

California Department of Transportation
Division of Design
Office of Special Projects

Value Analysis Program



ANNUAL REPORT

Federal Fiscal Year 2006/2007

October 1, 2006 - September 30, 2007



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EXECUTIVE SUMMARY

The Federal Fiscal Year 2006/07 was a busy year for the Department's Value Analysis (VA) Program. In the beginning of the year, the VA Program developed Deputy Directive 92 (DD-92) to implement the changes in federal law contained in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The new federal mandate requires a VA study to be conducted on all projects on the federal-aided system with a total cost (construction and support) of \$25 million or more, and bridge projects totaling over \$20 million. To accompany the new directive, Chapter 19 of the Project Development Procedures Manual was also revised. About mid-year, the VA Program obtained three new 3-year contracts with two consultants to lead our VA studies and perform training throughout the state. To finish off the year, the Program reinstated an Awards program, delivered the Cost-Risk Assessment pilot project, and nearly doubled our project studies from the previous year.

Last year, 55 studies were performed on projects with a total cost (capital and support) of over \$4.5 billion. In January 2008, the Department reported to the Federal Highway Administration (FHWA) a savings of \$225 million. These savings were derived from the "Accepted Alternatives" proposed by the VA teams and implemented by the decision-makers, project managers, functional managers, and Project Development Teams (PDT). In keeping with our Stewardship Agreement with FHWA, the Department accomplished an average 5 percent project cost savings on projects studied. The Department's implementation rate of 45 percent of "proposed" alternatives also met the national average. Based on the cost to perform the studies and the cost savings implemented, the Department achieved a Return on Investment (ROI) of 77:1.

In an effort to improve the delivery of projects, the VA Program was requested to help with two special projects: a Cost-Risk Assessment (CRA) pilot program and a study of the Safety Roadside Rest Area (SRRA) projects. The CRA pilot program studied five nearly complete (~80% PS&E) projects to identify risk and the cost associated with risk due to escalating material cost and the bid environment. The SRRA project used VA to reduce cost on nearly 10 rest area projects that needed ADA and Cal/OSHA upgrades.

The VA Program's goal is to maximize the value and quality of the projects delivered. Timing is a critical factor when implementing alternatives from a VA study. When a VA study is performed in the early stages of the project, there is a greater potential positive impact to value. Continuous outreach efforts to team members, project managers, and functional managers, will ensure the Program remains successful. Besides cutting cost, the VA process can be a valuable tool to build consensus among stakeholders, increase stewardship, improve customer service with our partners, solve difficult transportation problems, and improve project quality.

VALUE ANALYSIS OVERVIEW

WHAT IS VALUE ANALYSIS?

Value Analysis (VA) is a function-oriented, systematic team approach, used to analyze and improve value in a product, facility design, system or service. It is a powerful methodology for solving problems, reducing costs, and improving performance/quality requirements.

The VA Job Plan is an organized plan of action for accomplishing VA studies and assuring the implementation of the recommended changes. Summarized below are the 12 steps, as employed in the Department's VA Program, required to successfully complete a VA study. The process begins with the "Identify Project" phase and ends with the "Implement Alternatives" phase.

Pre-Study Preparation	Study Performance	Post-Study Implementation
Identify Project	Inform Team	Report Results
Select Team	Analyze Functions	Assess Alternatives
Prepare Data	Create Ideas	Implement Alternatives
	Evaluate Ideas	
	Develop Alternatives	
	Present Alternatives	

Typically, it takes 5 or 6 days to perform a VA study and requires the cooperation of the project/functional managers, resource advisors, and the VA Team members.

The Department conducts three types of VA studies:

- Project Studies. The use of VA to improve the value of projects has been demonstrated in all Districts since 1969. Project VA studies are broken down into two categories:
 - 1) Federally mandated studies
 - 2) Voluntary studies identified by the Districts.
- Product studies. The VA process can be used to improve the quality of transportation products. Typically, engineering products are items and systems as described in the Department's standard plans and specifications. Value Analysis can help identify products that need to be updated due to changing technology, outdated applications, or any other changes that affect our standard engineering products.
- Process studies. The VA process can be used to improve the quality of the Department's processes, such as policy and procedures and business practices.

