Appendix A: Development of the Strategic Research Plan

Concurrent with development of the FY 07-08 Research Program, the Department is developing a Strategic Research Plan, which will be used to guide selection of annual and off-cycle research projects. Key elements of the plan development process are the following. See Figure A-1 for a graphic presentation of the process.

- Research Roadmaps for Continuing Research. DRI is developing roadmaps that present all research that is currently being conducted. Figure A-2 shows a sample roadmap at the program level. At the project level (Figure A -3), the roadmap identifies all phases of a project that will be needed to achieve a desired outcome.

- Research Outcomes and Funding Levels. Each of the Program Steering Committees (PSCs) will be asked to identify key program, family and project outcomes. Identification of outcomes facilitates asking if the program is really doing the right program activities to bring about the outcomes it believes is needed by its customers. Defining family (major sub-program) and project-level outcomes insures that project selection is linked to program outcomes. District representatives will be given the opportunity to suggest additional outcomes. Input from PSCs and Districts will be consolidated and presented to the RDSC. The RDSC will adopt a set of outcomes to guide further development of the Strategic Research Plan. At the same meeting, the RDSC will adopt preliminary funding levels, by Department goal, for the FY 07-08 research program.

- Research Gaps. DRI will work with the TAPs and PSCs to identify new research projects needed to achieve adopted outcomes, and to develop a problem statement for each new project that is proposed.

- Leveraging Resources. DRI will coordinate roadmaps with other agencies.

- Research Project Priorities. DRI will work with the TAPs and PSCs to identify current projects (as represented in the research roadmaps for continuing research) that are most directly aligned with adopted outcomes. The RDAC will consider both existing projects and proposed new projects, and will score and rank projects by Department goal. Based on the resulting ranking, RDAC will recommend a program of projects to the RDSC. RDSC will approve the final program of projects.

- Strategic Research Roadmaps. A final set of research roadmaps will be developed that reflects the program of projects adopted by the RDSC. These roadmaps will comprise the Strategic Research Plan.

- Research Program. Once the final program of projects has been approved, DRI will identify research needing funding in FY 07-08 for inclusion in the Research Program.

Figure A-1
Annual Research Program Development Process (FY 07/08)

