



Cost Estimating Improvement Initiative: Tool Usage Survey

Requested by
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Table of Contents

List of Tables	2
List of Figures	3
Executive Summary	4
Background	4
Summary of Findings	4
Gaps in Findings.....	8
Next Steps	8
Detailed Findings	10
Tool Usage Survey.....	10
Survey Approach.....	10
Summary of Survey Results	10
Recommendations From Survey Respondents	39
Appendix A: Survey Questions	41

List of Tables

Table ES1. Tool Use Within Caltrans Districts and Functional Units	4
Table 1. Number of Survey Respondents: District and Functional Unit	10
Table 2. Respondents Preparing Resource Estimates: District and Functional Unit	11
Table 3. Incidence of Field Visits Prior to Scoping and Estimating: District.....	13
Table 4. Incidence of Field Visits Prior to Scoping and Estimating: Functional Unit.....	13
Table 5. PID Included With Resource Estimate Requests: District and Functional Unit.....	14
Table 6. Project Scoping Fact Sheet Tool Provided as Supplemental Scoping Information: District and Functional Unit.....	15
Table 7. Use of Bottom Up Tool to Prepare Resource Estimates: District and Functional Unit ..	16
Table 8. Alternate Tools to Bottom Up Tool: District.....	17
Table 9. Alternate Tools to Bottom Up Tool: Functional Unit	18
Table 10. Use of Historic Support Estimating Top Down Methods A B C Summary Tool: District and Functional Unit.....	20
Table 11. Alternate Tools to Historic Support Estimating Top Down Methods A B C Summary Tool: District	21
Table 12. Alternate Tools to Historic Support Estimating Top Down Methods A B C Summary Tool: Functional Unit.....	22
Table 13. Use of PS&E Sheet Count Tool: District and Functional Unit.....	23
Table 14. Project Development Teams Quantifying Risks for Resource Estimates: District and Functional Unit.....	24
Table 15. Incidence of Project Development Teams Quantifying Risks: District	25
Table 16. Incidence of Project Development Teams Quantifying Risks: Functional Unit	26
Table 17. Use of Risk Register Tool: District and Functional Unit.....	27
Table 18. Alternate Tools to Risk Register Tool: District.....	27
Table 19. Alternate Tools to Risk Register Tool: Functional Unit.....	27
Table 20. Supervisors' Management of Staff Support Costs: District and Functional Unit	28
Table 21. Supervisors' Tools and Practices for Managing Staff Support Costs: District.....	29
Table 22. Supervisors' Tools and Practices for Managing Staff Support Costs: Functional Unit.....	31
Table 23. Tools/Reports Used to Track Time and Support Costs: District	32
Table 24. Tools/Reports Used to Track Time and Support Costs: Functional Unit	34
Table 25. Project Managers Using the PRSM Programming Sheet Tool to Escalate Estimates: District and Functional Unit	36
Table 26. Project Managers Using the 11-Page Estimate Template to Escalate Estimates: District and Functional Unit.....	37
Table 27. Tools and Methods Used to Calculate Escalation: District	37
Table 28. Tools and Methods Used to Calculate Escalation: Functional Unit	38
Table 29. Project Managers Using the Risk Task to Manage Project Cost Uncertainties: District and Functional Unit.....	39

List of Figures

Figure ES1. Field Visit Prior to Scoping and Estimating: Statewide.....	5
Figure ES2. Use of Project Scoping Fact Sheet Tool: Statewide.....	5
Figure ES3. Use of Bottom Up Tool: Statewide.....	6
Figure ES4. Use of A B C Summary Tool: Statewide	6
Figure ES5. Use of PS&E Sheet Count Tool: Statewide	6
Figure ES6. Use of Risk Register Tool: Statewide	7
Figure ES7. Use of PRSM: Statewide	7
Figure ES8. Use of 11-Page Estimate Template: Statewide	8
Figure ES9. Use of Risk Task: Statewide.....	8
Figure 1. Number of Survey Respondents: Statewide	10
Figure 2. Respondents Preparing Resource Estimates: Statewide.....	11
Figure 3. Incidence of Field Visits Prior to Scoping and Estimating: Statewide.....	13
Figure 4. PID Included With Resource Estimate Requests: Statewide	14
Figure 5. Project Scoping Fact Sheet Tool Provided as Supplemental Scoping Information: Statewide.....	15
Figure 6. Use of Bottom Up Tool to Prepare Resource Estimates: Statewide	16
Figure 7. Use of Historic Support Estimating Top Down Methods A B C Summary Tool: Statewide.....	20
Figure 8. Use of PS&E Sheet Count Tool: Statewide	23
Figure 9. Project Development Teams Quantifying Risks for Resource Estimates: Statewide...24	
Figure 10. Incidence of Project Development Teams Quantifying Risks: Statewide	25
Figure 11. Use of Risk Register Tool: Statewide	26
Figure 12. Supervisors' Management of Staff Support Costs: Statewide.....	28
Figure 13. Project Managers Using the PRSM Programming Sheet Tool to Escalate Estimates: Statewide.....	36
Figure 14. Project Managers Using the 11-Page Estimate Template to Escalate Estimates: Statewide.....	37
Figure 15. Project Managers Using the Risk Task to Manage Project Cost Uncertainties: Statewide.....	39

Executive Summary

Background

As part of the California Department of Transportation (Caltrans) Cost Estimating Improvement Initiative, the Division of Project Management released a preliminary set of cost estimating tools for current capital outlay projects. The division is currently interested in assessing the levels of implementation of these tools throughout the agency. The Cost Estimating Improvement Initiative team will use the findings from this assessment to guide future staff training efforts that will encourage further tool implementation.

To inform the division's assessment, CTC & Associates surveyed the staff responsible for estimating and managing support and capital costs within the Construction, Design, Engineering Services, Environmental, Planning, Project Management, Right of Way and Land Surveys, and Traffic Operations units in all 12 Caltrans districts.

Summary of Findings

Online surveys examined the resource estimating and management practices used by staff within Caltrans districts and functional units. The survey was completed by 101 Caltrans staff members: 44 project managers and 57 other division staff.

The survey sought information about the use of a range of practices and tools. Table ES1 below provides a high-level summary of respondents' use of these practices and tools, and an average of overall tool use.

Table ES1. Tool Use Within Caltrans Districts and Functional Units

Practice or Tool	Use	Don't Use
Field Visits*	70%	30%
Project Scoping Fact Sheet Tool	43%	57%
Bottom Up Tool	28%	72%
Historic Support Estimating Top Down Methods A B C Summary Tool	19%	81%
Plans, Specifications & Estimates (PS&E) Sheet Count Tool	12%	88%
Risk Register Tool	62%	38%
Project Resourcing and Schedule Management (PRSM) Programming Sheet Tool	25%	75%
11-Page Estimate Template	42%	58%
Risk Task in PRSM	37%	63%
Average of Overall Tool Use	38%**	62%**

* Field visits conducted for some or all projects before scoping and estimating.

** Weighted average of all percentages with equal weight given to each practice or tool.

Key findings from survey respondents are summarized below.

Initial Practices in Resource Estimating

Respondents who prepare resource estimates reported on how often a field visit is involved before scoping and estimating a project, and whether a draft project initiation document (PID) is included with requests for resource estimates.

Sixty-eight respondents (67 percent) prepare resource estimates for their units (Figure ES1). Before scoping and estimating their projects, 19 of these respondents conduct a field visit for all of their projects, but 20 respondents don't conduct a field visit for any projects. The number of field visits conducted by the remaining respondents ranged from less than half of their projects (14) to more than half (12).

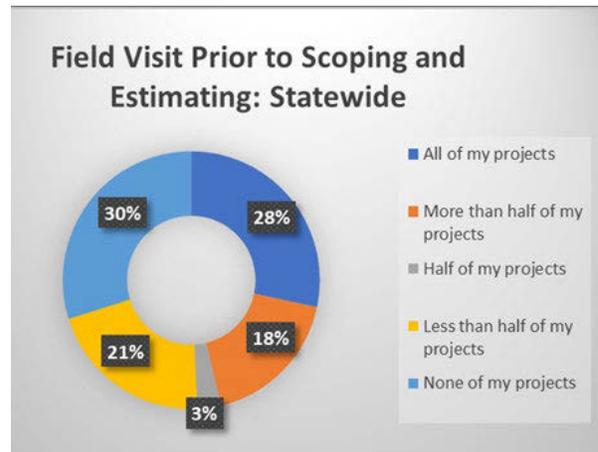


Figure ES1. Field Visit Prior to Scoping and Estimating: Statewide

Forty-nine respondents (72 percent) who prepare resource estimates include a draft PID with requests for resource estimates.

Resource Estimating Tool Usage

Respondents were asked about their use of five cost estimating tools: Project Scoping Fact Sheet Tool; Bottom Up Tool; Historic Support Estimating Top Down Methods A B C Summary Tool; Plans, Specifications & Estimates (PS&E) Sheet Count Tool; and Risk Register Tool.

Respondents were most likely to use the Risk Register and Project Scoping Fact Sheet tools and reported limited use of the Bottom Up, Historic Support Estimating Top Down Methods A B C Summary and PS&E tools. Below are charts summarizing statewide use of each tool; information about tool use by district and by functional unit is available within the report (see page references with each tool). References to the alternate tools and methods used by respondents appear throughout this report.

Project Scoping Fact Sheet Tool

(See page 15)

Thirty-seven respondents (57 percent) reported not receiving the Project Scoping Fact Sheet Tool as supplemental scoping information, while 28 respondents (43 percent) reported receiving it (Figure ES2).

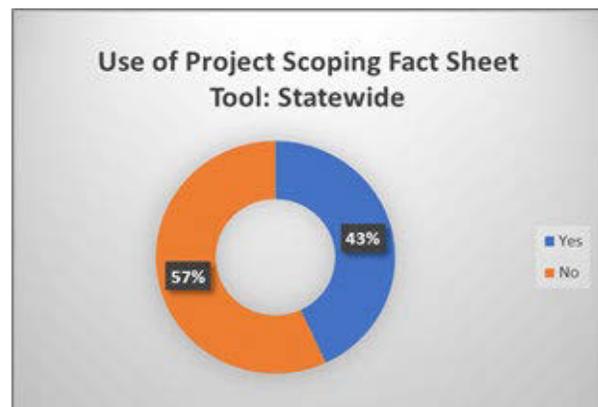


Figure ES2. Use of Project Scoping Fact Sheet Tool: Statewide

Bottom Up Tool

(See page 16)

Forty-seven respondents (72 percent) reported not using the Bottom Up Tool to prepare resource estimates, while 18 respondents (28 percent) reported using it (Figure ES3).

