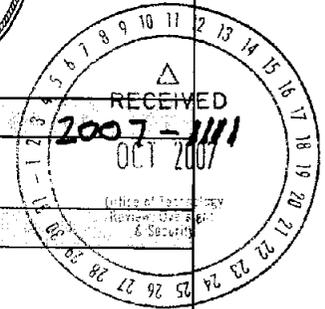


Information Technology Project Request

Feasibility Study Report
Executive Approval Transmittal



Department Name

Transportation

Project Title (maximum of 75 characters)

Roadway Design Software

Project Acronym	Department Priority	Agency Priority
RDS		

APPROVAL SIGNATURES

I am submitting the attached Feasibility Study Report (FSR) in support of our request for the Department of Finance's approval to undertake this project.

I certify that the FSR was prepared in accordance with State Administrative Manual Sections 4920-4930.1 and that the proposed project is consistent with our information technology strategy as expressed in our current Agency Information Management Strategy (AIMS).

I have reviewed and agree with the information in the attached Feasibility Study Report.

Chief Information Officer	Date Signed
<i>Ann Barsotti</i> Printed name: Ann Barsotti	8/28/07
Budget Officer	Date Signed
<i>Norma Ortega</i> Printed name: Norma Ortega	8-30-07
Department Director	Date Signed
<i>Will Kempton</i> Printed name: Will Kempton	10-1-07
Agency Secretary	Date Signed
<i>Dale E. Bonner for</i> Printed name: Dale E. Bonner	10-10-07

INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION A: EXECUTIVE SUMMARY

1. **Submittal Date** **September 2007**

2. Type of Document	FSR	SPR	PSP Only	Other:
	X			
Project Number				

3. Project Title	Roadway Design Software	Estimated Project Dates	
		Start	End
Project Acronym	RDS	July 2008	June 2014

4. **Submitting Department** **California Department of Transportation**
5. **Reporting Agency** **Business, Transportation and Housing**

6. **Project Objectives**

- The Department will implement roadway design software that has the ability to run on the most current hardware and operating system environments.
- The Department will implement roadway design software that has the ability to be configured to accommodate departmental engineering and surveying process changes.
- The Department will implement a roadway design software used by other state agencies.
- The Department will implement roadway design software currently being used by a consultant firms working for the Department work.
- The Department will implement roadway design software that has been in productive use for several years.

8. Major Milestones	Est. Complete Date
Release RFP	November 2008
Award Contract	June 2009
Test Software	January 2010
Configure Software	March 2010
Install Software Statewide	September 2010
Begin statewide training	December 2010
Customized training course	November 2010
Customized manual	November 2010
All Department staff trained	June 2014
PIER	June 2015
Key Deliverables	

INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION A: EXECUTIVE SUMMARY

RFP Ready for Release	November 2008
Custom training manual	November 2010
Training plan	October 2010
Installation Plan	August 2010

7.	Proposed Solution
<p>The selected Roadway Design Software (RDS) will be a commercial off-the-shelf application that will be configured to support current business processes. The solution vendor will provide the software, configuration of the application, initial training for the first four years of implementation, and ongoing software maintenance and support of the final application. After the initial four years of training, existing departmental staff that currently trains users on the CAiCE application will be used to train the remaining staff statewide.</p>	

**INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION B: PROJECT CONTACTS**

Project #	
Doc. Type	FSR

Executive Contacts

	First Name	Last Name	Area Code	Phone #	Ext.	Area Code	Fax #	E-mail
Agency Secretary	Dale	Bonner	916	323-5400		916	323-5440	secretary@bth.ca.gov
Dept. Director	Will	Kempton	916	654-6130		916	654-6490	will_kempton@dot.ca.gov
Budget Officer	Norma	Ortega	916	654-4556		916	654-4556	norma_ortega@dot.ca.gov
CIO	Ann	Barsotti	916	654-3910		916	654-3910	ann_barsotti@dot.ca.gov
Proj. Sponsor	Mark	Leja	916	654-3858				mark_leja@dot.ca.gov

Direct Contacts

	First Name	Last Name	Area Code	Phone #	Ext.	Area Code	Fax #	E-mail
Doc. prepared by	Jesus	Mora	916	227-2630				jesus_mora@dot.ca.gov
Primary contact	Jesus	Mora	916	227-2630				jesus_mora@dot.ca.gov
Project Manager	Mark	O'Dowd	916	227-2631				Mark_odowd@dot.ca.gov

INFORMATION TECHNOLOGY PROJECT SUMMARY
SECTION C: PROJECT RELEVANCE TO STATE AND/OR DEPARTMENTAL PLANS

1.	What is the date of your current Operational Recovery Plan (ORP)?	Date	10/2006
2.	What is the date of your current Agency Information Management Strategy (AIMS)?	Date	07/30/2006
3.	For the proposed project, provide the page reference in your current AIMS and/or strategic business plan.	Doc.	AIMS 2006
		Page #	38

Project #	
Doc. Type	FSR

4.	Is the project reportable to control agencies?	Yes	No
		X	
	If YES, CHECK all that apply:		
X	a) The project involves a budget action.		
	b) A new system development or acquisition that is specifically required by legislative mandate or is subject to special legislative review as specified in budget control language or other legislation.		
	c) The estimated total development and acquisition cost exceeds the departmental cost threshold and the project does not meet the criteria of a desktop and mobile computing commodity expenditure (see SAM 4989 - 4989.3).		
	d) The project meets a condition previously imposed by Finance.		

**INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION D: BUDGET INFORMATION**

Project #	
Doc. Type	FSR

**Budget Augmentation
Required?**

No
Yes

If YES, indicate fiscal year(s) and associated amount:

FY	2008/09	FY	2009/10	FY	2010/11	FY	2011/12	FY	2012/12	FY	2013/14
	\$200,000		\$650,000		\$1,713,250		\$2,063,250		\$2,663,250		\$3,071,625

PROJECT COSTS

1	Fiscal Year	FY 2008/09	FY 2009/10	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	TOTAL
2	One-Time Cost	\$206,428	\$959,642	\$1,299,035	\$1,247,428	\$1,164,857	\$973,232	\$ 0	\$6,050,622
3	Continuing Costs			\$1,167,677	\$2,335,354	\$3,554,638	\$4,877,136	\$4,928,743	\$16,863,548
4	TOTAL PROJECT BUDGET	\$206,428	\$959,642	\$2,466,712	\$3,582,782	\$4,719,495	\$5,850,368	\$4,928,743	\$22,914,170

SOURCES OF FUNDING

5	General Fund								\$
6	Redirection	\$206,428	\$309,642	\$753,462	\$1,519,532	\$2,056,245	\$2,778,743	\$2,778,743	\$10,402,795
7	Reimbursements								\$
8	Federal Funds								\$
9	Special Funds								\$
10	Grant Funds								\$
11	Other Funds	\$200,000	\$650,000	\$1,713,250	\$2,063,250	\$2,663,250	\$3,071,625	\$2,150,000	\$12,511,375
12	PROJECT BUDGET	\$406,428	\$959,642	\$2,466,712	\$3,582,782	\$4,719,495	\$5,850,368	\$4,928,743	\$22,914,170

PROJECT FINANCIAL BENEFITS

13	Cost Savings/Avoidances								
14	Revenue Increase								

Note: The totals in Item 4 and Item 12 must have the same cost estimate.

**INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION E: VENDOR PROJECT BUDGET**

Vendor Cost for FSR Development (if applicable)	\$
Vendor Name	

Project #	
Doc. Type	FSR

VENDOR PROJECT BUDGET

1.	Fiscal Year	2008/09	2009/10	2010/11	2011/12	2012-2014	TOTAL
2.	Primary Vendor Budget		\$520,000	\$876,000	\$876,000	\$1,706,375	\$3,978,375
3.	Independent Oversight Budget						
4.	IV&V Budget						
5.	Other Budget						
6.	TOTAL VENDOR BUDGET	\$0	\$520,000	\$876,000	\$876,000	\$1,706,375	\$4,108,375

------(Applies to SPR only)-----

PRIMARY VENDOR HISTORY SPECIFIC TO THIS PROJECT

7.	Primary Vendor	
8.	Contract Start Date	
9.	Contract End Date (projected)	
10.	Amount	\$

PRIMARY VENDOR CONTACTS

	Vendor	First Name	Last Name	Area Code	Phone #	Ext.	Area Code	Fax #	E-mail
11.									
12.									
13.									

**INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION F: RISK ASSESSMENT INFORMATION**

Project #	
Doc. Type	FSR

RISK ASSESSMENT

Yes	No
X	

Has a Risk Management Plan been developed for this project?

General Comment(s)

This project is a platform change for the Department's roadway design software. The platform change is a risk avoidance effort as the current software is being discontinued by the vendor.