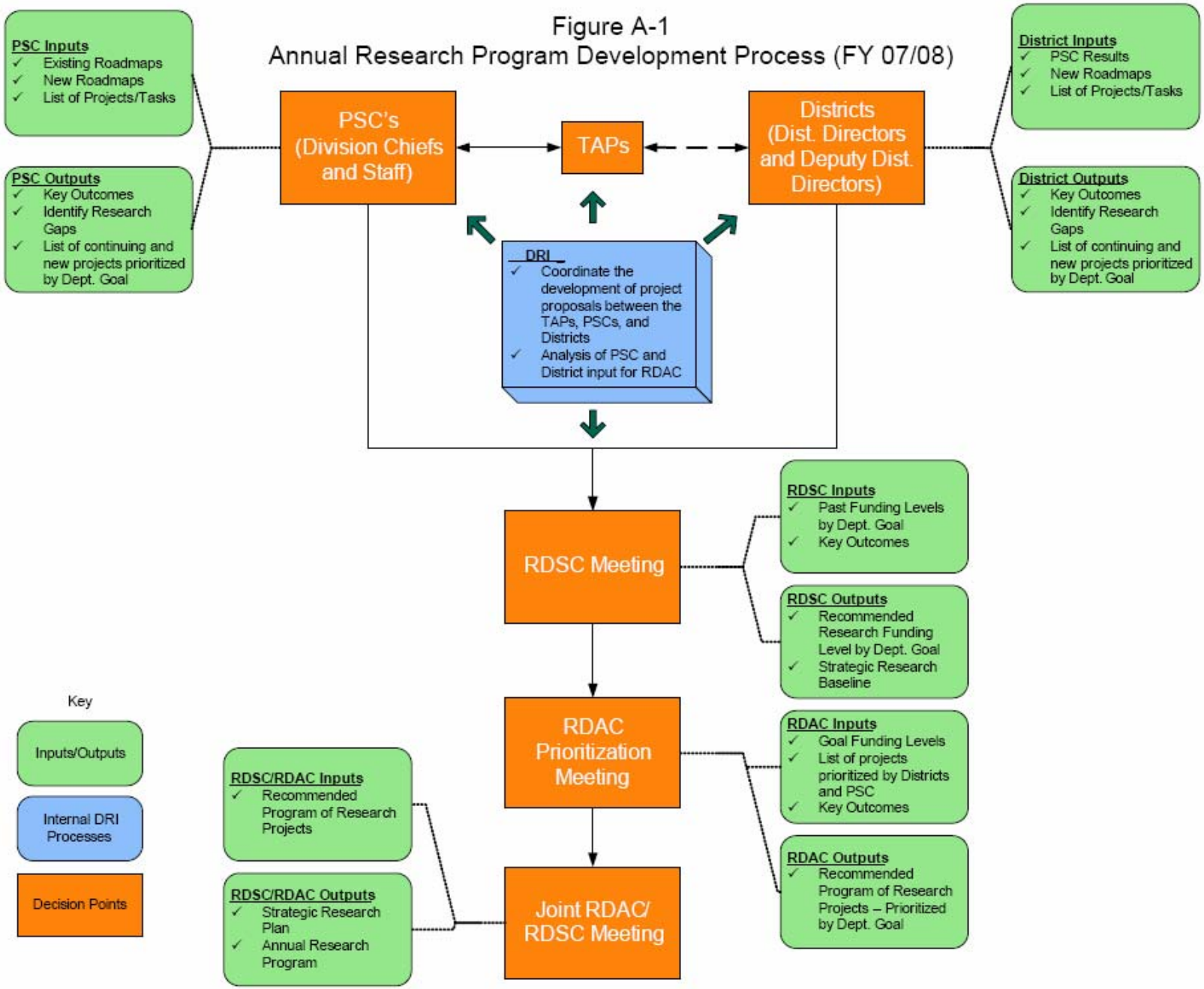
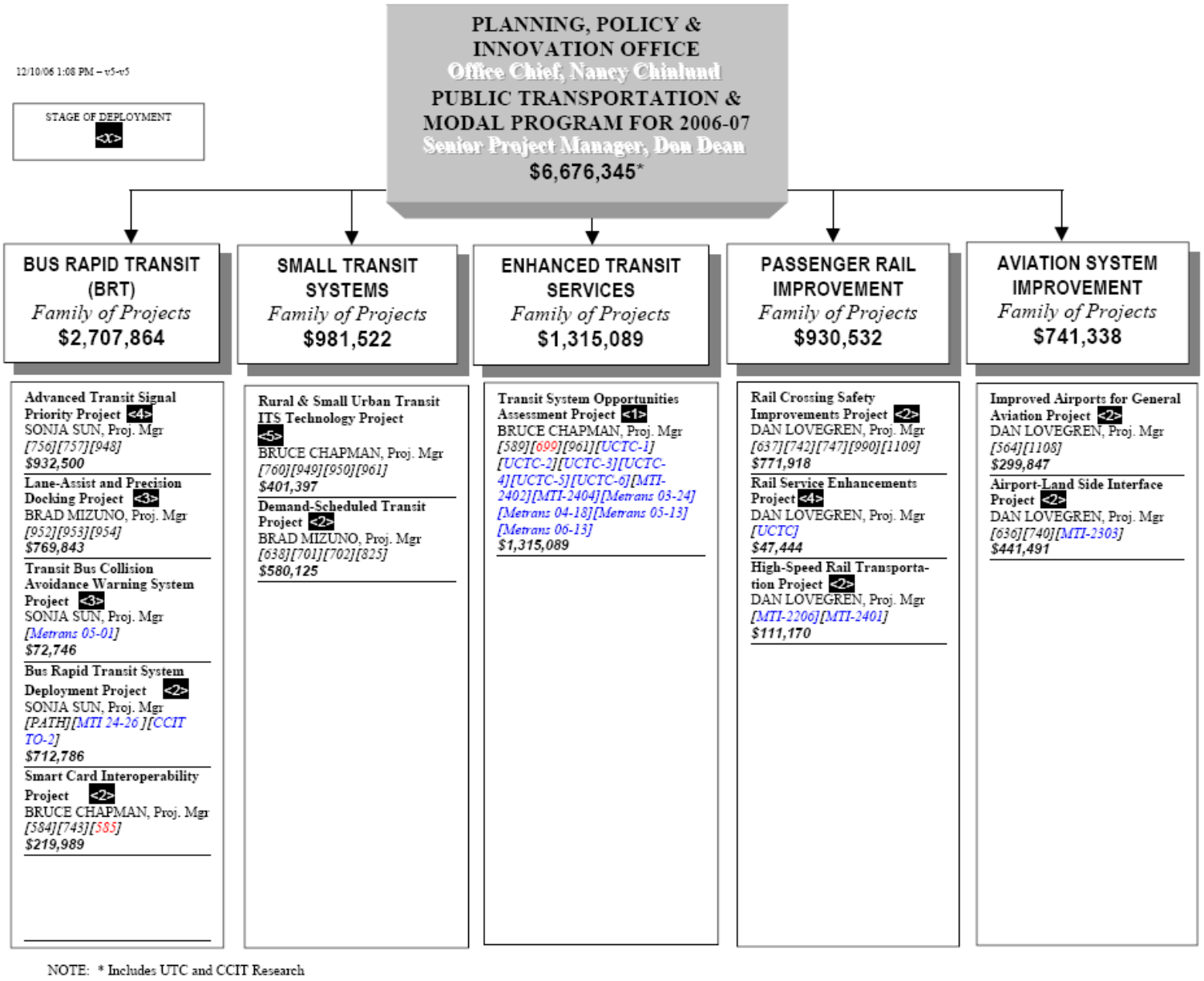
