

# Estimating Guides

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## Introduction

The philosophy of project cost estimating is to produce the best cost estimates reflective of the project risks using the most accurate and complete project and pricing information available at the time the estimate is prepared.

It is difficult to generate cost estimates for transportation projects that remain accurate throughout the entire project life cycle, particularly when comparing early conceptual estimates to the actual final cost of the completed project. Project cost estimates, in a way, are never really completed; they essentially are continually being updated to keep them current. However, developing quality estimates that can be relied on is important for many reasons:

- RCTD's programming and budgeting depends on reasonable project estimates.
- The Transportation Improvement Program has limited funding and budgets all available dollars. Overruns on one project forces something else to be unfunded. Underruns leaves funding in the bank thereby neglecting potential important improvements.
- County budgeting affects local and regional planning.
- Budget estimates are widely circulated to the Board, media and public.
- Poor estimates can cause a loss of credibility

Applying consistent formatting and standardized processes to each estimate enhances the efficiency, accuracy, reliability, and credibility of cost estimates. It also improves the ability to review and compare estimates at different stages of the project life cycle. In the current economic climate of greater-than-ever strains on public funds, the pressure to accurately estimate the ultimate cost of a project is increasing. An accurate and complete cost estimate goes a long way toward supporting the successful delivery of a project within its approved budget.

In summary, good engineering estimates are important. Take the time to do a quality estimate, consistent with the need, and everyone benefits.

## Estimate Stages

Estimates represent our best expectation of cost based on the data available. Consequently, estimates become inherently more accurate as a project develops and greater details are available. Typically, cost estimates are prepared at four stages of a project.

*The Conceptual Stage* is when an improvement is desired and estimates are developed to secure funding and program the improvements. This is typically the stage in which estimates used in the TIP are generated.

*The Planning Estimate Stage* is when an improvement has been programmed and assigned to a Project Manager. The Project Manager reviews/develops a more thorough scope of work with the RCTD functional groups and validates that the available funding is adequate and that the intended purpose of the project can be accomplished.

*The Preliminary Estimate Stage* is when technical engineering and environmental studies have been complete, various alternatives have been evaluated and decisions on the final alternative or scope of work are being determined.

*The Engineers Estimate Stage* is when engineering plans and project special provisions have been prepared. The quantities of work and materials are determined from the plans at various stages (65%, 95% & 100%) and used as the basis for calculating the Engineers Estimate.

STAGE	PURPOSE	METHODOLOGY
Conceptual 0% to 2%	Feasibility and/or programming	Historical cost of similar projects.
Planning 0% to 15%	Validation of project Feasibility and/or programming. Compiled in conjunction with initial in-depth scoping of project.	Historical cost of similar projects and/or historical unit cost for similar work.
Preliminary 25% to 35%	Refine cost based on field studies, technical studies, preliminary engineering and environmental analysis.	Cost based on initial quantities for large cost items. Contingency factors are included for lower cost items and a high contingency is used for the project.
Engineer's Estimate 65%, 95% & 100%	Used for project cost control during design. Establishes the funding requirements for award of the project. Used as a benchmark for comparison with contract bids.	Cost based on detailed quantity calculations and historic bid pricing. Each submittal should have successively lower contingency until final submittal at between 5% & 10%.

*Project Cost Estimate Stages*

Cost estimators must make assumptions in developing any estimate, particularly during the early stages of a project when much less information is known. All such assumptions should be documented clearly and comprehensively enough to readily establish the basis on which the estimate is built.

Project cost estimates should always reflect the entire scope of work for the project (e.g. engineering, property acquisition, construction).

### *Conceptual & Planning estimates*

Use of historical costs of similar projects or work produces an estimate using various factors that define the cost of typical transportation infrastructure, such as cost per lane kilometer of roadway, cost per interchange, cost per square meter of a bridge structure, and cost per intersection. The historical costs used to develop these estimates come from previous relevant projects.

The appropriateness of this method depends largely on the extent of the project definition available, and the similarity between the new project and historical models. This approach is beneficial at the very early stages of project

development when little or no design information is available. This method can be refined somewhat if selection of relevant projects and assessment of the data is more tailored to the specifics of the project being estimated.

Costs from similar projects in the past provide an excellent source of information, but analysis of the data requires good judgment, both to select the most appropriate past project as a source, and to assess the accuracy of the historical data.

Here are some samples of the types or resources that can be developed and used to prepare estimates at this stage.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF ENGINEERING SERVICES  
DIVISION OF STRUCTURE ENGINEERING & DESIGN SUPPORT  
OFFICE OF SPECIFICATIONS & ESTIMATES  
P. O. BOX 94784  
SACRAMENTO, CA 95824-0071

### COMPARATIVE BRIDGE COSTS

JANUARY 2012

The following tabular data gives some **general guidelines** for structure type selection and its relative cost. These costs should be used just for **preliminary estimates** until more detailed information is developed.

These costs reflect the **“bridge cost”** only and **do not** include items such as: time related overhead, mobilization, bridge removal, approach slabs, slope paving, soundwalls or retaining walls.

The following factors must be taken into account when determining a price within the cost range:

Factors for Lower end of Price Range	Factors for Higher end of Price Range
Short spans, Low Structure Height, No Environmental Constraints, Large Project, No Aesthetic Issues, Dry Conditions, No Bridge Skew	Long spans, High Structure Height, Environmental Constraints, Small Project, Aesthetic Issues, Wet Conditions (cofferdams required), Skewed Bridges
Urban Location	Remote Location
Steel Abutment	Cast-in-place Abutment
Spread Footing	Pile Footing (Large Diameter Piling)
No Stage Construction	2 Stage Construction

Factors that will increase the price over the high end of the Price Range, 25%-100%:

- Structures with more than 2 construction stages
- Unique substructure construction
- Widening less than 15 ft.

STRUCTURAL SECTION	(STR. DEPTH / MAX SPAN)		COMMON SPAN RANGE feet	COST RANGE \$ / Square foot	REMARKS
	SIMPLE	CONTINUOUS			
RC SLAB	0.06	0.045	16 - 44	115-345	THESE ARE THE MOST COMMON TYPES AND ACCOUNT FOR ABOUT 75% OF BRIDGES ON CALIFORNIA STATE HIGHWAYS.
RC T-BEAM	0.07	0.065	40 - 60	120-200	
RC BOX	0.06	0.055	60 - 120	130-200	
CI/PIPS SLAB	0.03	0.03	40 - 65	100-240	
CI/PIPS BOX	0.045	0.04	100 - 250	100-225	
PC/PS SLAB (+3" AC)	0.03	0.03	20 - 50	125-250	
PC/PS SLAB (+3" AC)	0.06	0.055	30 - 120	120-230	
PC/PS T-BEAM (+3" AC)	0.05	0.045	30 - 145	110-200	
PC/PS I GIRDER	0.055	0.05	50 - 120	110-190	
PC/PS BOX	0.06	0.045	120 - 200	140-250	
STRUCT STEEL I GIRDER	0.045	0.04	60 - 300	170-425	NO FALSEWORK REQUIRED.