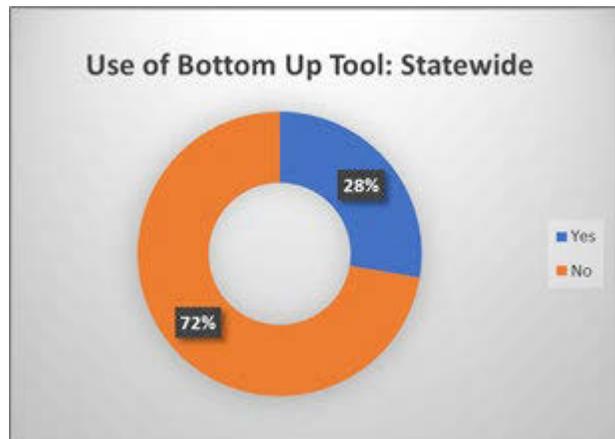


Figure ES3. Use of Bottom Up Tool: Statewide

Historic Support Estimating Top Down Methods A B C Summary Tool

(See page 19)

Fifty-one respondents (81 percent) reported not using the Historic Support Estimating Top Down Methods A B C Summary Tool to validate their bottom up estimate, while 12 respondents (19 percent) reported using the tool (Figure ES4).

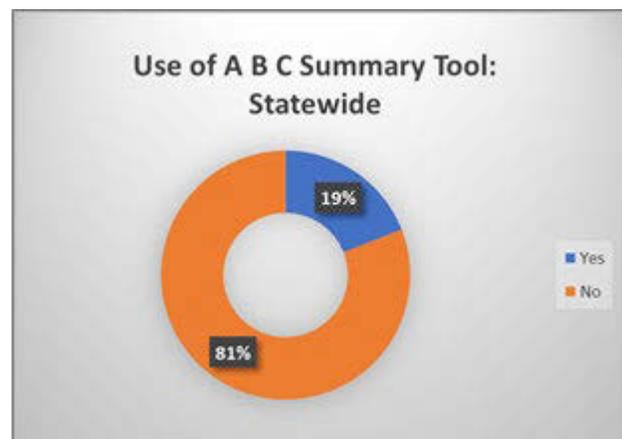


Figure ES4. Use of A B C Summary Tool: Statewide

PS&E Sheet Count Tool

(See page 23)

Nearly all respondents from design and engineering services functions (23 of 26, or 88 percent) reported not using the PS&E Tool (Figure ES5).

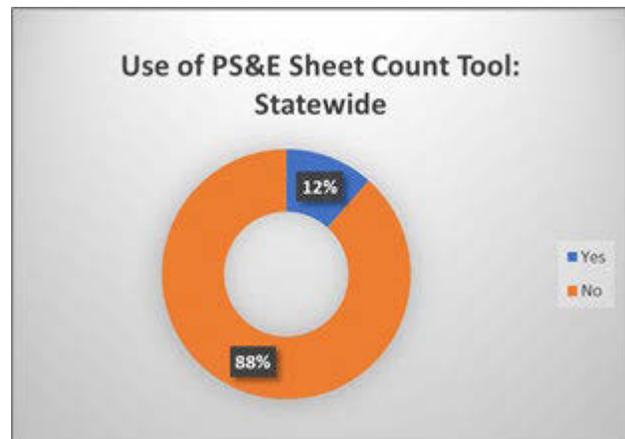


Figure ES5. Use of PS&E Sheet Count Tool: Statewide

Risk Register Tool

(See page 26)

Forty-seven respondents reported that project development teams in their districts quantify risk as part of their resource estimates. Of these respondents, 29 (62 percent) use the Risk Register Tool for this process, while 18 (38 percent) do not use the tool Figure ES6).



Figure ES6. Use of Risk Register Tool: Statewide

Resource Management

Thirty-seven supervisors (66 percent) reported managing staff support costs. Supervisors also described the tools and practices used to manage staff support costs (see page 28). Tools or reports that all respondents use to track and manage time charging and support costs are also included in the report (see page 32).

Escalation

Project managers reported on their use of the Project Resourcing and Schedule Management (PRSM) Programming Sheet Tool, 11-Page Estimate Template and Risk Task to escalate support and capital estimates. The Risk Task and 11-Page Estimate Template were most frequently used. Statewide use of each tool is summarized in the charts below; district and functional unit use is provided within the report (see page references with each tool).

PRSM Programming Sheet Tool

(See page 35)

Thirty project managers (75 percent) reported not using the PRSM Programming Sheet Tool to escalate support and capital estimates (Figure ES7).

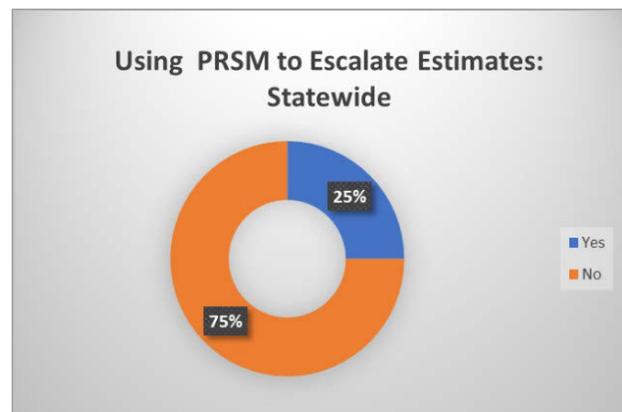


Figure ES7. Use of PRSM: Statewide

11-Page Estimate Template

(See page 36)

More than half of the project managers responding to the survey (23, or 58 percent) reported not using the 11-Page Estimate Template to escalate support and capital estimates, while 17 project managers (42 percent) reported using the template (Figure ES8).

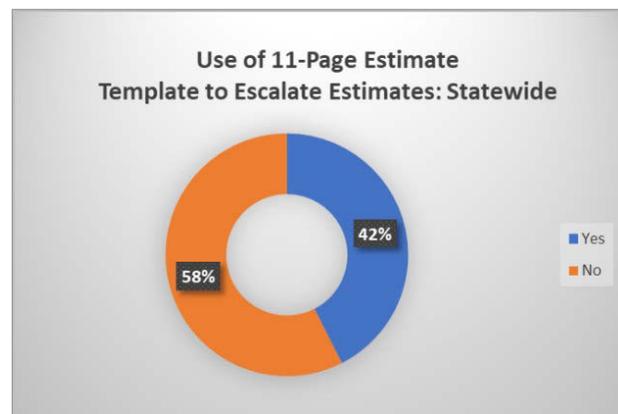


Figure ES8. Use of 11-Page Estimate Template: Statewide

Risk Task

(See page 38)

Twenty-four project managers (63 percent) reported not using the Risk Task to manage project cost uncertainties while 14 project managers (37 percent) reported using the tool (Figure ES9).

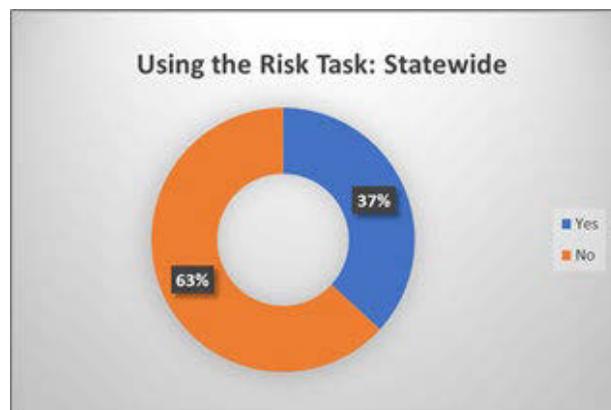


Figure ES9. Use of Risk Task: Statewide

Gaps in Findings

Representation varied considerably across districts and functional units. In districts, the number of respondents ranged from five or fewer (Districts 2, 7, 9, 10, 11, 12 and Headquarters) to approximately 20 (Districts 3, 5 and 8). In functional units, the number of respondents ranged from one (Traffic Operations) to 40 (Project Management). This range should be considered when reviewing summary comments about district or functional unit practices or tool use.

Specific information about the pool of potential respondents was not gathered at the time the survey was distributed. A more targeted and managed approach to identifying future survey participants will contribute to greater statistical significance of survey results.

Next Steps

The Cost Estimating Improvement Initiative team will use findings from this survey to guide future staff training efforts that will encourage tool implementation within Caltrans.

The Cost Estimating Improvement Initiative team may wish to consider modifications when distributing the next survey that assesses employee use of cost estimating tools, including:

- Managing the pool of potential respondents to ensure statistically significant findings.
- Modifying the online survey to:
 - Remove the request for specific identifying information, including name, phone number and email address.
 - Include drop-down menus for respondents to classify themselves by title and function.
 - Ask respondents to include both a tool or product name and detailed description when reporting on the alternate tools they are using to estimate costs.

Detailed Findings

Tool Usage Survey

Survey Approach

The California Department of Transportation (Caltrans) established the Cost Estimating Improvement Initiative to develop and refine support and capital cost estimating methods. As part of this initiative, the Division of Project Management released an initial set of cost estimating tools for current capital outlay projects and is interested in assessing current tool use among districts. The Cost Estimating Improvement Initiative team will use the information from this assessment to guide training efforts that will encourage further tool implementation.

To inform this assessment, CTC & Associates conducted an online survey of the Construction, Design, Engineering Services, Environmental, Planning, Project Management, Right of Way and Land Surveys, and Traffic Operations units in all 12 Caltrans districts. The surveys were distributed to staff responsible for estimating and managing support and capital costs. The survey questions are provided in [Appendix A](#). The full text of survey responses is presented in a supplement to this report.

Summary of Survey Results

The survey was completed by 101 district representatives: 44 project managers and 57 other division staff (Figure 1). Table 1 categorizes survey respondents by district and functional unit.