3.0 BUSINESS CASE

In 2004, the California Department of Transportation (Department) was informed that CAiCE, the roadway design software in current use, was being discontinued and would no longer be enhanced. This generated the need to determine what software could be used in the future for designing roadway projects.

3.1 Business Program Background

The Department has been using automated tools to design roadways for over twenty years. This software is used by project delivery staff to produce timely and quality Plans, Specifications, and Estimates (PS&E) for transportation improvement projects statewide. It is a vital tool for engineers to share data, determine better quantities, improve accuracy of estimates, and prepare higher quality plans to convey to contractors the scope of the project and the potential errors in hand calculations and using paper and pencil are reduced. To continue to efficiently and effectively deliver the expanding transportation improvement program, a reliable, sophisticated, well established and integrated roadway design software is critical in meeting the Department's mission of timely project delivery. Part of the Department's success in meeting our mission is by the use of integrated design software. Not only are these plans used for the construction of the project, maintenance forces use them for data management and our legal staff use the As-builts to minimize possible litigation involving construction claims and exposure to tort liability. Roadway design software (RDS) is integral to project delivery just as Microsoft Word and Excel are integral in the administration of any business.

In 1997, the Department conducted a pilot project for the replacement of its existing UNIX workstations with Windows based workstations. At the same time, the Department piloted the replacement of the existing roadway design software Interactive Graphics Roadway design software (IGRds) with the CAiCE roadway design software. In December 1998, a Caltrans Action Request was signed by the Director to implement the new plan. Since then all new projects have been designed using the CAiCE software. The last version upgrade for the CAiCE software occurred in 2003. Since that time, only minor enhancements have been added to the product and those are done as external modules, similar to word macros.

In 2004, all other State agencies that used CAiCE were also notified by Autodesk of their intention to discontinue and no longer enhance the product. Since then, Washington, Oregon, Wisconsin, and Georgia, conducted their own RDS evaluations for the replacement of CAiCE. As there is no assurance from Autodesk as to how long support will be available, these states have been proactive and have moved to new roadway design software. Washington, Oregon, and Georgia are in their third or last year of implementation. Earlier this year, Wisconsin selected new RDS to replace CAiCE. No other State Department of Transportation except Caltrans uses this software for roadway design. Forty-five DOT's use a Bentley RDS, while three use an Autodesk product, and one a unique RDS.

This replacement will also support the service goal and objective to promote quality service through an excellent workforce by ensuring that employee's receive the tools and training necessary to do their job.

3.2 Business Problems and Opportunities

In April 2004, Autodesk informed the Department that their proprietary software, CAiCE Visual Transportation 10, would be the last version of software to be released. This creates the following risks for the Department.

- Autodesk will discontinue support of this product as the customer base decreases. The Department has no guarantee of CAiCE support beyond our current contract, set to expire in October 2008. The product could be sunset as early as 2009. If CAiCE is sunset in 2009, the vendor will no longer support the product. CAiCE currently is also not enhancing the existing software. The Department cannot risk project delivery with software that will no longer be provided with patches or fixes in 2 years. This will be a security and productivity risk for the Department as there is no access to the proprietary base code. Reliable and established roadway design software is critical in meeting the Department's mission of timely project delivery and provides a tool to improve efficiency.

A planned move versus a forced move gives the Department control over the transition and therefore implementation of the new RDS. This will have less impact on project delivery, as the new RDS will be phased in over a four-year period prior to the discontinued support, which could be effective as early as 2009.

- As the Department's engineering/surveying requirements and/or processes change, there will be no opportunity to incorporate those changes into CAiCE. At a minimum, any new RDS will provide equivalent functionality to CAiCE. Without some of these enhancements, designers are required to perform these tasks manually, using paper and pencil, leading to a loss in productivity. While the Department will benefit and realize efficiency in our process by having these added features, until we are actually using a new RDS, there is no way to evaluate any time savings. These possible added features and requirements are not the driving force to replace CAiCE, rather the discontinuation, enhancement and support of CAiCE. The following are some of the functionalities or elements that another RDS can provide that CAiCE doesn't, nor do they have plans to add it. Features included below may not be contained in all of the RDS to be considered as a replacement to CAiCE.
 - A cost estimating module will tie the quantities generated from the roadway design software with a cost database for ease and efficiency in estimating a projects cost.
 - Enable multiple users to access the project data simultaneously
 - Direct output to stakeout and inspection systems

- Read/write to the latest version of LandXML (the civil engineer industry standard file exchange format) to exchange/transfer data with consultants and local agencies
 - Increased compatibility with the consultant community, local agencies, and other Departments of Transportation.
 - IPlot capabilities (Caltrans Standard for plotting)
 - Runs in MicroStation, the Department's drafting software.
 - Instantaneous 3D DTM (Digital Terrain Modeling) manipulation
 - Continued enhancements for Machine Control Guidance-including better integration and direct output of data to Contractor's/vendor's software.
 - Allow for wider capabilities to integrate GIS into the project delivery workflow process
 - Software enhancement development
 - Provide instantaneous vertical clearance results
 - Comprehensive user definable reports
 - Generation of volume computations with various methods, including triangle by station, grid, and end-area
 - Built in spell checker
- As the Department upgrades its operating system environments and continues to replace older workstation hardware with new hardware, compatibility issues may develop that make CAiCE unusable. Autodesk has stated that the CAiCE software will not be modified to run on the VISTA 64 bit platform, but may release a fix so it can run on the VISTA 32 bit platform. Autodesk has yet to test and confirm that CAiCE will run on Vista, the next operating system and there is a high certainty that CAiCE will not run on the next OS released. If a fix is not provided, CAiCE will not run on the VISTA 32 or 64-bit platform. When the current PCs used by design need to be replaced this will result in additional IT resources, increased project delivery support costs, and hardware costs to the Department, as PC will have to be purchased, re-imaged with today's operating system, and deployed statewide. There is also the risk that the current operating system, Windows XP, may not run on the next generation of hardware. This would adversely affect the Department's ability to meet its goal of efficiently delivering quality transportation projects and services. This will result in projects being delayed as well as putting the funding at risk.

Autodesk has not released any major new versions of the stand-alone CAiCE Visual Transportation products. To support existing CAiCE customers, Autodesk committed to providing service packs that specifically addresses problems and issues identified by customers using the current CAiCE product version. The service pack is a software patch that is applied to an installed CAiCE application and can be downloaded from the CAiCE website. The service packs do not incorporate new functionality. Since 2003, Autodesk has averaged 1 service pack a year and is currently planning on their fifth service pack (SP8) at the end of the 2007. Autodesk has shifted the majority of their support services to their competing product and that product is what is being enhanced and maintained.

3.3 Business Objectives

The following objectives were defined for this project:

- Implementation of roadway design software that will run on the most current hardware and operating system environments.
- Implementation of roadway design software that can be configured to accommodate departmental engineering and surveying process changes.
- Implementation of roadway design software that is in use by other state agencies, so that the Department can benefit by sharing software issues and resolutions with other agencies.
- Implementation of roadway design software that is used by or compatible with consultants doing departmental work. By employing software that is used by the consulting industry, cost savings will be obtained, as we would expect lower bids on Architecture and Engineering contracts from consultants. The ease of transferring data between both parties will be achieved with little or no loss in data and accuracy, software features will be maintained, and duplication of work will be eliminated.
- Implementation of roadway design software that has been in productive use for several years.

While additional efficiency will be gained by incorporating these objectives, they are secondary to the purpose and need of the project, which is to replace CAiCE, a discontinued and no longer enhanced RDS. The Department can take this opportunity to maximize the benefits of new technology to help meet its objective to efficiently deliver quality transportation projects and services and reduce the overall cost. Because each of these new RDS features is minor and different combinations are in different packages there is no way to evaluate whether or not there will be any real time savings in these efficiencies.

3.4 Business Functional Requirements

The business objectives and the functional requirements are very similar because this project is being done to mitigate a business risk. This is a technology based project with the goal of providing the Department the same functionality or greater than it has today, but on a platform that can be supported and enhanced to match the needs of the design staff. The roadway design software:

- Must function with current hardware and within the current infrastructure.
- Must be compatible with existing applications and should tightly integrate into the Department's drafting software.
- Must be compatible with InterPlot.
- Must be used by or compatible with other state and local agencies roadway design software.
- Must be used by or compatible with the consultant community and local agency roadway design software.

- Must support current departmental workflow and processes.
- Must provide, at least, equivalent functionality to the CAiCE roadway design software.

4.0 BASELINE ANALYSIS

CAiCE is the Department's current roadway design software. It is used in the preliminary design of projects up to PS&E. It is used to calculate quantities, including earth material that is needed to construct a project, as well as the material needed to build the roadbed, such as concrete and asphalt. The alignment of the road, both the horizontal and vertical position, is designed using CAiCE. Surveyors use it to gather existing terrain data for engineers to use as their base mapping. CAiCE also assists the engineer in visualizing the roadway in a 3-dimensional view. It is also used during construction for change orders.

