. When a complex, costly project is selected as a candidate for potential cost reductions, investigations should start as soon as a preliminary estimate is in hand.

VE should be employed when the ratio of potential savings to the cost of the VE study is significant. VE can also be used in evaluating standard details that are used repetitively on many projects. The cost of VE studies in preconstruction activities may be allocated to the preliminary engineering cost of the related project.

Local agencies are also encouraged to include a VE incentive clause in their construction specifications; such clauses encourage contractors to propose changes to the contract that fulfill a project's function requirements at less cost.

It is recommended that the local agency staff prepare a "VE Assessment Report" (Appendix 15.73) for all projects exceeding \$2 million in total cost, or any other project determined by the staff to warrant a report. The report will address the project characteristics, cost per kilometer, potential savings of high cost items, and other considerations unique to the project. From this assessment, a recommendation will be developed as to whether a VE study is needed. If the local agency decides that a VE study should not be performed, the reasons should be documented.

When the local agency determines that a VE study should be performed, they should use the references listed in Section 15.47. The study results of the VE team should be included in the design report submitted to the MDT CTEP Engineer along with the agency's recommended alternative.

When an alternative is acceptable to the local agency and MDT, the local agency submits a project prospectus to the MDT CTEP Engineer. The project then proceeds as defined in this manual.

.45 VE Coordinator

When the decision is made to proceed with a VE Team analysis, the Highways and Local Programs Operations Engineer will be the VE Coordinator.

The VE Coordinator will:

- a. Inform the local agency in writing that a VE Study Team is being formed.
- b. Reach agreement with the local agency on the time and place for the study. Select the VE Team Facilitator and the other members of the VE Team.
- c. Request that the local agency provide the typical project related information, the name of the local agency's VE Team member, and the name of a local agency contact person (not the VE Team member) who will be responsible for providing facility and equipment related items required by the VE Team. The local agency team member should be an unbiased representative who would normally have no direct involvement in the project.

.46 VE Study Team

The VE Study Team will be headed by a qualified facilitator not employed by the local agency. The duties and responsibilities of the facilitator will include, but are not limited to, the following:

- a. Acts as chairperson at meetings of the VE Team.
- b. Presents the findings and recommendations of the VE study to the local agency management and other interested agencies.
- c. Provides the final VE Study Report to the local agency and the MDT CTEP Engineer.

The VE Team will be comprised of five (5) members including the facilitator. One team member should have a background in bridge design or construction. If environmental factors are part of the study process, then the team should also include a member who has expertise on environmental issues. All VE Team charges will be billed to the local agency.

The VE Team will formally present their study results to local agency representatives, MDT Highways and Local Programs, and all other interested persons. Team findings and recommendations will then be documented in a formal report and sent to the local agency as soon as possible. Courtesy copies are sent to other appropriate agencies and individuals.

The local agency will evaluate the VE Team recommendations. Should their preferred alternative differ from the prospectus or if no project prospectus has been approved, the local agency submits a new or revised prospectus for their preferred alternative to the MDT CTEP Engineer. A summary of the VE study results should be included in this transmittal as reference material. The project then proceeds as defined in this manual.

.47 Reference Materials

- Value Engineering Guide for Cities and Counties, Kernpter-Rossman International. *Operating Tip — Value Engineering*, NWT² Center, October 1985.
- *Value Engineering Contract Provisions on Federal Aid Highway Construction Projects*, Report No. 75-84-2 17, FHWA, December 1984.
 - *Pavement and Shoulder Maintenance Performance Guide*, Report No. TS-84-208, FHWA, August 1984 (Developed in conjunction with Arkansas, Colorado, Iowa, New Mexico, North Dakota, South Dakota, Utah, and Montana).
- *Value Engineering for Highways*, prepared for FHWA by Kempler-Rossman International, revised October 1983.
- *Value Engineering - Conference Summary Report*, Report No. TS-80-246, FHWA, August 7, 1980.
- *Value Engineering — A Systematic Approach*, Arthur E. Mudge. McGraw-Hill, New York, 1971.
- *Value Engineering in the Construction Industry*, Alphonse J. Dell'isola, Construction Publishing Co., Inc., New York, 1974.
- *Guidelines for Value Engineering (VE)*, subcommittee on New Highway Materials, AASHTO-AGC-ARTBA Joint Cooperative Committee. Reprinted by USDOT/ FHWA February 1983.
- *MDT Standard Specifications* (latest edition)
- *Montana Public Works Standard Specifications* (latest edition)

15.5 Additional Data Required for Special Projects

.51 Traffic Signal Projects

The local agency shall provide warrants for signalization in accordance with Part 4c of the *Manual of Uniform Traffic Control Devices* (MUTCD). Designs for signalization at intersections with state routes require review by MDT. A signal permit is required for all traffic signals on state routes. An early application to the MDT Regional Administrator is advisable.

