

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Preparation Guidelines for Project Development Cost Estimates

Cost Estimating Guidelines

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Abstract

This Document replaces Appendix AA of Project Development Procedure Manual (PDPM). PDPM Chapter 20 – Project Development Cost Estimates includes the policy and procedures required for developing project cost estimates. This document provides minimum guidance necessary to develop reasonably accurate cost estimates but doesn't take place of experience and prudent engineering judgment. This guidance included discussion of many different factors that affect project cost estimates. Estimator should consider all of these factors as necessary in developing a project cost estimate.

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Preparation Guidelines for Project Development Cost Estimates

SECTION 1 General Guidelines

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 and also avoid excessive cost underruns. Cost overrun leads to shortage of funding to deliver the project, while cost underruns leaves unused funds that could have been used to deliver other important projects. The objective is to produce reliable construction estimates throughout project planning, development, and delivery process. It is important to identify costly unforeseen items of work before the project has been programmed to avoid delays and/or cancelation. Estimators should try to minimize the differences between project's planning estimates and final design estimate, as well as the difference between the Engineer's Estimate and the Low Bid.

Consistent and Comprehensive Methodology

Estimating cost 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, Caltrans requires 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 professional judgment to prepare a quality cost estimate. Consideration of project scope, schedule, and level of design details is required to develop accurate cost estimates. 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 (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. Project cost estimates should be developed through consultation with the project development team.

Identifying Items of Work and Estimating Quantities - Project Planning Phase

Systematic Field Reviews

In order to use project estimate with confidence it is essential that project alternatives be adequately scoped. This is best accomplished by visiting the project site and performing a systematic field review. 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. Going to 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 such as utility relocation, noise barriers, retaining walls, major storm drains, hazardous waste mitigation, and other environmental impacts. Consult with the local construction and traffic leads to determine the need for a transportation management plan or a traffic handling plan. Local maintenance lead could point out if there are any drainage or accidents issues. If high cost items are present or need to be designed into the project alternatives, they must be quantified. The “worst 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, further deterioration prior to construction, or other factors. Design feature decisions, project constructability, construction staging, etc should be evaluated in the field. The estimator should take notes 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* are advisable.

Additional Information

Additional types of information that must be obtained to prepare a Project Planning Cost Estimate include but are not limited to: 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; utilization of existing resources (recycling). Research the information already available early in the project development process and utilize it. If this information is not available, request it 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.

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 decreases as the project becomes more defined and there are fewer unknowns. 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, during which many decisions and agreements are made. All too frequently during this time, project personnel changes occur, which 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. All the assumptions used to develop cost estimate should be documented along with different versions of cost estimates as they are updated over time.

Identifying Contract Items and Estimating Quantities - Project Design Phase

Items Entered Into the Basic Engineering Estimating System

The items of work identified and estimated during the Project Planning phase should now be better defined as work performed by the project design staff and the other functional units is completed. As additional information and design details become available, improvements that were previously estimated can be quantified as contract items of work, increasing the reliability of the cost estimate greatly. Timely entry in of these quantities in the Basic Engineering Estimating System (BEES) 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; therefore, it is not done on a contract item basis. Work that 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 (for example, drainage or traffic items). 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, concurrently 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 preapproved by the Federal Highway Administration (FHWA), as being in the public interest, for Caltrans to furnish to the contractor on federal-aid projects (for example, sign panels, marker panels, monument disks, traffic controllers, or recycled/salvaged materials in stock). 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.

Basing Estimates 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

(for example, temporary railing) can be easily duplicated and may also have pricing conflicts.

Specific contract items should be identified using the BEES coded item list. A copy of the BEES coded item list may be requested through the district BEES coordinator. Coded contract items list is also available on Division of Engineering Services - Office Engineer (DES-OE) intranet website: <http://oe.dot.ca.gov/occs.html#bid>

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 together.

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, the most practical method. When using this method, it is important to consider the following factors:

- Similarly-sized projects should be used, and quantities for individual items should be similar.
- Consider using the average of the top three low bidders or average of all bidders after removing the outliers.
- Historic bid prices should be adjusted to the current cost based on the change in the California Historical Highway Construction Price Index (DES-OE) between the date of the old bid and the date of the current estimate. (Escalated price column in Caltrans Contract Cost Database on District 8 website reflects this adjustment). Also current estimate should be escalated forward to the date of anticipated mid-point of construction using available forecasted indices for construction cost escalation and/or inflation. A table of Construction Cost Indices and Forecast is available at the Headquarters Division of Design (HQ DOD) Cost Estimating website.
- 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.