Microstation is the drafting software that is used during preliminary and final design to develop contract plans for roadway and structures design. It is used to delineate the work to be done by a contractor in a 2-dimensional plan view and, to generate and develop the plans showing location of work, items to be constructed, order of work, and the quantities associated with the work. Microstation is also used in construction to delineate the changes made in the field to develop the as-built plans.

Approximately 4,000 employees statewide use CAiCE, including engineers and surveyors. Currently, CAiCE training is provided to approximately 600 users annually with classes on Introduction to Visual PE for Roadway Design, Advanced Design, Alignment, Digital Terrain Model for Engineers, and Visualization Tools. Training is provided in 10 districts and Sacramento.

4.1 Current Method

CAiCE files interface with Microstation in one of two ways. The first option is through translation, whereby a CAiCE file is converted to a graphic file that is viewable by other programs and imbedded as a picture in the Microstation file. Engineers and delineators export files back and forth between Microstation and CAiCE. These translations result in inefficiencies and usually require editing of files. The other option is to use a program called Cadlinks. The Cadlinks utility provides a link from the CAiCE file to the Microstation CADD file and vice versa. The Cadlinks program allows the user to interactively view and access information in a CAiCE file as well as in Microstation. This is supposed to allow changes to be made to the original CAiCE file and viewable in the Microstation CADD file. However, this program is cumbersome, not 100% effective, and time consuming.

4.2 Technical Environment

The Department currently uses the CAiCE roadway design software as a desktop application running on Windows (2000 and XP) workstations deployed statewide. Approximately 80% of the desktops are two years old or less, running on Windows XP

with 512 MB of memory and an 80 GB hard drive. The drafting software is also a desktop application running on the same Windows workstations deployed statewide. Project files are stored on file servers located in the districts and HQ and access is through mapped network resources. Once projects have been constructed and accepted by the Department, files are archived for future reference. These same resources will be used for the new application.

5.0 PROPOSED SOLUTION

5.1 Solution Description

The selected RDS will be a commercial off-the-shelf application that will be configured to support current business processes. The solution vendor will provide the software, configuration of the application, initial training for the first four years of implementation, and ongoing software maintenance and support of the final application. After the initial four years of training, existing departmental staff that currently trains users on the CAiCE application will be used to train the remaining staff statewide. The selected solution must satisfy the functional and technical requirements.

5.1.1 Hardware

The RDS will be installed and function properly on existing standard department hardware imaged with a typical suite of engineering, administrative, and networking software. No additional hardware will be required.

5.1.2 Technical Platform

RDS is a desktop application that runs on standard Microsoft Windows workstation platforms. The companies that produce these products currently do not have server-based applications. License management software will reside on an existing server. The solution must not exceed current usage of network resources and CADD files will continue to be stored on the CADD Sun servers deployed statewide.

5.1.3 Development Approach

No modifications to the base RDS will be necessary to meet the Department's workflow process. Configuration of the RDS will be required to make it comply with the Department's drafting and design standards and support current business processes. With the assistance of departmental staff, the solution vendor will perform the initial application configuration. In-house staff will perform testing to insure the Department's standards and defaults are integrated into the software and working as planned.

5.1.4 Integration issues

The solution must be compatible and integrate with Microstation the departments drafting software and InterPlot software that manages printing and plotting of project files.

MicroStation is the drafting software used to develop contract plans for roadway and structures design. The data in the contract plans are created in RDS; therefore, it is essential to have the new RDS work with MicroStation. CAiCE is able to interface with MicroStation and pass data to and from it. It is a minimum requirement of the new RDS to be able to interface with MicroStation in a similar manner. This will reduce the impact to project delivery and facilitate the transition to the new RDS. In order to create consistent plan appearance, improve reproduction quality, and allow for efficient manipulation of drawings and data, engineering and survey files must be created and populate with data in accordance with all aspects of the Department's standards (i.e. color, line type, line weight, font size and font type). Furthermore, Caltrans has created and maintained an extensive library of CADD resource files including Cell Library files. The utilization of these files on a consistent basis by the new RDS is necessary if electronic plans production is to be used effectively and efficiently. Regardless of the new RDS graphics engine, the RDS should be able to create MicroStation files that meet Caltrans' drafting standards with little effort from the users.

5.1.5 Procurement Approach

The project will utilize a Request for Proposal (RFP) to select the application based on best value. This will include a point system to rate the highest technical software along with the lowest cost to implement. It will create a level playing field for interested vendors to submit a competitive proposal for the cost of roadway design software, configuration services, training, and an implementation plan to replace existing software.

5.1.6 Technical Interfaces

The solution must be compatible with departmental workstation hardware, the Windows operating system, and standard applications. In addition, it must be interoperable with the Department's infrastructure.

5.1.7 Testing Plan

The solution vendor will perform unit and system testing. The Office of CADD & Engineering GIS Support (OoCEGS) in cooperation with staff from the Office of Land Surveys will be responsible for initial configuration and testing of the RDS solution. When completed, District CADD, Design,

Surveys, and Right of Way Engineering expert users will be engaged to test the initial product. District users will provide final user acceptance testing.

5.1.8 Resource Requirements

Caltrans Training Manual Customization:

The software vendor selected will develop functional unit specific manuals for use during the initial training to be done statewide.

Initial Software Configuration:

Configuration of the software will be required by the vendor to incorporate the Department's drafting and design standards. The vendor will perform the initial tasks to insure the Department's standards and defaults are integrated into the software. CAiCE and Microstation staff resources from OoCEGS will be redirected to assist in the initial configuration and testing of the RDS. District CADD, Design, Surveys and Right of Way Engineering staff resources will be redirected to provide system and acceptance testing.

Initial Contract Development & RFP Process:

It is estimated that 2.0 PYs of effort will be redirected in FY 08/09 to process and advertise the RFP. Because Autodesk is no longer developing the CAiCE software, the CAiCE project manager's resources with assistance from current CAiCE support staff will be redirected for this effort.

Project Manager:

A Senior Information Systems Analyst shall manage the overall project. The project manager will report directly to the Chief for the Office of Project Implementation (OPI) and receive assistance from the Department Project Management Office (PMO) on project management activities. This resource will be transferred to IT via the annual service level agreement process. Current OoCEGS CAiCE resources will be re-directed to manage the business aspects of the project. This effort is expected to be 1 PY for FY 08/09, 1.5 PYs for FY 09/10, 0.8 PYs for FY 10/11, and 11/12.

Initial Installation and Deployment:

It is estimated that 3 PYs (this includes the project manager) will be redirected in FY 09/10 for initial installation and deployment of the new software. In FY 10/11 PYs will be reduced to 1.8, in 11/12 PYs will be reduced to 1.3 and in 12/13 and 12/14 PYs will be reduced to .5. Some of these resources will also be required during the initial configuration and testing, administration and expert user training, and the system and acceptance testing phases of the project. Resources that are currently responsible for the installation and deployment of the CAiCE software will be redirected to the installation and deployment of RDS solution.

RDS Administration and Expert User Training:

The solution vendor will be required to provide training for OoCEGS and district CADD staff in RDS administration, as well as expert user training in FY 09/10.

Capital Outlay Support Staff Training:

It is estimated that approximately 4,000 of the Department's Capital Outlay Support (COS) users will have to be trained in the use of the RDS, and that this will take four years (FY 10/11 to 13/14) to complete. The solution vendor will be required to provide these training resources. The training logistics will be based on training facilities, available training weeks, classroom preparation, and having two instructors per classroom (to maximize the learning experience).

5.1.9 Training Plan

The RDS vendor will implement a "Train the Trainer" (T3) approach. In a T3 training approach, a subset of employees are initially trained on the new solution and instructed on how to train their peers. This is a cost-effective way of training an organization on a new application as it avoids the expense of individual travel and training for all users. In FY 09/10, the software vendor will train approximately 60 district and OoCEGS staff in the roadway design software system administration and as expert users. This staff will provide support resources to district users during the deployment.

Additional training by the vendor will be necessary to supplement existing staff and will be specifically for statewide training starting in FY 10/11. It is expected that the required knowledge and skill transfer will occur during the first three years of implementation. A detailed training plan will be developed following the T3 training to train 4,000 users statewide. After the initial four years of training, existing departmental staff, which currently trains users on the CAiCE application, will be used to train the remaining staff statewide.

Annually, Caltrans trains approximately 600 Engineers a year on CAiCE. Because CAiCE software will be used in active design projects for several years, this training must continue. Training is provided typically to new engineers, engineers rotating through design, or construction personnel supporting CAiCE projects during the construction phase. Therefore, current training staff cannot be re-directed until there are no new projects started in CAiCE, which is expected for at least two years after the new RDS implementation begins. The trainer will provide CAiCE training on an as needed basis for two additional years.