NOTE: Removal of a box girder structure costs from \$8 - \$15 per square foot.  
\*\*Average Cost/SQFT are calculated using "Bridge Costs Only" as defined by the Federal Highway Administration

CVAG RACE  
Construction Unit Costs  
DRAFT #12/2015

Item	Description	Unit	Unit Cost from 2010 Update	Proposed Unit Cost for 2015 Update
1	Remove Existing Pavement	FT	\$2.50	\$1.00
2	Remove Existing Roadway	SQFT	\$2.00	\$2.10
3	Class 2 Aggregate Base 7" Thick	SQFT	\$0.65	\$0.50
4	Class 2 Aggregate Base 10" Thick	SQFT	\$0.95	\$1.15
5	Asphalt Concrete 1.5" Thick	SQFT	\$0.80	\$1.10
6	Asphalt Concrete 4.0" Thick	SQFT	\$1.00	\$1.40
7	Asphalt Concrete 5.0" Thick	SQFT	\$1.80	\$1.30
8	Common Excavation	CYDS	\$12.50	\$14.00
9	Concrete Curb	FT	\$12.00	\$14.00
10	Concrete Curb & Gutter	FT	\$20.00	\$25.00
11	Concrete Sidewalk 4" Thick x 6' Wide	SQFT	\$3.50	\$9.00
12	Rebar Concrete Paving & Curb	SQFT	\$23.00	\$30.00
13	New Bridge Structure	SQFT	\$180.00	\$220.00
14	Widen Existing Bridge Structure	SQFT	\$150.00	\$350.00
15	Traffic Signals - for one intersection	EA	-	\$200,000.00
16	Pave Grade, Polymer Asphalt Concrete	SQFT	\$0.60	\$0.70
17	Cold-Plan Existing Roadway	SQFT	\$1.30	\$0.35

Legend:

- Boxed: Unit cost determined by data from project bids or provided by agencies
- Unboxed: Unit cost determined by average % increase of other items

Sources: Project Bids

- Adams Street Signal and Street Improvements (2015)
- Ave 52 Grade Separation
- Ave 54/86 S Interchange
- Clayton Street (2010)
- Fred Waring Between Adams and Fox Plains
- Graphic Arts Best Grade Separation (2013)
- Hwy 111 Cook St. to Eastern Indian Wells
- Hwy 111 Washington Street Interchange (2013)
- I-10 Interchange Drive (2010)
- I-10 Jefferson Street (2014)
- Jefferson St/Warner Road
- Madison Street between Ave. 50 and 52
- Monroe St. Widening between Ave. 44 and 52
- Monterey Loop at I-10 Interchange
- Pavement Management Plan (2014)
- Phase 3 Highway 111 Improvements

Project Agreements

- City of Indian Wells
- City of La Quinta
- City of Palm Springs
- City of Cathedral City
- CVAG

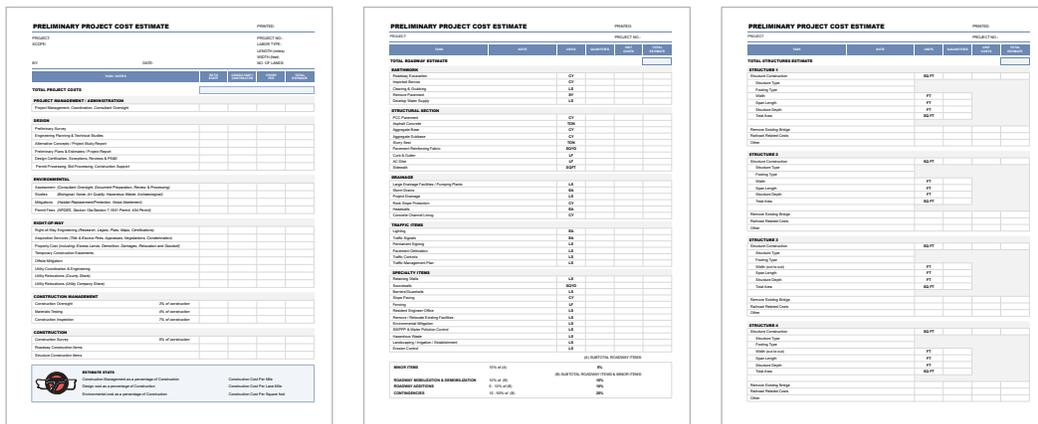
Sample Conceptual Estimate References

### Preliminary Project Estimates

This method of estimating builds up the estimate of a project from the expected cost of its functional components and the specific details for each. The functional components are the building blocks (such as the design, the land acquisition, the project management, and the construction) and the specific details are the variables that need to be calculated (such as the construction quantities, property cost, design fees, and so on).

The preparation of preliminary estimates is facilitated by the use of standardized spreadsheet templates created by RCTD. These templates are made up of three sheets containing the following information:

1. Project Summary Sheet
2. Construction - Roadway
3. Construction - Structures



Preliminary Estimate Templates

The Preliminary Cost Estimate Template created by RCTD is intended to provide a comprehensive summary of the anticipated project cost. It is expected that assumptions and detailed quantity and cost calculations will be prepared on separate sheets and appended to the Preliminary Estimate Template sheets.

Generally, the construction sheets are the most important estimate items due to the fact that the construction usually represents the largest dollar value of the project. If you are familiar with the Caltrans Project Study Report and

Project Report cost estimating procedures, then the construction sheets should seem familiar. We have essentially reduced the forms used by Caltrans down to these three sheets (3 vs 11 sheets). The RCTD templates also allow you to segregate the cost of work to be performed by in-house staff versus work to be performed by consultants or contractors.

For the roadway items, you need to calculate quantities for a few high dollar items typically used on roadway projects and then add adequate contingency funds for the current stage of the estimate (i.e. the earlier the stage, the higher the contingency). The roadway items are subdivided into the following categories:

- Earthwork
- Structural Section
- Drainage
- Traffic Items
- Specialty Items
- Minor items, Mobilization, Additions, and contingencies

The Structure estimates are developed by calculating the area of the structure and then multiplying by a cost per area from similar types of structures on previously constructed projects.

Right-of-way and utilities costs are often the biggest unknown when it comes to estimating. Estimating usually involves the costing of land per some area unit (such as per square feet or per acre) and then applying this amount over the land to be acquired. Other items that are usually accounted for are the cost of buildings or houses including the costs of purchasing, demolition and the associated relocation expenses of the occupants.

Environmental estimates can also be difficult to produce at the early stage. The highest dollar costs of environmental activities is usually for mitigation costs and these are not known until after specific special studies are performed that

determine the need for mitigation. Estimates for the cost of preparing environmental documentation can be developed when a project has been field reviewed and it has been determined what type of environmental document is necessary and what special studies will be needed.

Design costs are calculated in various ways. Sometimes design budgets are created as a percentage of construction. Sometimes they are prepared by determining the number of plan sheets and assigning a cost per sheet. Sometimes a detailed list of tasks is prepared along with the man-hours required and an associated cost per man-hour applied. Using a percentage of construction is obviously easier than creating a list of tasks, however, when time permits it is recommend that costs be determined using the task/man-hour method. This is also consistent with the requirement of consultants submitting cost proposals in response to RCTD's Requests for Proposals.

Typical ranges for design costs as a percentage of construction.

