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APPENDIX AA – Cost Estimates

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Preparation Guidelines for Project Development Cost Estimates

SECTION 1 – General Guidelines

ARTICLE 1 – Overview

Importance of Quality Cost Estimates

The reliability of project cost estimates at every stage in the project development process is necessary for responsible fiscal management. (See Chapter 20 for procedural information.) Unreliable cost estimates result in severe problems in Caltrans' programming and budgeting, in local and regional planning, and it results in staffing and budgeting decisions which could impair effective use of resources. This, in turn, affects Caltrans' relations with the California Transportation Commission (CTC), the Legislature, local and regional agencies, and the public, and results in loss of credibility.

Goal and Objective

Caltrans' goal is to avoid project cost overruns. One objective is to identify "unforeseen items of work" before the project concept, scope, and cost have been determined; thus minimizing the differences between preliminary project planning cost estimates and final project design cost estimates. Identifying costly "unforeseen items of work" after the project has been programmed may stop or delay a project.

Consistent and Comprehensive Methodology

Cost estimating is not an exact science. However, Caltrans must strive for reliable project cost estimates, so that projects can be delivered "within budget." To this end, it is required that project cost estimates be prepared using a consistent and comprehensive methodology. Even with a consistent and comprehensive methodology, careful attention is needed to ensure a quality cost estimate. The cost estimator needs to research, compare and, above all, use their professional judgment to prepare a quality cost estimate. Coordination between the project planning cost estimates, the project design cost estimates, and the Standard Specifications that will be used to construct the project is required.

Cost Estimates are Not Static

Cost estimates, in a sense, are never completed. They are not static, but have to be reviewed continually to keep them current.

Consult Others

Other functional units (Division of Structures, Right of Way, Traffic Operations, Materials, Maintenance, Construction, Environmental, Landscape Architecture, etc.) and local entities should be involved, as appropriate, in the preparation of both Project Planning Cost Estimates and Project Design Cost Estimates. Do not create a project cost estimate in a vacuum. Gather as much information as possible for the project and its various alternatives. It is better to have too much information than not enough.

ARTICLE 2 – Identifying Items of Work and Estimating their Quantities During the Project Planning Phase

Systematic Field Reviews

It is essential that project alternatives be adequately scoped. This is best accomplished by "walking the job" to obtain factual data to backup the cost estimates so they can be used with confidence. To be confident that the project is adequately scoped, a systematic field review should be performed. Systematic field reviews are an essential part of the project development process. They provide an important perspective that supplements the mapping, photos, survey data and other sources of information about the project that are used in the office. Actually being present on the proposed project site and seeing it first-hand minimizes the possibility of overlooking significant design features.

While in the field, project personnel should be on the lookout for high cost items (i.e.: costs of mitigating hazardous waste and other environmental impacts, utility relocation, noise barriers, retaining walls, major storm drains, need for a transportation management plan, traffic handling, etc.). If high cost items are present or need to be designed into the project alternatives they must be quantified. The "worse probable case" scenario should always be assumed, particularly on reconstruction projects. Existing facilities thought to be adequate may have become inadequate because of changes to standards, new data, etc. Design feature decisions, project constructability, construction staging, etc. should be evaluated in the field and notes taken to document decisions and to identify limits, boundaries, etc. A strip map and proposed typical sections are very useful in the field to document proposed project features. Consultation with the Survey Unit and a review of the *Drafting and Plans Manual* is advisable.

Additional Information

Additional information that must be obtained to prepare a Project Planning Cost Estimate includes: existing and forecasted traffic; geotechnical design information (particularly where foundation and slope stability problems can be anticipated); materials and pavement structural section design information; advance planning cost estimates for new structures and modifying existing structures; hazardous waste assessment; potential environmental issues and mitigation; right of way and utilities data sheets; traffic handling and transportation management plans; utilization of existing resources (recycling), etc. Check to see what information is already available early in the project

development process and begin using it. If it is not available, then it should be requested from the appropriate source unit.

Use Groupings from Standard Cost Estimate Format

Individual contract items are difficult to identify at the early project development stages, but it is possible to group basic work functions together to form a systematic approach to project cost estimating. Most projects have grading, pavement structural section materials, drainage and structures that are relatively easy to recognize and quantify. The standard cost estimating format provides for this approach by using such groupings. Coordination between the planning cost estimate and the Standard Specifications is also essential, since they will be used to construct the project. A thorough knowledge of the Standard Specifications is essential.