- Historic lump sum bid prices or unit prices for items of work (for example, culverts, trench excavation, clearing and grubbing) that include varying amounts of other related project specific 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 that had competitive bidding. Sources of historic bid prices and other information are:

- [Caltrans Contract Cost Database](#) (District 8 Website)
- [Bid Summaries](#) (DES-OE Website)
- (not recommended) (not recommended) (not recommended) Historical Highway Construction Price Index Reports (DES-OE Website)
- [Construction Cost Indices and Forecast](#) (HQ-DOD Cost Estimating)

For further information on cost estimating activities, roles and responsibilities refer to the [Ready to List Guide](#). For help with BEES_ contact the district BEES Coordinator. Questions on current cost estimating methods and practice should be directed to the Headquarters Division of Design, Office of Special Projects, Cost Estimating. Visit our websites on:

Intranet: <http://onramp.dot.ca.gov/hq/design/specproj/costestimate.php>

Internet: <http://www.dot.ca.gov/hq/oppd/costest/costest.htm>

Complete Analysis Method

This method is usually not practical for use on each and every item of work included in a 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 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 lengthy time limits, it will be necessary to determine whether the majority of a work item will be accomplished early or late in the project. To provide for work that 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.

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 include 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, and 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 close as possible to the project “Listing” for advertisement. 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 the time of preparation of the final contract documents. The BEES Item Price and Quantity Reports contain dates when item prices and quantities were last updated. Estimate review and updates, are especially necessary when the construction market is volatile. Construction cost indices and forecasts are good indicators of construction market volatility and fluctuations

Traffic Conditions

Traffic conditions significantly affect 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

Restrictions on contractors' working hours and the method of work on a project may significantly affect prices. The prices for work that is limited to short shifts, 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 (for example, 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, and work on the top of slopes or retaining walls are 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 are usually more readily available for work early in the spring and will therefore bid conservatively at that time. Later in the spring and during the summer, many contractors have ongoing 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 end of the construction season. It is important to know whether 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 (for example, drainage channels or earthwork).

Material Shortages

Material shortages will have a major effect on prices since prices are directly affected by supply and demand. In a location where a shortage of an item is known to be especially acute, a change in design should be considered if appropriate rather than increased bid prices.

SECTION 2 Project Planning Cost Estimates

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, when a range of alternatives have been developed 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 should be prepared based on designing to all applicable standards. (See PDPM [Chapter 20](#) – Project Development Cost Estimates for procedural information.) 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.

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 updated as appropriate. (See policy for updating cost estimates in PDPM Chapter 20)

Preparing the Standard Format for Project Planning Cost Estimates

General

A new standard cost estimate template is available in Excel spreadsheets format on Headquarters Division of Design Cost Estimating website under “[Templates](#)” tab. It is intended to be used as a standard format for all project planning cost estimates and replaces the former six-page cost estimate format. For many projects, the template can be used as is by completing the project information on the cover sheet and filling in the unit costs and quantities for items or subtotals for the subsections in rest of the sheets. If needed, lines can be deleted, replaced or added for items not listed. Additional lines for subsections or subtotals may be added as necessary. It is estimator’s responsibility to make sure that the Excel formulas works properly and the math adds up for the completed spreadsheets.

The standard format is broken into four main components Roadway, Structures, Right-of-Way, and Support Costs. They are organized over 11 spreadsheets in an Excel file as follows:

- Cover Sheet - sheet 1 of 11
- Roadway Items Summary - sheet 2 of 11
- Roadway Item Sections - sheets 3 through 8 of 11
- Structure Items - sheet 9 of 11
- Right-of-Way Datasheet - sheet 10 of 11
- Support Cost Summary, and Escalated Cost - sheet 11 of 11

Note: When attaching the cost estimate to a Project Initiation Document (PID) only first 10 sheets should be printed. The support costs on sheet 11 are attached separately under Support Cost Tables in PID.

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. Totals from the other sheets automatically transfer to this main summary sheet in the Excel template but estimator should verify them.

I. Roadway Items Summary

All of the roadway items subsections are summarized here. Subtotals from roadway subsections automatically transfer to this sheet but estimator should verify them.

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 a map and a 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 is in doubt (for example, in desert areas). A good method would be to use a realistic percentage figure based on the quantity of roadway excavation (5 to 10 percent, for example). 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 provided with 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. These values should be obtained as early as possible. (They can be assumed from adjacent projects or with consultation with the District Materials Unit.) If ordering “R” Value tests, ensure that an adequate number of tests are performed. The estimate should be updated as appropriate if this information changes.