- Total engineering: 8% to 12% of total construction cost
- Preliminary design: 1% to 3% of total construction cost
- Grading: 5% to 8% of estimated grade construction cost
- Paving: 4% to 7% of estimated paving construction cost
- Structures: 6% to 9% of estimated structural construction cost
- Geotechnical: can be a further 0.5% to 1.25% of total construction

### *Engineer's Estimates*

The Project Engineer's Estimate of Cost serves two primary purposes:

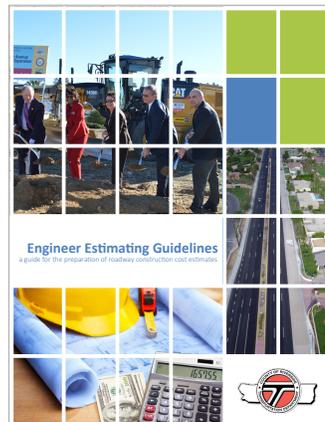
- It estimates the fair and reasonable price RCTD should expect to pay for each of the items of work to be performed.
- It provides the ability to validate the adequacy of available funding.

There are two methods commonly used for estimating prices to be used in Engineer's Estimates. One method is to use previous bid prices as a basis for

establishing prices on the proposed project (Historic Bid Based Approach). The other method is to make a complete analysis of production rates, labor costs, and material costs (Cost Based Approach). These methods can be used individually or in combination. The cost-based approach is not often used by the RCTD, but Contractors generally utilize it to prepare bids.

The historical bid-based approach applies historical unit cost data (i.e. recent average unit prices) to quantities or measures of individual work items to determine a total cost for each item. The unit cost data is gathered from prior construction contracts and then modified/adjusted to reflect current prices; specific conditions set out in the Special Provisions of the construction contract; and geographic, market or other project particulars.

RCTD has developed an Engineer Estimate Guide that is included in this appendix that provides specific details and instructions for preparing an Engineer's Estimate for RCTD projects.



*Engineering Estimate Guidelines*

The guide and RCTD's estimating practices are generally consistent with Caltrans' Estimating System "Basic Engineering Estimating System" or "BEES. Although similar, there are some differences due primarily to the fact that a Caltrans system assumes that the estimate will be processed for advertisement and award by Caltrans. This is not the case with RCTD managed projects. RCTD uses Caltrans basic list of bid items but RCTD is unable to process new items that are not included in the basic list in a manner consistent with

Caltrans. RCTD has developed a system for creating and managing items not included in Caltrans bid item list for projects that are advertised and awarded by RCTD. The details for this process are provided in RCTD's Engineer Estimate Guide.

### **Caltrans**

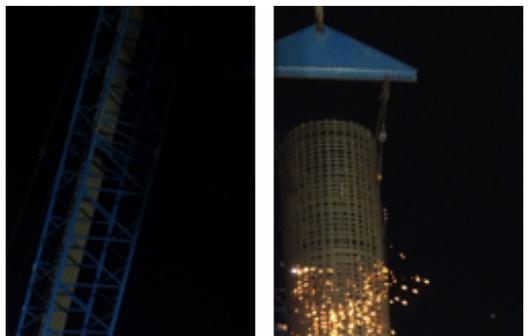
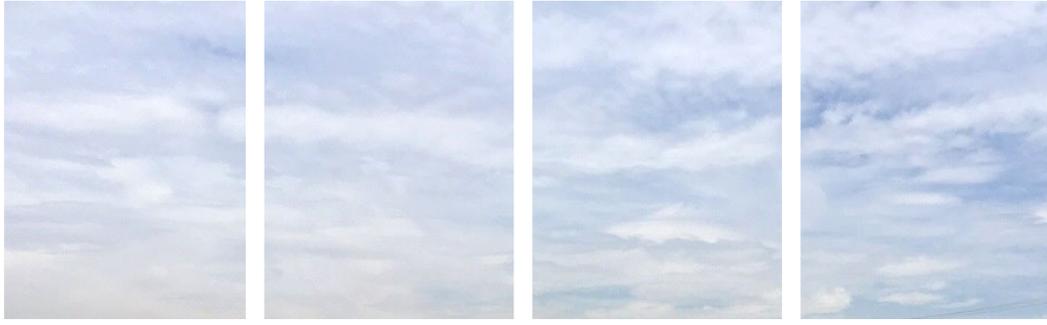
Caltrans provides significant cost estimating resources on their web site. Chapter 20 of the Caltrans Project Development Procedures Manual (PDPM) outlines the cost estimating requirements for Caltrans projects. Caltrans has created a web page that compiles the policies, tools, guidance and training to assist in the development of project cost estimates. Links to Caltrans' PDPM and estimating reference page are provided below.

[www.dot.ca.gov/hq/oppd/pdpm/pdpmn.htm](http://www.dot.ca.gov/hq/oppd/pdpm/pdpmn.htm) - [Chapter 20](#)

[www.dot.ca.gov/hq/oppd/costest/costest.htm](http://www.dot.ca.gov/hq/oppd/costest/costest.htm)

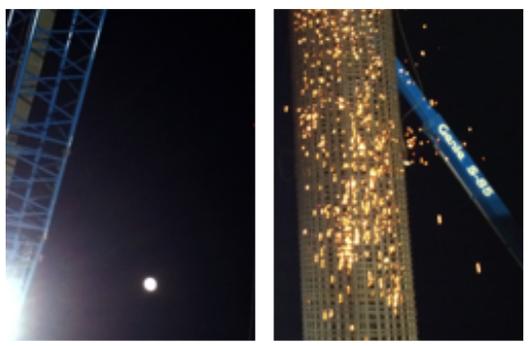
Caltrans' templates should be used on federally funded projects and can be used in lieu of RCTD templates on locally funded projects.





# Engineer Estimating Guidelines

a guide for the preparation of roadway construction cost estimates





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# Estimating Guide

## GENERAL

The Project Engineer's Estimate of Cost serves two purposes:

- It estimates the fair and reasonable price RCTD should expect to pay for each of the items of work to be performed.
- It provides the ability to validate the adequacy of available funding.

Historical Bid price information is maintained by RCTD. In addition, Caltrans publishes annual cost data books. The Caltrans documents are produced by the Office of Office Engineer and are posted on Caltrans web site at:

[www.dot.ca.gov/hq/esc/oe/awards/index.html](http://www.dot.ca.gov/hq/esc/oe/awards/index.html)

Caltrans also provides a searchable database with cost history that is available at the following web site:

[sv08data.dot.ca.gov/contractcost/index.php](http://sv08data.dot.ca.gov/contractcost/index.php)

To estimate the price of individual items, use recent bid prices for similar projects considered to have had competitive bidding.

Consider factors which might affect bid prices, such as: quantity, project location and accessibility, project terrain, effect of existing traffic on the contractor's operations, source and availability of materials and water, time limits which might require more than ordinary overtime work or double shifting, and season of the year in which the work is to be done.

The amount of funds allocated for the project should not influence the estimated prices. Reducing prices to keep the estimate of cost within the program amount will not reduce bid prices at the time bids are opened. Bid overruns can cause serious problems such as delay of award, or rejection of bids and need to re-advertisement.

Bear in mind that many funds are for project improvement (Capital Outlay) only. For these fund sources, do not set up funds for items to become County facilities if those items are to be used for other purposes. (Example: It may be illegal to have funds for Changeable Message Signs for traffic control and then require the contractor to turn such signs over to maintenance forces.)

#### Basic Engineering Estimate

Include all elements of the project such as railroad work, temporary or detour structures (and their removal), removal of existing structures, supplemental work and mobilization.

The Project Estimate of Cost has these components:

- Contract Items.
- Supplemental Work.
- County-furnished Materials and Expenses.
- Contingencies.