Contingencies Versus Confidence Factor

Contingency factors for project planning cost estimates vary depending on the cost estimate type. Contingencies are intended to compensate for the use of limited information. The percentage goes down as the project becomes more defined and thus less unknown. Contingencies are not intended to take the place of incomplete design work. Project alternatives and their associated cost estimates must be thoroughly compiled by diligently using all of the available data, modifying that data with good judgment and using past cost estimating experience so that the cost estimates can be used with confidence.

Documentation

Typically, the project development process for a project occurs over a period of years and many decisions and agreements are made. All too frequently during this time, project personnel changes occur that can affect the continuity of earlier project decisions. To avoid this situation, all project decisions and agreements that are made throughout the project development process should be thoroughly documented and retained in the project files. This philosophy also applies to notes, decisions, photos and mapping used during field reviews of the project site.

ARTICLE 3 – Identifying Contract Items and Estimating their Quantities During the Project Design Phase

Items Entered Into BEES

The items of work identified and estimated during the project planning phase should now be better defined, as work that is being performed by the project design staff and the other functional units working on the project is completed. With the availability of additional information and design details, the reliability of the cost estimate greatly increases as improvements previously estimated in a more general manner may now be quantified as contract items. As contract items of work are identified and quantities calculated, these quantities should be entered into the Basic Engineering Estimating

System (BEES). Entering the completed quantities into the BEES as soon as they are calculated facilitates estimate updates and eases the preparation of the Engineer's Cost Estimate.

District Cost Estimate

The Engineer's Cost Estimate consists of two components: (1) the District Cost Estimate, and (2) the Structures Cost Estimate. When these two components are combined, they equal the total construction cost for the project. The District Cost Estimate is comprised of the following:

- Contract Items

  These are the contract bid items of work used in the Engineer's Cost Estimate in the Proposal as well as the other Contract documents.

- Supplemental Work

  Supplemental work is work of an uncertain nature or amount and therefore it is not done on a contract item basis. Work which is known but cannot be predetermined and provided for under contract items of work should be included as supplemental work. Supplemental work is not intended to take the place of incomplete design work nor is it to be used for contingencies. Do not add supplemental work items for "possible additional work" for any major area of work (i.e. drainage, traffic items, etc.). Additional funds for undeterminable changes, such as increased asphalt content or price fluctuations for paving asphalt, should be included as supplemental work.

  Extra work identified in the contract special provisions must be itemized as supplemental work.

- State-Furnished Materials and Expenses

  Items listed under this component consist of work done by State forces, or others, concurrent with contract construction operations; or materials to be purchased and charged against the project, but which will be paid for directly by the State, not the contractor. Typical items of State expense are payment to a utility company to provide electrical service, transportation management plan work, or work to be done by a railroad or other agency under a service contract. Certain materials are approved by the FHWA, as being in the public interest, for Caltrans to furnish as State-furnished Materials to the contractor on Federal Aid projects (i.e. sign panels, marker panels, monument disks, traffic controllers, recycled/salvaged materials in stock, etc.). State-furnished materials and expenses are a part of the total construction costs of the project and are subtotaled and included in the District Cost Estimate.

- Contingencies

  Contingencies are a percentage of the subtotal of the cost of contract items, supplemental work, and state-furnished materials and expenses, and are included in the grand total of the District Cost Estimate to allow for unforeseen increases.

Based on Standard Specifications, Contract Plans and Special Provisions

All District Cost Estimates are to be based on the *Standard Specifications*, Contract Plans and Special Provisions. These documents form the basis for determining contract items. The *Standard Specifications*, along with the Contract Plans and Special Provisions for a specific project, prescribe the details for construction and completion of the work which the Contractor undertakes to perform in accordance with the terms of the contract. Coordination between the District Cost Estimate, the *Standard Specifications*, Contract Plans and Special Provisions is required.

Identifying Contract Items of Work

The other functional units (Division of Structures, Traffic Operations, Materials, Maintenance, Construction, Environmental, Landscape Architecture, etc.) and local entities involved in the preparation of the project design should also be involved in identifying the contract items of work. If the Office of Structure Design is designing structural features for the project, be careful to avoid either duplicating or overlooking quantities in the cost estimate. Common Office of Structure Design and District items (i.e.: temporary railing, etc.) can be easily duplicated and also have conflicts in their pricing.

