PROJECT QUALITY MANAGEMENT HANDBOOK

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Caltrans

Office of Project Management Process Improvement

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Project Quality Management Handbook
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Preface

Purpose

This handbook defines "quality" in the delivery of State highway projects and provides clear consistent guidance on how "quality" in State highway project delivery is achieved regardless of the funding source, implementing agency or who performs the work.

Audience

This Handbook is intended for use by task managers, functional managers, project managers and those who need to ensure that quality standards for State highway project are met, as well as keeping the project within schedule, cost and scope.

Background

This is the 1st edition of this handbook.

Revisions

This Exposure Draft is the fourth draft version of the first edition of the Handbook. The Exposure Draft is circulated for review and comment.

Conventions

Titles of books appear in *italics*.
Website URLs appear in ***bold italics***

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CHAPTER 1
OVERVIEW

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This chapter:

- Defines "quality" in the delivery of State highway projects and distinguishes between State highway "projects," "products" and "deliverables."
- Defines the "stakeholders" and "customers" of State highway projects.
- Describes "customer expectations" on State highway projects.
- Introduces "Project Management" and "Project Quality Management" as an integrated framework to ensure projects are aligned for success.

Definitions

Project

A Guide to the Project Management Body of Knowledge, Third Edition, *(PMBOK Guide)* defines project as "A temporary endeavor undertaken to create a unique product, service or result."

Projects produce products. The word "project" refers to the work performed to deliver the product.

The Product of a State Highway Project

The final product of a State Highway project is a physical change to the State highway system.

Deliverable

Any unique and verifiable product or a capability to perform a service that must be produced to complete a process, phase, or project. In the delivery of State highway projects, a deliverable is a service or product required to complete the project.

Quality in the Delivery of State Highway Projects

The International Organization for Standardization (ISO), defines "quality" as "the degree to which a set of inherent characteristics fulfill requirements." and defines "requirement" as "A condition or capability that must be met or possessed by a system, product, service, result, or component to satisfy a contract, standard, specification, or other formally imposed documents."

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In the delivery of State highway projects, "quality" is the degree that project deliverables and the final product of the project fulfill a contract, standard, specification, or other document and satisfy the quantified and documented needs and expectations of the sponsor and customers.

Agreement on these needs and expectations, based on communication between supplier and customer, must be formally documented. During the project lifecycle, unanticipated changes or conditions not part of existing agreements are resolved through concurrence of both parties or through a conflict resolution process and the results are documented.

"Quality" in the delivery of State highway projects involves more than fulfilling an agreement, requirement or standard. "Quality" requires effective two-way communication and information sharing not only within the project development team (PDT), but between PDT members, customers and key stakeholders.

Understanding other points of view allows task managers to identify implied needs as well as those stated by the customer and allows the customer to understand project constraints and limitations.

Customers and Stakeholders

Stakeholders

Individuals or organizations that are actively involved in the project or whose interests may be positively or negatively affected by the project.

Customers

Individuals, groups or organizations that receive or use products or services from a supplier. A customer can be either external or internal to the supplier organization or project team.

See "External Project Customers" and "Internal Project Customers" below.

External Project Customers

Transportation system users that pay for projects through fuel taxes, vehicle fees, tolls, bonds, sales taxes, fares, and other charges. The external customers are the recipients of the product, service or result produced by the project.

Internal Project Customers

Individuals, groups or organizations that use deliverables produced at various stages of the project. They are internal to the project, not necessarily internal to Caltrans. All project development team members are internal customers of other team members.

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Project Sponsors

Individuals or groups that secure funding for projects and represent external project customers by advocating for a project or group of projects. Project sponsors may be internal or external to Caltrans.

Implementing Agency

The entity charged with the successful completion of each project component as defined in Government Code 14529 (b):

- Project Initiation Document (PID)[1]
- Completion of all permits and environmental studies
- Preparation of plans, specifications, and estimates
- The acquisition of rights-of-way, including, but not limited to, support activities
- Construction, construction management and engineering, including surveys and inspection

There could be a different Implementing Agency for each component of a project.

To ensure clear lines of responsibility, only one agency can be the Implementing Agency for a single component.

[1] Although the PID is not listed as a project component in GC 14529 (b), it is required in GC 14526 (b) and 14527 (g) before the start of the components in 14529 (b). This implies the PID is an additional component.

Customer Expectations

External Customer Expectations

The goal of the Department of Transportation (Department) and the specific Programs within the Department is to meet the transportation needs and expectations of the transportation system users who pay for projects through fuel taxes, vehicle fees, tolls, bonds, sales taxes, fares, and other charges. The project's purpose and need statement, the project charter, and other agreements document the expectations of transportation system users, their elected representatives, and the project sponsors.

External customer expectations include:

- Satisfaction with the final product
- Improvement to transportation service and flexibility, reduced congestion and sensitivity to local concerns.
- Specific project features important to local agencies
- Project delivery in a timely manner (on schedule)
- Cost-effective (within budget)

Internal Customer Expectations

Deliverables must meet the needs of the Internal Customers . These needs include:

- Conformance to the Department's standards, policies, directives, and guidelines
- Conformance to State and Federal laws and regulations
- Conformance to the standards, policies, directives, and guidelines of Regulatory Agencies (who, themselves, are internal project customers)
- Conformance to project agreements and project-related permits
- Effective communication within the project development team and with key external customers and stakeholders
- Meeting other requirements that have been acknowledged and documented by the task manager and internal customers

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Project Management

Project Management

The *PMBOK Guide* defines project management as "The application of knowledge, skills, tools, and techniques to project activities in order to meet project requirements."

