

**APPENDIX 3-C**

**Procedural Guidelines for Highway Feasibility Studies**

# Procedural Guidelines for Highway Feasibility Studies

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### 1. Scope of these guidelines

These guidelines were developed for two reasons. The first was to guide the development of work statements for highway feasibility studies in which funds administered by the FHWA participate. The second was to guide the management of such studies. States are encouraged to consider these guidelines in other similar studies. Special consideration, in this regard, should be given when the study results may be used for planning, designing or constructing facilities in which funds administered by the FHWA will participate.

### 2. Management studies

Expeditious development of high quality products for, and coordinated and timely decisions within, a feasibility study are sometimes determined by the overall management of the study. Two aspects of this management are generally important. The first, is the specific form and

structure of the management of the study. The second is the phasing and sequencing of the study. Another aspect of study management which may arise is the possible early termination of the study before incurring the expense of the development and review of a final report.

a. Advisory and steering committees

If the feasibility study is entirely limited to one state, that state should consider "convening" an advisory committee to provide review, council and, if appropriate, to assist (including the provision of data) the State in management of the study. In some such cases, both highway and non-highway alternatives exist, coordination with a number of State agencies is required, or a substantial commitment of funds is involved. For these situations, the State may, in addition to an advisory committee, convene a steering committee to provide technical direction, accept the results of individual tasks within the course of the Study, etc.

If the feasibility study encompasses two-or-more States, the FHWA expects the States to convene a steering committee described above (as well as an advisory committee), unless the area of study is within an existing metropolitan area. In such cases the Metropolitan Planning Organization should act as the steering committee. In some of these cases, the FHWA will serve on the steering committee as a non-voting member

If the feasibility study encompasses two, or more states- and involves the detailed consideration of both highway and non-highway alternatives or the detailed study of the impact on natural resources, the FHWA strongly encourages the invitation of appropriate non-FHWA Federal officials to serve on the steering committee.

Members of the advisory and/or steering committees should be solicited regarding the availability and appropriate use of data (e.g. traffic, environmental resources, land use, social demographics, etc.) used in the course of the study.

b. Study tasks

In the conduct of a feasibility study, the FHWA has found it useful to structure a study into discrete tasks that build upon one another. In general, acceptance of the completion of one such task, or group of tasks, is required prior to the initiation of another task. Also, in general, an interim report, selection of base-maps, selection of alternatives, etc., are considered to be a product of a given task. This expedites the review of the progress study. In addition, it facilitates management of funds available for the conduct of the overall study. Attachment I, "Illustrative examples of tasks within a study" illustrates examples of feasibility study task structure.

c. Early termination of the study

For feasibility studies, where total expected study costs are relatively high (e.g., over \$400,000), or when the study is specifically for a high level facility (e.g., Interstate type facility, high speed rail), the study should be structured in such a way that early termination of the study is Possible.

The basis for termination would be substantial evidence of probable non feasibility of the principal improvement alternative(s) being studied. Such evidence should be established through preliminary comparisons of user benefits and costs, information on the lack of financial feasibility, or, a demonstration based on public involvement that a facility is generally unneeded (or unwanted).

A specific decision point concerning terminating the study must be described as a part of the statement of work for the study. A decision to terminate the study early should be established by comparing the value of the information that would be gained with the cost-to be incurred by completing the study. The decision to terminate early should be documented by the steering committee.

### 3. The meaning of 'feasibility'

The words 'feasible', 'feasibility', etc. are not specifically defined in Title 23 U.S.C. or in 23 CFR. There are, however, three definitions for the word 'feasible' in Webster's Third International Dictionary (1996). The first is "capable of being done, executed or effected", the second is "capable of being managed, utilized or dealt with successfully", and the third is "REASONABLE, LIKELY". Within the context of these guidelines, the meaning of 'feasibility' has the following parts:

- ◆ The degree to which a given alternative mode, management strategy, design or location is economically justified.
- ◆ The degree to which such an alternative is considered preferable from an environmental or social perspective.
- ◆ The degree to which eventual construction and operation of such an alternative can be financed and managed.

### 4. Alternatives

Unless constrained by the considerations noted in the next paragraph, feasibility studies should, at least initially, consider a wide range of alternatives. Such alternatives, which would be selected from those advocated by interested groups or recommended by local or State government could include: modes of transportation (e.g., bus, highway, rail) and management strategies (e.g. improvement of traffic control devices, implementation of congestion pricing, preferential facility treatment of HOVs), design levels (e.g., controlled access freeway, partially controlled access multilane highway, 2-lane uncontrolled access highway), and locations that may potentially serve an important purpose and fill a need for transportation of people and goods.

The constraining considerations include previous technical studies, legislative statute or history, public involvement, legal restrictions on the use of funds for the study, legal restrictions on the

use of funds, constraints imposed by natural or man-made elements in the study area, management priorities, etc. Such studies, statutes, etc., should be briefly documented and specifically discussed by the advisory and steering committee during the course of the feasibility study. In addition, such studies, statutes, etc., should be explained during public involvement for the feasibility study.