USE OF CONSULTANTS

The Department currently has three on-call contracts to provide VA services throughout the state. Two consultant contracts are regionally divided and the third is used for Training and Process/Product studies for the entire state. The two regional contracts cover all the project studies for the Northern Districts (North and Central Regions, District 4, and Headquarters) and the Southern Districts (Districts 7, 8, 11, and 12).

In May 2007, the procurement process was completed and three contracts were awarded to two VA specialist firms. Value Management Strategies (VMS) was successful in securing the projects studies for both the Northern and the Southern Districts. RH & Associates was successful in securing the Training and Process/Product study contract.

These on-call contracts for VA services were executed in May 2007 and are valid until June 30, 2010 for a total value of \$7 million. The VA contracts are helping the Department perform the increased number of studies required to comply with the federal VA Study mandate. With the \$25 million project cost threshold, many of the Department's projects now require a VA study. The Department uses Certified Value Specialist (CVS) team leaders to facilitate the studies. These contracts allow the Department to hire consultants who have access to nationally recognized CVS team leaders as well as expert consultants in their field for study purposes.

2006/2007 PROGRAM RESULTS

During the federal fiscal year ending September 30, 2007 the Department completed the following value analysis activities:

- Fifty-five (55) studies were completed including Forty-seven (47) mandated transportation project studies and eight (8) voluntary studies. An additional thirty-six (36) transportation project studies were performed, but not completed within the federal fiscal year. The results of these studies will be reported next year.
 - ❖ The total estimated project cost of the fifty-five (55) transportation projects studied was \$4,590,885,000. This included the \$892 million I-680/80/12 Interchange and several other projects over \$300 million throughout the state.
 - ❖ Project teams implemented 175 of 389 proposed recommendations resulting in \$225,000,000 in savings. Table 1 below summarizes the results of the VA transportation project studies.
- Three (3) process studies to improve the processes for out-of-state travel, Utility identification, and District 7's Feasibility Study Reports were performed.
- Fourteen (14) Cost Reduction Incentive Proposals (CRIPs), otherwise known as Value Engineering Change Proposals (VECPs), were submitted by contractors resulting in \$922,223 savings (the State shared 50% of these savings).

Table 1: Value Analysis Studies – Federal FY 2007

Study Leader	No. Studies	Original Project Costs	Value Analysis Alternatives				Total Study Cost (x 1000)	Return on Investment
			Proposed		Implemented			
		(\$Million)	No.	Savings (\$Million)	No.	Savings (\$ Million)		
In-house	0	0	0	0	0	0	0	
Consultant	55	\$4,591	389	\$347	175	\$225	2934	77:1
Total	55	\$4,591	389	\$347	175	\$225	\$2,934	77:1

Includes \$1,503,000 in staff time for studies.

Further analyzing the data, the **total implementation rate** (the percentage of Implemented Alternatives with respect to Proposed Alternatives) is **45%**. The VA program has been striving to improve the quality of alternatives so that the decision-makers can be confident in approving and implementing recommended changes. One of the main barriers to implementation is the timing of the study. Table 2 illustrates the return on investment and implementation rate by project phase. Once the project has reached the design phase (1-phase), it becomes more difficult to make changes to the project. The Implementation rate falls from 45% to 38% as the design progresses and the ROI falls sharply (107:1 to 29:1). Another worthy note is that 25% of the studies performed during the design phase had a zero (0%) implementation rate, while only 10% of the studies performed during the 0-phase had no implemented alternatives.