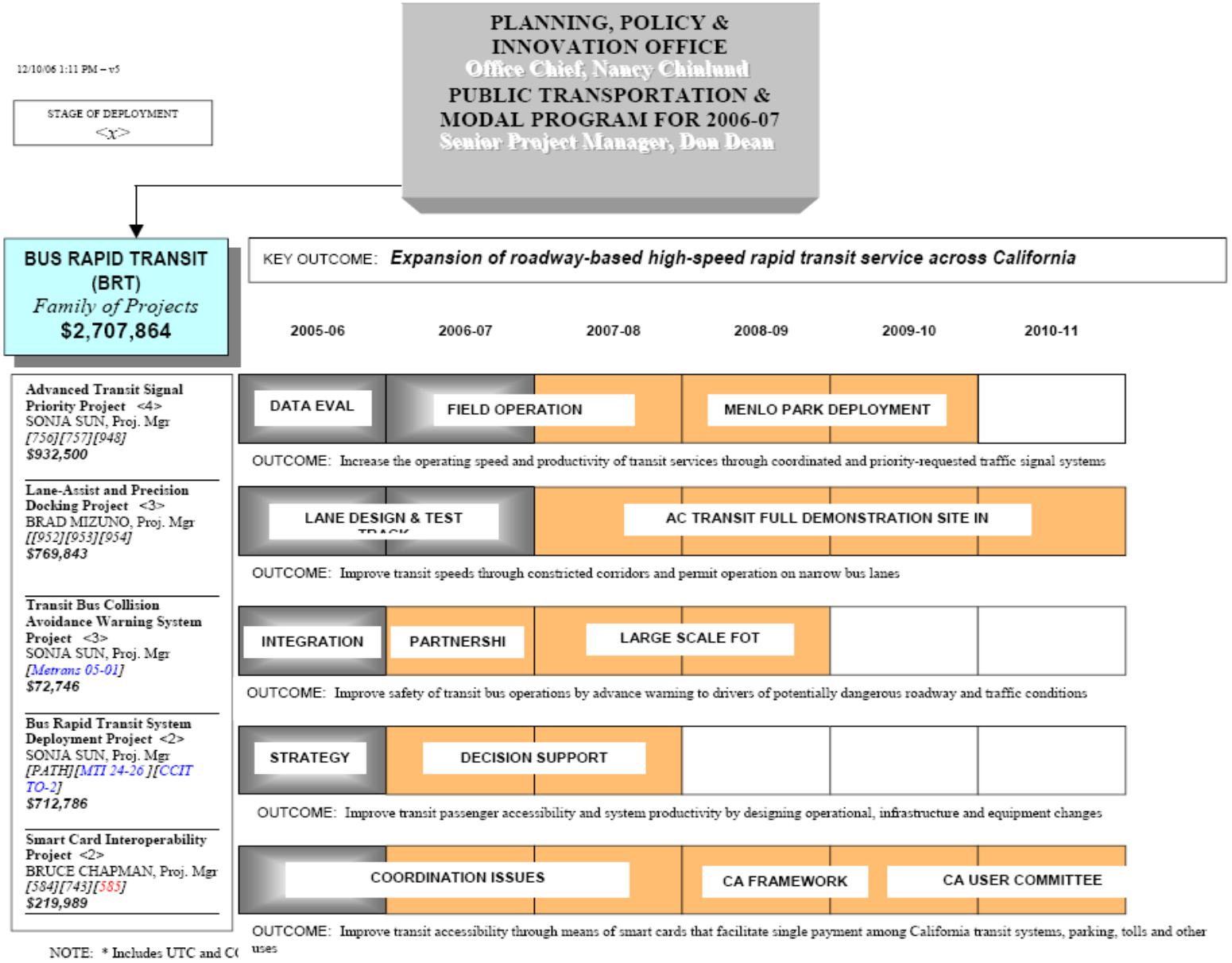