Project management balances competing demands (scope, time, cost, quality, requirements, expectation of various stakeholders, etc.) throughout the project lifecycle making sure that the right resources complete the right tasks at the right time and involves the interaction of three elements:

- People that perform the work and determine the success or failure of a project
- Processes that specify products or deliverables required for the project and identify who will perform the work and when
- Tools and techniques used to manage the project

Project Quality Management

Activities that determine quality policies, objectives and responsibilities so that the project will satisfy the needs for which it was undertaken

Includes planning and performing Quality Control, Quality Assurance and Independent Quality Assurance.

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CHAPTER 2
QUALITY CONTROL

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This chapter:

- Defines Quality Control (QC) in the delivery of State highway projects and describes the Quality Control Plan (QC Plan) prepared for each WBS deliverable
- Assigns Quality Control roles and responsibilities
- Identifies Quality Control as a component of the Project Quality Management Plan
- Describes continuing improvement to the Quality Control process

Definitions

Quality Control

Deputy Directive DD-90 (DD-90) describes QC as the operational processes, practices and activities performed at the project team level during the project delivery process to ensure that the product meets the project's purpose and need and fulfills established quality requirements.

Performed by project team members to identify and document customer expectations and ensure that their deliverables:

- Meet the internal customer expectations
- Contribute efficiently to meeting the external customer expectations

Activities documented in a QC Plan developed for each deliverable

Quality Control Plans

Developed for each deliverable by task managers under direction of their functional managers

Identifies and documents deliverable requirements and may include procedures to confirm that requirements are met

Quality Control and WBS

Quality control is a project activity. It is an integral part of each Work Breakdown Structure (WBS) element. It is a cost of producing the WBS element and is charged to the WBS element.

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Roles and Responsibilities

Quality Control (QC) is the responsibility of task managers and other project team members under the direction of their functional managers.

Headquarters Division Chiefs

Provide Statewide policy and guidance on quality control for deliverables produced in their functional areas, including standard forms, formats, templates, checklists, or content

Provide Statewide training in quality control for their functional areas

District Managers

Provide guidance on quality control, including standard forms, formats, templates, checklists, or content, provided that it does not conflict with the guidance issued by Headquarters Division Chiefs

Functional Managers and Project Managers

Ensure task managers have prepared QC Plans for each project deliverable

Coordinate communication with internal customers to verify that the QC Plans, if followed, will ensure that deliverables meet internal customer expectations

Verify that the QC Plans are consistent with external customer expectations

Verify that their employees are following the QC Plans

Ensure that QC Plans are updated and continuously improved

Initiate corrective action, if needed

Provide feedback for Lessons Learned and participate in continuous improvement of Quality Control

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Task Managers and Project Team Members

Develop, update and improve QC Plans under the direction of their functional managers

Communicate with internal customers to verify expectations and document them in the QC Plan

Implement QC Plans to produce project deliverables that meet customers' needs and requirements

Provide feedback for Lessons Learned and continuous improvement

Quality Management Plan (QMP)

The Project Quality Management Plan (QMP) is a component of the project management plan. It describes the project delivery team's plan for quality control, as well as quality assurances, independent quality assurance and continuous improvement. The QMP also includes the Project Charter, Communication Plan, Risk Management Plan, Change Management Plan, etc.

The goal of the QMP is to ensure that the product will meet the expectations of the external customers and that the deliverables will meet the needs of the internal customers. As with all plans, the team updates the QMP through the life of the project.

The QMP describes how the project team will perform quality control. The QMP lists each WBS deliverable, the functional unit (task manager) that will produce the deliverable, and the date of delivery (either planned or actual). It may also list the functional units that will receive each deliverable.

Project development team participation in developing and updating the QMP is one of the project communication tools that help integrate project team members, with customers, deliverables and quality goals throughout the components (phases) of the project lifecycle.

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Quality Control Plans

Quality Control (QC) in the delivery of State highway projects is the responsibility of the Project Delivery Team and is an essential component of the Quality Management Plan (QMP). Quality Control Plans (QC Plans) are tools to ensure that project deliverables meet customer expectations.

Task managers are assigned WBS deliverables and, under the direction of functional managers, develop and implement Quality Control Plans that ensure that the WBS deliverable will satisfy all of its customer requirements.

On State highway projects a QC Plan is prepared for each of the WBS deliverables identified in the QMP and:

- Identifies the functional manager, task manager, and internal customers of the deliverable
- Documents the requirements and expectations verified by the customers and task manager under the direction of the functional manager

The QC Plan also includes:

- Estimated start and finish dates
- Established procedures for development of the WBS deliverable
- Processes to confirm that deliverables meets the documented requirements
- The forms, formats, templates, and checklists that will be used
- The completed forms, formats, templates, and checklists as they are produced

The QC Plan requires that team members from the delivering and receiving functional units use QC forms, formats, templates, and checklists to verify that the deliverable meets the requirements documented in the Quality Control Plan.

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Evaluation and Feedback

Evaluation and Feedback are key components to continuously improving Quality Control on State highway projects. All functional managers, whether having already produced their deliverable, in process of producing their deliverable, or have a future deliverable, will regularly evaluate the effectiveness of the tools that they are using for quality control. These functional managers will continuously improve the QC Plans as required to effectively manage the project's quality.