Specific contract items should be identified by using the BEES coded item list. A copy of the BEES coded item list may be requested through the District BEES coordinator.

ARTICLE 4 – Cost Estimate Pricing Methods

Two Common Methods

There are two methods commonly used for estimating prices. One method is to use previous bid prices as a basis for establishing prices on the proposed project. The other method is to make a complete analysis of production rates, labor costs and material costs. These methods may be used individually or in combination.

Previous Bid Prices Method

The use of previous bid prices as a basis for cost estimating is probably the most frequently used method and in most cases is the most practical method. When using this method it is important to consider the following factors:

- Similar size projects should be used and quantities for individual items should be similar.

- Consider using the average of the 3 low bidders, or the second low bidder, or possibly applying an increase factor to the low bid.

- Previous bid prices should be revised by the projected change in the California Construction Cost Index between the date of the old bid and the date of the anticipated new bid.

- The reference bid price should be adjusted to reflect different conditions between the reference project and the project for which the cost estimate is being prepared. This would include considerations of differences in type of terrain, geographical location, soil, traffic and specifications.

- Lump sum bid prices or unit prices for items of work (e.g. culverts) that include varying amounts of other related work should not be used.

In arriving at an estimated price for the individual contract items of work, cost estimators should make full use of recent bid prices from similar projects having had competitive bidding. Sources of information and previous bid prices are:

- Bid Summaries

- Quarterly Report "Contract Items by Item Numbers";

- BEES "Item Price Menu";

- Annual *Contract Cost Data* Book; and, the

- BEES Program.

- "California Construction Cost Index"

For further information on these sources of previous bid prices which can be used as a basis for cost estimating, refer to the *Ready to List and Construction Contract Award Guide (RTL Guide)* and contact the District BEES Coordinator. Questions on current cost estimating methods and practice should be directed to Office of Office Engineer (HQOE) in the Engineering Service Center.

Complete Analysis Method

This method is usually not practical for use on each and every item of work that is on any given project. It may occasionally be necessary to use this method for earthwork items where rock or unusual material hauling is required, or for lump sum items such as signals and lighting. Under this method the operation is analyzed, production rates are assumed

and material lists are determined. The cost of materials is determined by using available price lists. Labor and equipment hours are determined based upon production rates multiplied by the respective labor rates and equipment rental rates to determine the costs. Overhead costs and profit are then added to obtain the final estimate of cost. It is especially important to consider possible premium pay for overtime on night work and subsistence. On larger projects with long time limits, it will be necessary to determine if the majority of a work item will be accomplished early or late in the project. To provide for work which cannot be accomplished early in the project, it may be necessary to project wage scales, rental rates and other such values to take into account inflation, in order to accurately estimate the costs.

ARTICLE 5 – Factors that Affect Unit Prices

Prepare Reasonable Cost Estimates

Project cost estimating is not an exact science, however, estimators are expected to prepare reasonable project cost estimates that represent the cost to complete the project. These costs include those required not only for the contractor to construct the project but, also includes the costs for the purchase of right of way, mitigation of environmental issues and any other costs that will be incurred to complete the project.

Almost all project cost overruns are due to conditions that exist at the time that the cost estimate was initially made. There is no single answer to good price estimating for contract items, rather it is a matter of diligently using all of the available data, modifying that data with good judgment, plus a measure of experience. Experience has shown that project cost estimators should consider the following factors which can affect bid prices on construction projects.

Fluctuation of Costs

Project cost estimates should be reviewed and updated periodically. This practice should continue as near the project "Listing" for advertisement as possible. Material shortages may develop at unexpected intervals which can result in an increase in material prices. Wages continually increase, although usually at a somewhat predictable rate. The time of the year that the project is advertised or constructed often affects prices and if this has changed for the project, the unit prices for the contract items may need revision. Project cost estimates must be current at time of preparation of the final contract documents. Review and updating, as necessary, is especially needed when the California Construction Cost Index is rising or falling frequently and rapidly. The BEES Item Price and Quantity Reports contain dates when item prices and quantities were last updated.

Traffic Conditions

Traffic conditions have a significant affect on prices. Prices should be adjusted to reflect difficulties, dangers and expenses caused by traffic conditions. Contractors are inclined to raise their prices on projects to be constructed with work sites exposed to considerable traffic.