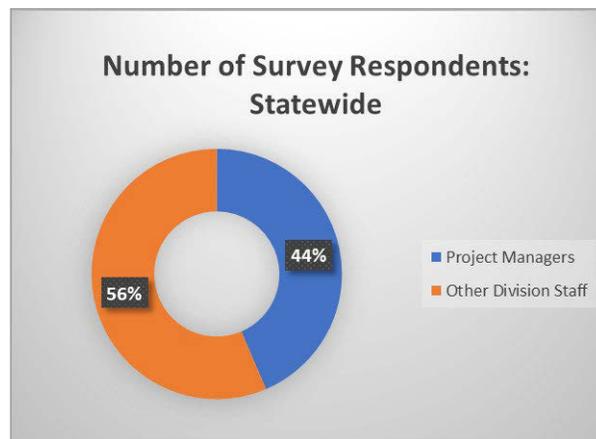


Figure 1. Number of Survey Respondents: Statewide

Table 1. Number of Survey Respondents: District and Functional Unit

District	Project Managers	Other Division Staff	Total	Functional Unit	Project Managers	Other Division Staff	Total
HQ	0	3	3	Construction	5	3	8
1	4	5	9	Design	3	20	23
2	1	1	2	Engineering Services	1	7	8
3	5	14	19	Environmental	7	3	10

District	Project Managers	Other Division Staff	Total
5	5	13	18
6	1	8	9
7	5	0	5
8	16	7	23
9	1	4	5
10	3	0	3
11	3	1	4
12	0	1	1
Total	44	57	101

Functional Unit	Project Managers	Other Division Staff	Total
Planning	0	5	5
Project Management	23	17	40
ROW/Land Surveys	5	1	6
Traffic Operations	0	1	1
Total	44	57	101

Of the 101 survey respondents, approximately two-thirds (68) prepare resource estimates for their units (Figure 2). A breakdown of survey respondents who prepare resource estimates is presented by district and by functional unit in Table 2.

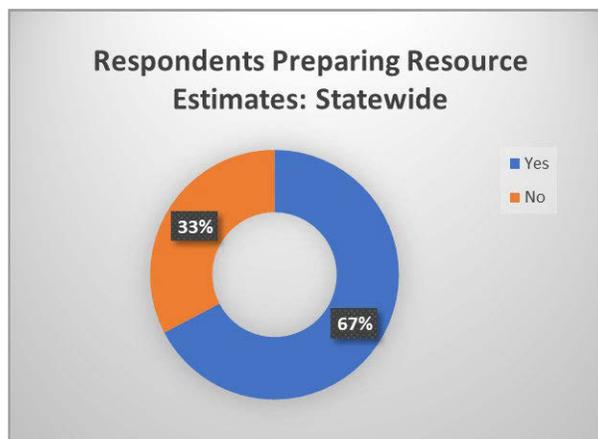


Figure 2. Respondents Preparing Resource Estimates: Statewide

Table 2. Respondents Preparing Resource Estimates: District and Functional Unit

District	No	Yes	Total
HQ	0	3	3
1	4	5	9
2	2	0	2
3	5	14	19
5	9	9	18
6	3	6	9
7	2	3	5
8	6	17	23
9	1	4	5
10	0	3	3
11	1	3	4
12	0	1	1
Total	33	68	101

Functional Unit	No	Yes	Total
Construction	2	6	8
Design	10	13	23
Engineering Services	1	7	8
Environmental	2	8	10
Planning	4	1	5
Project Management	13	27	40
ROW/Land Surveys	1	5	6
Traffic Operations	0	1	1
Total	33	68	101

Key findings from survey respondents are presented below in the following topic areas:

- [Initial practices in resource estimating](#) (see below).
- [Resource estimating tool usage](#) (see page 15).
- [Quantifying risks](#) (see page 24).
- [Resource management](#) (see page 28).
- [Escalation](#) (see page 35).

Within each topic area, survey findings are presented in three categories: state, district and functional unit. Following the discussion of these topic areas are recommendations received from survey respondents for improving cost estimating tools.

Initial Practices in Resource Estimating

Respondents who prepare resource estimates reported on how often a field visit is involved before scoping and estimating a project, and whether a draft project initiation document (PID) is included with requests for resource estimates.

Incidence of Field Visits Prior to Scoping and Estimating

Respondents who prepare resource estimates were asked to describe how frequently a field visit was involved prior to scoping and estimating a project based on the following options:

- All of my projects.
- More than half of my projects.
- Half of my projects.
- Less than half of my projects.
- None of my projects.

Almost half of respondents (46 percent) conduct field visits for all or more than half of their projects (19 respondents conduct a field visit for all projects; 12 for more than half of their projects). Of the remaining respondents, 14 conduct a field visit for less than half of their projects, and two for half of their projects, while 20 reported conducting a field visit for none of their projects.

When analyzing results by district, most respondents from Districts 5 and 10 reported conducting a field visit for all of their projects while most Headquarters (HQ), District 3 and District 7 respondents reported conducting a field visit for none of their projects. By functional unit, Environmental, Planning, Project Management and Traffic Operations were more likely to conduct field visits while Construction, Engineering Services, and Rights of Way and Land Surveys were less likely.

Survey results are summarized below by state (Figure 3), district (Table 3) and functional unit (Table 4).

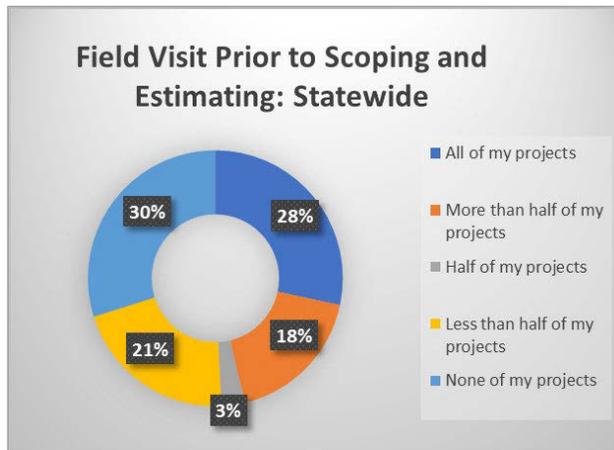


Figure 3. Incidence of Field Visits Prior to Scoping and Estimating: Statewide

Table 3. Incidence of Field Visits Prior to Scoping and Estimating: District

District	All Projects	More Than Half of Projects	Half of Projects	Less Than Half of Projects	No Projects	Total
HQ	0	0	0	0	3	3
1	2	2	0	1	0	5
2	0	0	0	0	0	0
3	0	2	2	2	8	14
5	5	2	0	1	1	9
6	2	2	0	1	1	6
7	0	0	0	1	2	3
8	5	2	0	6	3	16
9	1	1	0	1	1	4
10	2	1	0	0	0	3
11	1	0	0	1	1	3
12	1	0	0	0	0	1
Total	19	12	2	14	20	67

Table 4. Incidence of Field Visits Prior to Scoping and Estimating: Functional Unit

Functional Unit	All Projects	More Than Half of Projects	Half of Projects	Less Than Half of Projects	No Projects	Total
Construction	0	0	0	2	4	6
Design	4	2	0	3	3	12
Engineering Services	0	0	0	1	6	7
Environmental	3	2	1	2	0	8
Planning	1	0	0	0	0	1
Project Management	10	7	1	3	6	27
ROW/Land Surveys	0	1	0	3	1	5

Functional Unit	All Projects	More Than Half of Projects	Half of Projects	Less Than Half of Projects	No Projects	Total
Traffic Operations	1	0	0	0	0	1
Total	19	12	2	14	20	67

Project Initiation Document Included With Resource Estimate Requests

More than two-thirds of respondents who prepare resource estimates (49) include a draft PID with requests for resource estimates while nearly one-third of respondents (19) do not. All respondents from Districts 5, 6, 7, 9 and 12 reported including a PID; none of the respondents in District 10 reported including the document. PIDs were included most frequently by Design, Project Management and Traffic Operations, and less frequently by Environmental and Planning. Survey results are summarized below by state (Figure 4) and by district and functional unit (Table 5).

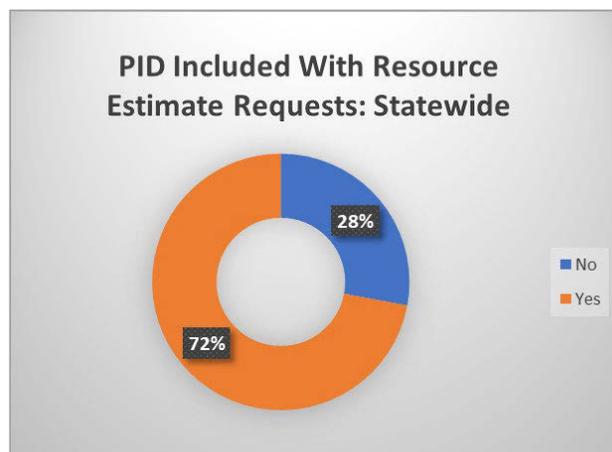


Figure 4. PID Included With Resource Estimate Requests: Statewide

Table 5. PID Included With Resource Estimate Requests: District and Functional Unit

District	No	Yes	Total
HQ	2	1	3
1	3	2	5
2	0	0	0
3	2	12	14
5	0	9	9
6	0	6	6
7	0	3	3
8	8	9	17
9	0	4	4
10	3	0	3
11	1	2	3
12	0	1	1
Total	19	49	68

Functional Unit	No	Yes	Total
Construction	2	4	6
Design	1	12	13
Engineering Services	3	4	7
Environmental	5	3	8
Planning	1	0	1
Project Management	5	22	27
ROW/Land Surveys	2	3	5
Traffic Operations	0	1	1
Total	19	49	68

Resource Estimating Tool Usage

Respondents who prepare resource estimates described their use of the following tools:

- Project Scoping Fact Sheet Tool.
- Bottom Up Tool.
- Historic Support Estimating Top Down Methods A B C Summary Tool.
- Plans, Specifications & Estimates (PS&E) Sheet Count Tool.