5.1.10 On-going Operation and Maintenance

Three of the OoCEGS staff supporting CAICE will be redirected to support the new software. In FY 12/13 and 13/14 all staff except one will be redirected to support the new software. OoCEGS will enter into a multi-year maintenance agreement. As part of this agreement, the vendor will provide updates and patches to the new roadway design software. The solution software will be implemented in such a fashion as to enable the Department to migrate easily to new releases of the software. The OoCEGS is responsible for deployment of patches and updates to district CADD and IT staff, which are in turn responsible for deploying it to the machines.

5.1.11 Information Security

The Department will define appropriate levels of access for the new system. The Department's standard WAN/LAN network security system will be implemented utilizing the existing firewall and security scheme. The Department's Information Security Officer will review the project to ensure adherence to all information security policy and procedures.

5.1.12 Confidentiality

There is no direct public access to this system. There is no confidential information stored in the graphic files. The policies and procedures currently in place to protect information contained in the graphics files will be the same for the RDS solution.

5.1.13 Impact on End Users

The goal is to have a smooth transition from CAiCE to the RDS solution. Transitioning from CAiCE to the new RDS allows the Department to continue to efficiently and effectively deliver the expanding transportation improvement program while mitigating the loss in productivity. Some end users will be trained in both applications, since current projects will continue in CAiCE and new projects will be done using the new software. Configuration of the software to drafting and design standards will minimize the need for end user modifications. Impact to the user will also be mitigated by training expert users and CADD support staff in each district location to provide direct support to end users. Finally, it is anticipated that the maintenance agreement will include provisions for on-line training and knowledgebase resources to be made available to end users to address questions during the transition.

5.1.14 Impact on Existing Systems

The Department has a number of ongoing design projects that requires the OoCEGS to maintain an agreement with CAiCE for two years. At the conclusion of the existing CAiCE maintenance contract, October 4, 2008, the

OoCEGS will determine if additional maintenance agreements will be required. The Department, at its discretion, may continue using the CAiCE software without a maintenance agreement. Once the deployment of RDS solution has begun, project starts will be required to be in the new software. The Department will continue to use and to support CAiCE projects during the construction phase. It is estimated that this use of the CAiCE software will be required for five years from the start of the migration to the new software. For those CAiCE projects in the early stages of design, files may be converted to the new software if time allows and the cost is minimal. CAiCE completed projects will be archived.

5.1.15 Consistency with overall strategies

This effort directly supports the Delivery Goal and the strategic objective to efficiently deliver quality transportation projects and services and reduce the overall cost to deliver capital projects, as well as supporting the Service Goal and objectives to promote quality service through an excellent workforce by ensuring that employees receive the tools and training necessary to do their job.

5.1.16 Impact on current infrastructure

No change.

5.1.17 Impact on data center

No change.

5.1.18 Backup and Operational Recovery

The Department's existing infrastructure and standard backup and recovery services are acceptable. There will be no change to the backup and operational recovery process due to the RDS solution.

5.1.19 Public access

There is no public access to this system.

5.1.20 Costs and Benefits

The short and long-term costs for the replacement of roadway design software would be similar regardless of the vendor chosen. The current estimated costs for the use and maintenance of the new software were obtained from prospective vendors based on the number of expected users per year. As the number of users increases, the cost per person for the use of the software decreases. The cost for training and customized manual development is based on a course catalog provided by one of the vendors that listed approximately 7 different courses. The OoCEGS has been developing training manuals for years and used historical data along with vendor information to determine this cost. Prospective vendors also provided instructor costs per day and travel expense data, which were used to determine the training required for approximately 4,000 users. Since the Department does not have experts in other RDS, the vendor will have to configure the software to incorporate the Department's standards. Configuration cost was based on historical data from the configuration of CAiCE and vendor input. The initial license cost is based on purchasing a minimum of 25 licenses to start training the CADD support staff, district expert users, and to configure the software. Total one-time project staff PY costs are \$939,247, continuing staff PY costs are \$8,463,548, and \$933,000 for total staff travel cost. Vendor costs are listed in the table below.

	Contract Services	On-Going Costs (Per Year)
Software Configuration and initial licenses	\$450,000	
Instructors and manual customization	\$3,978,375	
Software license and maintenance		\$600,000 (10/11) \$1,200,000 (11/12) \$1,800,000 (12/13) \$2,400,000 (13/14) \$2,400,000 (14/15)
Totals	\$4,428,375	\$8,400,000

5.1.21 Sources of Funding

In addition to redirecting the staff and costs from the CAiCE system to the new system, the Department will submit a Budget Change Proposal (BCP) beginning in 2008/09 for one time and on going costs.

5.2 Rationale for Selection

The proposed solution was selected because it will allow the Department to procure the software that best meets the requirements. Additionally this represents a relatively low risk approach given that off-the-shelf software will be the core of the system.

5.3 Other Alternatives Considered

For several years, the OoCEGS has been investigating alternatives for the replacement of the CAiCE software. The OoCEGS sent out surveys to all other state Transportation Departments, surveyed local transportation agencies, and consultants for data on what roadway design software was in use. From that data, several vendors that produce roadway design software applications were interviewed and evaluated. The OoCEGS analysis found that there are multiple commercial off the shelf products available that are cost effective. A custom developed solution would not meet the requirements that other states and contractors use the software. There are no state departments using custom developed roadway design software. The Department does not have adequate staffing nor does current staff have the skill set to develop software to design roadways. For those reasons, no economic analysis was provided for this option.

No other alternatives for procurements were considered, but the Department did investigate providing the training with only state staff. If Department employees were to provide the initial training to all 4,000 users, an additional permanent 8.5 PYs per year would be required for the initial 4 years of training. These new 8.5 PYs per year, along with existing CAiCE support staff, would still need to be trained on the new RDS until they become proficient enough to train state employees. Since this is a one time, short term need for training, hiring additional PYs would not be practical as these same PYs would have to be laid off at the end of the transition period. For this reason, the alternative was rejected.

6.0 PROJECT MANAGEMENT PLAN

6.1 Project Manager Qualifications

The project manager will have the skills and knowledge to lead the project through all aspects of the project lifecycle. Specifically, the project manager will be an experienced information technology project manager possessing the following key qualifications:

- Understanding of project objectives and their relation to the business objectives.
- Experience managing a statewide IT project with associated changes to operation procedures.
- Skill in communicating both oral and written goals, objectives, and status with management, stakeholders, and staff.
- Skill in resolving conflicts with stakeholders, vendors, and project staff.
- Knowledgeable in the Department's IT project management methodologies.

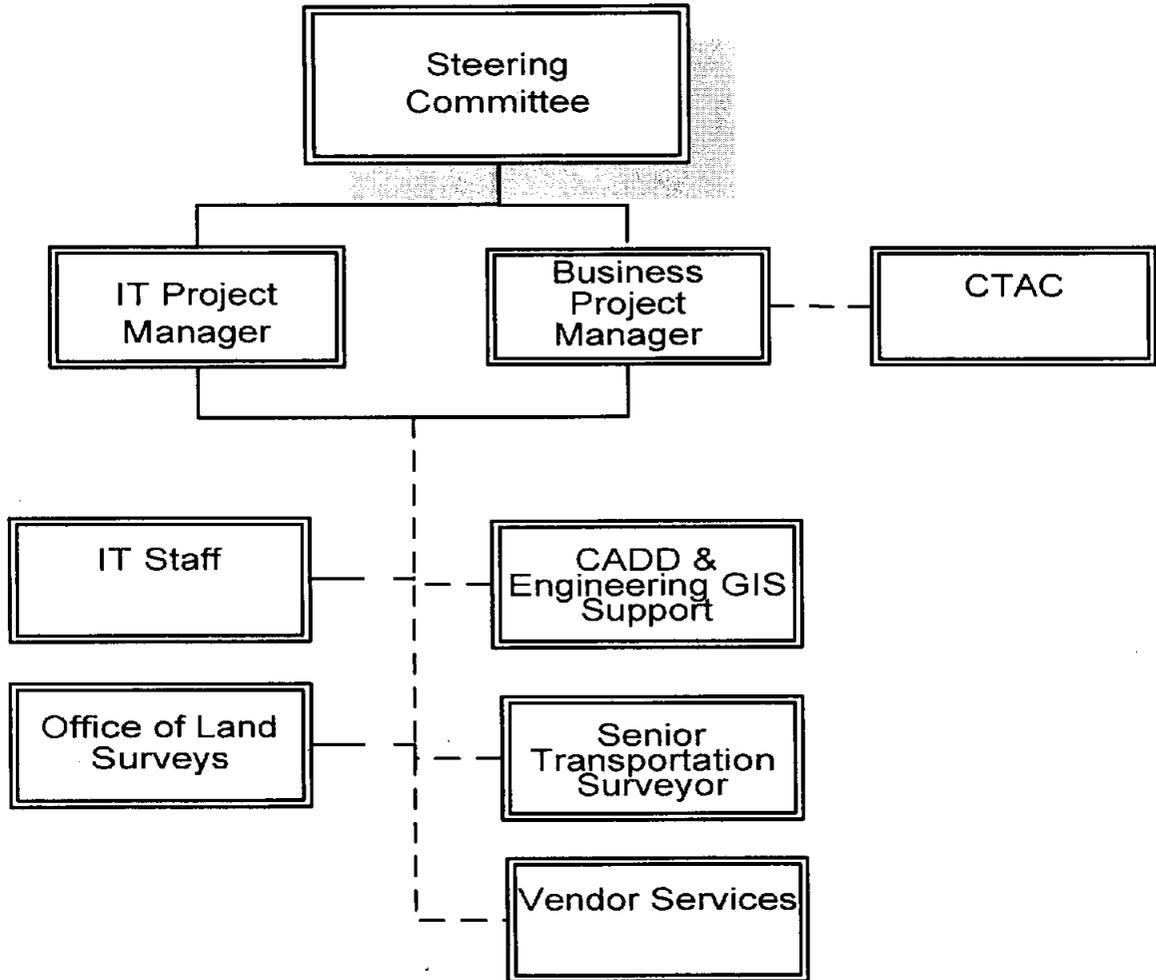
- Experience in working with staff and vendors to implement IT solutions.