The documentation of consideration of alternatives and factors relating to such consideration can be a vital source of information for environmental documents. Such documents may be required by such statutes as the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4371 et seq). The regulations for implementing the procedural provisions of this Act are as follow: 40 CFR Parts 1500-1508 are those of the *council of Environmental Quality* (CEQ); 23 CFR Part 771 are the Federal Highway Administration's implementation of the CEQ regulations).

## 5. Public involvement

Public involvement activities conducted, as part of, or in coordination with, a feasibility study should be consistent with the public involvement process adopted in response to the statewide and metropolitan planning regulations (specifically 23 CFR 450.212 and 23 CFR 450.316). Reports developed during the study can be used in this activity (see section 10 below).

In some cases, feasibility studies are undertaken in a climate in which some elected officials and members of the general public mistakenly believe that upon conclusion of a feasibility study, construction of a facility will soon begin. In such cases, the public involvement activities should, if possible, be designed to convey information at an early stage about the likely cost of a new facility or strategy, the likely benefits, and the extent of available funding for construction.

In general, public involvement should, to the extent practicable, be collaborative and be designed to avoid focusing attention on now facilities or strategies that are unlikely to be implemented. Rather it should focus on near term, reasonably implementable projects.

## 6. Assumptions and derived values

In all parts of the feasibility study, those assumptions and derived values that are most important to the results (e.g. demographic predictions, traffic, discount rates, estimates of the monetary value of time savings) should be stated explicitly and clearly. Such assumptions should be consistently used through each component of the study.

Furthermore, assumptions and derived values used in the study should be consistent with assumptions and derived values used in contemporaneous documents produced in connection with compliance with Federal regulations or in connection with applications for Federal grants. For example, if the predicted population growth rate in a given area was stated as 1 percent in a document recently used to produce a State Implementation Plan to Achieve and Maintain the National Ambient Air Quality Standards, the FHWA expects that the predicted population

growth rate would also be 1 percent in a feasibility study of a specific transportation facility in the same area.

## 7. Economic justification

Economic justification is typically a baseline consideration and the most important element in a feasibility study. The economic justification for a facility or strategy has three general components: a benefit-cost analysis, non-monetary but quantifiable considerations and non-quantifiable consideration. All such components are discussed in Me guidance from the Office of Management and Budget listed in attachment 2 entitled, "Annotations of Sources to be Considered in Feasibility Studies". This attachment also contains notes on other guidelines, executive orders, reports etc., that provide information helpful to analyzing the other components of the economic justification. Following is a brief summary of the most important points to keep in mind during the study of economic justification:

### a. Benefit-cost analysis

Benefit-cost analysis has historically been a product of feasibility studies. For this, among other reasons, the benefit cost analysis developed during a feasibility study may well attract more attention and produce more controversy than any other product of the study. Furthermore the benefit-cost analysis is generally considered the most objective and credible product of such studies.

In essence, a benefit cost analysis is a calculation of the stream of both benefits and costs over the lifetime of the facility or strategy. Both benefits and costs are discounted based on their timing (e.g., today's certainty of having a dollar of benefits next year is worth less than actually having a dollar of benefits its this year even if there is no inflation) . In addition, both benefits and costs are adjusted for inflation, preferably by use of constant dollars.

The level of detail of the analysis should be appropriate to the importance of the category of benefit or cost considered. in typical FHWA funded benefit-cost analyses, the most important benefits are the monetary equivalent value of t time savings to transportation users and the monetary equivalent value of the reduction in accidents, injuries and fatalities that would result from use of a new facility or implementation of a new strategy.

Substantial scrutiny should be given to accurate estimation of time savings and accident reduction with more scrutiny applied to whichever of them is the larger in terms of dollar benefits. Similarly, the most important costs are typically the cost and associated stream of maintenance and operational costs.

The issue of accounting for local and regional economic development benefits has sometimes resulted in contention within the context of feasibility studies. Typically, development benefits are essentially equivalent to a transfer payment. That is, forecasted local economic growth in the vicinity of a new transportation facility is growth that would have occurred elsewhere if the

transportation facility would have occurred elsewhere. In such cases, the development benefits should not be considered in the benefit-cost calculation. Similarly, in the case of the economic impact of the construction of a new transportation facility, the jobs, etc., associated with such construction should not be considered in the benefit-cost calculation since such jobs, etc., would have occurred elsewhere if construction had occurred elsewhere.

In some cases, for example, where a facility is to be reconstructed while in operation, appropriate consideration should be given to estimating the traffic management costs and the delay and other costs to facility users.