Quality Control Plans also include internal processes (checklists, etc.) to evaluate deliverables and confirm that the deliverable meets expectations or that corrective action, improvements to QC Plan, or other remedial steps are needed.

Regular project performance evaluations and performance reports provide feedback on the effectiveness of quality control plans. Functional managers and others that are responsible for quality control evaluate project deliverables and initiate corrective action, if needed.

Lessons Learned activities gather feedback on the delivery process directly from team members and from stakeholders and provide direction for continuous improvement of quality control activities. Statewide collection of Lessons Learned data identifies opportunities for process improvement of quality control activities.

Indicators of a Successful Quality Control Processes

Producing deliverables within schedule, cost and scope

Positive feedback from customers and stakeholders of effective and timely communication with the project team

Efficient decision-making and conflict resolution

Deliverables that meet customer requirements the first time

Continuous improvement of project delivery processes and project performance

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CHAPTER 3
QUALITY ASSURANCE

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This chapter:

- Defines Quality Assurance (QA) in the delivery of State Highway projects
- Assigns Quality Assurance roles and responsibilities
- Identifies Quality Assurance performance measures
- Describes the role of Quality Assurance in continuous improvement

Definitions

Quality Assurance

The *PMBOK Guide* defines Quality Assurance as "the application of planned, systematic quality activities (such as audits or peer reviews) to ensure that the project employs all processes needed to meet requirements.

The Department's *DD- 90 (see Appendix C)* describes QA as "The activities performed within the Implementing Agency during the project delivery process that provide the confidence that the project team is fulfilling established project requirements and expectations.

In the delivery of State highway projects QA is performed at planned points throughout the project delivery process to ensure QC processes are in place and effective and that project deliverables meet customers' needs.

Quality Assurance activities include:

- Evaluating Task Manager deliverables
- Reviewing project performance
- Initiating corrective action
- Providing input for continuous improvement

Quality Assurance and WBS

Quality assurance activities are part of the project. They each have their own Work Breakdown Structure (WBS) element or sub-task within a WBS element.

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Roles and Responsibilities

Quality Assurance in the delivery of a State highway project component (phase) is the responsibility of the Implementing Agency for that component.

Headquarters Division Chiefs

Provide Statewide guidance on quality assurance including standard forms, formats, templates, checklists, or content

Provide Statewide training in quality assurance for their functional areas

District Directors

Provide those activities necessary to fulfill the Department's owner/operator obligations for those projects impacting the State Highway System, including:

- Implementation of quality control and quality assurance practices for each project component for which the Department is responsible
- Ensure internal and external agreements and project-related decisions are timely and documented in the project record
- Assess Project Reports relative to their public benefit (external customer needs) and impact to the State Highway System
- Monitor performance of the District's State highway programs and initiate corrective action as needed
- Solicit feedback on the quality of District projects in meeting external customer expectations
- Support continuous improvement in quality management

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District Managers

Provide guidance on quality assurance, including standard forms, formats, templates, checklists, or content, provided that it does not conflict with the guidance issued by Headquarters Division Chiefs

Evaluate major project deliverables within their functional areas to ensure deliverables meet all requirements

Deputy District Directors for Program and Project Management

Monitor performance measures of the District's projects and, when the District is the Implementing Agency, assist in initiating corrective action at the project level, if needed

Communicates the Department's quality control and quality assurance expectations to the Implementing Agency if the Department is not the Implementing Agency

Solicits feedback on project performance from customers

Makes continuous improvement in response to feedback

Provides project managers with Quality Management training

Functional Managers And Project Managers	Ensure that quality assurance WBS elements are included in project plans and that they are executed and documented
	Ensure that task managers prepare Quality Control Plans that document agreement on the requirements of their deliverables
	Develop quality management plan and quality metrics for the project
	Confirm that QC Plans are followed and are effective in producing deliverables that satisfy customer needs
	Take corrective action in response to QA feedback
	Lead Lessons Learned and continuous improvement processes
Task Managers	Provides project deliverables to functional managers and to the project team for QA review
	Take corrective action to revise deliverables, if needed
	Participate in Lessons Learned and continuous improvement

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Performance Measures

QA Performance Measures are indicators that project Quality Control activities are effective or that corrective action is needed. A product and deliverables that meet customers' needs and expectations are the final performance measure. However, internal performance measures are signals that Quality Control is effective or that changes are needed.

Project Performance Measures

Deliverables meet schedule, milestone and cost baselines.

Pre-project and project agreements are in place.

Negative impacts of actual risks are effectively avoided or minimized.

Positive feedback is received that team communication is effective.

Few, or no, Program Change Requests are needed.

Conflicts are resolved effectively with decisions documented in Project Record.

Project meetings are effective.

Product Performance Measures

Deliverables meet customers needs the first time.

Sponsors and customers confirm the project's end-product meets their needs.

Objective measures such as pavement life, decreased frequency of crashes, and decreased congestion, indicate that the product has met its purpose and need.

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Quality Checkpoints

Quality assurance is performed at specific planned points in the project. There are two types of quality assurance:

- Reviews and approvals of major deliverables. The reviewer or approver verifies that the deliverable meets the internal and external project requirements.
- Value analysis, the systematic application of recognized techniques by a multi-disciplined team that identifies the function of a product or service; establishes a worth for that function; generates alternatives through the use of creative thinking; and reliably provides the needed functions at the lowest overall cost.

The Department's Work Breakdown Structure (WBS) includes several elements that can be included in the project workplan to ensure quality assurance. They are listed in Appendix A.