Figure A-2: Program Level Roadmap

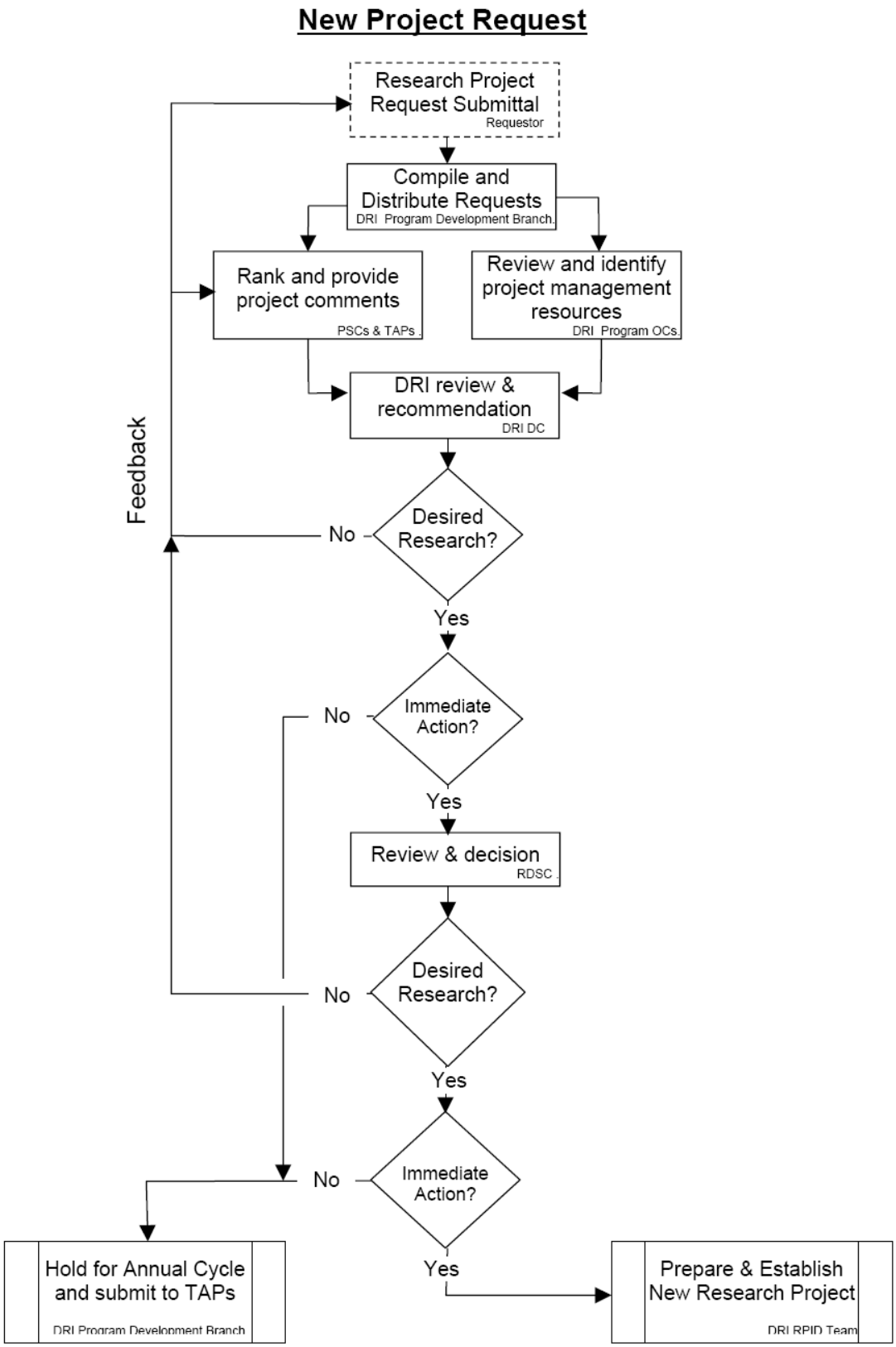


NOTE: * Includes UTC and CCIT Research

Figure A-3: Project Level Roadmap



Appendix B: Graphic Off-Cycle Process



Appendix C : Abbreviations/Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ACRP	Airport Cooperative Research Program
AWP	Annual Work Program
CALTRANS	California Department of Transportation
CFR	Code of Federal Regulations
CFS	Call for Submissions
DOT	Department of Transportation
DRI	Division of Research and Innovation
FHWA	Federal Highway Administration
FMIS	Fiscal Management Information System
FTA	Federal Transit Administration
ITS	Intelligent Transportation System(s)
JIC	Joint Implementation Committee
LTAP	Local Technical Assistance Program
MSA	Master Services Agreement
NCB	Non-Competitive Bid
NCHRP	National Cooperative Highway Research Program
OCLC	On-line Computer Library Center
OMS	Office of Management Support
OPPI	Office of Planning, Policy & Innovation
OTOR	Office of Traffic Operation Research
PATH	Partners for Advanced Transit and Highways
PI	Principal Investigator
PM	Project Manager
PSC	Program Steering Committee
RDAC	Research and Deployment Advisory Committee
RDSC	Research and Deployment Steering Committee
RFP	Request for Proposals
RPID	Research Project Input Document
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (2005)
SPR Part I, II	State Planning and Research: Part I – Planning, Part II – Research (A federal program)
STEP	Surface Transportation Environmental Programs
T2	Technology Transfer
TAC	Technical Advisory Committee
TAP	Technical Advisory Panel
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century
TPF	Transportation Pooled Fund
TRB	Transportation Research Board of the National Research Council
TRAMS	Transportation Accounting Management System
TRIS	Transportation Research Information Service
UC	University of California
USC	United States Code
US DOT	United States Department of Transportation
UTC	University Transportation Center

Appendix D: Definitions

Agreements/Contracts:

Interagency Agreement (IA): Used between State agencies, including the University of California and the California State University system, as the basis for securing interagency services and for reimbursement for such services. An IA constitutes the complete understanding between both parties. It must include the following:

- A clear and complete statement of the work, service, or product to be performed, rendered, or provided,
- A complete delineation of the responsibility of each party in the performance of such work,
- The basis upon which payments for such services are to be made, and
- The period of performance.

Master Agreement: A generic term for a certain kind of research agreement between Caltrans and academic institutions (Interagency Agreements with the University of California and other public entities and Standard Agreements with private entities). The Master Agreement sets the general terms, conditions, and spending authority of the agreement between the parties. It also provides for a supplemental contracting mechanism that, upon execution, specifies services, materials, equipment to be furnished, or work to be performed; by whom; the time for performance, including the terms, date of commencement and date of completion; and, the payment provision. The intent of the Master Agreement is to save time and resources because the general terms, conditions and spending authority have already been established. Currently, there are two supplemental contract methods: the Research Technical Agreement (RTA) and Task Order.

Master Services Agreement (MSA): Generally statewide agreements executed by the Department of General Services that have been competitively bid and allow State agencies the option of placing orders directly with contractors.

Research Technical Agreement (RTA): A supplemental contract to the Transportation Research Master Agreement with the University of California specifying the funding and performance requirements to be met while under contract for a specific research project.

Standard Agreement: A contract with private consultants or laboratories, other governmental agencies, educational institutions (other than the University of California), or foundations supporting units of the California State University system for the performance of specific research work for Caltrans.

Task Order: 1) A cost-reimbursement or cost-sharing type of contract with FHWA permitting Caltrans to conduct a specific research project or implementation study, or 2) a supplemental contract with a university under an Interagency Agreement or Standard Agreement. The Task Order for FHWA supplements a Basic Agreement. The Task Order with universities enables the Department and academic researchers to focus only on a statement of work, schedule, budget, and research team to get a particular research project done.

Transportation Master Research Agreement: An Interagency Agreement with the University of California providing for the execution of RTAs. The Transportation Master Research Agreement establishes the basic terms and conditions of contracting between Caltrans and the University, thereby enabling the two parties to enter into RTAs more quickly than if they entered into a full Interagency Agreement for every research project.

Annual Research Process

The Department's annual process for planning, selecting and funding transportation research projects for a specific fiscal year. See Off-Cycle below.

Annual Work Program

The Caltrans SP&R, Part II Annual Work Program (AWP) consists of the current and proposed research efforts to be financed in part with federal aid funds through the Federal Highway Administration. The AWP contains an organized listing of the participating research and development projects, both current and proposed, giving an account of program status, proposed work, and estimated costs.

Caltrans

The California Department of Transportation

Consultant

A qualified individual, group, or firm able to perform specialized research or to provide technical advice to a responsible department unit performing research. A consultant engaged by Caltrans is usually termed "contractor" in the agreement.

Contract Manager

A contract manager is the Caltrans person responsible for administering a contract and monitoring the contractor's performance. The contract manager serves as a liaison with the contractor and may perform administrative tasks ranging from the request of contract services through the performance and final payment for completed services.

Department

The California Department of Transportation (Caltrans)

Deployment

Deployment is the last stage in the research process. Deployment is the incorporation of the results into the everyday practices of the organization. Deployment may include a new or revised policy, procedure, standard, design, specification, test method, computer program, or manual change. It may also include the development, marketing and use of new products, including new kinds of equipment. Caltrans defines deployment in 5 stages. See Figure 5-1.

Disclaimer Clause

The standard clause that must appear verbatim in all published research reports involving FHWA participation is shown below:

"The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the state of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation."

Dissemination

The distribution of research facts or findings to appropriate programs, offices, districts, and/or parties for review and possible implementation.

Fiscal Year

For the state of California, a 12-month budgeting period from July 1 through June 30 of the next year (e.g., Fiscal Year 1996 is from July 1, 1995 through June 30, 1996). For the federal government, a 12-month period budgeting period from October 1 through September 30 of the next year.