Table 2: VA Study Results by Phase

Project Phase	# of Studies	ROI	Implementation Rate (%)
0	31	107	45
1	20	29	38

Table 3 shows a comparison of results by District. District 8 completed the most studies (16) last year. District 4 had the highest return on investment (256:1) and District 6 had the highest implementation rate (65%). Districts 4 and 6 had the highest average savings (8%).

Table 3: VA Study Results by District

District	# of Studies	ROI	Implementation Rate (%)	Avg. Project Savings (%)
1	0	0	0	0
2	3	4	46	1
3	4	52	38	5
4	8	256	43	8
5	8	102	49	5
6	3	40	65	8
7	5	32	46	2
8	16	35	37	4
9	0	0	0	0
10	5	30	47	1
11	2	19	42	5
12	1	0	50	0
Total	55	77:1	45%	5%

SPECIAL STUDIES

Because VA is a systematic team approach which can analyze and evaluate situations in a relatively short time frame, many offices, divisions, and Districts have utilized the VA program to assist in solving difficult problems. This past year was a banner year for special studies. The VA Program was involved with the Cost Risk Assessment (CRA) pilot program, studies of the Statewide Roadside Rest Area (SRRA) projects, as well as the Underground Utility identification, the Out-of-State Travel and the District 7 Feasibility Study Report process studies.

The **Cost Risk Assessment (CRA) pilot program** was initiated to assist in evaluating the impact of rising material costs and poor bidding environment. Headquarters Design put a call out to the Districts to identify five (5) projects that were approximately 80% complete and preparing for delivery in fiscal year 2008. These projects were then taken through a modified 2-day VA job plan to accomplish the following:

- Validate the project cost estimate
- Identify cost risks and the effects of those risks on cost
- Develop risk management strategies
- Evaluate the impact of traffic and work windows on item costs
- Identify constructability issues which could effect cost

The Districts embraced the concept enthusiastically and as a result, the pilot program was expanded to ten (10) projects. An evaluation of the pilot program is currently underway and a summary report will be provided later in the 07/08 state fiscal year. As a result of

this pilot program, the VA Program has adopted some of the risk practices into its typical VA job plan. On most large project studies, risk management has become a valuable tool.

The **California Safety Roadside Rest Area (SRRA) system** is a well-planned and maintained system of attractive and safe places where travelers restore their energy and driving alertness, gather information, and can learn about California's natural and cultural resources. Due to Americans with Disabilities Act (ADA) and California Occupational Safety and Health Administration (Cal-OSHA) mandates, the California Transportation Commission (CTC) directed the Department to bring the system into compliance. The existing rest area structures and sites will be reconstructed to comply with ADA and Cal-OSHA mandates. Recent bid results for SRRA projects have come in well over the estimated budget. The Department used VA to study all the SRRA sites to develop alternative ways to reduce construction costs while maintaining or improving project quality. Seven studies were conducted in Northern California and five in Southern California. The results from these studies are still being evaluated, however initial results indicate that the implemented savings is over \$12 million with a project performance increase of 20%.

