



## CHAPTER I GENERAL INFORMATION

### SECTION 1-02

### PROJECT INITIALIZATION AND PROGRAM ESTIMATING

**1-02.1 PURPOSE.** This section covers the program estimating process developed by the department to meet a higher level of accountability expected of MoDOT. MoDOT is expected to produce reliable and documented program estimates.

**1-02.2 PROJECT ESTIMATES.** Projects with a plan completion date within the five year program must have a detailed, (one cost, no range) estimate and shall be submitted to GHQ Transportation Planning on a Project Amendment Tracking System (PATS) form. This form is part of the Notes database "PL\Project Amendment Tracking." The estimate should be updated annually as the project progresses to plan completion.

Projects with completion dates more than five years into the future should have a sufficiently detailed estimate created and submitted to GHQ Transportation Planning on a PATS form. This estimate should be generated from the most reliable information at the time. However, on rare occasions, depending on the project's size and lack of a clear scope, a project's estimate may be composed of only an estimate for the preliminary engineering during the project initialization phase. Although no ranges will be allowed, this preliminary engineering estimate will permit the project to be added to the program.

A project estimate consists of four major cost components:

- preliminary engineering
- right of way
- construction
- construction engineering

Please refer to [Subsection 1-02.8](#) for additional details to be considered in estimate preparation.

**1-02.3 MANAGEMENT INVOLVEMENT.** Involvement by district senior management and the project team at early stages in the estimate process is necessary to produce reliable estimates. Meetings and field checks scheduled at the earliest possible stage will allow input from design, right of way and construction personnel, the project manager, and if necessary, the district engineer. Input from operations personnel, area engineers, and GHQ personnel may also be included, if appropriate. The goal is to clearly define the scope of the project at the earliest time possible, to produce an estimate less susceptible to project growth prior to the plan completion commitment date.

The district engineer is responsible for maintaining the consistency of the estimates' documentation. The district engineer should establish a review team that will implement a plan to ensure quality control of all project estimates. It is recommended this team include the transportation planning coordinator, project development engineer, right of way manager, transportation project managers, and other personnel deemed necessary. This team is not expected to inspect each estimate in detail, but rather establish consistent procedures to annually update the estimates of the projects. The team should work to ensure these processes are applied to each project so the best possible estimate is obtained. The team should ensure the project's scope is clearly and completely defined, and documentation justifying the assumptions made for the cost-per-mile [km] factors are used and placed in the project folder.

General Headquarters will provide quality assurance to ensure consistent project program estimates are produced throughout the department. This plan will include periodic reviews of the project files, the program estimating process, the district's quality control plan, and the district's plan for annual updating of the program estimate.

**1-02.4 PROJECT FOLDER FILES.** Each project shall have an estimate file folder with a copy of the right of way and program estimate histories with documentation of assumptions made for the specific scope of work. This folder shall be reviewed and revised at project development milestones or at least once per year. The documentation shall include assumptions made, maps, photos, as-built plans, functional classification, design criteria, scope of work and a copy of cost data used to support the estimate. The source of unit cost or cost-per-mile [km] data shall be

included, (such as estimate software, bid tabulation data from similar projects, data from [Figure 1-02.1](#), unit bid price books, or some other reputable source.)

Prior to the completion of the preliminary plan, a cost-per-mile [km] type of estimate is suitable and acceptable. Districts shall note deviations from the estimated costs given in [Figure 1-02.1](#). Project development, after preliminary plan approval, shall have the project estimate based upon pay item quantities. All estimate data sheets and the PATS form shall be dated when prepared and include the estimator's name. A copy of each PATS form prepared for the project shall remain in the estimate file. This procedure shall be followed for all projects, whether designed internally or by a consultant.

Variations of the Miscellaneous and Utility Costs percentage (see [Figure 1-02.1](#)) shall be documented. Cost adjustment factors not recognized in [Figure 1-02.1](#) shall not be used to inflate estimates. Examples of factors that are not permitted include estimating uncertainties, errors, omissions, and local "adjustment" factors.

The folders shall be retained in a central filing system from the time of project initialization until final payout of construction costs. The name of the person responsible for the folder, the folder's location, and the general contents should be maintained by the district. The project folders shall include awarded bid costs, change orders and incidental costs.

**1-02.5 SCOPE CHANGES.** The scope of a project refers to the elements and limits of a project that are so well defined that accurate costs and project delivery schedules can be forecasted. A change to the scope of the project will result in a deviation from the estimated cost and delivery schedule.