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Evaluation and Feedback

Feedback from customers and Lessons Learned activities provide opportunities for improving the QC/QA process. Feedback to the project team and to district management allows continuous improvement in the delivery of future State Highway projects.

Lessons Learned

Capture and provide benefit from experiences and events that have occurred during the course of a project or activity to continuously improve delivery processes and procedures

Performed for District-level delivery activities and includes regular review of District-level delivery quality procedures

Contributes to continuous quality improvement efforts at the District and Project levels to improve delivery performance

Could include in-house or independent quality audits to validate existing practices or to identify Delivery Plan policies and procedures that need improvement

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CHAPTER 4 INDEPENDENT QUALITY ASSURANCE

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This chapter:

- Defines Independent Quality Assurance (IQA), Project Sponsors and Implementing Agencies in the delivery of State highway projects
- Assigns Independent Quality Assurance roles and responsibilities
- Identifies Independent Quality Assurance as a component of the Project Quality Management Plan
- Describes the role of Lessons Learned in improving the delivery of State highway projects

Definitions

Independent Quality Assurance (IQA)

DD-90 (see Appendix C) describes IQA as "activities performed by the Department at a project level to ensure that the Implementing Agency's quality assurance activities result in projects being developed in accordance with Department standards, policies and practices and the Quality Control Plan."

Independent Quality Assurance and WBS

Independent Quality Assurance is a part of every project. It consists of elements from the list in Appendix B, performed by the Department.

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Roles & Responsibilities

Headquarters Division Chiefs

Provide Statewide guidance on independent quality assurance including standard forms, formats, templates, checklists, or content

Provide Statewide training in independent quality assurance for their functional areas

District Managers

Provide guidance on independent quality assurance, including standard forms, formats, templates, checklists, or content, provided that it does not conflict with the guidance issued by Headquarters Division Chiefs

Ensure that the Department's requirements are met when approving the Implementing Agency's deliverables

Deputy District Director for Program and project Management

Assigns staff to verify that the Implementing Agency is carrying out its QA and QC responsibilities

Solicits feedback on project performance from customers

Makes continuous improvement in response to feedback

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Implementing Agency

Performs and documents QC and QA activities including:

- Providing the Department with a Quality Management Plan that describes QC and QA activities
- Including QC and QA activities in its project plan and assigns resources and responsibilities for them
- Iniiating corrective actions, as needed
- Making continuous improvements
- Participating in Lessons Learned activities

District Project Manager and Functional Managers

Prepare a project workplan including IQA activities

Verify that quality assurance WBS elements are included in the project workplans and that they are completed and documented

Department's Subject Matter Experts (SMEs)

Review the deliverables produced in the Implementing Agency's quality assurance process to ensure that they comply with the Department's requirements

Participate as advisory members in Implementing Agency's QA reviews

Quality Management Plan

The Quality Management Plan (QMP) is an integral part of all State highway projects regardless of funding source, sponsorship, or who performs the work. The QMP focuses on the delivery of Quality Transportation Projects, emphasizing Quality Control, Quality Assurance, Independent Quality Assurance and utilizing continuous improvements.

Quality Management Plan (QMP)

Prepared by the Implementing Agency.

Describes how the Implementing Agency will perform:

- Quality Control
- Quality Assurance
- Evaluation, and Feedback
- Continuous improvement

Ensures that the project will comply with Department policies, standards, procedures, and best practices

Ensures that all project tasks, including project component closeout, are completed

The Implementing Agency submits a draft QMP to the Department. The Department reviews the draft QMP, provides recommended changes and provides the Implementing Agency with a plan for IQA. The Department may require the Implementing Agency to include elements of work listed in Appendices A and B. The IQA plan is incorporated into the QMP.

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Successes and Lessons Learned

Successful partnerships and success in the delivery of State highway projects require effective communication between partners with regular evaluation and feedback on the partnership process, as well as on the delivery processes and their products.

Independent Quality Assurance (IQA) provides scheduled opportunities for evaluation and feedback on:

- Project delivery processes
- Project quality procedures
- Project deliverables

Feedback from IQA activities is a source of Lessons Learned information for Implementing Agencies. Implementing Agencies are encouraged to perform Lessons Learned reviews throughout the project lifecycle. Lessons Learned feedback to the project team and to the Department allows continuous improvements to project quality and to meeting customer expectations in the delivery of future State Highway projects.

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CHAPTER 5
PROGRAM REVIEW

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This chapter:

- Defines Program Review
- Assigns roles and responsibilities to Headquarter staff
- Introduces the Statewide Quality Management System
- Describes the roles of Lessons Learned, Program Review Audits and Public Outreach at the Program Level

Definitions

Program Review

Program Review performed by or under the direction of Headquarters Deputy Directors establishes objectives and requirements for quality based on performance measures and program level evaluations of trends. Program Review results in validation, modification or redirection of business practices related to project delivery.

Unlike QC, QA and IQA, program review is not a project activity. The cost of Program Review is an indirect ("overhead") cost.