Off-Cycle

The off-cycle process provides an opportunity for the research committees to consider research problem statements or project proposals that cannot wait for the next annual cycle. The approval process is accelerated, because of the urgent nature of the request.

The off-cycle process also provides a flexible way to respond to solicitations that are received through the year (e.g., pooled-fund projects, grants, etc.).

Peer Review or Peer Exchange

An information exchange meeting among persons who are knowledgeable of the management and operation of research programs. These persons may include representatives from other state DOTs, the Federal Highway Administration, Transportation Research Board, universities, and the private sector. This activity is required every three years by 23 CFR 420.

Principal Investigator (PI)

The person (or persons) bearing the primary technical and administrative responsibility for the design and completion of a research study and for the day-to-day control and direction of the work (when using a research team approach, there may be more than one principal investigator).

Project Manager (PM)

The Caltrans person with full authority and responsibility, delegated by the appropriate Division Chief, to produce the intended results, on schedule and within budget, and to keep the project sponsors, customers and end users satisfied by managing all aspects of an approved project, from the initial Problem Statement to a Deployed Product. Also called the Research Project Manager.

Quarter

A time period within one year that is divided into four three-month segments for ease of reporting and monitoring progress. According to the fiscal year for the State of California, the first quarter begins July 1 and ends September 30. The second quarter begins October 1 and ends December 31; the third quarter begins January 1 and ends March 31; and, the fourth quarter begins April 1 and ends June 30 (the end of the fiscal year).

Research Problem Statement

A formal description of need for research based on a difficulty or crisis that requires new facts, policies, techniques, methods, etc. The Department prioritizes the problem statements and may approve some for solicitation of full research proposals.

Research Project Manager

See definition of Project Manager.

Research Proposals/ Solicitations:

Research Proposal: A detailed research plan with substantiating data submitted for approval to conduct a research project. The research project proposal typically includes a title, justification,

background data, a review of previous research and pertinent literature, objectives, a budget, and a work plan.

Unsolicited Proposal: An offer (usually accompanied by a proposal) from a university, a consultant, private laboratory, independent researchers, or others to perform research work not specifically requested by Caltrans.

Work plan: The section of the research proposal outlining the procedures and timeframe that the researcher plans to follow to conduct the research project.

Types of Proposals/Methods of Solicitation

Call for Submission (CFS): A method to openly solicit proposals from interested parties without committing to a contractual relationship in the initial phase. Information provided in a CFS is similar to that of an RFP. If the Department decides to proceed after receiving all proposals, the Department and the submitter must first enter into a contractual agreement before any work can be performed. Only public entities are eligible to submit proposals in response to DRI's CFS.

Request for Offer (RFO): An RFO is the method by which the Department solicits offers from contractors who are on a Department of General Services' Master Services Agreement (MSA) list. The contractor must provide all information that DRI deems necessary to evaluate the offer. The RFO submittal must provide enough information for DRI to be able to determine and verify the contractor's ability to perform the tasks and activities defined in the Statement of Work.

Request for Proposals (RFP): A procedure whereby the Department solicits proposals to perform research from qualified parties.

Transportation Pooled Fund Project: When DRI identifies a project that may be of interest to other states, the Department works with FHWA to initiate a pooled fund project and solicit participation by other states.

TRB's Cooperative Research Programs: When DRI identifies problem statements that may be of national interest the Department submits the problem statements to the appropriate TRB Cooperative Research Program.

Reports

Annual Accomplishment Report: A report required by the Federal Highway Administration that is an accounting of the accomplishments, savings, and cost of all research projects completed during the fiscal year period immediately preceding the Annual Accomplishment Report date (September). The report also includes the continuing projects for which resulting benefits have been implemented.

Final Report: A research report that documents the data gathered, the analysis performed, conclusions, the significance of the results to Caltrans operations, and recommendations on the means by which the research results may be implemented. It should not simply repeat information given in an interim report.

Progress Report: A report of progress, usually monthly, in addition to the quarterly report. Its contents and frequency are specified in the research agreement.

Biannual Report: A report that provides information on the status of an individual research project on a quarterly basis. This report enables research administrators and participating funding partners to periodically evaluate the progress of a particular research project to determine if the potential for producing significant results is strong enough to warrant project continuation.

Termination Request: A report by the Project Manager documenting the Department's determination that further research in a given area may not be productive or the desired outcome may not be

achieved. The Project Manager subsequently requests the researcher to terminate the project and prepare a Termination Report.

Termination Report: A report prepared by the researcher in response to a termination request. The researcher must submit a final report that addresses work and deliverables produced up to the time of termination, and it must discuss the reasons for the termination.

Research

Applied Research: A systematic, analytical, and experimental investigation of natural phenomena to gain specific new knowledge that answers a specific question or solves a problem. Applied research is needed to improve the functional characteristics of a system—usually resulting in direct application of results.

Basic Research: A systematic analytical and experimental investigation to increase knowledge of fundamental phenomena. Specific applications have not usually been identified.

Research: The scientific investigation, including analytical and/or experimental activities, to discover or apply new facts, techniques, methods, and natural laws.

Advanced Research (previously called Out of the Box)

Innovative, non-traditional or high risk research that has the potential for high payoff results that would serve the long-term needs of the Department.

Research Project Input Document (RPID)

An internal DRI form that the Project Manager completes to launch a project that has been approved by the RDSC. It is also used to help populate DRI's financial database.

Research Roadmap

A document that identifies all the research that will be needed to deliver Research Outcomes that support one or more Department Goals. The Roadmaps are used to organize projects by goals and outcomes. The baseline roadmaps are compared to the desired outcomes for a gap analysis and organize. The Roadmaps allow decision-makers to pursue the highest priority research. The roadmaps also show how various research projects work together to accomplish the stated outcomes.

Technology Transfer

A systematic process by which the existing research knowledge of others is transferred operationally by Caltrans into useful processes, products, or procedures. Technology Transfer includes those activities that lead to the adoption of a new technique or product, and can involve dissemination, demonstration, and training.