6.2 Project Management methodology

The project will utilize the Department of Transportation's project management methodology, which is itself based on the Project Management Body of Knowledge (PMBOK), as published by the Project Management Institute (PMI). The methodology covers all phases of the project, including project concept, project planning, project start-up, project execution, and project closeout.

6.3 Project Organization

As part of a 2001 Decision Document, a "...standing technical committee of Caltrans Designers be formed within the CADD Technical Advisory Committee (CTAC) to continuously monitor the roadway design software market". This standing technical committee will be the RDS committee responsible for the software evaluation.



6.4 Project Priorities

Listed below are priorities assigned by this project's stakeholders.

Project Variable	Stakeholder Ranking
Resources	Constrained
Scope	Accepted
Schedule	Improved

The resources for the project are the least flexible because the project will be using redirected staff and very few consultants. The project schedule is the most flexible; it could be delayed for short terms without any major negative consequences.

6.5 Project Plan

6.5.1 Project Scope

The scope of this project is limited to the procurement, configuration, deployment of, and training for the new RDS solution.

6.5.2 Project Assumptions

- The amount of configuration required for both roadway and surveying will be minimal.
- Redirected resources will be available at the time needed.
- Approval of budget.
- Used an average cost of \$103,214 per PY.
- Costs assume that only the design software will be replaced and not the drafting software.
- The Office of Chief Information Office will give the project a low criticality rating.

6.5.3 Project Phasing

This project is separated into two phases:

Phase I: Software selection, configuration and T3 training. After the software is selected and procured, the vendor will work with staff to configure the system to include the Department's drafting and design standards. This phase will also include preparation of manuals, training CADD support staff, and key District staff that will assist in training and provide level one support in their respective districts.

Phase II: Statewide Implementation. This includes extending the use and deployment of software to existing workstations and training the remaining staff statewide. Minor configuration changes to the software may be required as well as updating of the training manuals.

6.5.4 Roles and Responsibilities

The following chart identifies the major participants in the project and their roles and responsibilities:

Participant	Role/Responsibility
IT Project Manager	<ul style="list-style-type: none"> • Plan the project, resource that plan, monitor, and report progress versus plan to the steering committee as appropriate. • Manage all state and vendor project tasks throughout the projects. • Maintain all project management files. • Manage and track all project risk management activities. • Ensure quality control and quality assurance are performed in accordance with the quality plan. • Ensure all problems, issues and changes are recorded, maintained, and tracked in the program's tracking database. • Ensure that the software is installed on existing workstations and function properly. • Ensure that needed information technology resources are available when appropriate. • Ensure that the installation schedule is coordinated with any other changes to workstations and/or infrastructure.
Business Project Manager	<ul style="list-style-type: none"> • Act as the program's spokesperson responsible for communicating program strategy, benefits, and direction to users and other stakeholders. • Ensure program resources are available as needed. • Coordinate CADD activities. • Ensure proper configuration of design software.
Vendor(s)	<ul style="list-style-type: none"> • Will provide expertise in incorporating standards into the software. • Will provide support. • Will train project staff.
Project Team member	<ul style="list-style-type: none"> • Will provide subject matter experts. • Will act as testers.

Participant	Role/Responsibility
	<ul style="list-style-type: none"> • Will create the user acceptance test. • Will provide implementation support.
Sponsor	<ul style="list-style-type: none"> • Insures adequate resources are allocated to the project.

6.5.5 Project Schedule

FY 08/09

- Procurement processes.
 - Validate requirements.
 - Write RFP.
 - Advertise RFP.
 - Evaluate Proposals.
 - Award software.
- Develop a deployment strategy to install and test the software on existing network environment.
- Determine configuration requirements.

FY 09/10

- Install software for testing.
- Test software.
- Train system administration and CADD application support staff.
- Configure the software to incorporate the Department's standards.
- Test software with configuration changes.
- Train CADD support staff, district expert users, and district surveyors.
- Develop custom training courses and manuals for Capital Outlay Support staff, simulating the Department's workflow.

FY 10/11

- Install software statewide.
- Begin training statewide.
- Redirect CADD CAiCE support staff to the new roadway design software support.
- Redirect district CAiCE support to the new roadway design software support.

FY 11/12 – 12/13

- Continue training department staff.
- Redirect additional district CaiCE support to the new roadway design software support.

FY 13/14 – On-Going

- Continue training department staff.
- Continue supporting software.

6.6 Project Monitoring

The process to be used for tracking and reporting on the status of project and phase deliverables, phase schedule and phase budget is defined in the IT Project Management Policy CT.PM-5-Project Tracking. This policy states: *“Each information technology project management team will track the status and monitor the progress of defined project activities against the Project Management Plan and will document variance in terms of scope, schedule, and cost, as required, for all information technology projects within Caltrans.”*

6.7 Project Quality

The process to be used for assuring phase results will meet business and technical objectives and requirements, as well as applicable State and departmental standards as defined in the IT Project Management Policy CT.PM-7-Quality Assurance. This policy states: *“Caltrans will maintain processes and organizational entities to ensure that quality assurance is performed for information technology products that will include meeting stated business requirements and technology standards.”*

6.8 Configuration Management

The project’s configuration management procedure to be followed is defined in the IT Project Management Policy CT.PM-8-Configuration Management. This policy states *“Configuration management shall be performed on all information technology projects in accordance with established Department configuration management procedures. These procedures must ensure that: controlled and stable baselines are established for planning, managing, and building the system; the integrity of the system’s configuration is controlled over time; and the status and content of the baselines are known.”*

6.9 Authorization Required

Approval of the FSR is required internally from the Department, and externally from the Business, Transportation and Housing Agency and the Department of Finance.

7.0 RISK MANAGEMENT PLAN**7.1 Risk Management Worksheet**

Risk Category / Event	Probability (0=Low; 10=High)	Affected Project Area	Preventive Measures & Contingency Measures
BCP not approved for FY 08/09	6	Budget	Postpone project implementation until FY 09-10. Define risks of no implementation.
Project funding is reduced	5	Budget and schedule	Lengthen project schedule to accommodate working with less resources.
The project experiences cost overruns	2	Budget	Implement rigorous scope control through the review of project financials on a monthly basis.
Late Project Delivery	3	Schedule	Utilize detailed planning with rigorous scope control under the direction of a PM with experience managing similar projects.
Department cannot commit a qualified internal Project Manager full-time.	3	Resources	Hire outside PM with experience managing projects of similar scope and magnitude.
Lose key staff	4	Resources	Cross training, documentation of staff efforts. Assign alternate staff. Keep alternate staff briefed about efforts.
Change to the existing roadway design software may affect project delivery	3	Resources	Provide configured RDS solution software product to district COS staff. Control deployment to minimize risk on "mission critical" projects. Provide training to CADD and expert users in the districts to provide local support to resolve issues quickly. Provide knowledgebase access.

Risk Category / Event	Probability (0=Low; 10=High)	Affected Project Area	Preventive Measures & Contingency Measures
Staff resistant to change in roadway design software	3	Budget and Schedule	Provide training to staff that enables them to be productive in their respective functional area. "Market" the proposed solution by leveraging the staff that was engaged in the selection of the RDS solution software product. Provide district expert users and trained CADD staff to provide local support. Provide knowledgebase access to address simple questions.
Instead of proposing integration with Microstation vendors propose new drafting software in addition to design software.	6	Budget, Schedule, and Resources	Ensure requirements state that design software must integrate with existing drafting software.

7.2 Risk Tracking and Control

To prevent failure on the project, all members of the project team will monitor risk throughout the project. The tools used to monitor risk include project management software to identify potentially impacted project activities situated on the critical path, a risk management plan, and risk management worksheets. Risk control executes the risk management plan to respond to the risk events throughout the duration of the project. As changes occur, identification, quantification and response are repeated. Control and iteration are important. The project manager, risk manager, and project sponsor control the risks.