Program Review:

- Establishes quality objectives for Capital Outlay Support, the Department's program that delivers State Highway projects
- Communicates quality objectives to District staff
- Establishes methods and tools to monitor and evaluate project delivery performance and product quality
- Regularly monitors the Department's performance in State highway project delivery
- Provides feedback to the Districts
- Reports to external customers on the Department's performance in State highway project delivery
- Participates in Lessons Learned and in continuous improvement to identify business practices that help or hinder delivery
- Takes corrective action to initiate, modify, or improve delivery practices to resolve delivery issues

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Roles & Responsibilities

Department's Chief Engineer

Establishes and ensures implementation of Department policies, standards, procedures and best practices for Project Delivery

Establishes a Quality Management System for Project Delivery for use on all projects developed on or proposed for the State Highway System

Headquarters Division Chiefs

For each Division's respective area of responsibility relative to the efficient and timely delivery of quality projects on or proposed for the State Highway System:

- Develop and implement standards, procedures, and best practices
- Develop and implement guidance, tools, and training
- Provide statewide direction and standards for activities required to ensure compliance with Department policies, standards, and best practices
- Measure and monitor critical project deliverables by Districts
- Perform process reviews, ensuring the consistent and effective application of Department standards, procedures, best practices, and quality management activities
- Implement a system of continuous quality improvement using information learned from measuring and monitoring deliverables and from process reviews

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Quality Management System

The Statewide Quality Management System, established under the direction of the Department's Chief Engineer, applies to all projects on the State Highway System. Program Review is one component of this Quality Management System. Program Review is not a component of project-level Quality Management Plans.

The Statewide Quality Management System establishes quality objectives for the State's delivery programs as well as defining quality metrics for evaluating the delivery of State highway projects.

The Quality Management System requires quality activities at Program, District and Project levels to ensure State highway projects meet established standards and expectations.

The Quality Management System includes monitoring performance at the program-level and initiating corrective action and process improvement as needed.

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Successes and Lessons Learned

Program Review of the delivery of State Highway projects confirms that delivery processes at the Program, District and Project levels are effective and identifies policies and procedures at the Program level for process improvement to increase the efficiency and effectiveness of project delivery.

Lessons Learned activities are a component of each project. Delivery staff records successes, problems and solutions encountered during each phase of the project delivery process. Lessons Learned issues are captured in a statewide database and analyzed for solutions and improvements that can be applied to Project Delivery throughout the State.

Program Review leads to organizational process improvements that apply at the program level and consist of changes in policies and procedures to improve project delivery and better meet the needs of customers.

Lessons Learned

Provide a formal process to gather feedback from current projects to improve future project delivery

Provide specific examples of effective and ineffective delivery issues to a Statewide Lessons Learned depository to improve future projects

Initiate delivery process improvement projects and training objectives

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Program Review Audits

Identify delivery policies, procedures and/or business practices that may require modification or redirection

Provide independent review of compliance with policies and procedures

Lead to process analysis and improvement activities

Provide follow up confirmation for prior improvement efforts

Public Outreach

Holds periodic forums to discuss issues and “Lessons Learned” with interested public parties

Reports to external customers on Delivery Program performance and trends

Solicits feedback from external stakeholders

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APPENDICES

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Appendix A: Quality Assurance WBS Elements

Appendix A is Under Review and Revision

Quality Assurance WBS Elements

Project Management

100.05.05	Project Initiation and Planning (Sub-Task: Develop Quality Management Plan).
100.05.10	PID Component Execution and Control (Sub-Task: Coordinate Quality assurance / Quality control).
100.10.05	PA&ED Component Initiation and Planning (Sub-Task: Update Quality Management Plan).
100.10.10	PA&ED Component Execution and Control (Sub-Task: Coordinate Quality assurance / Quality control).
100.15.05	PS&E Component Initiation and Planning (Sub-Task: Update Quality Management Plan).
100.15.10	PS&E Component Execution and Control (Sub-Task: Coordinate Quality assurance / Quality control).
100.20.05	Construction Component Initiation and Planning (Sub-Task: Update Quality Management Plan).
100.20.10	Construction Component Execution and Control (Sub-Task: Coordinate Quality assurance / Quality control).
100.25.05	Right of Way Component Initiation and Planning (Sub-Task: Update Quality Management Plan).
100.25.10	Right of Way Component Execution and Control (Sub-Task: Coordinate Quality assurance / Quality control).

Project Initiation Document (PID) Component:

150.20.15	Scenic Resource and Landscape Architecture Review
150.25	Approved PID (PSR, PSSR, etc.)

Environmental Studies and Permits (PA&ED) Component:

165.25.15	CE/ CE Determination
165.25. 20	Environmental Quality Control & Other Reviews
180.10.05.05	Draft Final Environmental Document (FED) Review
180.10.05.10	Revised Draft FED
205.20.10	Draft Freeway Agreement Review

Right of Way Component:

200.15	Approved Utility Relocation Plan

Plans, Specifications and Estimates Component:

185.25.05	Project Review with Affected Agencies
250.15	Externally Reviewed Structures PS&E Package
255.15	Environmental Reevaluation
260.15.30	Environmental Certification at RTL
265.35.10	Signed and Approved Contract

Construction Component:

270.20.05	Resident Engineer's File Review

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270.20.10	Project Plans, Special Provisions, and Estimate Review
270.20.25	Contractors' Falsework Submittals Review
270.20.30	Contractors' Trenching and Shoring Submittals Review
270.20.35	Shop Plans Review
270.20.40	Cost Reduction Incentive Proposals (CRIPS) Review
270.25.40	Approved Subcontractor Substitutions.
270.35.05	Materials Sampling and Testing for Quality Assurance
270.35.10	Plant Inspection for Quality Assurance
270.35.15	Independent Assurance Sampling and Testing
270.20.45	Contractors' Water Pollution Control Program Review
270.40	Safety and Maintenance Reviews
270.55	Final Inspection and Acceptance Recommendation
285.05.05	Need For CCO Determination
285.05.15	CCO Approval
290.15	Reviewed and Approved Claim Report
295.35	Certificate of Environmental Compliance

Value Analysis WBS Elements

Value Analysis (VA) Value Analysis provides independent peer reviews of project decisions on concepts, designs, options, etc.