Transportation Pooled Fund Program (TPF)

A means for FHWA to partner with state agencies and other organizations when there is mutual interest in solving transportation-related problems. Partners may pool funds and other resources to solve these problems through research, planning, and technology transfer.

University Transportation Center

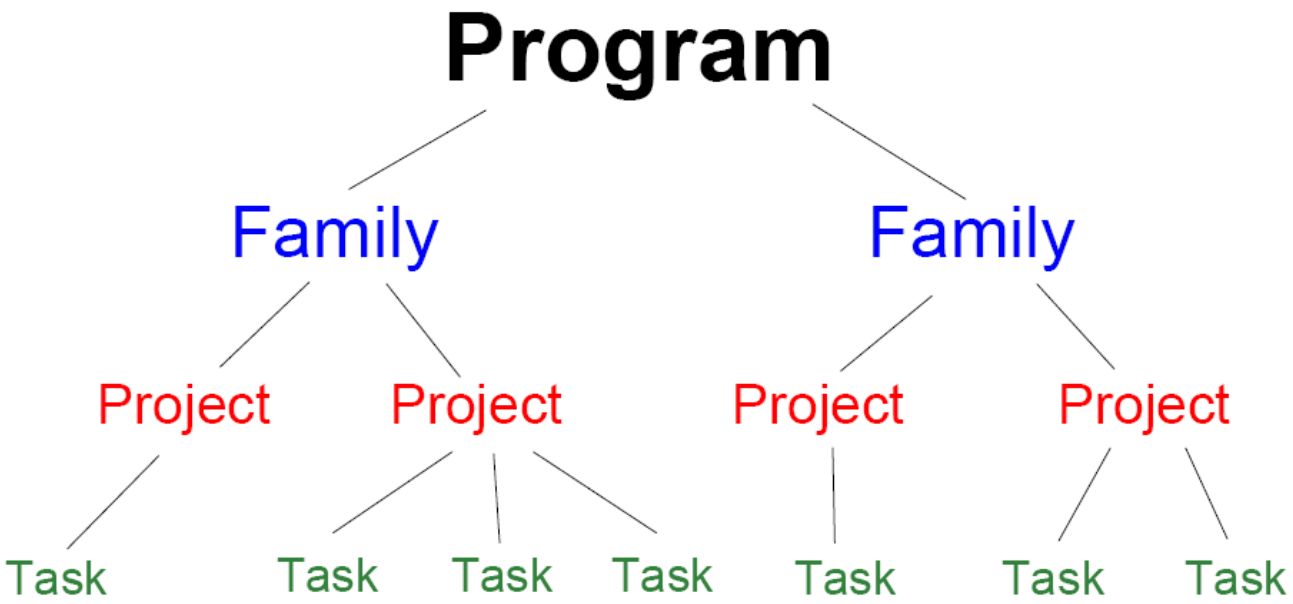
University Transportation Centers are non-profit institutions of higher learning listed in SAFETEA-LU Section 5402. University Transportation Centers advance significantly state-of-the-art transportation research and expand the workforce of transportation professionals through:

Research: Basic and applied research, the products of which are judged by peers or other experts in the field of transportation to advance the body of knowledge in transportation.

Education: An education program relating to transportation that includes multidisciplinary course work and participation in research.

Technology Transfer: An ongoing program of technology transfer that makes transportation research results available to potential users in a form that can be implemented, utilized, or otherwise applied.

Appendix E: Project Family



A Project has Deployable Products.
A Task has Deliverables.
A Project can be made up of a number of Tasks that can occur either sequentially or in parallel.
A Family is a grouping of related Projects.

Appendix F: Research Progress Report

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

RESEARCH QUARTERLY PROGRESS REPORT

MR-6068 (REV. 2/93)

1. TITLE	2. FEDERAL STUDY NUMBER
3. OBJECTIVE	2a. CONTRACT NUMBER
	4. EA *(DIV-UNIT-EA)*

5. PRESENT WORK PLAN APPROVED ON:	6. ORIGINAL START	7. ESTIMATED COMPLETION	8. TIME ELAPSED %	9. PROJECT COMPLETED TO DATE %

10. List specific major steps or phases to accomplish the objective.
Use the following symbols to indicate planned progress.3
Circle symbol when actually accomplished.
S = Starting Date, **C** = Estimated Completion Date
List of Tasks:

	FISCAL YEAR												
Qtr.	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	Beyond
Prior	Jul Sep	Oct Dec	Jan Mar	Apr Jun	Jul Sep	Oct Dec	Jan Mar	Apr Jun	Jul Sep	Oct Dec	Jan Mar	Apr Jun	

11. EXPLAIN WHAT WAS DONE THIS QUARTER AND HOW IT COMPARES WITH WHAT WAS PROPOSED IN BLOCK **12** OF THE LAST QUARTERLY REPORT.
DESCRIBE ANY UNANTICIPATED PROBLEMS THAT AROSE THIS QUARTER OR ANY RECENT IMPLEMENTATION.

12. BRIEFLY DESCRIBE THE WORK PLANNED FOR THE NEXT QUARTER ALONG WITH ANY PROJECTED DEVIATIONS FROM THE WORK PLAN OR ANTICIPATED MODIFICATIONS TO THE COST ESTIMATE OR THE WORK SCHEDULE.