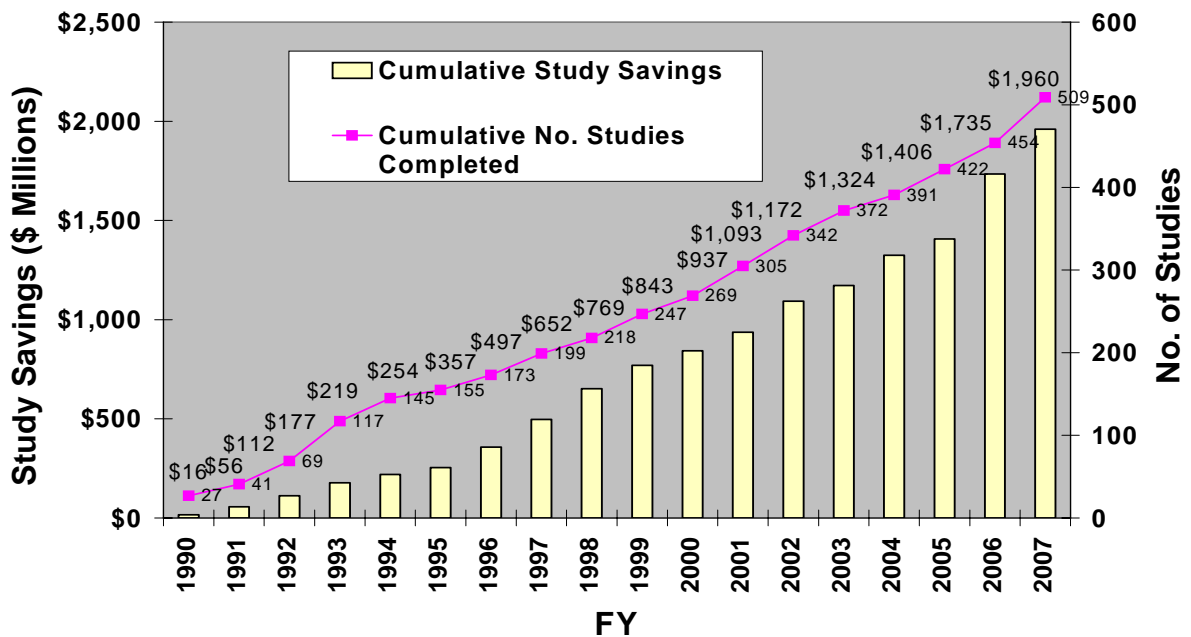
Identification of underground utilities continues to be a major problem in the design and construction of transportation projects. Some of the difficulties are a result of the large number of stakeholders involved. A VA team analyzed the utility process using the VA tools and job plan. As a result of this study, each District is creating a Utility Engineering Unit to coordinate the efforts. A Utility database will also be developed as data becomes available.

Two other **process studies** were initiated this year, one from District 7 and the other from the Director's Office. District 7 studied their "Feasibility Study Report (FSR)" process. The District identified the need for a standard method of documenting the study of transportation problems and their proposed solutions prior to initiating a project. The process included the development of guidelines and flowcharts for the FSR process. The Director's Office along with the Research, Accounting, and Administration Divisions studied the Out-of-State Travel (OST) process. Over 70 alternatives were identified to streamline the OST Blanket, the Trip Report, and the Form 257 process. The study also identified the information needed to procure a database that would tie all the processes together.

HISTORICAL HIGHWAY PROJECT SAVINGS

The historical savings from the Department's VA program are presented graphically in the following Charts. Chart 1 shows the Cumulative savings over the past 17 years. Over \$1.9 billion in savings has been realized from the VA Program. Table 2 indicates the number of studies performed by each District over the last 17 years. Chart 2 shows the average implemented savings for each study.