## **CONTRACT ITEMS**

### **GENERAL**

Contract items are the bid items of work used in the Engineer's Estimate, the Bid Schedule and Contract Book.

List the items of work in numerical sequence by Item Code number. The item description should be exactly as shown in the Coded Item List. Electronic or hard copies of the coded item list may be obtained from RCTD.

### **NON-STANDARD ITEMS**

When work does not fit an established item and it is anticipated that the work is not unique to the project, the County Specifications Engineer will need to create a new one. The item description should be understandable but as brief as possible. Use the same style and format as that used for standard items. Do not use abbreviations. If the work is unique to the project and not expected to be used on future projects, the work should be coded using bid item 000003 with the description replaced with an appropriate description for the work.

All County created items shall begin with the first two digits equal to "01". The Second two digits shall represent the section of the Caltrans specification that the bid item is related to. These second two digits represent the first two digits that are provided on item codes that are created by Caltrans and generally correspond to the relevant section of the specifications. The last two digits are provided sequentially.

### **SPECIALTY ITEMS**

Some items of work require equipment and expertise not normally possessed by most general contractors. Therefore, the awarded contractor may have to subcontract these items. It is Caltrans' policy (and subsequently County policy) to allow the subtraction of the cost of this specialized work from the total non-specialty contract amount, and only require the awarded contractor to perform a minimum of 50 percent of the remaining contract work. The Standard Specifications requires the prime contractor to perform at least 50 percent of the dollar amount of the contracted work, excluding specialty items. This

requirement is to ensure that the contractor does the majority of work and is not just a work broker.

Specialty items of work are designated on the Engineer's Estimate with an (S).

These guidelines apply to Specialty Items:

- When a project contains work that is different from the basic type of work and that work would normally be done by a specialty contractor, designate the item or items covering such work as specialty items.
- If the prime contractor's forces can be expected to perform the work, do not designate the work as a specialty item.
- The following rules apply when designating specialty items:
- If the Engineer's Estimate is less than \$500,000, each specialty item must have a value of \$2,000 or more.
- If the Engineer's Estimate is greater than \$500,000, each specialty item must have a value of \$5,000 or more.
- Group items (for example, striping, pavement markings, and pavement markers) to meet the value criterion.
- Keep specialty items to a minimum to ensure that the awarded contractor does the majority of the work. If the prime contractor is expected to be other than a general contractor, designate as specialty items work which would not be done by the awarded contractor.
- If it is anticipated that the prime contractor will be a general contractor, limit specialty items to those listed in Table B.
- When a highway project involves the construction, alteration or modification of an off-highway building structure, designate items of building work as specialty items.

**Table A**  
**Approved Specialty Items**

ITEM CODE	SPECIALTY ITEMS
120090	CONSTRUCTION AREA SIGNS
120100	TRAFFIC CONTROL SYSTEM
12----	TRAFFIC CONTROL DEVICES SUCH AS PORTABLE CHANGEABLE MESSAGE SIGN, BARRICADE, CONES, ETC.
1531--	PLANE PAVEMENT
20----	EROSION CONTROL, PLANTING, IRRIGATION AND PLANT ESTABLISHMENT WORK
4201--THRU 4202--	GRIND AND GROOVE PAVEMENT
490340 THRU 499010	DRIVING PILES, CAST-IN-DRILLED-HOLE CONCRETE PILING AND SHEET PILING
500001	PRESTRESSING CAST-IN-PLACE CONCRETE
5124--THRU 5125--	ERECT PRECAST MEMBERS
515059 THRU 515165	CORE CONCRETE
517950 THRU 518220	SOUND WALLS
519080 THRU 519119	JOINT SEALING
5201--	BAR REINFORCING STEEL
5301--	SHOTCRETE
5400--THRU 5401--	WATERPROOFING
5502--	ERECT STRUCTURAL STEEL
5601--THRU 5610--	INSTALL SIGN STRUCTURES, CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)
5900--THRU 5902--	CLEAN AND PAINT STEEL
60----	RAILROAD TRACK WORK
7110--THRU 719506	SANITARY SEWERS
7405--THRU 7415--	PUMPING PLANT RELATED WORK AND EQUIPMENT
7500--THRU 7505--	MISCELLANEOUS METALS
8000--THRU 8099--	FENCES
8320--THRU 8395--	RAILINGS AND BARRIERS (EXCEPT CONCRETE)
83959-THRU 8396--	CRASH CUSHIONS
8405--THRU 8407--	STRIPING AND PAVEMENT MARKINGS
8501--THRU 8502--	PAVEMENT MARKERS
8601--THRU 8690--	SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS
9901--THRU 9950--	BUILDINGS AND RELATED FACILITIES

If an item listed in Table A is a majority of the work, do not designate it as a specialty item.

Furnishing specialty type items, such as "furnish steel piling" or "furnish sign structure" are not to be designated as specialty items.

Items with the prefixes temporary, adjust, remodel, relocate, and reconstruct which are similar to the approved specialty items listed in Table A, should also be designated as specialty items. Examples are temporary traffic stripe and reconstruct metal beam guard railing.

### FINAL PAY QUANTITIES

Final pay quantities are to be designated on Engineer's Estimate using (F) as appropriate for the item involved. Do not identify final pay items on the plans. Payment will be made for the total quantity shown on the Engineer's Estimate unless the Engineer orders a change in the dimensions of the work. Do not round final pay items in the Engineer's Estimate. The contract items of work listed in Table B are generally designated final pay.

**Table B**  
**Items Generally Designated as Final Pay**

ITEM	CONSTRUCTION WORK
Minor Concrete (Minor Structure)	Drainage Inlets and Pipe Headwalls
Miscellaneous Iron and Steel	Frames and Grates
Class A Concrete (Structure)	Box Culverts and Wingwalls
Bar Reinforcing Steel	Box Culverts and Wingwalls
Furnish and Install Sign Structures (Tubular, Truss, Lightweight, etc.)	Overhead Sign Structures
Structure Excavation (Bridge)	Bridges
Structure Backfill (Bridge)	Bridges
Structural Concrete, Bridge	Bridges
Structural Concrete, Bridge Footing	Bridges
Structural Concrete, Approach Slabs	Bridges
Sound Wall (Masonry Block)	Walls, Bridges
Structural Concrete, Retaining Wall	Retaining Walls
Bar Reinforcing Steel (Bridge)	Bridges
Bar Reinforcing Steel (Retaining Wall)	Retaining Walls
Miscellaneous Metal (Bridge)	Bridges
Miscellaneous Metal (Restrainer)	Bridges
Railings and Concrete Barrier on Structures	Bridges
Pipe (Supply Line)	Irrigation Systems

Independent verification of Final pay quantity calculations shall be provided.

### **MOBILIZATION & DE-MOBILIZATION**

Mobilization reimburses the contractor for costs incurred before and during "move in". Mobilization requires that contractor furnish and/or deliver to the job site all labor, materials, resources, and temporary support facilities, including but not limited to portable sanitary facilities, and equipment necessary to perform the required Work. In addition, contractor shall prepare all required written plans and schedules, including but not limited to: Site-Specific Health and Safety Plan, initial and progress construction schedules, and sub-contractor work plans.