Project Scoping Fact Sheet Tool

Twenty-eight respondents reported receiving the Project Scoping Fact Sheet Tool as supplemental scoping information while 37 respondents reported not receiving the tool. Districts 5, 6, 9 and 10 were most likely to receive the tool and Districts 1, 3, 7 and 8 to not receive it. Project Management and Traffic Operations were most likely to receive the tool and Construction, Design, Environmental and Planning to not receive it. Survey results are summarized below by state (Figure 5) and district and functional unit (Table 6).

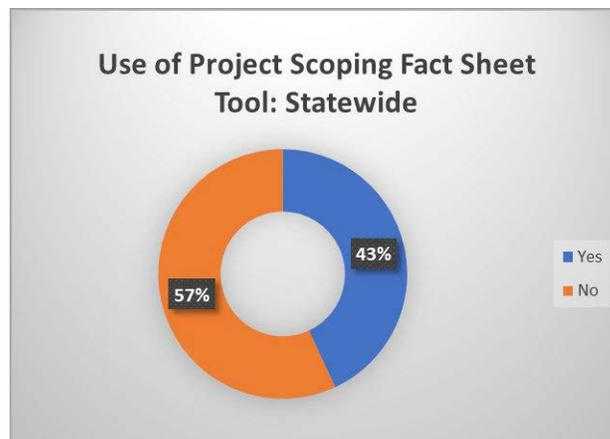


Figure 5. Project Scoping Fact Sheet Tool Provided as Supplemental Scoping Information: Statewide

Table 6. Project Scoping Fact Sheet Tool Provided as Supplemental Scoping Information: District and Functional Unit

District	No	Yes	Total
HQ	1	2	3
1	3	1	4
2	0	0	0
3	11	2	13
5	2	7	9
6	1	5	6
7	3	0	3
8	12	5	17
9	1	3	4
10	0	2	2
11	2	1	3
12	1	0	1
Total	37	28	65

Functional Unit	No	Yes	Total
Construction	6	0	6
Design	10	3	13
Engineering Services	4	3	7
Environmental	5	2	7
Planning	1	0	1
Project Management	9	17	26
ROW/Land Surveys	2	2	4
Traffic Operations	0	1	1
Total	37	28	65

Bottom Up Tool

Eighteen respondents use the Bottom Up Tool to prepare resource estimates, while 47 respondents do not use it. With the exception of Districts 9, 10 and 11, most district respondents reported not using the tool. Similarly, most functional unit respondents reported not using the tool with the exception of Rights of Way and Land Surveys, and Traffic Operations. Survey results are summarized below by state (Figure 6) and by district and functional unit (Table 7).

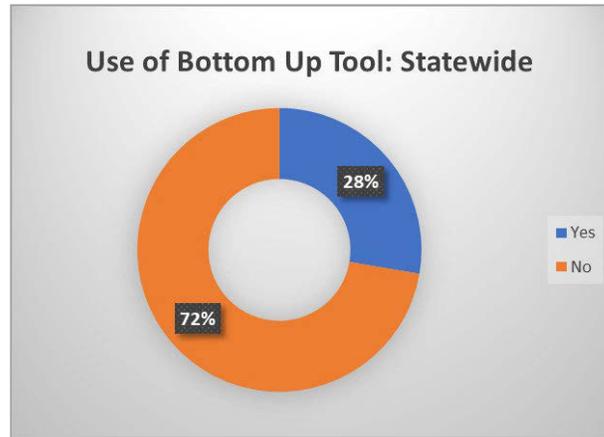


Figure 6. Use of Bottom Up Tool to Prepare Resource Estimates: Statewide

Table 7. Use of Bottom Up Tool to Prepare Resource Estimates: District and Functional Unit

District	No	Yes	Total
HQ	3	0	3
1	4	0	4
2	0	0	0
3	12	2	14
5	6	3	9
6	5	1	6
7	2	1	3
8	12	5	17
9	1	3	4
10	0	2	2
11	1	1	2
12	1	0	1
Total	47	18	65

Functional Unit	No	Yes	Total
Construction	6	0	6
Design	10	2	12
Engineering Services	7	0	7
Environmental	6	2	8
Planning	1	0	1
Project Management	16	10	26
ROW/Land Surveys	1	3	4
Traffic Operations	0	1	1
Total	47	18	65

Alternate Tools to the Bottom Up Tool

Respondents who don't use the Bottom Up Tool described the methods they use to prepare resource estimates. A range of practices were cited, including internally developed tools and policies, past experience and historical data.

Several respondents noted that while they hadn't yet used the Bottom Up Tool, it looked "extremely helpful" and they were eager to implement it. Other respondents commented that the

new tool was “too much” and “left too many opportunities for error.” According to a District 8 respondent, only Design uses the bottom up tool; Project Management uses an Excel spreadsheet.

Survey responses are summarized below by district (Table 8) and by functional unit (Table 9).

Table 8. Alternate Tools to Bottom Up Tool: District

District	Alternate Tools and Methods
HQ	<ul style="list-style-type: none"> • METScan. (This tool appears to be associated with Caltrans’ Materials and Testing Services.) • GS bottom-up resource estimating tool in Geotechnical Design Quality Management Plan. This Excel-based bottom up resource estimating tool was developed for the Division of Engineering Services. • Workload Estimating Norms (WEN) developed by specialists. • Manual calculations.
1	<ul style="list-style-type: none"> • 11-Page Estimate Template. • RW Data Sheet Estimating tool. • District 8 cost data page.
3	<ul style="list-style-type: none"> • CNORMS, an Excel-based WEN tool for construction. • DARR (Design Assignment and Resource Request) form. • District 8 database. • Environmental Workload Estimator (EWE) (district reviews and updates tool annually). • PLOOK, a web-based quick access basic project information utility that displays current workplan information, is easier to use than Project Resourcing and Schedule Management (PRSM), Caltrans’ project management tool to assist in project resource and schedule development, project management and tracking the status of projects. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ “Norm” tool. ○ Unit templates with adjustments for project specifics. ○ Contractors’ estimators. ○ Recent estimates. ○ Past experience.
5	<ul style="list-style-type: none"> • PRSM based on subject matter expert (SME) bottom up estimates. • Internal tools and practices: <ul style="list-style-type: none"> ○ Contract cost database. ○ Excel spreadsheet. ○ Top down method based on similar projects. ○ Historical database of past projects. ○ Resources based on expected number/type of plan sheets. ○ Past experience.

District	Alternate Tools and Methods
6	<ul style="list-style-type: none"> • Work Breakdown Structure (WBS) standard template. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ Hours estimated for each project phase based on duration. ○ Percentage based on total hours for each project phase.
7	<ul style="list-style-type: none"> • Internal tools and practices: <ul style="list-style-type: none"> ○ Historical data. ○ Input from/negotiations with division coordinators.
8	<ul style="list-style-type: none"> • CNORMS. <ul style="list-style-type: none"> ○ Preliminary Environmental Analysis Report (PEAR) tool in Standard Tracking and Exchange Vehicle for Environmental System (STEVE). • Internal tools and practices: <ul style="list-style-type: none"> ○ Biomonitor cost scoping tool. ○ Compensatory mitigation cost estimating tool. ○ Excel spreadsheet/template. ○ Historical data. ○ Past experience.
9	Excel spreadsheet.
12	Heuristics.

Table 9. Alternate Tools to Bottom Up Tool: Functional Unit

Functional Unit	Alternate Tools and Methods
Construction	<ul style="list-style-type: none"> • CNORMS. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet/template.
Design	<ul style="list-style-type: none"> • Internal tools and practices: <ul style="list-style-type: none"> ○ Top down method based on similar projects. ○ Heuristics. ○ Contract cost database. ○ Excel spreadsheet. ○ “Norm” tool. ○ Historical data. ○ Past experience.
Engineering Services	<ul style="list-style-type: none"> • GS bottom-up resource estimating tool in Geotechnical Design Quality Management Plan. • WEN developed by specialists. • METScan. • District 8 database.

Functional Unit	Alternate Tools and Methods
Engineering Services	<ul style="list-style-type: none"> • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ Contractors' estimators. ○ Recent estimates. ○ Historical database of past projects. ○ Past experience. ○ Manual calculations.
Environmental	<ul style="list-style-type: none"> • PEAR tool in STEVE. • EWE (district reviews and updates tool annually). • Internal tools and practices: <ul style="list-style-type: none"> ○ Biomonitor cost scoping tool. ○ Compensatory mitigation cost estimating tool. ○ Past experience.
Planning	<ul style="list-style-type: none"> • 11-Page Estimate Template. • District 8 cost data page.
Project Management	<ul style="list-style-type: none"> • DARR form. • PLOOK (easier to use than PRSM). • PRSM based on SME bottom up estimates. • WBS standard template. • Internal tools and practices: <ul style="list-style-type: none"> ○ Percentage base on total hours for each project phase. ○ Input from/negotiations with division coordinators. ○ Excel spreadsheet. ○ Historical data.
ROW/Land Surveys	RW Data Sheet Estimating tool.

Historic Support Estimating Top Down Methods A B C Summary Tool

Twelve respondents reported using the Historic Support Estimating Top Down Methods A B C Summary Tool to validate their bottom up estimate, while 51 respondents reported not using the tool. None of the respondents from Districts 1, 6, 11 and 12 use the tool; however, both respondents from District 10 reported using it. Similarly, most functional unit respondents reported not using the tool with the exception of Traffic Operations. Survey results are summarized below by state (Figure 7) and by district and functional unit (Table 10).