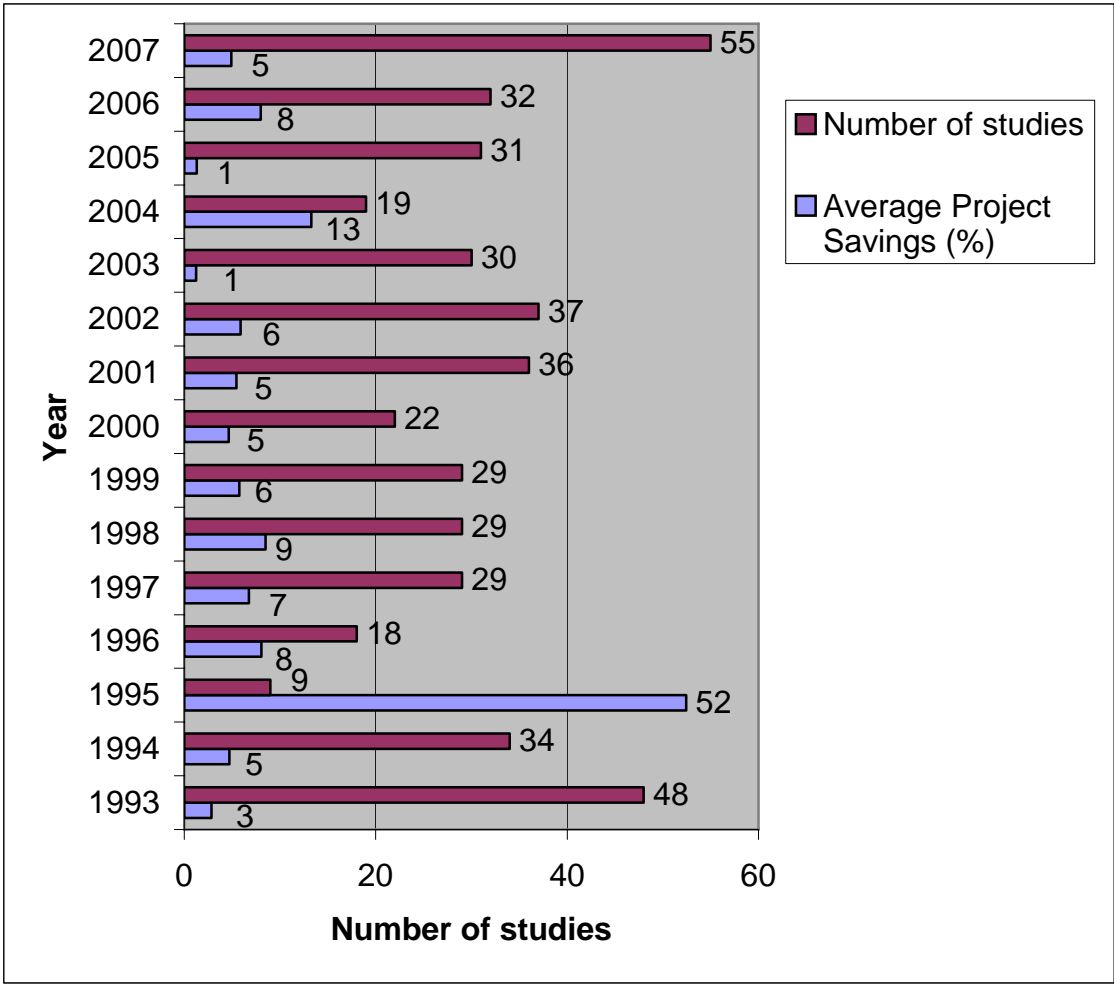
**Chart 1:
VA Highway Project Cumulative Savings**



**Table 4:
Number of VA studies Completed (1990-2007)**

District	Federal Fiscal Year																		Total
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
1	1	0	2	3	2	1	1	0	1	0	0	0	3	1	0	1	0	0	16
2	2	6	0	6	3	0	2	3	0	1	1	2	1	0	1	1	1	3	33
3	0	1	1	2	0	2	1	0	1	2	0	4	1	1	1	3	1	4	25
4	2	4	5	6	6	0	8	10	6	6	6	7	15	6	5	4	9	8	113
5	1	5	6	0	2	0	0	1	0	0	1	1	1	0	0	2	2	8	30
6	0	2	2	4	0	0	0	2	2	2	0	2	1	2	2	2	2	3	28
7	1	0	0	4	1	1	0	2	8	7	1	5	6	9	6	5	3	5	64
8	0	1	0	7	11	0	1	2	1	2	3	3	4	9	1	9	7	16	77
9	2	1	1	2	1	0	0	1	0	0	3	2	2	0	0	0	0	0	15
10	2	2	0	1	1	0	0	0	2	0	2	2	0	1	0	1	6	5	25
11	2	4	5	12	5	5	3	7	6	6	5	7	1	1	3	3	1	2	78
12	0	3	0	1	2	0	2	1	2	3	0	1	2	0	0	0	0	1	18
Total	13	29	22	48	34	9	18	29	29	29	22	36	37	30	19	31	32	55	522