Demobilization will be paid after the Work has been deemed substantially complete, contractor has provided record documents in accordance with the requirements of the specifications, and contractor has demobilized from the site, which shall include removal of all materials, resources, equipment, temporary support facilities, and all remaining construction debris at the completion of the work.

Use a mobilization item when the number of working days for the project is 120 or more (excluding plant establishment working days) and the estimated cost is \$300,000 or more. A mobilization item may be included for projects consisting principally of bridgework even if the project's number of working days and estimated cost are less than the criteria above.

On large and complex projects including interchanges and bridges it is common to split 10% of the construction cost between the items of mobilization demobilization.

## **SUPPLEMENTAL WORK**

Supplemental Work is work which is anticipated and required for completion of the project but is of such an uncertain nature or amount that it cannot be done on a contract item basis.

Do not use Supplemental Work:

- to take the place of complete design work and quantity calculations. When work can be shown or specified such that it is biddable, it must be paid for by contract item.
- to reserve extra funds for contingencies by adding items or amounts in excess of what can be reasonably anticipated.
- to perform work which should be funded from other sources.
- for contract funds to be paid to anyone other than the contractor such as railroad inspection work. Include these funds under County-Furnished Materials and Expenses.

The Standard Specifications indicate that various portions of removal work (unsuitable material, slides, buried manmade objects, etc.) will be paid as extra work. Funds for this work should come from contingencies unless specific information is available to show that the amount of work is sufficient to justify a separate entry in Supplemental Work.

Work mentioned in a general way in the contract special provisions should be funded from contingencies unless specific information is available to show that the amount is sufficient to justify a separate entry in Supplemental Work.

Itemize any extra work identified in the contract special provisions as Supplemental Work, except as discussed above.

Justification must be provided for Individual Supplemental Work items equal to or greater than the following dollar amounts or percent of the total amount of Contract Items, whichever is greater:

Projects less than \$300,000 = \$ 4,000 or 5%

Projects less than \$1 million = \$15,000 or 2.5%

Projects more than \$1 million = \$25,000 or 1%

If the Total Supplemental Work excluding items shown in Table C to be excluded is equal to or greater than the following dollar amounts or percent of the total amount of Contract Items, whichever is greater; justification must be provided:

Projects less than \$300,000 = 10%

Projects less than \$1 million = \$ 30,000 or 5%

Projects between \$1-5 million = \$ 50,000 or 3%

Projects between \$5-25 million = \$ 150,000 or 2%

Projects more than \$25 million = \$ 500,000 or 1%

Base the justification for supplemental work on factual information, such as experience with similar work, conditions, and materials.

When an anticipated quantity of work cannot be estimated within 25 percent, it is appropriate to establish a contract item with the quantity set at a level such that an underrun of more than 25 percent is unlikely. Funds can then be included in Supplemental Work to cover overruns.

Table C is a partial listing of typical work for which it would generally be appropriate to include funds in Supplemental Work.

**Table C**  
**Items Appropriate for Supplemental Work**

TYPE OF WORK	CONDITIONS FOR USING SUPPLEMENTAL WORK
Additional Asphalt Concrete Additional Imported Borrow Increased Paving Asphalt	Only if the type of work is a large percentage of total, material source is not known, and material from different likely sources varies greatly in density.
Clean and Seal Random Cracks Salvage and Stockpile Excess Screenings Remove Unsuitable Material Remove Slide Subsurface Drainage Remove Rock and Debris	If evidence indicates more than can be funded from contingencies.
Maintain Traffic (include flagging costs) Maintain Detour Maintain Existing Plants Maintain Water Supply Maintain Existing Electrical System Apply Pesticide	If need for extra work is related to the work being performed on the project in question.
Detour Signing	If on local streets or roads.
Locate Existing Irrigation Facilities Settlement Platform Installation Compensation Adjustments for Price Index Fluctuations of Paving Asphalt	For projects with 5 000 tonnes of asphalt concrete and 50 working days. <u>Excluded</u> from limits since calculated by formula.
Federal Trainees	If project is Federal Aid eligible, with at least 100 working days.
Repair Existing Irrigation System Prune Existing Plants Replace Existing Plant Material Dispose of Removed Plant Material Maintain Existing Plants Maintain Existing Irrigation Mowing Correct Plant Deficiencies Modify Irrigation System Remove Rock and Debris Additional Water	For restoration projects, Initial repair of existing irrigation facilities, Initial removal of litter, Initial plant removal, or Damage repair.  <u>Excluded</u> from total Supplemental Work Note: There is no exclusion on any individual Supplemental Work Item.
Additional Footing Work	Earthquake Retrofit projects.
Clean Deck Joints	Bridge maintenance projects.
Damage Investigation	Bridge Repair projects.
Incentive for Asphalt Concrete QC/QA	QC/QA Projects - Equal to 4% of estimate for asphalt concrete. <u>Excluded</u> from limits.
Partnering	Projects with estimated cost of \$1,000,000 or more - <u>Excluded</u> from limits.

Table D provides a partial list of types of work for which it is normally inappropriate to include funds in Supplemental Work.

**Table D**  
**Items Not Appropriate for Supplemental Work**

TYPE OF WORK	REASON FOR NOT USING SUPPLEMENTAL WORK
Additional Roadwork Additional Drainage Work Additional Electrical Work Improvement for Safety Unforeseen. . . . . Possible. . . . . Miscellaneous. . . . .	Too general. Entries for this type work may be appropriate if they are more specific.
Clean Out Existing Culverts Repair Existing. . . . .	Improper to perform maintenance work if funded from state or federal funds.
Railroad Work Electrical Service Resident Engineer's Office Motorist Service Patrol Traffic Management Plan	Include under County-furnished Material and Expense unless paid to or through Contractor.
Haul Material	Should be included in contract item work.

**COUNTY-FURNISHED MATERIALS AND EXPENSES**

Items to be listed under this component consist of:

- work to be done by County forces or others concurrently with contract construction operations; or
- materials to be purchased and charged against the project but to be paid for directly by the County, not the contractor.

Item codes for this category of work should have a 0106 or 06 prefix (0106XX or 06XXXX). County-furnished materials and expenses are to be subtotaled and included as part of the total cost of the project.

Typical items of County expense include payment to a utility company to provide water meters and electrical service or work to be done by a railroad or other agency under a service contract, or may be work performed by County personnel such as providing painted striping. Rental cost of the Resident Engineer's office may be included when the project cost exceeds \$300,000 and the project time limit is 50 or more working days.

FHWA has approved the following materials as being in the public interest for Caltrans to furnish to the contractor as State-Furnished Materials on Federal Aid projects:

- Permanent sign panels and mounting hardware
- Types N, P, and R object marker panels and reflectors
- Laminated wood box posts and metal caps
- Survey Monument Disks
- Markers for railings and concrete barriers
- Traffic signal controller assemblies, including wired cabinets and loop detector units
- Closed circuit television cameras, changeable message signs and assemblies
- Lamps for traffic signal units, flashing beacons and sign illumination fixtures
- Asphalt concrete sealant for inductive detector loops
- Self-adhesive reflective numbers and sealer for numbering lighting equipment
- Recycled (salvaged) material in stock, such as temporary traffic signals and flashing beacons
- Seed and plants not commercially available, either by type or size, that must be grown or obtained for specific projects

The above list can therefore be considered for any County contracts. Obtain FHWA concurrence for any materials not listed above on a project-by-project basis during PS&E development for Federally funded projects.