Restrictive Work Hours or Method of Work

Restricting the contractors working hours or the method of work on a project may have major affects on prices. The prices for work that is limited to short shifts, or required to be completed in long shifts, or limited to nighttime operations should be increased to reflect the cost of premium wages required for such work and for the general inefficiencies and decreased productivity that may result. Night work for plant operations (i.e. - asphalt concrete production) can especially be expensive when small quantities are involved. Plants usually do not operate at night and may require special production runs at much higher than normal operating costs.

Quantities of Work

Small quantities of work usually always have higher unit cost than identical work in larger quantities. This is because move-in, overhead, and other such costs must be distributed over a smaller base. Production rates are also less efficient and are usually slower for small quantities which also tend to increase unit prices.

Separate Operations

Separate operations will usually increase item costs, especially if the order of work or the work unit is to be constructed in scattered locations throughout the project (each requiring move-in and move-out costs). If this is the case, unit prices should be based on the smaller unit sizes and should not be based upon the entire quantity for the total project.

Handwork and inefficient Operations

Handwork and small or inefficient operations (even though equipment may be used) will have higher unit costs than work that is able to be mass produced or constructed by using techniques that result in higher production rates.

Accessibility

Work requiring long out of direction movements by construction personnel and equipment can be especially expensive. Material hauling that must be accomplished by entering and exiting only on interchange ramps, material hauling uphill rather than downhill, work on the top of slopes or retaining walls, etc. is always more expensive to construct than work that is easy to accomplish on level or gentle slopes. The ease of accessibility to the work will affect the cost to do the work.

Geographic Location

Geographically remote locations usually result in higher bid prices. If subsistence payment will be required for the workers it will affect the bid prices. It is also important to take into account where the sources of supply are and the distance to the project from which materials must be delivered.

Construction Season

The time of the year that the project is advertised and constructed affects the unit cost for items of work. Contractors usually are more readily available for work early in the spring and will therefore bid conservatively at that time. Later in the spring or during the summer many contractors have on-going projects that keep them busy, therefore, they tend to bid higher or not at all. Consideration should also be given when a project is to be awarded near the end of summer or the construction season. It is important to know if the work can be accomplished before winter weather causes the project to be shut down. If the job cannot be finished before the end of the construction season and the project needs to be suspended, contractors will increase their bid prices to cover their overhead during the winter and repair any damage that may occur. Even if contractors reasonably expect to finish before the winter, they may protect themselves to allow for an early winter. This can especially be true if construction involves work on items that may be affected by winter weather (i.e. - drainage channels, earthwork, etc.).

Material Shortages

Material shortages will have a major effect on prices since prices are directly affected by supply and demand. Where a shortage is especially acute, a change in design might be considered rather than increasing prices.

SECTION 2 – Project Planning Cost Estimates

ARTICLE 1 – General

Estimate Each Alternative

The project development process includes engineering and environmental studies to determine alternatives to ensure that all social, economic and environmental issues have been considered. In doing so, a range of alternatives has been developed and costs for each viable alternative should be determined. The highest realistic cost alternative should be used for programming the project.

Exception Approval Required

Project Planning Cost Estimates (see Chapter 20, Section 2, for procedural information) should be prepared based on designing to all applicable standards. Cost estimates for alternatives that do not meet mandatory or advisory design standards are only legitimate when there is an approved fact sheet. Proposed exceptions to mandatory and advisory design standards must be approved following the procedures in Chapter 21 – Exceptions to Design Standards.

Format

All project planning cost estimates, except those specialized formats developed for certain project types (see Article 3 in this Section) are to be prepared and submitted using the standard format included at the end of this Appendix (AA).

Keep the Cost Estimate Current

As studies progress in the project planning phase, more information such as final contour mapping, materials and drainage information, and structure studies becomes available. Each piece of new information will increase the accuracy of the cost estimate and provides the opportunity to update the project cost. Project cost estimates should be reviewed periodically and updates, as appropriate, should be completed.

ARTICLE 2 – Preparing the Standard Format for Project Planning Cost Estimates

General

The standard format included at the end of this Appendix (AA) is intended to be used as a format for all project planning cost estimates. For many projects, the form can be used as is by completing a cover sheet and "filling-in" the blanks. However, if needed, extra lines are provided for items not listed. Additional lines may be added as necessary.