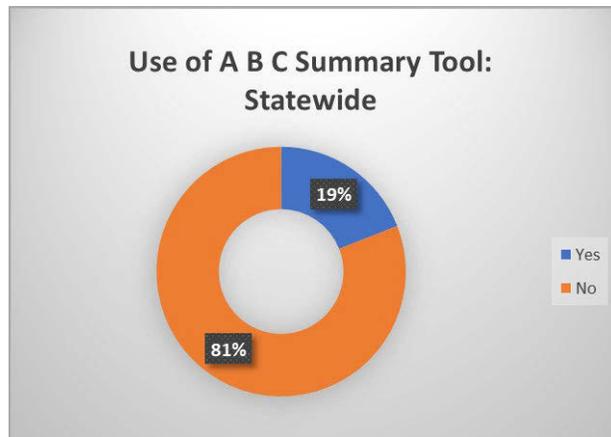


Figure 7. Use of Historic Support Estimating Top Down Methods A B C Summary Tool: Statewide

Table 10. Use of Historic Support Estimating Top Down Methods A B C Summary Tool: District and Functional Unit

District	No	Yes	Total
HQ	2	1	3
1	4	0	4
2	0	0	0
3	13	1	14
5	7	2	9
6	6	0	6
7	0	2	2
8	14	3	17
9	3	1	4
10	0	2	2
11	1	0	1
12	1	0	1
Total	51	12	63

Functional Unit	No	Yes	Total
Construction	6	0	6
Design	10	2	12
Engineering Services	6	1	7
Environmental	7	1	8
Planning	1	0	1
Project Management	18	6	24
ROW/Land Surveys	3	1	4
Traffic Operations	0	1	1
Total	51	12	63

Alternate Tools to Historic Support Estimating Top Down Methods A B C Summary Tool

Respondents who don't use the Historic Support Estimating Top Down Methods A B C Summary Tool also described a range of other tools and practices. Some nonusers noted that they don't prepare cost estimates (they enter resource estimates in Project Resourcing and Schedule Management (PRSM)), while others said they would be investigating the new tools. A District 11 respondent said the tool was used "sparingly" because it "is not a good measure for new multi-asset projects"; it is useful for high-level project cost information but "should not be used for unit level resourcing." Survey responses are summarized below by district (Table 11) and by functional unit (Table 12).

**Table 11. Alternate Tools to Historic Support Estimating Top Down
Methods A B C Summary Tool: District**

District	Alternate Tools and Methods
HQ	GS bottom-up resource estimating tool in Geotechnical Design Quality Management Plan.
1	<ul style="list-style-type: none"> • RW Data Sheet Estimating tool. • Internal tools and practices: <ul style="list-style-type: none"> ○ Percentage based on total hours for each project phase. ○ Input from/negotiations with division coordinators. ○ Excel spreadsheet. • Historical data.
3	<ul style="list-style-type: none"> • CNORMS. • DARR form. • District 8 database. • EWE (district reviews and updates tool annually). • PLOOK (easier to use than PRSM). • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ “Norm” tool. ○ Unit templates with adjustments for project specifics. ○ Contractors’ estimates. ○ Recent estimates. • Historical data. • Past experience. • Manual calculations.
5	<ul style="list-style-type: none"> • OPI (Online Project Information) System Expenditure Detail to track historical expenditures for similar projects. • Bottom up approach based on products/process to complete work. • OCER (Office of Construction Estimates Review). • Internal tools and practices: <ul style="list-style-type: none"> ○ Top down method. ○ Excel spreadsheet. • Historical data.
6	<ul style="list-style-type: none"> • Resource estimate entered to PRSM. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. • Historical data. • Past experience.
8	<ul style="list-style-type: none"> • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. • Support/cost ratio averages. • Historical data. • Past experience. • Comparable projects.

District	Alternate Tools and Methods
9	<ul style="list-style-type: none"> • PRSM information from past projects. • Internal tools and practices: <ul style="list-style-type: none"> ◦ Bottom up method (adjust for project needs).
12	<ul style="list-style-type: none"> • Heuristics.

Table 12. Alternate Tools to Historic Support Estimating Top Down Methods A B C Summary Tool: Functional Unit

Functional Unit	Alternate Tools and Methods
Construction	<ul style="list-style-type: none"> • CNORMS. • Internal tools and practices: <ul style="list-style-type: none"> ◦ Support/cost ratio averages. • Past experience.
Design	<ul style="list-style-type: none"> • OPI Expenditure Detail to track historical expenditures for similar projects. • Bottom up approach based on products/process to complete work. • OCER. • PRSM information from past projects. • Historical data. • Internal tools and practices: <ul style="list-style-type: none"> ◦ Top down method. ◦ Excel spreadsheets. • Heuristics. • Historical data. • Past experience.
Engineering Services	<ul style="list-style-type: none"> • GS bottom-up resource estimating tool in Geotechnical Design Quality Management Plan. • Past experience. • Internal tools and practices: <ul style="list-style-type: none"> ◦ Excel spreadsheet.
Environmental	<ul style="list-style-type: none"> • EWE (district reviews and updates tool annually). • Comparable projects. • Past experience.
Project Management	<ul style="list-style-type: none"> • PLOOK (easier to use than PRSM). • Resource estimate entered to PRSM. • Internal tools and practices: <ul style="list-style-type: none"> ◦ Excel spreadsheet. ◦ Support/cost ratio averages. ◦ Bottom up method (adjust for project needs). • Historical data. • Past experience. • Comparable projects.

Functional Unit	Alternate Tools and Methods
ROW/Land Surveys	<ul style="list-style-type: none"> • RW Data Sheet Estimating tool. • Comparable projects. • Manual calculation.

Plans, Specifications & Estimates (PS&E) Sheet Count Tool

Respondents from design and engineering services functions described their use of the PS&E Sheet Count Tool to validate PS&E phase bottom up estimates. Nearly all respondents (23 of 26) reported not using the tool. Only one respondent from HQ and two respondents from District 8 reported using the tool. Similarly, one respondent each from Engineering Services, Environmental and Traffic Operations reported using the tool. Survey results are summarized below by state (Figure 8) and by district and functional unit (Table 13).

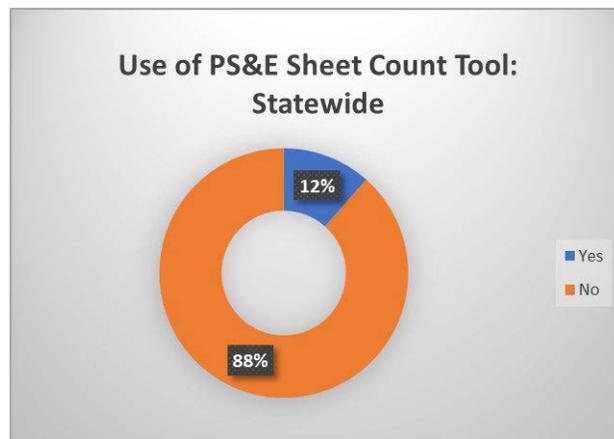


Figure 8. Use of PS&E Sheet Count Tool: Statewide

Table 13. Use of PS&E Sheet Count Tool: District and Functional Unit

District	No	Yes	Total
HQ	2	1	3
1	0	0	0
2	0	0	0
3	9	0	9
5	5	0	5
6	1	0	1
7	0	0	0
8	3	2	5
9	1	0	1
10	1	0	1
11	0	0	0
12	1	0	1
Total	23	3	26

Functional Unit	No	Yes	Total
Construction	0	0	0
Design	12	0	12
Engineering Services	5	1	6
Environmental	1	1	2
Planning	0	0	0
Project Management	5	0	5
ROW/Land Surveys	0	0	0
Traffic Operations	0	1	1
Total	23	3	26

Quantifying Risks

As part of the resource estimating process, respondents described their project development teams' practices to quantify risk and their use of the Risk Register Tool.

Project Development Teams Quantifying Risks for Resource Estimates

Two-thirds of respondents (47) who prepare resource estimates reported that project development teams in their districts quantify risk as part of their resource estimates. Most respondents in all districts reported quantifying risk except Districts 8 and 11, where nearly equal numbers of respondents reported quantifying or not quantifying risk. In all functional units except Construction, respondents most frequently reported quantifying risk as part of resource estimates. Survey results are summarized below by state (Figure 9) and by district and functional unit (Table 14).



Figure 9. Project Development Teams Quantifying Risks for Resource Estimates: Statewide

Table 14. Project Development Teams Quantifying Risks for Resource Estimates: District and Functional Unit

District	No	Yes	Total
HQ	1	2	3
1	0	4	4
2	0	0	0
3	4	10	14
5	3	5	8
6	0	6	6
7	0	3	3
8	8	9	17
9	0	4	4
10	0	2	2
11	1	1	2
12	0	1	1
Total	17	47	64

Functional Unit	No	Yes	Total
Construction	4	2	6
Design	4	8	12
Engineering Services	1	6	7
Environmental	4	4	8
Planning	0	1	1
Project Management	4	21	25
ROW/Land Surveys	0	4	4
Traffic Operations	0	1	1
Total	17	47	64

Incidence of Project Development Teams Quantifying Risks for Resource Estimates

Respondents were asked to describe how frequently a field visit was involved prior to scoping and estimating a project based on the following options:

- All of my projects.
- More than half of my projects.
- Half of my projects.
- Less than half of my projects.
- None of my projects.

Of the 47 respondents who reported that project development teams in their districts quantify risk as part of their resource estimates, 22 respondents reported quantifying risks for all of their projects, 13 for more than half of their projects, two for half of their projects, and 10 for less than half of their projects. Respondents from Districts 6, 7, 8, 9 and 11 most frequently reported quantifying risks for all of their projects; respondents from HQ and District 12 most frequently reported quantifying risks for less than half of their projects. Survey results are summarized below by state (Figure 10), district (Table 15) and functional unit (Table 16).



Figure 10. Incidence of Project Development Teams Quantifying Risks: Statewide

Table 15. Incidence of Project Development Teams Quantifying Risks: District

District	All Projects	More Than Half of Projects	Half of Projects	Less Than Half of Projects	Total
HQ	0	0	0	2	2
1	1	2	0	1	4
2	0	0	0	0	0
3	3	3	1	3	10
5	1	4	0	0	5
6	4	1	0	1	6
7	3	0	0	0	3
8	5	3	0	1	9

District	All Projects	More Than Half of Projects	Half of Projects	Less Than Half of Projects	Total
9	3	0	1	0	4
10	1	0	0	1	2
11	1	0	0	0	1
12	0	0	0	1	1
Total	22	13	2	10	47

Table 16. Incidence of Project Development Teams Quantifying Risks: Functional Unit

Functional Unit	All Projects	More Than Half of Projects	Half of Projects	Less Than Half of Projects	Total
Construction	1	1	0	0	2
Design	1	4	0	3	8
Engineering Services	1	2	0	3	6
Environmental	3	1	0	0	4
Planning	0	0	0	1	1
Project Management	15	3	0	3	21
ROW/Land Surveys	0	2	2	0	4
Traffic Operations	1	0	0	0	1
Total	22	13	2	10	47

Risk Register Tool

Of the 47 respondents who reported quantifying risk, nearly two-thirds (29) use the Risk Register Tool for this process. Respondents from Districts 3, 5, 8 and 11 were least likely to use this tool. Among the functional units, respondents from Project Management most frequently reported using the tool; none of the respondents from Environmental reported using the tool, and only three of eight respondents from Design reported using it. Survey results are summarized below by state (Figure 11) and by district and functional unit (Table 17).