## **CONTINGENCIES**

The next-to-last entry of the Project Estimate of Cost is to allow for contingencies. Typically, the amount for contingencies will be a nominal 10 percent of the subtotal of the cost of contract items, supplemental work, and

County-furnished materials and expenses. The contingency amount is included in the grand total of the final estimate to allow for unforeseen costs.

## **ESTIMATING ITEM PRICES**

Estimating is not an exact science, and no estimator can be "right" all the time. However, estimators can prepare reasonable estimates of the cost of the work to be performed by the contractor.

Estimates should never be artificially reduced to stay within the funding limits, nor should they be reduced to make available more project funding.

Many overruns are due to conditions that existed at the time the estimate was initially prepared and should have been considered. Estimators should consider the following factors which experience has shown will affect the bid prices on construction projects.

### **FLUCTUATION OF COSTS**

Review and update estimates just prior to project advertisement. Review and update unit prices and estimates as conditions change. Estimates must be current at the time the project is ready to list.

Material shortages may develop at unexpected intervals, causing an increase in material prices. Wages continually increase, although usually at a somewhat predictable rate. The time of year a project is advertised or constructed often affects prices.

### **TRAFFIC CONDITIONS**

Traffic conditions can have a significant affect on bid prices. Adjust prices to reflect special difficulties, dangers, and expenses caused by traffic. Contractors are inclined to raise their prices when they bid on projects with difficult traffic conditions. A separate bid item for traffic control is appropriate when a lot of work and expense is expected.

### **RESTRICTIVE WORK HOURS OR METHOD OF WORK**

Restricting the working hours or the method of work on a project may have a major affect on prices. If the special provisions limit work to nighttime or short shifts, increase unit prices to reflect:

- the cost of premium wages for night work
- premium payment for partial shifts
- general decreases in productivity and efficiency.

Night work for asphalt concrete can be especially expensive where small quantities are involved because asphalt plants do not usually operate at night and may have to do special runs at a much higher operating cost per unit. On the other hand, night work can reduce bid prices for projects with a lot of daytime traffic, where traffic control costs may be reduced significantly by allowing night-time work.

### **SMALL QUANTITIES OF WORK**

Small quantities of work will nearly always have higher unit cost than identical work in larger quantities. Move-in cost, overhead, and so on must be distributed over a much smaller base. Production is usually inefficient and slow for small quantities, which will also increase unit costs.

### **SEPARATED OPERATIONS**

Separated operations will generally have higher item costs. The order of work or scattered locations of work may require portions of a work unit to be constructed as separate operations, each requiring separate move-in and move-out costs. The unit prices should then be based on the smaller operations, not on the total quantities for the project.

### **HANDWORK AND INEFFICIENT OPERATIONS**

Handwork and small or inefficient operations (even though equipment may be used) will have higher unit costs than work adaptable to mass production machine operation or high production rates.

## **ACCESSIBILITY**

Work on an existing interchange may require long out-of-direction movements by construction personnel and equipment if the contractor must observe one-way ramp movements or enter or leave a freeway only at interchanges. Material hauling done under these conditions can be especially expensive.

Work is expensive at the top of retaining walls, on slopes, or where workers must climb slopes to get to the work area, regardless of whether the operation is handwork or is done by equipment. This is because work, which is easy to do on level ground or a gentle slope, may be almost impossible to do on steep slopes. Such a work situation will affect the contractor's bid.

## **GEOGRAPHIC LOCATION**

Geographically remote locations usually result in higher bid prices. Estimates should reflect subsistence payments when required. The source of supplies and the distance to the project from these sources should also be considered.

## **CONSTRUCTION SEASON**

The time of the year construction is scheduled may affect the bid prices. Contractors are usually more available for work early in the spring and will therefore bid competitively at that time. Later in the spring or summer, many of the contractors have on-going contracts to keep them busy and therefore tend to bid higher or not at all.

For projects to be awarded near the end of summer or the construction season, it is important to know if construction can be finished before the construction season ends. If a job cannot be finished before the end of the construction season, contractors will increase bid prices to cover overhead during winter suspension, to repair winter damage, and so on. Even if contractors reasonably expect to finish before winter, they may protect themselves by increasing bids to allow for damage due to early rains. This is especially true if construction involves work in or around drainage channels in high precipitation or snow areas.

## **MATERIAL SHORTAGES**

Material shortages will have a major affect on bid prices since prices are directly affected by supply and demand. Where a shortage is especially acute, the District might consider a change in design rather than face increasing prices.

## **ESTIMATE PRICING 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 can be used individually or in combination. RCTD performs estimates using the previous bid price method almost exclusively.

### **PREVIOUS BID PRICES METHOD**

Basing estimates on previous bid prices is probably the most widely used and the most practical method. When using this method, take into consideration these factors:

- Use of approximately the same size and type of project having similar quantities for individual items.
- Consider using the average of the 3 low bidders or using the second low bidder.
- At a minimum, revise previous bid prices by the projected change in the California Construction Cost Index between the date of the old bid and the anticipated date of the new bid.
- Adjust the reference bid price to reflect conditions of the project, such as type of terrain, geographical location, soil, traffic and other related factors.
- Do not use lump sum bid prices or unit prices for items of work (for example, culverts) that include varying amounts of other related work.
- Seasonal work items vary by the time of year. Use comparable months.
- Sources of previous bid prices

The Specification Engineer maintains a cost history database for most common bid items used by the County. Bid Item bid price history reports are posted on RCTD's web site.

### **COMPLETE ANALYSIS METHOD**

This method is not usually practical for all contract items of work. It may be used occasionally for earthwork items where rock or unusual haul is required, or for lump sum items such as signals and lighting.

When using this method, carry-out these initial steps:

- Analyze the proposed construction.
- Estimate production rates.
- Compile a materials list.

Then:

- find materials costs using available price lists,
- determine labor and equipment hours based on the production rates,
- calculate sub-total using the above factors and finally,
- add overhead and profit for the total 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 done early or late in the project. To provide for work which cannot be done early in the project, it may be necessary to forecast wage scales and material cost increases in order to accurately estimate contract item costs.

### **GUIDELINES FOR ROUNDING QUANTITIES**

A PS&E contains two kinds of quantities:

- Actual calculated quantities are shown on the plans to help the contractor and the Engineer complete the project.

- Estimated quantities are included in the Engineer's Estimate, the Bid Schedule and the Contract book to simplify bidding and avoid errors in extensions.

With the exception of final pay items, quantities must be rounded. In addition to simplifying bidding, rounding keeps the estimate from seeming more accurate than it can actually be. Measurements and calculations cannot always produce absolutely accurate individual quantities. The total quantity, in turn, cannot be more accurate than the least-accurate individual quantity.

Total quantities are to be rounded by adjusting the calculated quantities, usually upward. Round on total or end quantities only, never on partial quantities or subtotals. Quantities on Plans should be actual calculated quantities, never rounded quantities.

Quantities greater than 1,000 are to be rounded to no more than 3 significant figures. The significant figures are those figures of a number that begin with the leftmost figure and extend to the last figure to right that is not zero. For example, 5,050 and 1,620,000 have 3 significant figures.

Quantities less than 1,000 are to be rounded to no more than 2 significant figures.