WBS 150.10.10 VA during project initiation

WBS 160.10.20 VA during permits and environmental studies

WBS 185.15.20 VA during plans, specifications and estimates

See the *Guide to Project Delivery Workplan Standards (WSG) 9.0* for the complete Caltrans Project Delivery Work Breakdown Structure (WBS), the Resource Breakdown Structure (RBS), Standard Milestones and their use to plan and control work content of capital projects.

To access the *Guide to Project Delivery Workplan Standards* see the URL listed in Appendix B References.

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Appendix B: Independent Quality Assurance WBS Elements

Appendix B is Under Review and Revision

Independent Quality Assurance WBS Elements

Project Management

100.05.10	PID Component Execution and Control (Sub-Task: Verify that quality assurance and quality control activities are planned and executed).
100.10.10	PA&ED Component Execution and Control (Sub-Task: Verify that quality assurance and quality control activities are planned and executed).
100.15.10	PS&E Component Execution and Control (Sub-Task: Verify that quality assurance and quality control activities are planned and executed).

Project Initiation Document (PID) Component:

150.05.05	Review of Existing Reports, Studies, and Mapping (PID Checkpoint 1)
150.05.35	Problem Definition (PID Checkpoint 2)
150.10	Initial Alternatives Development (PID Checkpoint 3)
150.15	Alternatives Analysis (PID Checkpoint 4)
150.25.20	PID Circulation, Review & Approval (PID Checkpoint 5)

Environmental Studies and Permits (PA&ED) Component:

165.05.05	Project Information Review (PA&ED Checkpoint 1)
160.10	Engineering Studies (PA&ED Checkpoint 2)
160.15.25	Draft Project Report Circulation, Review, & Approval (PA&ED Checkpoint 3)
180.05.10	Approved Project Report (PA&ED Checkpoint 4)
180.10.10	Public Distribution Of FED And Respond To Comments (PA&ED Checkpoint 5)

Plans, Specifications and Estimates Component:

185.05.05	Project Concept Review (PS&E Checkpoint 1)
185.15.10	Proposed Geometrics Review (PS&E Checkpoint 2)
230.60	Updated PS&E (PS&E Checkpoint 3)
250.50	Project Review (PS&E Checkpoint 4)
255.05	Circulated & Reviewed Draft District PS&E Package (PS&E Checkpoint 5)

Right of Way Component:

100.25.10	Right of Way Component Execution and Control (Sub-Task: Verify that quality assurance and quality control activities are planned and executed).

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Construction Component:

100.20.10	Construction Component Execution and Control (Sub-Task: Verify that quality assurance and quality control activities are planned and executed).

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Appendix C: References

For more information on Quality Management and on Quality Management in the delivery of State Highway Projects, see:

A Guide to Project Management Body of Knowledge, Third Addition v1.2 (PMBOK Guide).

ISO 900 / ISO 14000 Quality Management Principles. Available on the Internet at
http://www.iso.org/iso/en/iso9000-14000/understand/qmp.html

ISO 9000 Definitions Translated into Plain English. Available on the Internet at:
http://www.praxiom.com/iso-definition.htm

Guide to Project Delivery Workplan Standards (WSG), release 9.0.
Available on Intranet at:
http://pd.dot.ca.gov/pm/ProjectOffice/WorkplanStandards/StandardsHome.asp

Department guide to*: Implementing Agency Responsibilities on State Highway Projects, Revised July 2007*,*
(This document outlines the responsibilities of "Implementing Agencies" that administer State Highway projects in California.).

*Deputy Directive 90, Funding of Quality Management Work on State Highway Projects.**
Available in Appendix C or on the Intranet at
http://admin.dot.ca.gov/bfams/deputydirectives/indexDDbyNum.shtml

*Project Management Directive- PMD-012R2; Local Capital Outlay Expenditure Authorizations**
Available on Intranet at:
http://pd.dot.ca.gov/pm/ProjectOffice/ProcessGuidance_Directives/Guidance_DirectivesHome.asp

The *Project Delivery Quality Management* website at:
http://pd.dot.ca.gov/communication/quality/index.asp

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* Some documents are available only the Intranet internal website

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Appendix D: Deputy Directive DD-90

Deputy Directive

Number: *DD-90*

Refer to
Director's Policy: DP - 03 - Safety and Health

DP - 06 - Partnerships
DP - 07 - Project Delivery
DP - 08 – Freeway System Management
DP - 10 – Commitments
DP - 14 – Quality in Caltrans

Effective Date: December 2006

Supersedes: NEW

TITLE Funding of Quality Management Work on State Highway Projects

POLICY

The California Department of Transportation (Department) will perform the quality management work needed to fulfill its owner/operator responsibilities for projects on or proposed for the State ~~Highway~~ System (SHS). If a government agency is the project sponsor, this work will be at State expense because it provides a benefit to the State. Otherwise, it will be at the expense of the project sponsor. The work at State expense consists of:

- Quality control and quality assurance for each project component for which the Department is the Implementing Agency, and
- Independent quality assurance for all projects on or proposed for the SHS.