Chart 2:
Average Percentage Saved per Study
 (Average study cost under \$40,000)



AWARDS

This year, the VA Program reinstated the annual VA Awards program. Biennially, the American Association of State Highway and Transportation Officials (AASHTO) VA Technical Committee presents some of the nation's DOTs with awards in four different categories. These categories are Most Value Added for projects less than \$25 million, between \$25 million and \$75 million, over \$75 million, and the Most Value Added for Improved Process. In addition to the AASHTO Awards, the VA Program also awarded two outstanding achievements, the District Value Analysis Coordinator (DVAC) of the Year and the E. Darwin Spartz Award.

The Department received national recognition at the 2007 AASHTO Value Engineering Conference by receiving the following award:

AASHTO Award: Most Value Added Proposal – Improved Process Award

Purpose of Award: To recognize outstanding implemented results from a particular VAVE study done in a given fiscal year.

06/07 Winner: Geotechnical investigation requirements to develop retrofit strategies for the Antioch and Dumbarton Bridges.

In short, the VA team, with the assistance of a panel of experts, concluded that the objectives of the geotechnical investigation could be achieved with fewer exploratory borings drilled to shallower depths. Ultimately, all seven of the VA team recommendations were implemented, saving the State about \$2.35 million or 19 percent of the original cost. Caltrans will use the results of this successful VA study to develop appropriate retrofit strategies for other bridges throughout the Bay Area.



Figure 1: From left to right: Kurt Lieblong, Florida DOT, AASHTO VE Technical Committee Chairman; Mo Pazooki, Caltrans - District 4 - Project Manager; Michael Rahgozar, URS Corporation.

The VA Program awarded the following two awards this past year:

Caltrans Award: 2007 E. Darwin Spartz – Excellence in Value Analysis

Caltrans' Rose Casey, District 7 Deputy Director of Planning & Public Transportation, won the "E. Darwin Spartz Excellence in Value Analysis" Award, which recognizes the excellent application of Value Engineering/Value Analysis (VA) within the Department of Transportation. She has made significant contributions to the Department by being a champion of the VA Program throughout the year.

Rose is a strong supporter of the VA Program in District 7, where she always takes the opportunity to apply VA to her projects in order to improve the quality while reducing the cost of the project. She has participated in several VA studies, which have won national recognition, including the AASHTO "Most Added Value" award. A special thanks goes to Rose and the entire District 7 staff from the HQ VA Program.



Figure 2: From left to right: Raja Mitwasi, District 7 Chief Deputy; Rose Casey; Deputy Director, Planning/Public Transportation; Troy Tusup, HQ Value Analysis Program Manager.

Caltrans Award: 2007 District Value Analysis Coordinator of the Year

Anthony Robinson earned the title of “Value Analysis Coordinator of the Year.” Each year the HQ Value Analysis Program evaluates the District and Regional VA Coordinators based on some very stringent criteria. Engaging with management, meeting FHWA requirements, identifying projects early to maximize savings, and engaging with local officials and HQ are among some of the measured criteria.

Anthony’s leadership has taken the VA program to the next level in District 8. Over the past year, District 8 has engaged with the local agencies and educated them on the benefits of Value Analysis. Anthony is managing over 19 local VA studies along with his 12 in-house studies. District 8 embraces the VA process by including it in Project Development for both mandated and non-mandated projects. Congratulations to Anthony and the entire District 8 staff from the HQ VA Program.



Figure 3: From left to right: Anthony Robinson, District 8 Value Analysis Coordinator; Ray Tritt, Chief, HQ Office of Special Projects; Troy Tusup, HQ Value Analysis Program Manager.

VALUE ANALYSIS TRAINING

The Department maintains an active VA training program so that the engineering and planning staff have the opportunity to learn the VA Methodology before being assigned to VA teams. This year, 86 employees were trained in the VA workshops, and over 100 people were educated about the VA process in the VA seminars. Since 1982 the Department has trained over 1400 individuals.