In those cases where the total discounted benefits are about equal to the total discounted costs, other considerations could be the deciding factor in determining economic justification. There are two types of such considerations; those that are non-monetary but quantifiable and those that are not quantifiable.

b. Non-monetary but quantifiable considerations

To the extent possible, all impacts should be translated into Monetary, dollar equivalent terms. Notwithstanding this however, non-monetary, but quantifiable considerations can sometimes be an important part of the economic justification of a transportation facility or strategy. For example, construction of a transportation facility may lead to quantifiable improvement in access to an important education, medical or recreational facility. Similarly, such construction may lead to a quantifiable decrease in evacuation time required in the event of a disaster, etc.

c. Non-quantifiable considerations

To the extent possible, all impacts that can not be stated in dollars should be quantified in other understandable measures. Notwithstanding this however non-quantifiable considerations can also sometimes be an important part of the economic justification of a transportation facility or strategy. For example, construction of a transportation facility may lead to improved stability of the local economy or support a well considered locally funded comprehensive development plan, etc.

d. Base case and sensitivity analysis

Feasibility studies by nature, provide, imprecise results, therefore, it is vital to present the information in a manner that allows readers to understand exactly what is being assumed as the base condition, and how the final results would be affected by variations in such assumptions. This is accomplished by performing various sensitivity tests and comparing the results with those based on the various assumptions for the base condition.

For example, a study may use a 7 percent discount rate as the base condition (current OMB policy). Other discount rates can and should be used in the sensitivity analysis, but the results

must be compared to the results based on a 7 percent discount rate and not vice versa. That is, the results of the base case must be given more credence in the consideration of economic justification and more emphasis in the presentation than the results of any of the sensitivity analyses.

## 8. Environmental and social considerations

In addition to addressing the economic justification for an alternative facility or strategy, feasibility studies should, if possible, determine the degree to which such an alternative is considered preferable from an environmental or social perspective. typically, feasibility studies are done relatively early in the process of implementing a project or strategy. Therefore, *when estimating* the number of acres of wetland disturbed or number of residences displaced by a facility it would be appropriate to provide a range or otherwise indicate the extent of the uncertainty in such estimates. However, with respect to environmental considerations, there are specific laws which can have a great deal of influence in planning for potential facilities.

An example of such a law is the Section 4 (f) provision of the 1966 U.S. Department of Transportation (DOT) Act (also known as parkland exclusion, or as Title 49 U.S.C. 303 or as Title 23 u.s.c. 138). This law prohibits U.S. DOT funding a project that will use public parkland, recreation areas wildlife refuges, etc. absent stringent administrative determinations relating to consideration of alternatives to such use and mitigation of harm to the park. On the other hand, with respect to social considerations, the degree to which an alternative is considered preferable from a social perspective is, of necessity, somewhat subjective. Nonetheless, such consideration is important and careful attention to it must be given.

if implementation of a major facility is feasible, a final consideration is that use of Federal funds for construction always requires some form of environmental document. one of the important products of a feasibility study that may be directly usable in an environmental document is a clear statement of the need for, and purpose of, a new facility.

## 9. Financial feasibility

The third meaning of feasibility as noted in Section 3., above is financial feasibility. This is the degree to which eventual construction and operation of an alternative facility, or implementation of a strategy can be financed and managed. The feasibility study should, as appropriate, quantify the resources required for construction,, operation, etc., and identify funding, personnel, etc.,, sources that may be available to support such requirements. If a shortfall exists, new sources may be examined for use in financing the facility or strategy. These sources should be examined in sufficient degree to determine the likeliness of their availability. A strong case can be made that a facility or strategy is financially feasible if an overall facility financing structure is developed and subsequently formally adopted by the management committee and/or project sponsors, as a part of and/or concurrently with, the feasibility study. Such a product may be directly usable in financial planning documents developed for project implementation.

## 10. Reports

In general, reports developed during a feasibility study have been the focus of much attention and a vehicle for post study decision making. Thus, considerable effort should be given toward production of reports with clear non-technical summaries, easily understood graphics, good organization etc.

The FHWA encourages the consideration of creating electronic versions of the reports (suitable for distribution by computer to computer networks) videotape versions of the reports (suitable for convenient public viewing), or using any other nontraditional means of conveying factual information to wider audience than would read hard copy reports.

There are two general types of reports interim and final. Examples of the way interim reports are placed within the study process as well as what such reports could contain-are provided in Attachment 3 "Illustrative examples of interim and final report structure and content".

a. Interim

The FHWA encourages the development of interim reports documenting findings and, if appropriate, general interest reports (e.g. newsletters) made during the course of feasibility studies. These can be used during the practice of public involvement and as a general purpose device for transmitting information to interested parties.

Appropriate points for such reports could be completion of study tasks (see Attachment I for an illustration of such tasks). Reports, or newsletters should be used in public involvement (see Section 5. above) and widely distributed.

b. Final

The FHWA requires a close out or final report for feasibility studies in which Federal-aid funds participate. The FHWA expects that the transmittal to FHWA of the final feasibility study to contain a specific endorsement by the managing agency(ies) or the steering committee for the study. Such an endorsement will be construed by the FHWA to mean that the agency(ies) or committees accept the assumptions of the study (e.q., demographic projections) as well as any conclusions contained in the final study report.

The final report should contain an executive summary or should be accompanied by a separate cover executive summary stating the legislative requirement for the study (if applicable), briefly define the study approach, briefly summarize the management of the study, briefly summarize the types of analysis methods used, summarize the results and state a conclusion. If the conclusion in the executive summary does not clearly indicate a preferred alternative and the reasons for this preference, the agency(ies) responsible for the report should specifically indicate such a preference and reason(s) for the preference when officially transmitting the final feasibility report or executive summary.