DEFINITIONS

Quality Management consists of discrete activities that establish the quality objectives, policies and responsibilities within the project delivery process, and the implementation of these activities.

- Quality Control – The operational processes, practices and activities performed at the project team level during the project delivery process to ensure that the product meets the project's purpose and need and fulfills established quality requirements.
- Quality Assurance – The activities performed within the Implementing Agency during the project delivery process that provide the confidence that the project team is fulfilling established project requirements and expectations.
- Independent Quality Assurance – The activities performed by the Department at a project level to ensure that the Implementing Agency's quality assurance activities result in projects being developed in accordance with Department

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standards, policies and practices and the Quality Control plan provided by the Project Sponsor.

Owner/Operator is that entity ultimately responsible for the operation, maintenance and tort liability of a facility. Per Government Code (GC) 14520.3 (b), the Department is the owner/operator of the SHS.

Project Sponsors secure funding for projects and serve as project advocates. The sponsor chooses an Implementing Agency and is the customer of the Implementing Agency. The Department is the sponsor for all projects funded from the State Highway Operation and Protection Program and most Interregional Improvement Program projects.

State Expense refers to funds appropriated to the Department by the Legislature from sources other than reimbursements.

The Implementing Agency is the entity charged with the successful completion of each project component as defined in GC Section 14529 (b):

- Project Initiation Document[2]
- Completion of all permits and environmental studies.
- Preparation of plans, specifications, and estimates.
- The acquisition of right-of-ways, including, but not limited to, support activities.
- Construction, construction management, and engineering; including surveys and inspection.

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There could be a different Implementing Agency for each component of a project. To ensure clear lines of responsibility, only one agency can be the Implementing Agency for a single component.

The Implementing Agency should not be confused with Lead Agency as defined under California Environmental Quality Act and National Environmental Policy Act.

- *RESPONSIBILITIES*

District Directors:

- Develop and implement District or Region Quality Management Plans, identify, request and assign the resources needed to perform quality management as part of the annual budget process.

Division Chiefs:

- For their respective functions, provide guidance on what work is included in quality control, quality assurance, and independent quality assurance.
- Implement performance measures related to compliance.
-

[2] Although the Project Initiation Document is not listed as a project component in GC 14529 (b), it is required in GC 14526 (b) and 14527 (g) before the start of the components in 14529 (b). This implies the Project Initiation Document is an additional component.

Managers, Project Managers, Functional Managers, Supervisors, Public Information Officers and Employees:

- Provide quality and timely products, services and information.
- Communicate to impacted persons any changes or problems that could impact the timely, efficient delivery of a project or project component

APPLICABILITY

All employees involved with the delivery of State Highway projects.

Original Signed By *December 20, 2006*

RANDELL H. IWASAKI
Chief Deputy Director

Date Signed

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Appendix E: Deputy Directive DD-23

Deputy Directive

Number: *DD-23-R1*

Refer to
Director's Policy:

03 -	Safety and Health
06 -	Partnerships
07 -	Project Delivery
08 -	Freeway System Management
10 -	Commitments
14 -	Quality in Caltrans

Effective Date: February 2007
Supersedes: DD-23 (6-28-94)

TITLE Roles and Responsibilities for Development of Projects on the State Highway System

POLICY

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The California Department of Transportation (Department), as owner/operator of the State Highway System (SHS), has the statutory and inherent obligation to ensure that all modifications or additions to the SHS, regardless of project sponsor or funding source, are:

- Safe, operational, maintainable, compatible and of good value.
- Providing for the efficient multimodal movement of people and goods.
- In the best interest of the general public.
- Developed and constructed in compliance with laws and regulations that govern the use of State and Federal transportation funds.
- Developed and constructed in partnership with vested stakeholders.

The Department meets its obligations by:

- Engaging in early and continuous partnerships and ensuring accountability amongst project sponsors, implementing agencies, stakeholders, departmental functional units, local, regional and transit agencies, Tribal Governments, developers and consulting firms employed by the Department or its partners.
- Ensuring that all projects on or proposed for the SHS are planned, developed and constructed efficiently and effectively in accordance with standards and practices defined in various Department policies, procedures, manuals and guidance documents.
- Maintaining ultimate approval authority for all projects on the SHS.
- Keeping the public informed through appropriate community outreach.

DEFINITIONS /BACKGROUND

Owner/Operator is that entity ultimately responsible for the operation, maintenance and tort liability of a facility. Per Government Code (GC) 14520.3 (b), the Department is the owner/operator of the SHS.

Project is that temporary endeavor undertaken to plan, develop and construct an improvement, modification, or addition to the SHS.

Project Sponsor secures funding for the project and serves as the project advocate. The project sponsor chooses an Implementing Agency for each project component and is the customer of the Implementing Agency. The Department is the sponsor for all projects funded solely from the State Highway Operation and Protection Program and most projects funded from the Interregional Improvement Program.

The Implementing Agency is that entity charged with successful completion of each project component as defined in GC Section 14529 (b):

1. Project Initiation Document (PID).[1]
2. Completion of all permits and environmental studies.
3. Preparation of plans, specifications, and estimates.
4. Acquisition of rights-of-way, including, but not limited to, support activities.
5. Construction, construction management and engineering, including surveys and inspection.

There could be a different Implementing Agency for each component of a project. To ensure clear lines of responsibility, only one agency can be the Implementing Agency for a single component. Contract advertisement, award and administration shall be completed by the same Implementing Agency.