The VA program offers three types of training courses:

- Module 1 Value Methodology Training Workshop - This course is a 40-hour workshop comprised of 50% lecture and 50% hands-on training. The course is designed to teach the VA Methodology, provide the Department with trained Value Specialists, and motivate employees to participate as team members on upcoming VA studies.

Both the Society of American Value Engineers (SAVE) and the Project Management Institute (PMI) have approved the course. The successful completion of this course allows employees to apply for the Associate Value Specialist (AVS) certification through SAVE. In addition, this course has been approved by PMI and is worth 40 Professional Development Units (PDUs).

- Module 2 Value Methodology (VM) Training Workshop - This 24-hour seminar provides a comprehensive overview of advanced VM techniques ranging from FAST diagramming, Value Metrics, and Value Program Management.

This is a SAVE accredited course that provides students the ability to apply to become a Certified Value Specialist (CVS) from SAVE International. Like Module 1, this course is also approved by PMI and is worth 24 PDUs.

- VA Overview for Project Managers and Management – This is a two-hour seminar focusing on the roles and responsibilities of Project Managers and functional unit managers. The course is co-facilitated by the Department's VA Program Manager and one VA team leader (consultant CVS). This interactive seminar is designed to give a brief overview of VA Methodology, federal legislation requirements, the Department's VA program work plans, and "when" to use VA in the project delivery process to maximize the benefits from VA.
- Other VA seminars included a District 8 VA summit, which included our local partners, and the Design Senior Seminar.

To learn more about VA Training, or to attend a course, please contact your District VA Coordinator (DVAC) or the HQ VA Program manager. You may register for Module 1 and 2 through the Learning Management System (LMS), course #100563 and #100764 respectfully. Both courses are brought to you by: the HQ VA unit and Capitol Project Skill Development (CPSD) unit.