**1-02.5 (1) TYPES OF SCOPE CHANGES.** There are two kinds of scope changes: non-major scope changes which must be approved by the district engineer, and major scope changes which must be approved by the Director of Transportation Planning and the Director of Project Development. These scope changes are summarized in [Subsections 1-02.5\(1\)\(a\) and 1-02.5\(1\)\(b\)](#).

**1-02.5 (1) (a) NON-MAJOR SCOPE CHANGES REQUIRING APPROVAL BY THE DISTRICT ENGINEER.**

1. Any changes to the elements or limits of a project resulting in a maximum increase or decrease of \$5,000,000 or up to 10% of the estimated cost of the project.
2. Any change(s) to the elements or limits of a project that delay the delivery of a project in the STIP by a quarter within the same state-fiscal year. (Note: After a scope change approval, the district must follow the STIP amendment policy in order to have the project's letting / award date changed in the program.)

The details of the proposed scope change, the reasons why the change is necessary, and the projected impacts to the project's budget and delivery schedule should be included in the form of a letter from the project manager and addressed to the district engineer. A signature line for approval by the district engineer should also be included. A signed copy of the letter should be provided to GHQ Design and GHQ Transportation Planning for documentation purposes.

**1-02.5 (1) (b) MAJOR SCOPE CHANGES REQUIRING APPROVAL BY THE DIRECTOR OF TRANSPORTATION PLANNING AND THE DIRECTOR OF PROJECT DEVELOPMENT.**

1. Any changes to the elements or limits of a project resulting in an increase or decrease of greater than \$5,000,000 or greater than 10 % of the estimated cost of the project.
2. Any change(s) to the elements or limits of a project that delay the delivery of a project in the STIP by one state-fiscal year. (Note: After a scope change approval, the district must follow the STIP amendment policy in order to have the project's letting / award date changed in the program.)

The details of the proposed scope change, the reasons why the change is necessary, and the projected impacts to the project's budget and delivery schedule should be included in the form of a letter from the

district engineer and addressed to the directors of project development and transportation planning. A signature line for approval by both directors should also be included.

**1-02.6 REVIEW OF ESTIMATES.** Estimates shall be reviewed and updated at least annually or at the following stages of project development: project initialization, conceptual plan/location study completion, preliminary plan completion, and right of way plan completion. The estimate shall be submitted to GHQ Transportation Planning annually or at the above noted project development stages with a PATS form (see [Figure 1-02.2](#)).

If, after review of the previous estimate, it is determined that no change is necessary, documentation should be included in the folder indicating the previous estimate remains valid.

If the project is to be awarded during the current year, the programmed amount will not be allowed to be revised once the annual program is finalized. In order to confirm that GHQ Transportation Planning has incorporated a submitted PATS form into the annual program, districts should check to ensure that the PATS form has been labeled "GHQ Transportation Planning Reviewed" and then also check the "Tentative" tab of the Approach file **PROGRAM.APR**.

All estimated costs shall be submitted in current dollars. Any inflation adjustment will be made by GHQ Transportation Planning, when required. Estimate revisions will be used to calculate the current cost of the program, but not be used to determine any changes in the district funding distribution.

It is important to the department that annual estimate updates be performed. These updates provide greater responsiveness to our customers and are necessary to address MoDOT's accountability issue.

**1-02.7 ESTIMATE TRACKING.** An inflation rate of 3% will be used for projects with a completion date within the five year program. The updated estimate is compared to the programmed amount from the time the project first entered the five year program. The future inflation factor will be computed by GHQ. If any project estimate exceeds the previous estimate by an amount greater than the 3% per year inflation factor (or a factor determined by GHQ), it will be assumed the scope of the project has grown. An explanation citing the reasons why a project has experienced growth shall be submitted by the district to GHQ Transportation Planning when the PATS form is submitted.

**1-02.8 ESTIMATE OVERRUNS.** Any district project estimate, submitted with final plans, having a magnitude greater than 3% per year above the program estimates will be investigated. Projects can reach the bid opening stage even if the district's final estimate shows the job is well above its programmed estimate. Dramatic increases in property values, discovery of hazardous waste, or other situations may warrant an estimate increase.

Estimate overruns and underruns will count toward the district's annual allocation for transportation management areas, rural preservation and rural regional funding. Corridor projects should also stay within the 3% inflation rate limit. If the final district estimate for an individual project is above its programmed estimate, the following must be accomplished before a project may reach the bid opening stage:

1. The district identifies the major cost variation(s).
2. The district takes all practical steps needed to reduce cost, including any assistance from divisions.
3. The district engineer makes a recommendation of how to proceed with the project.
4. The recommendation will be reviewed by GHQ Transportation Planning, Design, Bridge, Right of Way and Construction and Materials.