13.		THIS FISCAL YEAR	TOTAL PROJECT	% EXPENDED TO DATE	14. Contractor Name	
Approved Total Funding	$	$	$			
Funds Expended To	Date	$	$	%	15. Responsible Unit	
Approved Caltrans PY's	Date	PY'S	$		16. Date	Quarter
PY's Expended To	Date	PY'S		%	17. PI Signature *(and Contract Monitor Initials)*	

FM 93 1759 M

Appendix G: Contents of the Final Report

1. Cover Page

- Identify the title of the research project
- Identify the federal report number
- Identify the report type (i.e. draft/interim/final)
- Identify the ownership of the report
  Example: State of California
  Department of Transportation
  Division Name
  Office Name (if applicable)
- Include a graphic, if desired
- Identify the report date, e.g., August 2005

2. Title Page

- Identify the ownership of the report
  Example: State of California
  Department of Transportation
  Division Name
  Office Name (if applicable)
- Identify the title of the research project
- Identify the report type (draft, interim, or final)
- Identify the author(s) of the report
- You may also identify the researcher and the individual(s) who prepared the report

3. Technical Report Documentation Page

Federal form DOT-F-1700.7 needs to be completed if the research was federally funded. For the most updated version of and instructions to prepare the Technical Report Documentation Page, refer to DRI Internal website: (http://onramp.dot.ca.gov/newtech/project_management/research_manual/old/manual_8_18_section_5000.doc).

4. Table of Contents

- Include an organized list of important report sections in outline form with beginning, but not inclusive, page numbers
- Include numbers or letters only before main items
- Use column heads (such as “Chapter” or “Section” on the left and “Page” on the right) and Department of Transportation (DOT) headers if desired
- Include a list of “Appendices,” at the end of the outline, with the heading centered but without a dividing line above it if desired

5. Illustrations and Tables

- List “Tables and Illustrations” at the foot of the “Contents” or on a separate page behind the “Table of Contents”
- List the titles of all illustrations, which may include tables, drawings, diagrams, maps, charts, graphs and photographs
- The illustrations, except tables and photographs, are called “Figures.” Photographs may be called “plates” if they are grouped on one page or printed singly on special paper

- Number the illustrations consecutively as they appear in the text. Within the text of the heading, "Figure" should be placed below the illustration and before or above its title in initial caps. It is usual to use column headings "Figure" or "Table" on the left and "Page" on the right.

Note: The contractor is free to copyright material, including Interim Reports and Final Reports, developed under contract, with the provision that Caltrans and FHWA reserve a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use and authorize others to use the work for government purposes.

6. Disclaimer Statement

All reports must include a disclaimer statement before the introduction. For research reports involving FHWA participation, the disclaimer statement must say:

"The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification or regulation."

The United States Government does not endorse products or manufacturers. Trade and manufacturers' names appear in this report only because they are considered essential to the object of the document.

7. Foreword, Preface and Acknowledgments

- The Foreword must appear on a separate page. The Preface and Acknowledgments may be combined on one page or appear on separate pages
- Present these items in the initial pages of the report
- Acknowledge financial support using this phrasing: *"This work was supported by …"*

8. Executive Summary[1]

An executive summary is a report, proposal, or portfolio, etc in miniature (usually one page or shorter). That is, the executive summary contains enough information for the readers to become acquainted with the full document without reading it. Usually, it contains a statement of the problem, some background information, a description of any alternatives, and the major conclusions. Someone reading an executive summary should get a good idea of main points of the document without becoming bogged down with details. Covering no more than a page in length, the executive summary is Longer and is a highly condensed version of the most important information the full document contains.

(Source: Technical Writing: A Reader-Centered Approach. 2"J ed. By Paul V. Anderson, Harcourt, Brace, Jovanovich Publishers, 1991)

With the possible exception of the conclusion and recommendation, the executive summary is the most important part of a report. As such, it should be the best-written and most polished piece of the document. This is because many readers may only look at the executive summary when deciding whether or not to read the entire document. In some companies, the executive summaries are distributed so that employees are informed as to what information is available, and interested readers may request the entire document. In short, you may expect that an executive summary will be read more frequently and by more people than will your entire document.

When writing your executive summary, ask yourself if those who read the summary will be those who will read the entire report. If you are dealing with two different groups of people, you will have to decide how much technical detail to include in the summary. If it is likely that some who read only the executive summary will not have the technical background of the writer or final reader, keep the technical information and vocabulary to a minimum. You might have three types of readers: those

who want a full picture but won't check the details (they might read the executive summary, some of the body, the conclusions, and the recommendations), those who read everything (they read the appendixes, all the data, the calculations, etc.), and those who are in executive positions, wish to be kept informed on what is going on in the company, and will say "yes" or "no" to a project (they will read the executive summary, the conclusions, and the recommendations). Your executive summary must address all three types of readers.

Since the executive summary is a condensation, when creating it, you omit any preliminaries, details, and illustrative examples. You do include the main ideas, the facts, the necessary background to understand the problem, the alternatives, and the major conclusions. Brevity and conciseness are the keys to a well-written summary. Do not take a few sentences from key sections of the document and string them together. Rather, go over the entire document and make notes of the elements you consider important. From your notes, create a rough draft of the summary. Then, polish what you have written until it is smooth and seamless without unnecessary wordiness. Do not include any introductory or transitional material. Finally, ensure that your executive summary is accurate and representative of your full document.

9. Introduction

The author must, at the outset of the introduction clearly identify the exact subject of the report and its organization. The text in this section is concise. It should not contain details of any state-of-the-art survey, test procedure or mathematical analysis.

It must, however:

- Identify the problem that led to the research project and how it relates to other prior and current research
- Indicate the research project's objectives as stated in the research proposal and any later supplements
- Briefly summarize how the research findings address each specific research objective, and
- Relate the significance of the research findings to the overall operations of Caltrans

10. Background

This section provides background data, a review of previous research, and pertinent literature and the objectives and support for the research project.

11. Body

In general, the body of the report should:

- State the research procedure(s) in sufficient detail to permit the research to be replicated
- Describe any problems encountered during the progress of the research
- Include a description of the data recorded, a detailed statement of how the data was analyzed and a summary of the analyses (with the raw data either included in an appendix or not presented), and
- Discuss the meaning of the relationships observed or derived from the research

12. Conclusions and Recommendations

The authors must provide detailed quantitative statements about the relationships that were found. They must also provide a description of the tests used for significance and the degree of confidence one may have in the stated findings.