Section 3: Drainage

Large drainage facilities (for example, reinforced concrete boxes or animal crossings) 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 field map and reasonable calculations can be made using *Standard Plans*. Some specialty items such as retaining walls and sound walls require consultation with other functional units in the District, Division of Engineering Services, and Headquarters.

Section 5: Environmental Items

District Environmental functional unit should be consulted to develop reasonable cost estimate for environmental items such as hazardous wastes and environmental mitigation. It is important to deal with hazardous waste and environmental issues immediately and avoid them if possible, since they often cause large cost increases that impact project cost estimates. Landscape, irrigation and NPDES (National Pollutant Discharge Elimination

System) items should be included in the estimate as necessary after consultation with respective functional units. Make sure to use latest specifications for these items.

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

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 6: Traffic Items

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

Section 7: Detours

Section 8: Minor Items

Minor items (for example, fencing, curbs, sidewalks, and access ramps) can be estimated by using a percentage (5% to 10% depending on level of design) of total cost of the “main” construction items (Sections 1-5). Ideally, these items should be identified in the field and placed on the strip map to be calculated and totaled in the office later. 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), and bike path requirements.

Section 9: Mobilization

Depending on the project need Mobilization is allowed to be anywhere from 0 to 10 percent of the sum of all contract item costs, including the mobilization item. Mobilization percentage should be determined using recent contract item cost data for similar projects with mobilization and by taking into consideration project conditions such as project size, duration, location and other conditions that could influence mobilization. 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 above 10 percent 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 the Headquarters Office of Office Engineer before making the increase in mobilization percentage.

Section 10: Supplemental Work

Supplemental Work (SW) provides funds for construction work that cannot be predicted or calculated beforehand because of an uncertain nature or amount; 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 percent of the total of the main construction items plus minor items while large projects could require only 2 to 3 percent.

Section 11: State Furnished Material and Expenses

State Furnished Materials and Expenses (SFME) include items that are paid for by state or other agency. These items are not part of the contract items but must include in the project estimate. It includes items such as COZEEP, RE Office, Public Information, etc.

Section 12: Time-Related Overhead

For projects over \$5 million Time-Related Overhead (TRO) is an item. TRO is calculated based on percentage of contract items only, excluding mobilization, SW, SFME and contingency. TRO percentage is allowed to be anywhere from 0 to 10 percent. Select the TRO depending on project specific circumstances. Consider TRO on bid history of recent similar type of projects near the project location.

Section 13: Contingency

Contingency factors for the cost estimate vary from 50 percent to 10 percent depending on the project cost estimate type. Contingencies are calculated as percentages of the total main construction items plus minor items, SW, SFME, and TRO. 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 fewer unknowns.

II. Structures Items

Estimates of structure costs should be obtained from the Division of Engineering Services (DES), Office of Structures Estimating. They should be contacted to discuss the cost estimate requirements for each project with structures items. Besides the bridge work other structure work may be required on a project. For example, non-standard noise barriers and non-standard retaining walls will require special designs and therefore need cost estimates prepared by the Structures Estimating unit. (See the *Standard Plans* for details.) 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 Structures Estimating unit should be referred to in the project cost estimate.

In the cost estimate template the structure sheet (sheet 9 of 11) contains spacing for six bridges (or other structures). If more than six spaces are required, insert additional spaces or sheets (e.g. sheets 9A, 9B ...) 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 may be identified through the right-of-way process, but it should be shown in the cost estimate at this location.

The cost estimates for structure items usually include separate contingencies and mobilization. Check for duplication 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](#) – Resolutions of Necessity). The Right of Way Data Sheet should be referenced 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.

Specialized Project Planning and Other Cost Estimates

Specialized Project Types

Some units at Caltrans have developed specialized project development reports to aid the project approval process for certain specialized project types. Many of these specialized project development reports 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.

Some of the specialized formats have a “fill in the blanks” structure and include preparation guidelines to facilitate completion of the cost estimate formats. The standard format templates can be modified to serve the same purpose.

The concepts presented in this guidance relating to field reviews, identifying items of work, determining prices, and other factors still apply to the specialized forms and should be followed while completing them.

Other Cost Estimates

Various programs (Transportation System Management, Facilities, etc.) and processes during project development (for example, fact sheets for mandatory and advisory design exceptions and determination of cooperative features) require cost estimating. For guidance on preparing these specialized cost estimates, see the appropriate appendices in PDPM manual or instructions in other manuals or documents, as appropriate