.52 Projects Involving State Routes

Designs for all projects involving state routes shall be submitted to the MDT CTEP Engineer for approval. All work at intersections with state routes requires submittal of an intersection plan to the MDT CTEP Engineer for approval. Prints of existing intersection plans are available from MDT. Revisions should be shown on these prints.

15.6 Design Approval Notices

If hearings are held or if the opportunity for a hearing has been afforded, the local agency will publish a notice of design approval. The notice is published after the hearing has been held (or the opportunity offered) and after the design has been developed and approved. Its purpose is to inform interested parties of action taken in response to their comments or concerns.

The notice is published in the same manner as the hearing notice and should include the following:

- a. A description of the location or design.
- b. A map or sketch of the area involved.
- c. A statement announcing that maps, sketches, and other supporting documentation are available to the public at a convenient location.

15.7 Appendixes

15.71 Sample Request to Publish Notice of Design Approval

15.72 Sample FHWA Project Notice of Approval of Location and Design

15.73 Sample Format VE Assessment Report

15.74 Preliminary Field Review (PFR) Checklist

Appendix 15.71 Sample Request to Publish Notice of Design Approval

Ladies and Gentlemen:

Please publish one time only the attached Notice of Approval of Location and Design for the project referenced above.

It is further requested that you send to this office three (3) copies of an affidavit of publication, together with your billing in triplicate.

Please mail the affidavits and invoices to:

(Address of Approving Authority)

Very truly yours,

Approving Authority

Attachment

Appendix 15.72 Sample FHWA Project Notice of Approval of Location and Design

The (Agency Name) does advise that the (Approving Authority on CA Agreement) has approved the following described Location and Design on _____ in _____ Agency.

The project _____ (Termini)

The proposed project provides for

All maps and data concerning this project are available for public inspection at the office of the _____ Agency Engineer, _____, Montana.

This notice is in conformance with Federal Aid Highway Act, 23 U.S.C. 101 et. seq., 128, 315, section 2(a), 2(b)(2), and 9(e)(1) of the Department of Transportation Act, 49 U.S.C. 1651(a) and (a)(2), 1657(e)(1); 49 CFR SS 1.4(c); and 23 CFR SS 1.32.

Approving Authority

Appendix 15.73 Sample Format — VE Assessment Report

Agency: _____ Date: _____

Project: _____ Project #: _____

Project Limits: _____

Reviewing Team: _____

Project Characteristics

Length: _____ Cost: \$ _____ Cost/Unit Length: \$ _____

Major structure (Y/N) _____ Includes items that have questionable complex or costly function (Y/N) _____

Extensive ROW (Y/N) _____ Includes items difficult to construct (Y/N) _____

Complex project (Y/N) _____ Includes items that appear too costly (Y/N) _____ Complicated or costly traffic control or detours (Y/N) _____

Includes critical or expensive materials (Y/N) _____

Horizontal Alignment: _____

Vertical Alignment: _____

Materials Source: _____

Design Concept: _____

Other Considerations: _____

Other Alternatives Considered: _____

Major High Cost Items and Potential Cost Savings Ideas

Cost

Potential Savings

1. _____ \$ _____ \$ _____

2. _____ \$ _____ \$ _____

3. _____ \$ _____ \$ _____

Conclusions and Recommendations: _____

Approving Authority Recommendations: _____

APPENDIX 15.74 Preliminary Field Review Checklist

Project No. _____
Project Name _____
Date of Review _____
Proposed Ready Date _____

PROJECT LOCATION

County _____ Route Name _____

“AS-BUILT” PROJECTS

Identification Number	Station	FROM (Reference Point)	Station	TO (Reference Point)
-----------------------	---------	---------------------------	---------	-------------------------

Begin Station _____

End Station _____

Begin Reference Point _____

End Reference Point _____

Length: Urban _____, Rural _____, Total _____

Speed Zones _____

Last Major Work _____ Improved _____

ROADWAY FUNCTIONAL CLASSIFICATION

Type: _____

ACCIDENT DATA

Accident Rate _____ Avg. Accident Rate – Statewide: _____

Severity Rate _____ Avg. Accident Rate – Statewide: _____

Clusters _____

EXISTING GEOMETRIC DESIGN

Type of Surface _____

Existing Surface Width _____

Horizontal Curves that do not meet the criteria described in MDT's *Geometric Design Standards for Urban and Developed Areas*