If approved, the project will be processed for bid opening. However, the cost overrun must be accounted for in the district's current Right of Way & Construction Program funding. Projects may be delayed in order to stay within the district's annual allocation.

Districts will be required to review and justify their project's final scope and estimate as detailed in [Subsection 1-02.5](#). Additionally, the district shall provide a proposed method to ensure all projects are completed as scheduled and within annual budget limitations.

Right of way overruns will also be investigated. If the final right of way estimate is over the programmed right of

way estimate, the project or other projects must be evaluated to reduce costs or scope to balance the district program budget. Right of way overruns shall be documented.

**1-02.9 ESTIMATING PROCESS CHECKLIST.** The scope of work shall be identified as accurately as possible at each project stage.

The project description shall identify the stage of project development and include an accurate and complete description of the scope of work involved, (i.e. grading, paving, drainage, bridge, widening, resurfacing, relocation, signals, etc.).

The following considerations are guidelines and should not be considered a complete list of items needed on a project. The district shall use the best resources available in creating an estimate. It is the responsibility of the estimator to provide an accurate and complete cost estimate. The estimator and others involved should visit the project location, if appropriate.

**1-02.9 (1) DESIGN CONSIDERATIONS.** Below is a partial list of design items. Other items may be considered and included in the estimate, as necessary. Possible resources for estimating prices are historical bid prices on similar projects, district refined cost-per-mile [km] prices, actual quantities with unit bid prices, construction price indices, etc.

- Grading (light, medium, or heavy) - Class A, Class C Excavation, Borrow
- Pavement - heavy, medium or light duty - include curb and gutter if applicable
- Drainage - stream crossings, closed systems, open channel
- Shoulder widening
- Resurfacing
- Signals, lighting, signing (include temporary signals)
- Temporary by-pass
- Traffic control, detours, etc.
- Pavement edge treatment
- Guardrail items
- Urban contingencies (i.e. enhancements, landscaping, etc.)
- Erosion control (seed and mulch, rock ditch liner, paved ditch, rock blanket)
- Temporary erosion control
- Mobilization
- Detention storage basins

Preliminary engineering cost estimates shall be based upon historical data for projects from the same work type (add lanes, high type resurfacing, etc.). The total of construction engineering costs (comprised of construction engineering and construction contingency) shall be 10% of construction costs. Construction engineering and construction contingency should be 7% and 3%, respectively.

**1-02.9 (2) RIGHT OF WAY CONSIDERATIONS.** If right of way acquisition is involved, a written request for an estimate should be made to the district right of way manager with the following information:

- Location layout (i.e. aerial photos, quad map, microfilm plans, right of way plans, etc.)
- Average right of way width and land area taken
- Proposed access controls
- Anticipated improvements to be taken
- Proposed borrow areas, parklands, wetlands

The project estimator shall obtain a right of way estimate from district Right of Way personnel, which has been developed according to the guidelines and policies of the Right of Way Manual.

**1-02.9 (3) ENVIRONMENTAL CONSIDERATIONS.** If environmental issues are involved, the district shall consult GHQ Design – Environmental Studies for assistance in determining any cost.

The district shall furnish GHQ Design – Environmental Studies with the following applicable items:

- Request for Environmental Services (RES) form (see [Subsection 2-03.2](#))
- Location layout of structures, suspected wetlands and unusual features (i.e. aerial photos, quad map, microfilm plans, right of way plans, etc.)
- Photographs

GHQ Design – Environmental Studies shall give consideration to the following items:

- Parklands
- Wetlands
- Historic structures
- Hazardous waste sites
- Threatened and endangered species
- Archeological sites
- Noise mitigation
- Socio-economic impacts

**1-02.9 (4) UTILITIES CONSIDERATIONS.** The designer should furnish the district utility engineer the following applicable items:

- Location layout (i.e. aerial photos, quad map, microfilm plans, right of way plans, etc.)
- Photographs

The district utility engineer shall consider the following in developing an estimate:

- Known major utilities
- Railroad crossings
- Determine if existing utilities are on existing highway right of way or private easement
- Coordinate with appropriate utility companies

**1-02.9 (5) BRIDGE CONSIDERATIONS.** GHQ Bridge will furnish the districts with square foot [square meter] cost estimates for the various routine structure types based on the geographic location within the state. GHQ Bridge should be contacted for assistance in estimating non-routine structures.

For early stages of a project (prior to a preliminary bridge layout), the following items shall be considered by the district design team:

- Number of major stream crossings
- Flood plain proximity to crossing location
- Earthquake design necessity
- Nearby structures that are similar
- Number of bridge rehabilitations
- Clearance requirements