Deputy Directive (DD) 23, "Developing Special Funded Projects," dated June 28, 1994, established roles and responsibilities for projects on the SHS funded by others. The passage of Senate Bill 45 in 1997 and Proposition 35 in 2000 redefined these roles and responsibilities, necessitating the revision of this DD to be consistent with current statute.

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1. Although the PID is not listed as a project component in GC 14529 (b), it is required in GC 14526 (b) and 14527 (g) before the start of the components in 14529 (b). This implies the PID is an additional component.

RESPONSIBILITIES

Project Sponsors:

- Identify and prioritize the projects they sponsor.
- Identify the purpose and need for their project relative to the SHS.
- Establish project goals and evaluate project outcomes relative to the established goals.
- Serve as advocates for their projects, and secure funding from the various funding programs or other sources.
- Choose an Implementing Agency or Agencies for project components.
- Secure funding for the preparation and completion of project components as defined in GC Section 14529 (b).
- Secure funding for the preparation and completion of activities at the project team and functional level to perform quality control and quality assurance activities to ensure compliance with Department policies, standards and practices.

Implementing Agencies:

- Deliver project components on time and within budget.
- Deliver quality project components in accordance with Department policies, standards, and practices to ensure the project is in the best interest of the general public and to preserve the immunities established by law to protect the Department and its employees.
- Implement adequate quality control and quality assurance procedures to ensure project components comply with Department policies, standards, procedures, and best practices.
- Ensure that project component closeout activities are completed, including, but not limited to, survey monumentation, as-built plans, environmental commitments compliance, and right-of-way.

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Deputy Director, Project Delivery:

- Establishes and ensures implementation of Department policies, standards, procedures, and best practices for Project Delivery.
- Establishes a Quality Management System for Project Delivery for use on all projects developed or proposed for the SHS.
- Provides capital outlay support (COS) resources for the timely and quality delivery of products and services.

Deputy Director, Maintenance and Operations:

- Establishes and ensures implementation of Department policies, procedures, and best practices for issuance of encroachment permits.
- Establishes and ensures implementation of Department policies, procedures, and best practices for maintenance and operations of SHS.
- Provides maintenance and operations support resources for the timely and quality delivery of products and services, including encroachment permits and owner-operator activities in support of project delivery.

Deputy Director, Planning and Modal Programs:

- Ensures that implementation of projects on or proposed for the SHS are consistent with the Department's Interregional Transportation Strategic Plan vision.
- Provides resources for the development of PIDs, including quality control and quality assurance or independent quality assurance activities.

Division Chiefs:

For each Division's respective area of responsibility relative to the efficient and timely delivery of quality projects on or proposed for the SHS:

- Develop and implement standards, procedures, and best practices.
- Develop and implement guidance, tools, and training.
- Provide statewide direction and standards for activities required to ensure compliance with Department policies, standards, and best practices.
- Measure and monitor critical project deliverables by Districts.
- Perform process reviews, ensuring the consistent and effective application of Department standards, procedures, best practices, and quality management activities.
- Implement a system of continuous quality improvement using information learned from measuring and monitoring deliverables and from process reviews.

District Directors:

- Assess the feasibility of the project sponsor's ability to obtain funding for the proposed project component(s) through completion before Department begins work on the PID or subsequent project component.
- Assess a project's purpose and need relative to its public benefit and impact to the SHS.
- Appoint a primary point of contact for the Department for each project.
- Determine and provide those activities necessary to fulfill the Department's owner/operator obligations for those projects impacting the SHS, including, but not limited to:
  - Implementation of quality control and quality assurance practices for each project component for which the Department is responsible;
  - Implementation of independent quality assurance (commonly referred to as oversight) for each project component that is the responsibility of others.
- Ensure project decisions are made through public outreach and involvement of stakeholders.
- Enter into cooperative or highway improvement agreements as appropriate with project sponsor prior to expenditure of COS resources.
- Inform stakeholders of the policies, standards, procedures, and best practices required by the Department and Federal Highway Administration.
- Deliver on commitments made to partners and customers, based on statutory authority and available resources, and ensure the timely delivery of quality products and services for which the Department is responsible.
- Ensure that departmental functional support units are properly resourced to deliver timely and quality products and services.

- Determine the appropriate agency to be lead under the California Environmental Quality Act per current Department policy.

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Public Information Officers:

- Communicate to the public, specific actions that will be taken to restore or minimize effects of all construction, maintenance, permitting, planned emergency restoration, or other activities on the SHS.

Managers, Project Managers, Functional Managers, and Supervisors:

- Empower employees with the tools, resources, time and training to deliver the products and services for which the Department is responsible.
- Participate in the development of work plans defining project scope, cost, schedule, resource, and quality requirements.
- Prioritize commitments to ensure the successful delivery of both the Department's and external project sponsors' projects.
- Ensure that work does not begin without appropriate authorization.
- Notify their District Director and Deputy District Directors, via established chains of command, of any changes or problems that could delay the successful delivery of a project.
- Ensure project compliance with Department policies, standards, procedures, and best practices.
- Engage the appropriate Department public information office early in the project delivery process through project construction completion.
-

Employees:

- Provide quality and timely products and services by using the appropriate tools, resources, time, and training.
- Communicate to their project managers, supervisors, and impacted functional units any changes or problems that could impact the timely, efficient delivery of a project or project component.

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APPLICABILITY

All employees involved with the delivery of modifications or additions to the SHS.

Original Signed By *February 23, 2007*

RANDELL H. IWASAKI
Chief Deputy Director

Date Signed