The processes and procedures to be used are defined in the Department's information technology (IT) Project Management Policy CT.PM-9-Risk Management. This policy states: "*Risks associated with each Caltrans Information Technology project will be identified, analyzed, and prioritized. Identified risks will be controlled through the processes of project planning and monitoring. Risk identification and management will be integrated components of project management and will be continually assessed and analyzed during the life of the project.*"

Risk management began with the development of the conceptual solution that will be procured and implemented as a result of this project. During the course of this study, the FSR team identified several key risk areas. These risks have been documented within this section, and where appropriate, the actions taken to date to either mitigate or

plan contingencies have been included. After the project kickoff occurs, there will be periodic risk management sessions throughout the project involving the project participants, and under the direction of the project manager. Based on the results of this session, additional project activities may be identified for the project plan. If a risk event occurs as the project unfolds, the project manager may convene one or more special risk management sessions.

Every monthly progress report will include reference to the specific risks relevant to the reporting period. If new risks are identified between monthly progress reports, the project manager will decide whether or not consideration of the risk can be safely deferred until the next report.

8.0 ECONOMIC ANALYSIS WORK SHEETS

See attached EAW worksheet.

EXISTING SYSTEM/BASELINE COST WORKSHEET

All costs to be shown in whole (unrounded) dollars.

Date Prepared:09/28/2007

Department: Transportation

Project: Roadway Design Software (RDS)

	FY 2008/09		FY 2009/10		FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		SUBTOTAL	
	PYs	Amts	PYs	Amts										
Continuing Information														
Technology Costs														
Staff (salaries & benefits)	23.5	2,425,529	23.5	2,425,529	23.5	2,425,529	23.5	2,425,529	23.5	2,425,529	23.5	2,425,529	141.0	14,553,174
Hardware Lease/Maintenance		0		0		0		0		0		0		0
Software Maintenance/Licenses		250,000		250,000		250,000		250,000		250,000		250,000		1,500,000
Contract Services		0		0		0		0		0		0		0
Data Center Services		0		0		0		0		0		0		0
Agency Facilities		0		0		0		0		0		0		0
Other		0		0		0		0		0		0		0
Total IT Costs	23.5	2,675,529	141.0	16,053,174										
Continuing Program Costs:														
Staff	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	24000.0	2,477,136,000
Other		0		0		0		0		0		0		0
Total Program Costs	4000.0	412,856,000	24000.0	2,477,136,000										
TOTAL EXISTING SYSTEM COST	4023.5	415,531,529	24141.0	2,493,189,174										

EXISTING SYSTEM/BASELINE CI

Department: Transportation

Costs to be shown in whole (unrounded) dollars Date Prepared: 09/28/2007

Project: Roadway Design Software (RDS)

	Subtotal		FY 2014/15		FY 2015/16		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Continuing Information								
Technology Costs								
Staff (salaries & benefits)	141.0	14,553,174	23.5	2,425,529	23.5	2,425,529	188.0	19,404,232
Hardware Lease/Maintenance		0		0		0		0
Software Maintenance/Licenses		1,500,000		250,000		250,000		2,000,000
Contract Services		0		0		0		0
Data Center Services		0		0		0		0
Agency Facilities		0		0		0		0
Other		0		0		0		0
Total IT Costs	141.0	16,053,174	23.5	2,675,529	23.5	2,675,529	188.0	21,404,232
Continuing Program Costs:								
Staff	24000.0	2,477,136,000	4000.0	412,856,000	4000.0	412,856,000	32000.0	3,302,848,000
Other		0		0		0		0
Total Program Costs	24000.0	2,477,136,000	4000.0	412,856,000	4000.0	412,856,000	32000.0	3,302,848,000
TOTAL EXISTING SYSTEM COST	24141.0	2,493,189,174	4023.5	415,531,529	4023.5	415,531,529	32188.0	3,324,252,232

PROPOSED ALTERNATIVE: Off the Shelf Software

Date Prepared: 09/28/2007

Department: Transportation

All Costs Should be shown in whole (unrounded) dollars.

Project: Roadway Design Software (RDS)

	FY 2008/09		FY 2009/10		FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		SUBTOTAL	
	PYs	Amts	PYs	Amts										
One-Time IT Project Costs														
Staff (Salaries & Benefits)*	2.0	206,428	3.0	309,642	1.8	185,785	1.3	134,178	0.5	51,607	0.5	51,607	9.1	939,247
Hardware Purchase		0		0		0		0		0		0		0
Software Purchase/License		200,000		0		0		0		0		0		200,000
Telecommunications		0		0		0		0		0		0		0
Contract Services														
Software Configuration		0		250,000		0		0		0		0		250,000
Project Management		0		0		0		0		0		0		0
Project Oversight		0		0		0		0		0		0		0
IV&V Services		0		0		0		0		0		0		0
Other Contract Services**		0		270,000		876,000		876,000		876,000		830,375		2,898,000
TOTAL Contract Services		0		520,000		876,000		876,000		876,000		830,375		3,978,375
Data Center Services		0		0		0		0		0		0		0
Agency Facilities		0		0		0		0		0		0		0
Other		0		130,000		237,250		237,250		237,250		91,250		933,000
Total One-time IT Costs	2.0	406,428	3.0	959,642	1.8	1,299,035	1.3	1,247,428	0.5	1,164,857	0.5	973,232	9.1	6,050,622
Continuing IT Project Costs														
Staff (Salaries & Benefits)	0.0	0		0	5.5	567,677	11.0	1,135,354	17.0	1,754,638	24.0	2,477,136	57.5	5,934,805
Hardware Lease/Maintenance		0		0		0		0		0		0		0
Software Maintenance/Licenses***		0		0		600,000		1,200,000		1,800,000		2,400,000		6,000,000
Telecommunications		0		0		0		0		0		0		0
Contract Services		0		0		0		0		0		0		0
Data Center Services		0		0		0		0		0		0		0
Agency Facilities		0		0		0		0		0		0		0
Other		0		0		0		0		0		0		0
Total Continuing IT Costs	0.0	0	0.0	0	5.5	1,167,677	11.0	2,335,354	17.0	3,554,638	24.0	4,877,136	57.5	11,934,805
Total Project Costs	2.0	406,428	3.0	959,642	7.3	2,466,712	12.3	3,582,782	17.5	4,719,495	24.5	5,850,368	66.6	17,985,427
Continuing Existing Costs														
Information Technology Staff	23.5	2,425,529	23.5	2,425,529	19.0	1,961,066	12.5	1,290,175	6.5	670,891	0.0	0	85.0	8,773,190
Other IT Costs		250,000		250,000		250,000		0		0		0		750,000
Total Continuing Existing IT Costs	23.5	2,675,529	23.5	2,675,529	19.0	2,211,066	12.5	1,290,175	6.5	670,891	0.0	0	85.0	9,523,190
Program Staff	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	24000.0	2,477,136,000
Other Program Costs		0		0		0		0		0		0		0
Total Continuing Existing Program Costs	4000.0	412,856,000	24000.0	2,477,136,000										
Total Continuing Existing Costs	4023.5	415,531,529	4023.5	415,531,529	4019.0	415,067,066	4012.5	414,146,175	4006.5	413,526,891	4000.0	412,856,000	24085.0	2,486,659,190
TOTAL ALTERNATIVE COSTS	4025.5	415,937,957	4026.5	416,491,171	4026.3	417,533,778	4024.8	417,728,957	4024.0	418,246,386	4024.5	418,706,368	24151.6	2,504,644,617
INCREASED REVENUES		0		0		0		0		0		0		0

* Project Management & Process Management

** Training Staff (and Manual Reproduction)

*** Software Maintenance increases annually until all 4000 users covered.

PROPOSED ALTERNATIVE: Off the Shelf Software

Date Prepared:09/28/2007

Department: Transportation
Project: Roadway Design Software (RDS)