Figure 11. Use of Risk Register Tool: Statewide

Table 17. Use of Risk Register Tool: District and Functional Unit

District	No	Yes	Total
HQ	0	2	2
1	0	4	4
2	0	0	0
3	6	4	10
5	3	2	5
6	1	5	6
7	0	3	3
8	7	2	9
9	0	4	4
10	0	2	2
11	1	0	1
12	0	1	1
Total	18	29	47

Functional Unit	No	Yes	Total
Construction	1	1	2
Design	5	3	8
Engineering Services	3	3	6
Environmental	4	0	4
Planning	0	1	1
Project Management	5	16	21
ROW/Land Surveys	0	4	4
Traffic Operations	0	1	1
Total	18	29	47

Alternate Tools to Risk Register Tool

Most respondents who don't use the Risk Register Tool reported that they don't need to use a tool, primarily because it is the responsibility of the project manager. A District 3 respondent noted that while the district can enter information into the Risk Management Plan, that is typically a function of the project manager. A District 8 respondent reported that Materials Engineering only has certain risks related to materials, which are added to the register when necessary by email or in a meeting. An HQ respondent noted that because the tool does not use Monte Carlo simulation, it "overestimates risk needs and leads to inflated programming recommendations. [HQ does] not agree with calculations done in the tool." Survey results are summarized below by district (Table 18) and by functional unit (Table 19).

Table 18. Alternate Tools to Risk Register Tool: District

District	Alternate Tools and Methods
3	<ul style="list-style-type: none"> • District 3 risk register (typically provided by project manager). • Risk group within district quantifies. • Internal tools and policies: <ul style="list-style-type: none"> ○ Project manager role.
8	<ul style="list-style-type: none"> • Risk group within district quantifies.

Table 19. Alternate Tools to Risk Register Tool: Functional Unit

Functional Unit	Alternate Tools and Methods
Design	<ul style="list-style-type: none"> • District 3 risk register (typically provided by project manager). • Risk group within district quantifies. • Internal tools and policies: <ul style="list-style-type: none"> ○ Project manager role.
Project Management	<ul style="list-style-type: none"> • Risk group within district quantifies.

Resource Management

Managing Staff Support Costs

Those respondents who are supervisors were asked if they manage staff support costs. Two-thirds of these respondents (37) reported managing staff support costs while one-third (19) do not. Supervisors in HQ and in Districts 3, 8 and 11 most frequently reported managing staff support costs, while respondents from Districts 6, 7, 10 and 12 do not manage these costs. Supervisors in Design, Environmental, Project Management and Traffic Operations most frequently reported managing staff support costs, while respondents from Planning less frequently reported managing staff support costs. Survey results are summarized below by state (Figure 12) and by district and functional unit (Table 20).

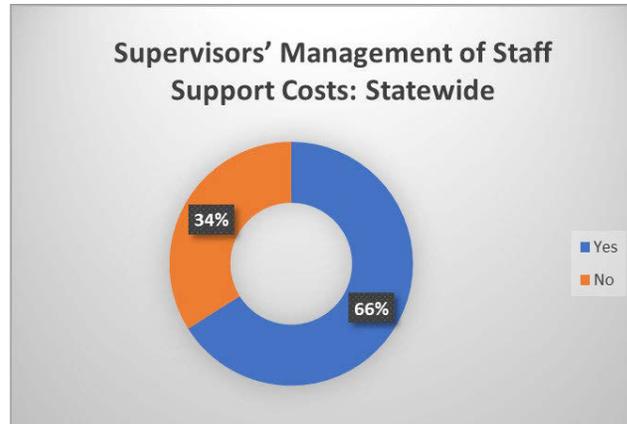


Figure 12. Supervisors' Management of Staff Support Costs: Statewide

Table 20. Supervisors' Management of Staff Support Costs: District and Functional Unit

District	No	Yes	Total
HQ	0	1	1
1	2	3	5
2	1	1	2
3	3	13	16
5	2	3	5
6	1	0	1
7	1	0	1
8	6	11	17
9	1	1	2
10	1	0	1
11	0	4	4
12	1	0	1
Total	19	37	56

Functional Unit	No	Yes	Total
Construction	3	3	6
Design	4	12	16
Engineering Services	2	2	4
Environmental	3	7	10
Planning	3	1	4
Project Management	4	8	12
ROW/Land Surveys	0	3	3
Traffic Operations	0	1	1
Total	19	37	56

Tools and Practices for Managing Staff Support Costs

Tools and practices that supervisors use to track and manage time charging and support costs are summarized below by district (Table 21) and by functional unit (Table 22).

Table 21. Supervisors’ Tools and Practices for Managing Staff Support Costs: District

District	Tools and Practices
<p>HQ</p>	<ul style="list-style-type: none"> • PRSM. • AMS Advantage, Caltrans’ integrated financial management system. • Internal tools and practices: <ul style="list-style-type: none"> ○ Vision tracking allocation. ○ Estimates to completion (ETC) reports.
<p>1</p>	<ul style="list-style-type: none"> • PRSM. • AMS Advantage. • QMRS (Quality Management Reporting System), a database reporting system for Project Delivery used to aggregate and display data captured in the Project Delivery Workload Development Migration warehouse. • Datalink contains information from AMS and was developed as a method to obtain data in a timely manner for inquiry and reporting purposes. • Internal tools and policies: <ul style="list-style-type: none"> ○ PRSM programming sheets from project management support unit. ○ Excel spreadsheet.
<p>2</p>	<ul style="list-style-type: none"> • Internal tools and practices: <ul style="list-style-type: none"> ○ North Region Project Development (NRPD) Pre-Status tool. ○ Monthly financial reports. ○ Excel spreadsheet.
<p>3</p>	<ul style="list-style-type: none"> • PRSM. • NRPD Pre-Status tool. • AMS Advantage: Phase III and Phase IV reports. • Datalink. • PLOOK. • LMS (Learning Management System). Bundled with Staff Central, LMS is Caltrans’ PeopleSoft human resources system that allows the user to manage his/her training. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ On-ramp timesheets. ○ Project manager tools. ○ Expenditures reports. ○ Risk management plans. ○ Workplan Status Report.
<p>5</p>	<ul style="list-style-type: none"> • AMS. • CTPass, a portal to multiple department programs including AMS Advantage, PRSM and other systems. • PRSM. • AMS InfoAdvantage. • QMRS. • California Transportation Improvement Program System (CTIPS) through project management support unit.

District	Tools and Practices
5	<ul style="list-style-type: none"> • Internal tools and practices: <ul style="list-style-type: none"> ○ District dashboard. ○ Communications with project manager and design manager. ○ Staff Central. ○ Excel spreadsheet. ○ Timesheets. ○ Central Region project management support unit. ○ Project reporting.
6	<ul style="list-style-type: none"> • PRSM. • AMS Advantage. • Datalink. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ Expenditures reports. ○ ETC and actual cost of work performed (ACWP) reports. ○ Comparable projects. ○ Project plans and documents. ○ Past experience.
7	<ul style="list-style-type: none"> • PRSM. • Project initiation reports (PIRs). • Internal tools and practices: <ul style="list-style-type: none"> ○ Expenditures reports.
8	<ul style="list-style-type: none"> • District WPS (FileMaker) system. • PRSM. • WBS. • WPS. • Internal tools and practices: <ul style="list-style-type: none"> ○ Coordination with project manager. ○ Excel spreadsheet ○ Expenditures report. ○ ETC report. ○ Staff internal activity logs. ○ Time to prepare reports. ○ Project management support unit.
9	<ul style="list-style-type: none"> • Datalink. • PRSM. • Internal tools and practices: <ul style="list-style-type: none"> ○ Party chief reports.
10	PRSM.
11	<ul style="list-style-type: none"> • PRSM. • Internal tools and practices: <ul style="list-style-type: none"> ○ Custom district reports. ○ Cost-to-complete projection. ○ Labor and budget reports.

**Table 22. Supervisors' Tools and Practices for Managing Staff Support Costs:
Functional Unit**

Functional Unit	Tools and Practices
Construction	<ul style="list-style-type: none"> • PRSM. • AMS Advantage: Phase III and Phase IV reports. • WPS. • Internal tools and practices: <ul style="list-style-type: none"> ○ Staff internal activity logs.
Design	<ul style="list-style-type: none"> • PRSM. • WBS. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ On-ramp timesheets. ○ Project manager tools. ○ Communications with project manager and design manager. ○ Staff Central. ○ Cost-to-complete projection.
Engineering Services	<ul style="list-style-type: none"> • PRSM. • AMS Advantage. • LMS. • Internal tools and practices: <ul style="list-style-type: none"> ○ NRPD Pre-Status tool. ○ Vision tracking allocation. ○ ETC reports.
Environmental	<ul style="list-style-type: none"> • PRSM reports. • District WPS (FileMaker) system. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ ETC reports. ○ Expenditures reports. ○ Time to prepare reports.
Planning	<ul style="list-style-type: none"> • AMS. • Datalink. • Internal tools and policies: <ul style="list-style-type: none"> ○ PRSM programming sheets from project management support unit. ○ Excel spreadsheet.
Project Management	<ul style="list-style-type: none"> • PRSM/Workplan. • AMS Advantage. • QMRS. • PLOOK. • NRPD Pre-Status tool. • CTPass. • PRSM. • AMS Advantage. • AMS InfoAdvantage • QMRS.