P.I. Station (Reference Post)	Radius	Direction	Superelevation
-------------------------------	--------	-----------	----------------

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Crest Curves that do not meet the criteria described in MDT's *Geometric Design Standards for Urban and Developed Areas*

Sag Curves that do not meet MDT criteria

V.P.I. Station (Reference Post)	Length	G1	G2	Design Speed/SSD
---------------------------------	--------	----	----	------------------

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Grades that do not meet MDT criteria

Location	Grade
----------	-------

Maximum Grade _____

Existing Fill Slopes (Fill Height, Slope)

Existing Cut Slopes (Cut Depth, slope)

TRAFFIC DATA

Present AADT _____ DHV _____ Future AADT/year _____

Other _____

ROADSIDE HAZARDS (Mailboxes, Utilities, Trees, Rocks, Signs, Culvert Ends, etc.)

PROPOSED WORK (Type of Project) _____

FIELD REVIEW RECOMMENDATION

Design Speed _____ Terrain _____

Finished Surface Width _____ Standard Width _____

Overlay Thickness _____

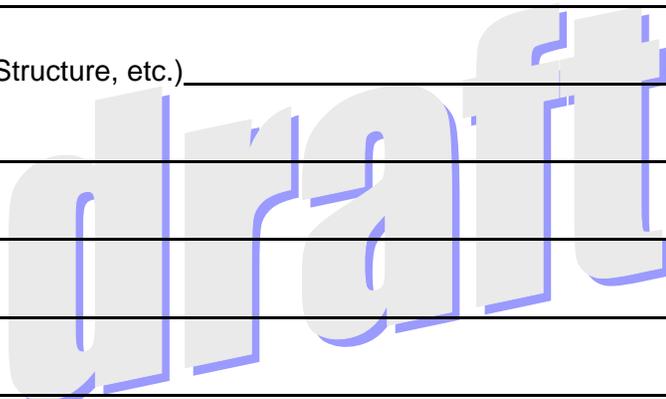
Pedestrian Features (Sidewalk, ADA criteria) _____

Curb & Gutter_____

Cold Milling (depth, width, use of millings)_____

Guardrail (New, Upgrade, Structure, etc.)_____

Special Considerations_____



SURVEY

Aerial Mapping_____ Full Survey_____ Partial Survey_____

Cross Sections_____

Pipes: Condition_____; Soil Tests_____

R-Value_____ Corings_____

Digouts_____

Hydraulic Survey_____

Target Date of Survey Completion_____

Other Items_____

RIGHT-OF-WAY

Existing R/W Width_____

New R/W (Incl. Possible Permits) _____

Limited Access _____

Railroad Requirements _____

UTILITIES

Telephone _____

Power Poles _____

Railroad Conflicts _____

Sewer & Water Conflicts _____

Adjustments (Drains, Valves, etc.) _____

Other _____

ENVIRONMENTAL ISSUES

Environmental Document Type _____

4(f) Lands _____

6(f) Lands _____

Wetlands _____

Possible Hazardous Waste Sites _____

Cultural Survey Required _____

Historic Bridges _____

Other (Fisheries, Threatened & Endangered Species, Protected Streams, Landmarks, etc.)

PUBLIC HEARINGS

Formal _____ Informational _____ News Release _____

TRAFFIC ITEMS

Signing (Upgraded to MUTCD Criteria) _____

Lighting, Noise, etc. _____

Intersections (signalization, auxiliary lanes)

GEOMETRIC DESIGN EXCEPTION

Grade _____ Fill/Cut Slopes _____

Width _____ Design Speed _____

Vertical Curves _____ Clear Zones _____

Horizontal Alignment _____

Other _____

HYDRAULIC INFORMATION

Structures (“As-Built”, Station, Reference Point, Type, Replace, Name of Drainage, Detour)

Storm Drain Systems (upgrades, new inlets, trunk lines etc.)

Irrigation Facilities (Location, Size, Type, Replace (y/n), Detour Required)

Pipes Over 84" (2100 mm) _____

Other (Backwater, Debris, Overtopping, etc.) _____

Administer of the Floodplain (county and/or incorporated community) _____

Materials and Geotechnical Considerations _____