The standard format is broken into four components:

- Cover Sheet,
- Roadway Items,
- Structure Items, and
- Right of Way.

The concept behind the standard format requires that the cost estimator determine quantities and costs for groups of related work. Identification of contract items is not necessary (but would be beneficial) to obtain a realistic cost estimate for each viable project alternative. Calculation sheets, maps and sketches used to determine costs and quantities for the cost estimate should be retained in the project files until the project has been completed and finalized. The following is a discussion on the components of the standard format:

Cover Sheet

All project planning cost estimates should have a standard cover sheet to provide project description information, a summary of the project (or alternate) cost estimate and approval signatures. The information to be provided is self-explanatory.

I. Roadway Items

Section 1: Earthwork

Roadway excavation and the possible need for imported borrow is ideally estimated by developing typical cross sections, profiles, contour maps and then using electronic calculations. Without this luxury, it is necessary to walk the project with map, typical cross section and profile (for a new facility). Quantities can be calculated using slope distance, amount of widening and length. With careful judgment used in averaging the various end areas, a

realistic cost estimate can be obtained. For projects with a new profile, it is possible to calculate earthwork by plotting the profile and existing ground line and then plotting a few critical cross sections. Additional cross sections may need to be plotted at interchanges.

Clearing and grubbing is an important factor in all cost estimates, but particularly in forested areas. Calculations by the hectare are desirable but payment is usually made by lump sum.

Develop water supply can be included in other items of work, but it is prudent to include a lump sum amount where availability of water (desert areas, etc.) is in doubt. A good method would be to use a realistic percentage figure based on the quantity of roadway excavation -- say 5 to 10 %. Special studies on the availability of water and the economics of supplying water may be required. If water is not supplied, compaction methods may need to be altered and thus reflected in the estimate.

Section 2: Pavement Structural Section

Preliminary materials information is necessary to adequately estimate pavement structural section items. If not available, the pavement structural section of a similar adjacent project could be used. Most of these items are calculated by determining width, depth and length. Items with side slope material such as aggregate base should be calculated using average widths and depths times length for the portions outside the hinge point.

Typical cross sections need to be developed at the very earliest stage to facilitate cost estimating, and a sketch should be referred to in the cost estimate to indicate the basis for the calculations. The Traffic Index (T.I.) and "R" Values used should be shown on the referenced typical cross section sketch. The T.I. and "R" Values should be obtained as early as possible (can be assumed from adjacent projects or with consultation with the District Materials Unit). If ordering "R" Value tests, make sure an adequate number of tests are performed. The estimate should be updated as appropriate if this information changes.

Section 3: Drainage

Large drainage facilities (i.e.: reinforced concrete boxes, animal crossings, etc.) should be estimated separately and the *Standard Plans* should be consulted for quantities. Drainage items for widening and rehabilitation projects can be estimated by determining extensions to existing culverts and the number of other features, such as inlets, and overside drains, that will be affected. Be aware of any additional right of way that may be needed for drainage easements. Bid sheets from adjacent or similar type projects can be evaluated for use for unit costs. Cost estimates for drainage on new alignment projects can be quantified by comparisons with similar types of projects.

Section 4: Specialty Items

Features such as retaining walls and noise barriers can usually be identified during field reviews. Locations can be shown on the filed map and reasonable calculations can be made using *Standard Plans*. Items such as hazardous wastes and environmental mitigation require consultation with other functional units in the District, Division of Engineering Services, and Headquarters. It is important to deal with hazardous waste and environmental issues immediately and avoid them if possible, since they often come back to adversely affect project cost estimates with large cost increases.

Section 5: Traffic Items

The District Traffic Unit can provide realistic cost estimates for signing, stripping and other traffic items, when they are given specific project data. The handling of traffic almost always is a major consideration. A Transportation Management Plan must be developed, as appropriate, early in the process with consultation from other functional units within the District (i.e.: Traffic, Construction, Maintenance, Surveys, etc.).

Section 6: Planting and Irrigation

Reconstruction of irrigation facilities (pumps, sumps, return lines, etc.) to be handled as a part of the construction contract can also be identified from field review. Locations can be shown on the filed map and reasonable calculations can be made using Standard Plans.

Section 7: Roadside Management and Safety Section

Items such as erosion control or slope protection (both during construction and permanent) can be estimated by using slope information obtained from the field review.