Functional Unit	Tools and Practices
Project Management	<ul style="list-style-type: none"> • PIRs. • WPS. • CTIPS through project management support unit. • Internal tools and practices <ul style="list-style-type: none"> ○ Monthly financial reports. ○ Excel spreadsheet. ○ Expenditures report. ○ Risk management plans. ○ Workplan Status Reports. ○ Staff Central. ○ District dashboard. ○ Project reporting. ○ ETC and ACWP reports. ○ Party chief reports. ○ Comparable projects. ○ Project plans and documents. • Past experience.
ROW/Land Surveys	<ul style="list-style-type: none"> • PRSM. • PLOOK.

Tracking and Managing Time and Support Costs

All survey respondents described the tools or reports they use to track and manage time charging and support costs. Survey results are summarized below by district (Table 23) and by functional unit (Table 24).

Table 23. Tools/Reports Used to Track Time and Support Costs: District

District	Time/Cost Tracking and Management Tools/Reports
HQ	<ul style="list-style-type: none"> • PRSM. • AMS Advantage. • Internal tools and policies: <ul style="list-style-type: none"> ○ Vision tracking allocation. • ETC reports.
1	<ul style="list-style-type: none"> • PRSM/PRSM Workplan. • AMS Advantage. • QMRS. • Datalink. • Internal tools and policies: <ul style="list-style-type: none"> ○ PRSM programming sheets from project management support unit. ○ Excel spreadsheet.
2	<ul style="list-style-type: none"> • NRPD Pre-Status tool. • Internal tools and policies: <ul style="list-style-type: none"> ○ Monthly financial reports. ○ Excel spreadsheet.

District	Time/Cost Tracking and Management Tools/Reports
3	<ul style="list-style-type: none"> • PRSM. • NRPD Pre-Status tool. • AMS Advantage: Phase III and Phase IV reports. • Datalink. • PLOOK. • LMS. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ On-ramp timesheets. ○ Expenditures reports. ○ Risk management plans. • Workplan Status Report.
5	<ul style="list-style-type: none"> • PRSM. • AMS. • QMRS. • CTPass. • CTIPS through project management support unit. • Internal tools and practices: <ul style="list-style-type: none"> ○ Communications with project manager and design manager. ○ Timesheets. ○ Excel spreadsheet. ○ District dashboard. ○ Project reporting. ○ Staff Central.
6	<ul style="list-style-type: none"> • PRSM. • AMS Advantage. • Datalink. • Internal tools and practices: <ul style="list-style-type: none"> ○ Budget reports. ○ Excel spreadsheet. ○ Expenditures reports. ○ ETC and ACWP reports. ○ Past experience.
7	<ul style="list-style-type: none"> • PRSM. • PIRs. • Internal tools and practices: <ul style="list-style-type: none"> ○ Expenditures report.
8	<ul style="list-style-type: none"> • PRSM. • WPS/WPS (FileMaker) system. • WBS. • Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ Expenditures reports. ○ ETC reports. ○ Staff internal activity logs.

District	Time/Cost Tracking and Management Tools/Reports
8	<ul style="list-style-type: none"> ○ Timesheets. ○ Time to prepare reports. ○ Project management support unit reports.
9	<ul style="list-style-type: none"> ● PRSM. ● Datalink. ● Internal tools and policies: <ul style="list-style-type: none"> ○ Party chief reports.
10	PRSM.
11	<ul style="list-style-type: none"> ● PRSM. ● Internal tools and practices: <ul style="list-style-type: none"> ○ Labor reports. ○ Budget reports. ○ Custom district reports.

Table 24. Tools/Reports Used to Track Time and Support Costs: Functional Unit

Functional Unit	Time/Cost Tracking and Management Tools/Reports
Construction	<ul style="list-style-type: none"> ● PRSM. ● AMS Advantage: Phase III and Phase IV reports. ● WPS. ● Workplan Status Report. ● Internal tools and policies: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ Staff internal activity logs.
Design	<ul style="list-style-type: none"> ● PRSM. ● PLOOK. ● WBS. ● Internal tools and policies: <ul style="list-style-type: none"> ○ Excel spreadsheets. ○ On-ramp timesheets. ○ Project manager tools and communications. ○ Expenditures reports.
Engineering Services	<ul style="list-style-type: none"> ● PRSM. ● AMS Advantage. ● LMS. ● NRPD Pre-Status tool. ● Internal tools and policies: <ul style="list-style-type: none"> ○ Vision tracking allocation. ○ ETC reports.
Environmental	<ul style="list-style-type: none"> ● PRSM. ● WPS/WPS (FileMaker) system. ● WBS. ● Internal tools and practices: <ul style="list-style-type: none"> ○ Excel spreadsheet. ○ Expenditures reports.

Functional Unit	Time/Cost Tracking and Management Tools/Reports
Environmental	<ul style="list-style-type: none"> ○ ETC reports. ○ Timesheets. ○ Coordination with project manager. ○ Project management support unit reports. ● Time to prepare reports.
Planning	<ul style="list-style-type: none"> ● PRSM. ● AMS Advantage. ● QMRS. ● Datalink. ● Internal tools and policies: <ul style="list-style-type: none"> ○ PRSM programming sheets from project management support unit. ○ Excel spreadsheet
Project Management	<ul style="list-style-type: none"> ● PRSM/PRSM Workplan. ● AMS Advantage. ● Datalink. ● QMRS. ● PIRs. ● CTPass. ● AMS InfoAdvantage. ● CTIPS through project management support unit. ● WPS. ● Internal tools and policies: <ul style="list-style-type: none"> ○ District dashboard and custom reports. ○ Status documents. ○ Monthly financial reports. ○ ETC and ACWP reports. ○ Excel spreadsheets. ○ Workplan Status Report. ○ Party chief reports. ○ Staff Central. ○ Past experience.
ROW/Land Surveys	<ul style="list-style-type: none"> ● PRSM. ● PLOOK.

Escalation

Project managers were surveyed about their experience using the following tools for escalating support and capital estimates:

- PRSM Programming Sheet Tool.
- 11-Page Estimate Template.
- Risk Task.

PRSM Programming Sheet Tool

Three-quarters of the project managers responding to the survey (30) do not use the PRSM Programming Sheet Tool to escalate support and capital estimates. (PRSM is a project

management system that provides a scheduling tool for Caltrans' capital project managers and identifies staff time against a workload model.) Only 10 project managers responding to the survey use the tool. From a district perspective, project managers from Districts 9 and 10 most frequently reported using the tool. Among the functional units, the tool is reportedly used most frequently in Project Management. Survey results are summarized below by state (Figure 13) and by district and functional unit (Table 25).

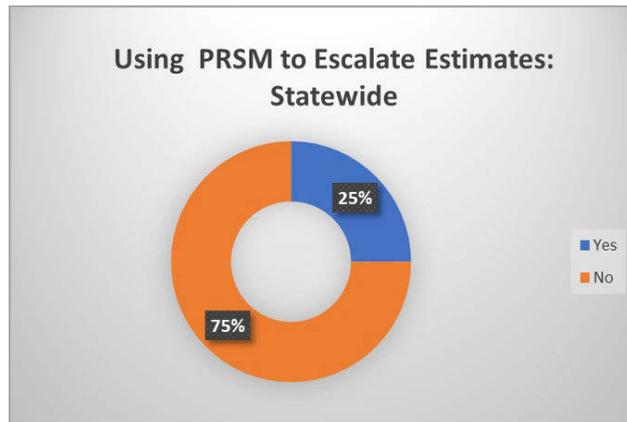


Figure 13. Project Managers Using the PRSM Programming Sheet Tool to Escalate Estimates: Statewide

Table 25. Project Managers Using the PRSM Programming Sheet Tool to Escalate Estimates: District and Functional Unit

District	No	Yes	Total
HQ	0	0	0
1	3	0	3
2	1	0	1
3	3	2	5
5	4	1	5
6	1	0	1
7	3	2	5
8	12	2	14
9	0	1	1
10	0	2	2
11	3	0	3
12	0	0	0
Total	30	10	40

Functional Unit	No	Yes	Total
Construction	4	0	4
Design	3	0	3
Engineering Services	1	0	1
Environmental	7	0	7
Planning	0	0	0
Project Management	12	9	21
ROW/Land Surveys	3	1	4
Traffic Operations	0	0	0
Total	30	10	40

11-Page Estimate Template

More than half of the project managers responding to the survey (23) do not use the 11-Page Estimate Template to escalate support and capital estimates, while 17 project managers responding to the survey reported using the template. Project managers from Districts 3 and 10 most frequently reported using the tool while almost all project managers from District 8 do not. Among the functional units, the tool is reportedly used most frequently in Design and Project Management; the template is not used in Engineering Services, Environmental, and Rights of

Way and Land Surveys. Survey results are summarized below by state (Figure 14) and by district and functional unit (Table 26).

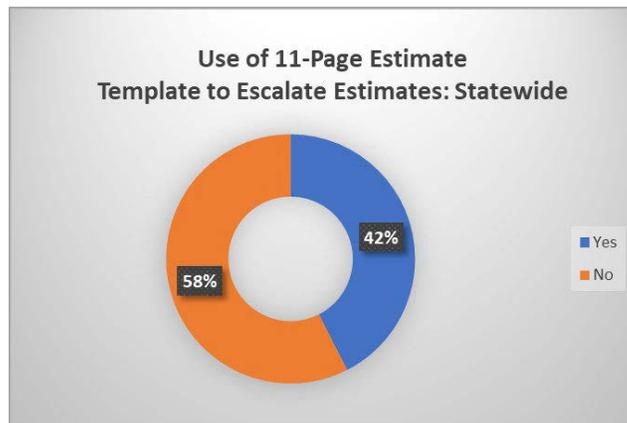


Figure 14. Project Managers Using the 11-Page Estimate Template to Escalate Estimates: Statewide

Table 26. Project Managers Using the 11-Page Estimate Template to Escalate Estimates: District and Functional Unit

District	No	Yes	Total
HQ	0	0	0
1	2	1	3
2	0	1	1
3	1	4	5
5	2	3	5
6	1	0	1
7	2	3	5
8	13	1	14
9	0	1	1
10	0	2	2
11	2	1	3
12	0	0	0
Total	23	17	40

Functional Unit	No	Yes	Total
Construction	3	1	4
Design	0	3	3
Engineering Services	1	0	1
Environmental	7	0	7
Planning	0	0	0
Project Management	8	13	21
ROW/Land Surveys	4	0	4
Traffic Operations	0	0	0
Total	23	17	40

Alternate Tools for Calculating Escalation

Those project managers not using either the PRSM Programming Sheet Tool or the 11-Page Estimate Template described the methods and tools used to calculate escalation. Survey responses are summarized below by district (Table 27) and by functional unit (Table 28).