Avoid decimal quantities. However, it is not always possible to eliminate the decimal for small quantities. For example, a total quantity such as 1.4 m<sup>3</sup> (Cubic Meter) of Minor Concrete (Minor Structure), cannot be rounded up to 2 m<sup>3</sup> or down to 1 m<sup>3</sup> without having an estimated quantity more than 25 percent off the calculated quantity. Therefore, decimal quantities of less than 5 must be rounded to one decimal place. Volumetric or weight quantities of 5 or greater are to be rounded to the nearest whole number.

Sometimes it is possible to avoid the use of decimal quantities by changing the unit of measure. For example, use 500 kg of commercial fertilizer instead of 0.5 tonne.

Rounding must not produce a condition where the estimated quantity will be beyond the 25 percent limit for overruns or underruns specified in Section 4 of the Standard Specifications.

Final pay quantities entered in the Engineer's Estimate are not to be rounded, except to eliminate any decimal figures for total pay quantities of more than 5 units (cubic meters, meters, etc.). When the total final pay quantities contain decimal figures and they are 5 units or less, the quantity shall be rounded to not more than one decimal place when entered in the Engineer's Estimate.

## **SEGREGATED ESTIMATES**

### **FEDERAL-AID PROJECTS**

Segregated estimates are required when Federal-Aid projects involve any of the following:

- Highway work -- Segregate each item quantity according to Federal Fund type using the appropriate reimbursement ratio. Current reimbursement ratios and applications can be obtained from the Budget Program, Office of Federal Resources, or the FHWA Transportation Engineer.
- Structures -- Separate each structures by component level. Funding segregations used in highway work are not applicable to structures estimates because FHWA requires costs to be identified by individual structure.
- Non-participation items of work.
- Non-participation portions of the project.
- Work paid for by others (for example, cities, Caltrans, or local transportation agencies contributing to construction costs under cooperative agreements).
- Utility relocation when done by contract item work (by Right of Way, Utility, or Railroad Agreement).
- Work which is not a part of the project (work that is being done on the same County contract but outside of the Federal Aid project limits).

If a Cooperative Agreement or Utility Agreement requires anyone other than the County to pay for any of the contract items, Supplemental Work, or County-furnished Materials and Expenses, then those items are to be segregated as nonparticipating work.

The information needed to prepare Federal segregated estimates is generally available to the Project Engineer before the PS&E is complete. All funding sources and levels should be determined prior to PS&E submittal.

#### **OTHER AGENCIES INVOLVED**

Where other sources are contributing funds toward construction through a cooperative agreement, utility agreement, right of way contract, purchase order, or other instrument, a segregated estimate may be required which identifies each contributing agency.

## UNITS OF MEASURE

Estimates are prepared using abbreviations for units of measure. The standard abbreviations used for Unit of Measure are shown in Table E.

**Table E**  
**Unit of Measure**

English		Metric	
UNIT	ABBR.	UNIT	ABBR.
Acre	ACRE	Calendar Day	CDAY
Calendar Day	CDAY	Each	EA
Cubic Foot	CF	Hectare	HA
Cubic Yard	CY	Hour	H
Each	EA	Kilogram	KG
Gallon	GAL	Kilometer	KM
Hour	HR	Lane Kilometer	LNKM
Lane Mile	LNMI	Liter	L
Linear Foot	LF	Lump Sum	LS
Lump Sum	LS	Meter	M
Mile	MI	Square Meter	M2
Pound	LB	Cubic Meter	M3
Square Foot	SQFT	Station (100 m)	STA
Square Yard	SQYD	Tablet	TAB
Station (100 ft)	STA	Tonne (1000 kg)	TONN
Tablet	TAB	Track Foot	TF
Thousand Foot Board Measure	MFBM	Working Day	WDAY
Ton	TON		
Track Foot	TF		
Working Day	WDAY		

If abbreviations are needed for non-standard units of measure, the Specifications Engineer should add them to the approved list before incorporating a final estimate into the contract file.

## ENGLISH / METRIC CONVERSION

Table F is provided to assist engineers with the conversion from english to metric or from metric to english. Use of these standard conversion factors will provide consistent results by all engineers.

**Table F**  
**English/Metric Unit Conversion**

### Conversion Factors From English Units to Metric Units

UNIT	ABBR.	MULTIPLY	UNIT	ABBR.
Acre	ACRE	0.4046856	Hectare	HA
Calendar Day	CDAY	1	Calendar Day	CDAY
Cubic Foot	CF	0.02831685	Cubic Meter	M3
Cubic Yard	CY	0.7645549	Cubic Meter	M3
Each	EA	1	Each	EA
Gallon	GAL	3.785412	Liter	L
Hour	HR	1	Hour	H
Pound	LB	0.4535924	Kilogram	KG
Linear Foot	LF	0.3048	Meter	M
Lane Mile	LNMI	1.609344	Lane Kilometer	LNKM
Lump Sum	LS	1	Lump Sum	LS
Thousand Foot Board Measure	MFBM	2.359737	Cubic Meter	M3
Mile	MI	1.609344	Kilometer	KM
Square Foot	SQFT	0.09290304	Square Meter	M2
Square Yard	SQYD	0.8361274	Square Meter	M2
Station (100 ft)	STA	0.3048	Station (100 m)	STA
Tablet	TAB	1	Tablet	TAB
Ton	TON	0.9071847	Tonne (1000 kg)	TONN
Track Foot	TF	1	Track Foot	TF
Working Day	WDAY	1	Working Day	WDAY

### Conversion Factors From Metric Units to English Units

UNIT	ABBR.	MULTIPLY	UNIT	ABBR.
Hectare	HA	2.471054	Acre	ACRE
Calendar Day	CDAY	1	Calendar Day	CDAY
Cubic Meter	M3	35.31467	Cubic Foot	CF
Cubic Meter	M3	1.307951	Cubic Yard	CY
Each	EA	1	Each	EA
Liter	L	0.264172	Gallon	GAL
Hour	H	1	Hour	HR
Kilogram	KG	2.204623	Pound	LB
Meter	M	3.28084	Linear Foot	LF
Lane Kilometer	LNKM	0.6213712	Lane Mile	LNMI
Lump Sum	LS	1	Lump Sum	LS
Cubic Meter	M3	0.423776	Thousand Foot Board Measure	MFBM
Kilometer	KM	0.6213712	Mile	MI
Square Meter	M2	10.76391	Square Foot	SQFT
Square Meter	M2	1.19599	Square Yard	SQYD
Station (100 m)	STA	3.28084	Station (100 ft)	STA
Tablet	TAB	1	Tablet	TAB
Tonne (1000 kg)	TONN	1.102312	Ton	TON
Track Foot	TF	1	Track Foot	TF
Working Day	WDAY	1	Working Day	WDAY

# PRELIMINARY PROJECT COST ESTIMATE

PRINTED:

PROJECT:  
SCOPE:

PROJECT NO.:  
LABOR TYPE:  
LENGTH (miles)  
WIDTH (feet)  
NO. OF LANES:

BY:

DATE:

TASK / NOTES	RCTD STAFF	CONSULTANT / CONTRACTOR	OTHER FEE	TOTAL ESTIMATE
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## TOTAL PROJECT COSTS

### PROJECT MANAGEMENT / ADMINISTRATION

Project Management, Coordination, Consultant Oversight				
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### DESIGN