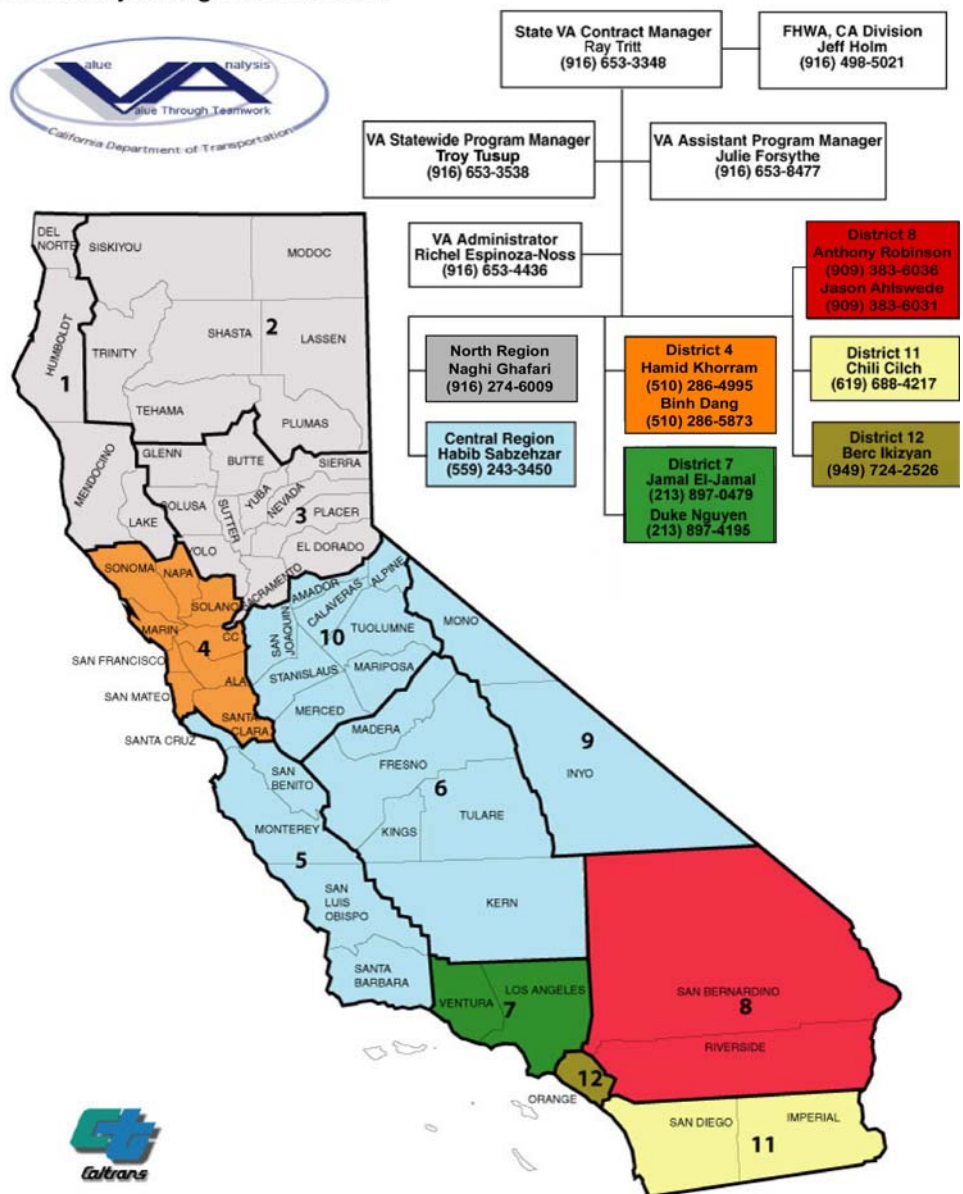
VA PROGRAM ORGANIZATION

The Department has been actively engaged in Value Analysis (VA) for over 35 years and has a growing program. Both consultants and in-house VA team leaders are used to organize and conduct VA studies under the leadership of District VA Coordinators (DVAC). The Office of Special Projects in the Division of Design in Sacramento manages the VA Program for the entire state.

VA Program Mission: Provide stewardship and improve mobility across California through application of the VA methodology on the Department's projects, products, and processes.

VA Program Vision: The Department is a leader in the application of Value Analysis in the transportation industry.

Value Analysis Organization Chart



UPCOMING EVENTS

- Thirty-five studies were performed, but not finalized, within the federal fiscal year 2006/2007. These studies are in various stages of progress and will be reported next year. Many of these studies were performed on local projects where the Department played an oversight role in the process.
- The VA Program is continuously being contacted to improve the Department's business practices. This year we have initiated several studies throughout the Department. These studies include; developing Vegetation/Fire Strip strategies, performing a "Need and Purpose" Pilot project to better develop the Statement, and modifying the WBS to streamline the project development process.
- The VA Report Guide, the VA Team Study Guide, the VA Procedures Guide and the VA Concepts Guide are being updated to provide standards and procedures for the application of value analysis to highway projects within the Department. The VA study process is being redesigned to capture non-financial benefits of studies in the areas of traffic operations, safety and schedule, and stakeholder consensus building. Mutually exclusive alternatives will be identified to eliminate over-reporting of potential savings and under-reporting of implemented alternatives.
- The Department's VA database will be upgraded to capture all the procedural modifications and to better track study results. The database will streamline the FHWA annual report as well as track the success of the program.
- The Department's VA Program continues to maintain the VA Website. The website includes; manuals, guides, blank VA Task Order forms, and a complete list of contact numbers for the entire VA Team. The VA database will supply the website with reports that reflect the status of all the VA studies actively in progress as well as completed projects.
- The Department's VA program is working with the Data Retrieval System (DRS) unit to explore opportunities in archiving the VA Final reports in the DRS Database.