Table 27. Tools and Methods Used to Calculate Escalation: District

District	Alternate Tools and Methods
1	<ul style="list-style-type: none"> • District tools and policies: <ul style="list-style-type: none"> ○ District 1 Right of Way Data Sheet template (with built-in escalation rates). ○ RW Data Sheet Estimating tool that estimates support, capital and lead time.

District	Alternate Tools and Methods
2	District Excel escalation tool. (The district asks the PID writer not to calculate the escalation in the 11-Page Estimate Template. Instead, the project manager calculates escalation.)
5	<ul style="list-style-type: none"> • Excel spreadsheet. • Manual practices: Calculate out to midpoint of phase. • HQ direction. • Statewide Online Project Reporting System Programming sheet.
6	Excel spreadsheet.
7	<ul style="list-style-type: none"> • District policy. • Manual practices (e.g., calculator).
8	<ul style="list-style-type: none"> • District tools and practices: <ul style="list-style-type: none"> ○ PPM (no further description offered by the respondent).
11	WBS.

Table 28. Tools and Methods Used to Calculate Escalation: Functional Unit

Functional Unit	Alternate Tools and Methods
Engineering Services	If cost or schedule is changed, unit receives a new request for a PRSM resource estimate and prepares a new Excel spreadsheet.
Environmental	<ul style="list-style-type: none"> • District tools and practices: <ul style="list-style-type: none"> ○ PPM (no further description offered by the respondent).
Project Management	<ul style="list-style-type: none"> • District tools and policies: <ul style="list-style-type: none"> ○ District 2 Excel escalation tool. (The district asks the PID writer not to calculate the escalation in the 11-Page Estimate Template. Instead, the project manager calculates escalation.) ○ District 5 Excel spreadsheet. ○ District 7 policy. ○ In District 11, escalation is controlled by PPM and auto-applied to all reporting tools for consistency across district. • Manual practices: <ul style="list-style-type: none"> ○ Calculator. ○ Calculate out to midpoint of phase. • HQ direction. • Excel spreadsheet. • Statewide Online Project Reporting System Programming sheet. • WBS.
ROW/Land Surveys	<ul style="list-style-type: none"> • District tools and policies <ul style="list-style-type: none"> ○ District 1 Right of Way Data Sheet template (with built-in escalation rates). • Right of way data sheet estimating tool that estimates support, capital and lead time.

Risk Task

Nearly two-thirds of the project managers responding to the survey (24) do not use the Risk Task to manage project cost uncertainties while 14 project managers reported using the tool. Project managers from District 7 most frequently reported using the tool. Among the functional units, the tool is reportedly used most frequently in Project Management and not used in

Construction, Design and Engineering Services. Survey results are summarized below by state (Figure 15) and by district and functional unit (Table 29).



Figure 15. Project Managers Using the Risk Task to Manage Project Cost Uncertainties: Statewide

Table 29. Project Managers Using the Risk Task to Manage Project Cost Uncertainties: District and Functional Unit

District	No	Yes	Total
HQ	0	0	0
1	1	2	3
2	0	1	1
3	3	2	5
5	3	2	5
6	1	0	1
7	2	3	5
8	12	1	13
9	0	1	1
10	1	1	2
11	1	1	2
12	0	0	0
Total	24	14	38

Functional Unit	No	Yes	Total
Construction	3	0	3
Design	2	0	2
Engineering Services	1	0	1
Environmental	6	1	7
Planning	0	0	0
Project Management	9	12	21
ROW/Land Surveys	3	1	4
Traffic Operations	0	0	0
Total	24	14	38

Recommendations From Survey Respondents

Several respondents provided summary comments, including recommendations for improving the current cost estimating tools. Many of these respondents noted their unfamiliarity with the tools because of time and other constraints, and their willingness to implement them. Others reported that they were not involved in estimating. Below are highlights of survey responses.

Improvements to Tools and Processes

- **District 1 planning respondent:**
 - Include quantity estimation formulas for the 11-Page Estimate Template, which are then referenced by the Item Quantities in each sheet.

- Make searching item unit costs in specific areas of the District 8 Cost Data site easier and quicker.
- **District 6 project management respondent:** Develop simpler tools. The project scoping tool in place of the fact sheet previously used is too confusing and inefficient for the functional units.
- **District 9 project management respondent:**
 - Improve the risk tool functionality. When new versions are rolled out, functionality is lost (for example, drop-down menus stop working).
 - Need risk tasks for Phases IV and IX.
- **District 11 project management respondent:**
 - Don't use Program Evaluation and Review Technique (PERT) calculations for programming dollars.
 - Use PRSM RISK. There is a high probability of project cost inflation and no ability to document support risk in PRSM without adding dollars to the EAC [estimate at completion] document's outstanding risk (without programming or holding funding, which creates issues with other project manager direction and tools, including SB-1 reporting).
- **District 11 project management respondent:**
 - Connect the tools and processes from PID estimating to management and control in the budget adjustment of an ongoing phase.
 - Make the estimating process and tools a living process that can be manipulated by task managers and project managers electronically and all in one place.
- **District 12 design respondent:** Fully deploy all tools throughout the organization (to provide additional data and logic).
- **HQ engineering services respondent:** Develop an Advanced Planning Study (APS) showing structure type, foundation type, walls and cost.

Other Resources and Comments

- **District 2 project management respondent:** Consider the district's Excel-based risk management plan tool, which quantifies high-high, medium-high or high-medium risks (as the Project Development Team determines necessary).
- **District 8 project management respondent:** Create a directive to ensure that all functional groups use the tools and to provide uniformity and standardize the workplan request format and quality.

Appendix A: Survey Questions

The following survey was distributed to project managers and other division staff responsible for estimating and managing support and capital costs within the following project delivery functions in each of Caltrans' 12 districts: construction, design, engineering services, environmental, planning, project management, right of way and land surveys, and traffic operations.

Use of Cost Estimating Tools

Note: Responses to the question below determined how respondents completed the survey:

- Respondents who answered “no” were directed to the **Resource Management** questions.
 - Respondents who answered “yes” were directed to the **Resource Estimating** questions.
-

Do you personally prepare resource estimates for your unit or function?

- Yes.
- No.

Resource Estimating: Background

1. How often is a field visit involved prior to scoping and estimating your projects?
 - All of my projects.
 - More than half of my projects.
 - Half of my projects.
 - Less than half of my projects.
 - None of my projects.
2. Is a draft project initiation document (PID) usually included with requests for resource estimates?
 - Yes.
 - No.

Resource Estimating: Tool Usage

1. Is the Project Scoping Fact Sheet Tool provided to you as supplemental scoping information?
 - Yes.
 - No.
2. Do you use the Bottom Up Tool located on the Cost Estimating Improvement Initiative web page for your function (see <https://projmgmt.onramp.dot.ca.gov/cost-estimating-improvement-initiative-ceii>)?
 - Yes.
 - No (please describe the tool you use to prepare resource estimates).

3. Do you use the Historic Support Estimating Top Down Methods A B C Summary Tool located on the Cost Estimating Improvement Initiative web page to validate your bottom up estimate (see <https://projmgt.onramp.dot.ca.gov/cost-estimating-improvement-initiative-ceii>)?
 - Yes.
 - No (please describe the tool you use to prepare resource estimates).
4. For **Design and DES staff only**: Do you use the Plans, Specifications & Estimates (PS&E) Sheet Count Tool located on the Cost Estimating Improvement Initiative web page to validate your PS&E phase bottom up estimate (see <https://projmgt.onramp.dot.ca.gov/cost-estimating-improvement-initiative-ceii>)?
 - Yes.
 - No.

Resource Estimating: Quantifying Risks

Note: Responses to the question below determined how respondents completed the survey:

- Respondents who answered “no” were directed to the **Resource Management** questions.
 - Respondents who answered “yes” were directed to the remaining two questions.
-

Do project development teams in your district quantify risks as part of your resource estimates?

- Yes.
 - No.
1. How often do project development teams quantify risks as part of your resource estimates?
 - All of my projects.
 - More than half of my projects.
 - Half of my projects.
 - Less than half of my projects.
 2. Do you use the Risk Register Tool (Quantified Risk) located on the Cost Estimating Improvement Initiative web page (see <https://projmgt.onramp.dot.ca.gov/cost-estimating-improvement-initiative-ceii>)?
 - Yes.
 - No (please describe the tool you use to quantify risk).

Resource Management

1. **For supervisors only**: Do you manage your staff’s support costs?
 - No.
 - Yes (please describe how you manage your staff’s support costs).

2. **For all respondents:** What tools or reports do you use to track and manage time charging and support costs?
-

*Note: After responding to the **Resource Management** questions, respondents other than project managers were directed to the **Wrap-Up** question to complete the survey. Project managers in district project management units completed a separate survey with the following four questions about escalating estimates and then were directed to the **Wrap-Up** question.*

Escalation

1. Do you use the Project Resourcing and Schedule Management (PRSM) Programming Sheet Tool located on the Cost Estimating Improvement Initiative web page to escalate support and capital estimates (see <https://projmgt.onramp.dot.ca.gov/cost-estimating-improvement-initiative-ceii>)?
 - Yes.
 - No.
2. Do you use the 11-Page Estimate Template located on the Cost Estimating Improvement Initiative web page (and Division of Design web site) to escalate support and capital estimates (see <https://projmgt.onramp.dot.ca.gov/cost-estimating-improvement-initiative-ceii>)?
 - Yes.
 - No.
3. If you don't use either of the tools provided on the Cost Estimating Improvement Initiative web page, what method and tool do you use to calculate escalation?
4. Do you use the Risk Task to manage project cost uncertainties?
 - Yes.
 - No.

Wrap-Up

Please use this space to provide any comments or additional information about your previous responses.