Section 8: Minor Items

Minor items (i.e.: fencing, curbs, sidewalks, access ramps, etc.) can be estimated by using a percentage of 5 to 10 % of the "main" construction items (Sections 1-5). Alternately, these items may also be identified in the field and placed on the strip map to be totaled up in the office. Remember to consider work on local streets, such as work that may eventually be shown on a freeway agreement, and other requirements for the project, such as access features needed to comply with the Americans with Disabilities Act (ADA).

Section 9: Mobilization

Mobilization is 10% of the total of the main construction items plus minor items. Mobilization for structures should not be included in this total as it is part of the cost estimates provided by the Division of Structures. On occasion it may be justified to increase the mobilization percentage for a project due to stage construction with multiple move-ins and -outs, or if the project is in a remote

location. If this is the case, discuss it with Office of Office Engineer in the Engineering Service Center before making the increase in mobilization percentage.

Section 10: Roadway Additions

Supplemental work provides funds for construction work that can not be predicted or calculated beforehand because of an uncertain nature or amount and therefore it is not done on a contract item basis. Typical examples are removal of slide material, removal of unsuitable material, or increases in the asphalt content. Supplemental work does not take the place of incomplete design work, nor is it used for contingencies. Smaller projects could require 10% of the total of the main construction items plus minor items while large projects could require only 2 to 3%.

Contingency factors for the cost estimate vary from 50% to 10% depending on the project cost estimate type. Contingencies are calculated as percentages of the total main construction items plus minor items. They are used for unforeseen items of work that crop up as studies progress. The percentage goes down as the project becomes more defined and thus less unknown.

II. Structures Items

Estimates of structure costs should be obtained from the Engineering Service Center (ESC) Division of Structures (DOS). The ESC Project Functional Manager should be contacted to discuss the cost estimate requirements for each specific project. Remember that other structure work may be required to be estimated besides bridge work. For example, non standard noise barriers and non standard retaining walls (see the *Standard Plans* for details) will require special designs and therefore cost estimates prepared by the Division of Structures. When cost estimates are requested, provide sufficient information in the request to adequately define the proposed structure or structure modifications required. Advanced Planning structure cost estimates and other appropriate back-up calculations provided by the Division of Structures are to be referred to in the cost estimate.

The structure list contains spacing for three bridges (or other structures). If more than three spaces are required, use additional sheets as appropriate.

Any railroad related work that is required for such items as shooflys or track reallocations is to be shown on the form. This work will probably be identified through the right of way process, but should be shown in the cost estimate at this location.

It is important to note that the cost estimates for structure items usually include costs for contingencies and mobilization. Be careful not to double up on these items when compiling the project cost estimate.

III. Right of Way Items

The right of way portion of the cost estimate should be obtained from the District Right of Way Branch. The Right of Way Branch prepares its cost estimate based on current

procedures and guidelines contained in the *Right of Way Manual*. Costs for the listed right of way items are to be obtained from the Right of Way Data Sheet (see Appendix JJ). The Right of Way Data Sheet should be referred to in the project cost estimate as backup information.

"Construction Contract Work" (contractual obligations made by the Right of Way Branch with the property owner, such as the costs to relocate fencing, reconstruct gates, reconstruction road approaches) should be described briefly and the estimated cost to perform this work given. The estimated cost should only be shown in this portion of the Project Planning Cost Estimate, not included. Construction contractual obligations are to be included in the project cost estimate as construction items of work.

ARTICLE 3 – Specialized Project Planning and Other Cost Estimates

Specialized Project Types

Specialized project development reports have been developed to aid the project approval process for certain specialized project types. Many of these specialized project development reports (Combined PSR/PR, PSSRs, Highway Planting PR, etc.) also include their own specialized cost estimate formats. In most cases, these specialized formats were created from the standard format but have been simplified to focus on the typical items of work associated with these specialized project types.

The specialized formats were created so that they can be completed by "filling-in the blanks". The information needed should be self-explanatory from reading the specific form and its complementary preparation guidelines. The concepts presented in this Appendix relating to field reviews, identifying items of work, determining prices, etc. still apply to the specialized forms and should be followed while completing them.

Other Cost Estimates

Various programs (TSM, Facilities, etc.) and processes during project development (Fact Sheets for mandatory and advisory design exceptions; determination of cooperative features; etc.) require cost estimating. For guidance on preparing these specialized cost estimates, see the appropriate Appendix in this manual or instructions in other manuals or documents, as appropriate.