Preliminary Survey				
Engineering Planning & Technical Studies				
Alternative Concepts / Project Study Report				
Preliminary Plans & Estimates / Project Report				
Design Certification, Exceptions, Reviews & PS&E				
Permit Processing, Bid Processing, Construction Support				

### ENVIRONMENTAL

Assessment <i>(Consultant Oversight, Document Preparation, Review &amp; Processing)</i>				
Studies <i>(Biological, Noise, Air Quality, Hazardous Waste, Archaeological)</i>				
Mitigations <i>(Habitat Replacement/Protection, Noise Abatement)</i>				
Permit Fees <i>(NPDES, Section 10a/Section 7,1601 Permit, 404 Permit)</i>				

### RIGHT-OF-WAY

Right-of-Way Engineering <i>(Research, Legals, Plats, Maps, Certifications)</i>				
Acquisition Services <i>(Title &amp; Escrow Fees, Appraisals, Negotiations, Condemnation)</i>				
Property Cost <i>(including: Excess Lands, Demolition, Damages, Relocation and Goodwill)</i>				
Temporary Construction Easements				
Offsite Mitigation				
Utility Coordination & Engineering				
Utility Relocations <i>(County Share)</i>				
Utility Relocations <i>(Utility Company Share)</i>				

### CONSTRUCTION MANAGEMENT

Construction Oversight	3% of construction			
Materials Testing	4% of construction			
Construction Inspection	7% of construction			

### CONSTRUCTION

Construction Survey	5% of construction			
Roadway Construction Items				
Structure Construction Items				



#### ESTIMATE STATS

Construction Management as a percentage of Construction  
 Design cost as a percentage of Construction  
 Environmental cost as a percentage of Construction

Construction Cost Per Mile  
 Construction Cost Per Lane Mile  
 Construction Cost Per Square foot

# PRELIMINARY PROJECT COST ESTIMATE

PRINTED:

PROJECT:

PROJECT NO.:

TASK	NOTE	UNITS	QUANTITIES	UNIT COSTS	TOTAL ESTIMATE
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**TOTAL ROADWAY ESTIMATE**

<b>EARTHWORK</b>					
Roadway Excavation		CY			
Imported Borrow		CY			
Clearing & Grubbing		LS			
Remove Pavement		SY			
Develop Water Supply		LS			

<b>STRUCTURAL SECTION</b>					
PCC Pavement		CY			
Asphalt Concrete		TON			
Aggregate Base		CY			
Aggregate Subbase		CY			
Slurry Seal		TON			
Pavement Reinforcing Fabric		SQYD			
Curb & Gutter		LF			
AC Dike		LF			
Sidewalk		SQFT			

<b>DRAINAGE</b>					
Large Drainage Facilities / Pumping Plants		LS			
Storm Drains		EA			
Project Drainage		LS			
Rock Slope Protection		CY			
Headwalls		EA			
Concrete Channel Lining		CY			

<b>TRAFFIC ITEMS</b>					
Lighting		EA			
Traffic Signals		EA			
Permanent Signing		LS			
Pavement Delimitation		LS			
Traffic Controls		LS			
Traffic Management Plan		LS			

<b>SPECIALTY ITEMS</b>					
Retaining Walls		LS			
Soundwalls		SQYD			
Barriers/Guardrails		LS			
Slope Paving		CY			
Fencing		LF			
Resident Engineer Office		LS			
Remove / Relocate Existing Facilities		LS			
Environmental Mitigation		LS			
SWPPP & Water Pollution Control		LS			
Hazardous Waste		LS			
Landscaping / Irrigation / Establishment		LS			
Erosion Control		LS			

(A) SUBTOTAL ROADWAY ITEMS:

<b>MINOR ITEMS</b>	10% of (A)	<b>5%</b>
<b>ROADWAY MOBILIZATION &amp; DEMOBILIZATION</b>	10% of (B)	<b>10%</b>
<b>ROADWAY ADDITIONS</b>	5 - 10% of (B)	<b>10%</b>
<b>CONTINGENCIES</b>	10 - 50% of (B)	<b>25%</b>

(B) SUBTOTAL ROADWAY ITEMS & MINOR ITEMS:

# PRELIMINARY PROJECT COST ESTIMATE

PRINTED:

PROJECT:

PROJECT NO.:

TASK	NOTE	UNITS	QUANTITIES	UNIT COSTS	TOTAL ESTIMATE
------	------	-------	------------	------------	----------------

## TOTAL STRUCTURES ESTIMATE

### STRUCTURE 1

Structure Construction		SQ FT			
Structure Type					
Footing Type					
Width		FT			
Span Length		FT			
Structure Depth		FT			
Total Area		SQ FT			
Remove Existing Bridge					
Railroad Related Costs					
Other					

### STRUCTURE 2

Structure Construction		SQ FT			
Structure Type					
Footing Type					
Width		FT			
Span Length		FT			
Structure Depth		FT			
Total Area		SQ FT			
Remove Existing Bridge					
Railroad Related Costs					
Other					

### STRUCTURE 3

Structure Construction		SQ FT			
Structure Type					
Footing Type					
Width (out to out)		FT			
Span Length		FT			
Structure Depth		FT			
Total Area		SQ FT			
Remove Existing Bridge					
Railroad Related Costs					
Other					

### STRUCTURE 4

Structure Construction		SQ FT			
Structure Type					
Footing Type					
Width (out to out)		FT			
Span Length		FT			
Structure Depth		FT			
Total Area		SQ FT			
Remove Existing Bridge					
Railroad Related Costs					
Other					



**Sample Project**

**Engineer's Estimate**

Project Number: **A9-0000.00** Description: **Put type of Work Here**

ITEM NO.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	BID	AMOUNT
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Title for Bid Item Grouping goes here

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SUBTOTAL  
Items 1-31



**Sample Project**

**Engineer's Estimate**

Project Number: **A9-0000.00** Description: **Put type of Work Here**

ITEM NO.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	BID	AMOUNT
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**SUMMARIES**

SUBTOTAL	Items 1-31					
MOBILIZATION & DEMOBILIZATION						
CONTINGENCY						
SUPPLEMENTAL ITEMS						
COUNTY FURNISHED ITEMS						
<b>GRAND TOTAL</b>						

Prepared by: \_\_\_\_\_

Checked by: \_\_\_\_\_



**Sample Project**

**Engineer's Estimate**

Project Number: **A9-0000.00** Description: **Put type of Work Here**

ITEM NO.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	BID	AMOUNT
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Title for Bid Item Grouping goes here

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SUBTOTAL  
Items 1-31

**Sample Project**

**Engineer's Estimate**

Project Number: **A9-0000.00** Description: **Put type of Work Here**

ITEM NO.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	BID	AMOUNT
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Title for Bid Item Grouping goes here

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61						
62						

SUBTOTAL  
Items 32-62



**Sample Project**

**Engineer's Estimate**

Project Number: **A9-0000.00** Description: **Put type of Work Here**

ITEM NO.	ITEM CODE	ITEM	UNIT	ESTIMATED QUANTITY	BID	AMOUNT
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**SUMMARIES**

SUBTOTAL	Items 1-31					
SUBTOTAL	Items 32-62					
MOBILIZATION & DEMOBILIZATION						
CONTINGENCY						
SUPPLEMENTAL ITEMS						
COUNTY FURNISHED ITEMS						
<b>GRAND TOTAL</b>						

Prepared by: \_\_\_\_\_

Checked by: \_\_\_\_\_