13. Deployment

IMPORTANT NOTE: All research must have clearly defined plans for deploying the research findings. Such plans must clearly identify "customers" of the research findings from the earliest stages of the research, i.e., at the "Problem Statement" development phase.

This statement should point out any immediate practical application of the research findings. It should be prepared cooperatively by the researcher from potential deployment offices. Also, it should provide answers to the following questions.

Did the findings warrant or assist in:

- The application of new procedures?
- The issuance of new specifications, standards, or designs?
- The use of new materials?
- The development of new equipment?
- The rejection of a proposed new procedure?
- A determination that no problem exists?
- Other positive benefits?
- No conclusions, but the determination that additional research is needed? Why?

The report shall include a recommended procedure for deployment and describe the methods used to translate the research product into practical implementations. Describe any potential benefits from deploying the research findings:

- Savings in time, money and lives
- Increased safety
- Better service
- Improved aesthetics
- Improved environment
- Increased energy efficiency
- Enhanced capability for solving transportation problems that may become available to the engineering, planning or related professions, and
- Other user and nonuser benefits

When savings can be expressed in terms of dollar amounts, the PI shall estimate the first year savings and the subsequent average annual savings anticipated upon application of the research results. If the findings are positive, but not suitable for immediate application, the report shall indicate the extent of additional work needed to produce results suitable for deployment, e.g., testing for verification, combining, correlating and interpreting additional research, etc.

Also, the report shall state whether significant deployment is proposed that could be profitably shared or if an implementation plan needs to be prepared. *(For more information, see Section 6000 Deployment and Technology Transfer.)*

14. Appendices

Appendices shall include information such as supporting data, substantiation of evidence, documentation, charts, photographs, and other details referred to in the text (usually by footnotes), which are not appropriate for the body of the report. Identify appendices with A, B, C; 1, 2, 3; or I, II, III, if Roman numerals have not been used for chapters.

15. References and Bibliography

The References list books or other authoritative writings that have been cited ("called out") in the text as "stated by Lee (1968, p.l2)" or "(Ref. 6)" or just "(3)" and that have not been listed in footnotes or

at the end of each chapter. It may be arranged alphabetically or numerically to correspond to the citation numbers in the text.

Appendix H: Technical Report Documentation Page

1 . Report No. FHWA/CA/TL-	2. Government Accession No.	3. Recipient's Catalogue No.
4. Title and subtitle		5. Report Date
		6. Performing Organization code
7. Authors		8. Performing Organization Report No.
9. Performing Organization Name and Address California Department of Transportation Division of Research & Innovation 1227 O St Sacramento, CA 95814		10. Work Unit Number
		1 1 . Contract or Grant No.
12 Sponsoring Agency Name and Address California Department of Transportation Sacramento, C A 95819		13. Type of Report and Period Covered
		14. Sponsoring Agency Code
15. Supplementary Notes		
16. Abstract		
17. Keywords		18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161
19. Security Classif. (of this report) Unclassified 20. Security Classif. (of this page)		21 . No. of Pages 22. Page

Appendix I: Format for The Content of Termination Report

Title

Indicate that this is a Termination Report, and identify the project.

Objectives

List the objectives of the research project as stated in the proposal.

Objectives Achieved

List the objectives achieved prior to termination of the project, and describe how they were met.

Objectives Unattained

List the objectives not achieved at the time the project was terminated, and indicate why.

Accomplishments

Inform other researchers who wish to continue or to conduct new research in the same subject area what has already been accomplished.

Reasons For Termination

Indicate the reason(s) for terminating the project.

Expenditures

Specify the dollar amounts expended under the following four categories: personnel, (including consultants), materials, equipment and travel.

Nonexpendable Equipment

- Indicate whether any non-expendable equipment was purchased or assigned to the project.
- Identify the non-expendable equipment, when it was purchased or assigned and its purchase price or value when it was assigned to the project.
- List the current depreciated value of the equipment and how that value was determined.
- Indicate when authority was granted to purchase non-expendable equipment (for example, upon proposal approval or later, as a separate request.)
- Give the disposition of the equipment.

Appendix J: Stages of Research Deployment

CONCEPT - STAGE 1

- First steps following Problem Statement and Proposal.
- Includes detailed literature search.
- Involves experimental design, data collection, analysis, and reporting.
- Assesses results of research.
- Defines barriers to implementation (e.g., policies, specifications, standards).
- Submits a Final Report and outlines a recommended implementation plan.

LABORATORY PROTOTYPE - STAGE 2

- Develops prototype product, such as a breadboard circuit or computer system model.
- Demonstrates operation in laboratory setting.
- May incorporate customized or one-of-a-kind components.
- Assesses results.
- Submits Final Report and recommends design of full-scale demonstration.

CONTROLLED FIELD DEMONSTRATION - STAGE 3

- Prepares for full-scale testing of demonstration project.
- Includes collaboration with outside agencies or other state departments of transportation and the U.S. Department of Transportation.
- Controlled tests at specialized facilities are observed and supported by cooperating agencies, industry, and technical associations.
- Potential end-users are enlisted to support the field pilot stage.
- Assesses results.
- Submits Final Report and recommends site/conditions for first application pilot stage.

FIRST APPLICATION (CONTRACT) FIELD PILOT - STAGE 4

- Works with potential end-users to select site and to conduct pilot testing under real-world operating conditions.
- Test specifications and standards are developed.
- Research assistance given to assure proper installation and operation.
- Problems are corrected and adjustments made, as necessary, to complete pilot testing.
- To the extent possible, potential end-users operate the project under careful research surveillance.
- Assesses results.
- Submits Final Report and recommends initial sites for full corporate deployment.

SPECIFICATION AND STANDARDS WITH FULL DEPLOYMENT - STAGE 5

- End-user(s) select site(s) and deploy the method/process/equipment using resident management, supervision, staff and contracting forces (where applicable).
- Deployment is without research supervision or direction.
- On-call assistance is available upon request.
- Assesses results.
- Submits Final Report and recommends adoption of specifications and standards.