(Enter Type of Project Cost Estimate as Title)

District-County-Route_____

PM _____

EA _____

Program Code_____

PROJECT DESCRIPTION:

Limits _____

_____

Proposed Improvement (Scope) _____

_____

Alternate _____

SUMMARY OF PROJECT COST ESTIMATE

TOTAL ROADWAY ITEMS	$_____
TOTAL STRUCTURE ITEMS	$_____
SUBTOTAL CONSTRUCTION COSTS	$_____
TOTAL RIGHT OF WAY ITEMS	$_____
TOTAL PROJECT CAPITAL OUTLAY COSTS	$_____

Reviewed by District Program Manager _____
(Signature)

Approved by Project Manager _____ Date _____
(Signature)

Phone No. _____ Page No. _____ of ____

District-County-Route _____
PM _____
EA _____

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost	Section Cost
Roadway Excavation	_____	____	$_____	$_____	
Imported Borrow	_____	____	$_____	$_____	
Clearing & Grubbing	_____	____	$_____	$_____	
Develop Water Supply	_____	____	$_____	$_____	
Top Soil Reapplication	_____	____	$_____	$_____	
Stepped Slopes and Slope Rounding (Contour Grading)	_____	____	$_____	$_____	
_____	_____	____	$_____	$_____	
			Subtotal Earthwork		$_____

Section 2 Pavement Structural Section*	Quantity	Unit	Unit Price	Item Cost	Section Cost
PCC Pavement (___Depth)	_____	____	$_____	$_____	
PCC Pavement (___Depth)	_____	____	$_____	$_____	
Asphalt Concrete	_____	____	$_____	$_____	
Lean Concrete Base	_____	____	$_____	$_____	
Cement-Treated Base	_____	____	$_____	$_____	
Aggregate Base	_____	____	$_____	$_____	
Treated Permeable Base	_____	____	$_____	$_____	
Aggregate Sub base	_____	____	$_____	$_____	
Pavement Reinforcing Fabric	_____	____	$_____	$_____	
Edge Drains	_____	____	$_____	$_____	
_____	_____	____	$_____	$_____	
			Subtotal Pavement Structural Section		$_____

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost	Section Cost
Large Drainage Facilities	_____	____	$_____	$_____	
Storm Drains	_____	____	$_____	$_____	
Pumping Plants	_____	____	$_____	$_____	
Project Drainage (X-Drains, overside, etc.)	_____	____	$_____	$_____	
_____	_____	____	$_____	$_____	
			Subtotal Drainage		$_____

*Reference sketch showing typical pavement structural section elements of the roadway. Include (if available) T.I., R-Value and date when tests were performed.

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

District-County-Route _____
PM _____
EA _____

Section 4: Specialty Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Retaining Walls	_____	____	$_____	$_____	
Noise Barriers	_____	____	$_____	$_____	
Barriers and Guardrails	_____	____	$_____	$_____	
Equipment/Animal Passes	_____	____	$_____	$_____	
Water Pollution Control	_____	____	$_____	$_____	
Hazardous Waste Investigation and/or Mitigation Work	_____	____	$_____	$_____	
Environmental Compliance	_____	____	$_____	$_____	
Resident Engineer Office Space	_____	____	$_____	$_____	
_____	_____	____	$_____	$_____	
			Subtotal Specialty Items		$_____

Section 5: Traffic Items	Quantity	Unit	Unit Price	Item Cost	Section Cost
Lighting	_____	____	$_____	$_____	
Traffic Delineation Items	_____	____	$_____	$_____	
Traffic Signals	_____	____	$_____	$_____	
Overhead Sign Structures	_____	____	$_____	$_____	
Roadside Signs	_____	____	$_____	$_____	
Traffic Control Systems	_____	____	$_____	$_____	
Transportation Management Plan	_____	____	$_____	$_____	
Temporary Detection System	_____	____	$_____	$_____	
Staging					
			Subtotal Traffic Items		$_____

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

District-County-Route _____
PM _____
EA _____

Section 6 Planting and Irrigation	Quantity	Unit	Unit Price	Item Cost	Section Cost
Highway Planting	_____	____	$_____	$_____	
Replacement Planting	_____	____	$_____	$_____	
Irrigation Modification	_____	____	$_____	$_____	
Relocate Existing Irrigation Facilities	_____	____	$_____	$_____	
Irrigation Crossovers	_____	____	$_____	$_____	
_____	_____	____	$_____	$_____	
			Subtotal Planting and Irrigation Section		$_____