All Costs Should be shown in whole (unrounded) dollars

	Subtotal		FY 2014/15		FY 2015/16		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-Time IT Project Costs								
Staff (Salaries & Benefits)	9.1	939,247	0.0	0	0.0	0	9.1	939,247
Hardware Purchase		0		0		0		0
Software Purchase/License		200,000		0		0		200,000
Telecommunications		0		0		0		0
Contract Services								
Software Configuration		250,000		0		0		250,000
Project Management		0		0		0		0
Project Oversight		0		0		0		0
IV&V Services		0		0		0		0
Other Contract Services		2,898,000		0		0		2,898,000
TOTAL Contract Services		3,978,375		0		0		3,978,375
Data Center Services		0		0		0		0
Agency Facilities		0		0		0		0
Other		933,000		0		0		933,000
Total One-time IT Costs	9.1	6,050,622	0.0	0	0.0	0	9.1	6,050,622
Continuing IT Project Costs								
Staff (Salaries & Benefits)	57.5	5,934,805	24.5	2,528,743		0	82.0	8,463,548
Hardware Lease/Maintenance		0		0		0		0
Software Maintenance/Licenses		6,000,000		2,400,000				8,400,000
Telecommunications		0		0		0		0
Contract Services		0		0		0		0
Data Center Services		0		0		0		0
Agency Facilities		0		0		0		0
Other		0		0		0		0
Total Continuing IT Costs	57.5	11,934,805	24.5	4,928,743	0.0	0	82.0	16,863,548
Total Project Costs	66.6	17,985,427	24.5	4,928,743	0.0	0	91.1	22,914,170
Continuing Existing Costs								
Information Technology Staff	85.0	8,773,190	0.0	0	0.0	0	85.0	8,773,190
Other IT Costs		750,000		0		0		750,000
Total Continuing Existing IT Costs	85.0	9,523,190	0.0	0	0.0	0	85.0	9,523,190
Program Staff	24000.0	2,477,136,000	4000.0	412,856,000	4000.0	412,856,000	32000.0	3,302,848,000
Other Program Costs		0		0		0		0
Total Continuing Existing Program Costs	24000.0	2,477,136,000	4000.0	412,856,000	4000.0	412,856,000	32000.0	3,302,848,000
Total Continuing Existing Costs	24085.0	2,486,659,190	4000.0	412,856,000	4000.0	412,856,000	32085.0	3,312,371,190
TOTAL ALTERNATIVE COSTS	24151.6	2,504,644,617	4024.5	417,784,743	4000.0	412,856,000	32176.1	3,335,285,360
INCREASED REVENUES		0		0		0		0

ECONOMIC ANALYSIS SUMMARY

Date Prepared:09/28/2007

Department: Transportation

All costs to be shown in whole (unrounded) dollars.

Project: Roadway Design Software (RDS)

	FY 2008/09		FY 2009/10		FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		SUBTOTAL	
	PYs	Amts	PYs	Amts										
EXISTING SYSTEM														
Total IT Costs	23.5	2,675,529	23.5	2,675,529	23.5	2,675,529	23.5	2,675,529	23.5	2,675,529	23.5	2,675,529	141.0	16,053,174
Total Program Costs	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	4000.0	412,856,000	24000.0	2,477,136,000
Total Existing System Costs	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	24141.0	2,493,189,174

PROPOSED ALTERNATIVE	Off the Shelf Software													
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Total Project Costs	2.0	406,428	3.0	959,642	7.3	2,466,712	12.3	3,582,782	17.5	4,719,495	24.5	5,850,368	66.6	17,985,427
Total Cont. Exist. Costs	4023.5	415,531,529	4023.5	415,531,529	4019.0	415,067,066	4012.5	414,146,175	4006.5	413,526,891	4000.0	412,856,000	24085.0	2,486,659,190
Total Alternative Costs	4025.5	415,937,957	4026.5	416,491,171	4026.3	417,533,778	4024.8	417,728,957	4024.0	418,246,386	4024.5	418,706,368	24151.6	2,504,644,617
COST SAVINGS/AVOIDANCES	(2.0)	(406,428)	(3.0)	(959,642)	(2.8)	(2,002,249)	(1.3)	(2,197,428)	(0.5)	(2,714,857)	(1.0)	(3,174,839)	(10.6)	(11,455,443)
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	(2.0)	(406,428)	(3.0)	(959,642)	(2.8)	(2,002,249)	(1.3)	(2,197,428)	(0.5)	(2,714,857)	(1.0)	(3,174,839)	(10.6)	(11,455,443)
Cum. Net (Cost) or Benefit	(2.0)	(406,428)	(5.0)	(1,366,070)	(7.8)	(3,368,319)	(9.1)	(5,565,747)	(9.6)	(8,280,604)	(10.6)	(11,455,443)		

ALTERNATIVE #1														
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Total Project Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Cont. Exist. Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Alternative Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
COST SAVINGS/AVOIDANCES	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	24141.0	2,493,189,174
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	24141.0	2,493,189,174
Cum. Net (Cost) or Benefit	4023.5	415,531,529	8047.0	831,063,058	12070.5	1,246,594,587	16094.0	1,662,126,116	20117.5	2,077,657,645	24141.0	2,493,189,174		

ALTERNATIVE #2														
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Total Project Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Cont. Exist. Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Alternative Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
COST SAVINGS/AVOIDANCES	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	24141.0	2,493,189,174
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	4023.5	415,531,529	24141.0	2,493,189,174
Cum. Net (Cost) or Benefit	4023.5	415,531,529	8047.0	831,063,058	12070.5	1,246,594,587	16094.0	1,662,126,116	20117.5	2,077,657,645	24141.0	2,493,189,174		

ECONOMIC ANALYSIS SUMMARY

Date Prepared:09/28/2007

Department: Transportation

All costs to be shown in whole (unrounded) dollars.

Project: Roadway Design Software (RDS)

	SUBTOTAL		FY 2014/15		FY 2015/16		FY 2016/17		FY 2017/18		FY 2018/19		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
EXISTING SYSTEM														
Total IT Costs	141.0	16,053,174	23.5	2,675,529	23.5	2,675,529	0.0	0	0.0	0	0.0	0	188.0	21,404,232
Total Program Costs	24000.0	2,477,136,000	4000.0	412,856,000	4000.0	412,856,000	0.0	0	0.0	0	0.0	0	32000.0	3,302,848,000
Total Existing System Costs	24141.0	2,493,189,174	4023.5	415,531,529	4023.5	415,531,529	0.0	0	0.0	0	0.0	0	32188.0	3,324,252,232

PROPOSED ALTERNATIVE	Off the Shelf Software													
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Total Project Costs	66.6	17,985,427	24.5	4,928,743	0.0	0	0.0	0	0.0	0	0.0	0	91.1	22,914,170
Total Cont. Exist. Costs	24085.0	2,486,659,190	4000.0	412,856,000	4000.0	412,856,000	0.0	0	0.0	0	0.0	0	32085.0	3,312,371,190
Total Alternative Costs	24151.6	2,504,644,617	4024.5	417,784,743	4000.0	412,856,000	0.0	0	0.0	0	0.0	0	32176.1	3,335,285,360
COST SAVINGS/AVOIDANCES	(10.6)	(11,455,443)	(1.0)	(2,253,214)	23.5	2,675,529	0.0	0	0.0	0	0.0	0	11.9	(11,033,128)
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	(10.6)	(11,455,443)	(1.0)	(2,253,214)	23.5	2,675,529	0.0	0	0.0	0	0.0	0	11.9	(11,033,128)
Cum. Net (Cost) or Benefit	(10.6)	(11,455,443)	(1.0)	(2,253,214)	23.5	2,675,529	0.0	0	0.0	0	0.0	0	11.9	(11,033,128)

ALTERNATIVE #1														
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Total Project Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Cont. Exist. Costs	0.0	0	4000.0	36,500,000	0.0	0	0.0	0	0.0	0	0.0	0	4000.0	36,500,000
Total Alternative Costs	0.0	0	4000.0	36,500,000	0.0	0	0.0	0	0.0	0	0.0	0	4000.0	36,500,000
COST SAVINGS/AVOIDANCES	24141.0	2,493,189,174	23.5	379,031,529	4023.5	415,531,529	0.0	0	0.0	0	0.0	0	28188.0	3,287,752,232
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	24141.0	2,493,189,174	23.5	379,031,529	4023.5	415,531,529	0.0	0	0.0	0	0.0	0	28188.0	3,287,752,232
Cum. Net (Cost) or Benefit	24141.0	2,493,189,174	23.5	379,031,529	4023.5	415,531,529	0.0	0	0.0	0	0.0	0	28188.0	3,287,752,232

ALTERNATIVE #2														
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Total Project Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Cont. Exist. Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Alternative Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
COST SAVINGS/AVOIDANCES	24141.0	2,493,189,174	4023.5	415,531,529	4023.5	415,531,529	0.0	0	0.0	0	0.0	0	32188.0	3,324,252,232
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	24141.0	2,493,189,174	4023.5	415,531,529	4023.5	415,531,529	0.0	0	0.0	0	0.0	0	32188.0	3,324,252,232
Cum. Net (Cost) or Benefit	24141.0	2,493,189,174	4023.5	415,531,529	4023.5	415,531,529	0.0	0	0.0	0	0.0	0	32188.0	3,324,252,232

PROJECT FUNDING PLAN

Department: Transportation

All Costs to be in whole (unrounded) dollars

Date Prepared:09/28/2007

Project: Roadway Design Software (RDS)