Section 7: Roadside Management and Safety Section	Quantity	Unit	Unit Price	Item Cost	Section Cost
Vegetation Control Treatments	_____	____	$_____	$_____	
Gore Area Pavement	_____	____	$_____	$_____	
Pavement beyond the gore area	_____	____	$_____	$_____	
Miscellaneous Paving	_____	____	$_____	$_____	
Erosion Control					
Slope Protection	_____	____	$_____	$_____	
Side Slopes/Embankment Slopes	_____	____	$_____	$_____	
Maintenance Vehicle Pull outs					
Off-freeway Access (gates, stairways, etc.)					
Roadside Facilities (Vista Points, Transit, Park and Ride, etc.)	_____	____	$_____	$_____	
Relocating roadside facilities/features	_____	____	$_____	$_____	
_____	_____	____	$_____	$_____	
			Subtotal Roadside Management and Safety Section		$_____

TOTAL SECTIONS: 1 thru 7 $_____

NOTE: Extra lines are provided for items not listed; use additional lines as appropriate.

District-County-Route _____
PM_____
EA _____

Section 8: Minor Items

$_____ x (5 to 10%) = $_____
(Subtotal Sections 1 thru 7)

TOTAL MINOR ITEMS $_____

Section 9: Roadway Mobilization

$_____ x (10%) = $_____
(Subtotal Sections 1 thru 8)

TOTAL ROADWAY MOBILIZATION $_____

Section 10 Roadway Additions

Supplemental Work
$_____ x (5 to 10%) = $_____
(Subtotal Sections 1 thru 8)

Contingencies
$_____ x (**%) = $_____
(Subtotal Sections 1 thru 8)

TOTAL ROADWAY ADDITIONS $_____

TOTAL ROADWAY ITEMS $_____
(Subtotal Sections 1 thru 10)

Estimate Prepared By _____ Phone# _____ Date _____
(Print Name)

Estimate Checked By _____ Phone# _____ Date _____
(Print Name)

** Use appropriate percentage per Chapter 20.

District-County-Route _____
PM _____
EA _____

II. STRUCTURES ITEMS

	Structure (1)	Structure (2)	Structure (3)	
Bridge Name	_____	_____	_____	
Structure Type	_____	_____	_____	
Width (out to out) - (ft)	_____	_____	_____	
Span Lengths - (ft)	_____	_____	_____	
Total Area - (ft^2)	_____	_____	_____	
Footing Type (pile/spread)	_____	_____	_____	
Cost Per ft^2 (incl. 10% mobilization and 20% contingency)	_____	_____	_____	
Total Cost for Structure	_____	_____	_____	

SUBTOTAL STRUCTURES ITEMS $_____
(Sum of Total Cost for Structures)

Railroad Related Costs:	_____	_____	_____	$_____
	_____	_____	_____	$_____
	_____	_____	_____	$_____

SUBTOTAL RAILROAD ITEMS $_____

TOTAL STRUCTURES ITEMS $_____
(Sum of Structures Items plus Railroad Items)

COMMENTS:

Estimate Prepared By _____ Phone# _____ Date _____
(Print Name)

NOTE: If appropriate, attach additional pages and backup.

Page No. ____ of ____

District-County-Route _____
PM _____
EA _____

III. RIGHT OF WAY ITEMS ESCALATED VALUE

A. Acquisition, including excess lands, damages to remainder(s) and Goodwill $_____

B. Utility Relocation (State share) $_____

C. Relocation Assistance $_____

D. Clearance/Demolition $_____

E. Title and Escrow Fees $_____

TOTAL RIGHT OF WAY ITEMS $_____
(Escalated Value)

Anticipated Date of Right of Way Certification $_____
(Date to which Values are Escalated)

F. Construction Contract Work

Brief Description of Work:

_____

_____

_____

_____

Right of Way Branch Cost Estimate for Work * $_____

* This dollar amount is to be included in the Roadway and/or Structures Items of Work, as appropriate. Do not include in Right of Way Items.

COMMENTS:

Estimate Prepared By _____ Phone# _____ Date _____
(Print Name)

NOTE: If appropriate, attach additional pages and backup.