	FY 2008/09		FY 2009/10		FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		SUBTOTALS	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
TOTAL PROJECT COSTS	2.0	406,428	3.0	959,642	7.3	2,466,712	12.3	3,582,782	17.5	4,719,495	24.5	5,850,368	66.6	17,985,427
RESOURCES TO BE REDIRECTED														
Staff	2.0	206,428	3.0	309,642	7.3	753,462	12.3	1,269,532	17.5	1,806,245	24.5	2,528,743	66.6	6,874,052
Funds:														
Existing System		0		0		0		250,000		250,000		250,000		750,000
Other Fund Sources		0		0		0		0		0		0		0
TOTAL REDIRECTED RESOURCES	2.0	206,428	3.0	309,642	7.3	753,462	12.3	1,519,532	17.5	2,056,245	24.5	2,778,743	66.6	7,624,052
ADDITIONAL PROJECT FUNDING NEEDED														
One-Time Project Costs	0.0	200,000	0.0	650,000	0.0	1,113,250	0.0	1,113,250	0.0	1,113,250	0.0	921,625	0.0	5,111,375
Continuing Project Costs	0.0	0	0.0	0	0.0	600,000	0.0	950,000	0.0	1,550,000	0.0	2,150,000	0.0	5,250,000
TOTAL ADDITIONAL PROJECT FUNDS NEEDED BY FISCAL YEAR	0.0	200,000	0.0	650,000	0.0	1,713,250	0.0	2,063,250	0.0	2,663,250	0.0	3,071,625	0.0	10,361,375
TOTAL PROJECT FUNDING	2.0	406,428	3.0	959,642	7.3	2,466,712	12.3	3,582,782	17.5	4,719,495	24.5	5,850,368	66.6	17,985,427
Difference: Funding - Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Estimated Cost Savings	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0

ADJUSTMENTS, SAVINGS AND REVENUES WORKSHEET (DOF Use Only)

Department: Transportation
Project: Roadway Design Software (RDS)

Date Prepared: 09/28/2008

Annual Project Adjustments	FY 2008/09		FY 2009/10		FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-time Costs												
Previous Year's Baseline	0.0	0	0.0	200,000	0.0	650,000	0.0	1,113,250	0.0	1,113,250	0.0	1,113,250
(A) Annual Augmentation /(Reduction)	0.0	200,000	0.0	450,000	0.0	463,250	0.0	0	0.0	0	0.0	(191,625)
(B) Total One-Time Budget Actions	0.0	200,000	0.0	650,000	0.0	1,113,250	0.0	1,113,250	0.0	1,113,250	0.0	921,625
Continuing Costs												
Previous Year's Baseline	0.0	0	0.0	0	0.0	0	0.0	600,000	0.0	950,000	0.0	1,550,000
(C) Annual Augmentation /(Reduction)	0.0	0	0.0	0	0.0	600,000	0.0	350,000	0.0	600,000	0.0	600,000
(D) Total Continuing Budget Actions	0.0	0	0.0	0	0.0	600,000	0.0	950,000	0.0	1,550,000	0.0	2,150,000
Total Annual Project Budget Augmentation /(Reduction) [A + C]	0.0	200,000	0.0	450,000	0.0	1,063,250	0.0	350,000	0.0	600,000	0.0	408,375

[A, C] Excludes Redirected Resources

Total Additional Project Funds Needed [B + D]

Annual Savings/Revenue Adjustments

Cost Savings	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Increased Program Revenues		0		0		0		0		0		0

PROJECT FUNDING PLAN

Department: Transportation

All Costs to be in whole (unrounded) dollars

Date Prepared:09/28/2007

Project: Roadway Design Software (RDS)

	SUBTOTALS		FY 2014/15		FY 2015/16		FY 2016/17		FY 2017/18		FY 2018/19		TOTALS	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
TOTAL PROJECT COSTS	66.6	17,985,427	24.5	4,928,743	0.0	0	0.0	0	0.0	0	0.0	0	91.1	22,914,170
RESOURCES TO BE REDIRECTED														
Staff	66.6	6,874,052	24.5	2,528,743		0	0.0	0	0.0	0	0.0	0	91.1	9,402,795
Funds:														
Existing System		750,000		250,000		0		0		0		0		1,000,000
Other Fund Sources		0		0		0		0		0		0		0
TOTAL REDIRECTED RESOURCES	66.6	7,624,052	24.5	2,778,743	0.0	0	0.0	0	0.0	0	0.0	0	91.1	10,402,795
ADDITIONAL PROJECT FUNDING NEEDED														
One-Time Project Costs	0.0	5,111,375	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5,111,375
Continuing Project Costs	0.0	5,250,000	0.0	2,150,000	0.0	0	0.0	0	0.0	0	0.0	0	0.0	7,400,000
TOTAL ADDITIONAL PROJECT FUNDS NEEDED BY FISCAL YEAR	0.0	10,361,375	0.0	2,150,000	0.0	0	0.0	0	0.0	0	0.0	0	0.0	12,511,375
TOTAL PROJECT FUNDING	66.6	17,985,427	24.5	4,928,743	0.0	0	0.0	0	0.0	0	0.0	0	91.1	22,914,170
Difference: Funding - Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Estimated Cost Savings	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0

ADJUSTMENTS, SAVINGS AND REVENUES WORKSHEET (DOF Use Only)

Department: Transportation

Date Prepared: 09/28/2007

Project: Roadway Design Software (RDS)

Annual Project Adjustments	FY 2014/15		FY 2015/16		FY 2016/17		FY 2017/18		FY 2018/19		Net Adjustments	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-time Costs												
Previous Year's Baseline	0.0	921,625	0.0	0	0.0	0	0.0	0	0.0	0		
(A) Annual Augmentation /(Reduction)	0.0	(921,625)	0.0	0	0.0	0	0.0	0	0.0	0		
(B) Total One-Time Budget Actions	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5,111,375
Continuing Costs												
Previous Year's Baseline	0.0	2,150,000	0.0	2,150,000	0.0	0	0.0	0	0.0	0		
(C) Annual Augmentation /(Reduction)	0.0	0	0.0	(2,150,000)	0.0	0	0.0	0	0.0	0		
(D) Total Continuing Budget Actions	0.0	2,150,000	0.0	0	0.0	0	0.0	0	0.0	0	0.0	7,400,000
Total Annual Project Budget Augmentation /(Reduction) [A + C]	0.0	(921,625)	0.0	(2,150,000)	0.0	0	0.0	0	0.0	0		

[A, C] Excludes Redirected Resources

Total Additional Project Funds Needed [B + D]

0.0 12,511,375

Annual Savings/Revenue Adjustments

Cost Savings	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Increased Program Revenues		0		0		0		0		0

Detail Summary Sheet

Staff Breakdown	FY 2008/09		FY 2009/10		FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		FY 2014/15		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-Time IT Project Costs																
IT Project Manager	0.7	72,250	1.0	103,214	0.5	51,607	0.5	51,607	0.0	0	0.0	0				278,678
Systems Analyst	0.3	30,964	0.5	51,607	0.3	30,964	0.3	30,964	0.0	0	0.0	0				144,500
Business Project Manager	0.7	72,250	1.0	103,214	0.5	51,607	0.5	51,607	0.5	51,607	0.5	51,607				381,892
Business Analyst	0.3	30,964	0.5	51,607	0.5	51,607	0.0	0	0.0	0	0.0	0				134,178
Total One-time IT Costs	2.0	206,428	3.0	309,642	1.8	185,785	1.3	134,178	0.5	51,607	0.5	51,607	0.0	0	9.1	939,247
Continuing IT Project Costs																
District CADD Support			0.0	0	2.3	237,392	5.1	526,391	9.0	928,926	15.0	1,548,210	15.0	1,548,210	46.4	3,240,920
Staff for Application Support			0.0	0	3.2	330,285	5.9	608,963	8.0	825,712	9.0	928,926	9.5	980,533	35.6	2,693,885
Total Continuing IT Costs	0.0	0	0.0	0	5.5	567,677	11.0	1,135,354	17.0	1,754,638	24.0	2,477,136	24.5	2,528,743	82.0	5,934,805
Total Project Costs	2.0	206,428	3.0	309,642	7.3	753,462	12.3	1,269,532	17.5	1,806,245	24.5	2,528,743	24.5	2,528,743	91.1	6,874,052

Other Contract Services

Category	# of Staff	Class Size	Hours of Training	Hours/Category
Roadway Design	2816	14	72	14482.29
Hydrolic	211	14	56	844
Survey & Processing Units	501	14	48	1717.714
Right of Way Engineering	271	14	16	309.7143
Structure PI	30	14	64	137.1429
Structure Design	150	14	40	428.5714
Landscape Architecture	148	14	24	253.7143
Total				18173.14

Training Staff Cost: $18174 \text{ (total hours)} / 1,768 \text{ (hrs/PY)} / 3 \text{ years} \times 1.25^* \times 2 \text{ (Instructors)} = 8.57 \text{ PYs/yr}$

$8.6 \text{ PYs} \times \$91,250 = 784,750$

* An additional 25% will be added to the calculated classroom training time to account for classroom preparation efforts.