EQUATE

ENVIRONMENTAL CLEARANCE PROCESS

QUALITY and PRODUCTIVITY INITIATIVE

TEAM FINAL REPORT

ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAY DEVELOPMENT GROUP

MARCH 1993

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This is a study of the Environmental Clearance Process (ECP) as performed at the Arizona Department of Transportation. The study documents the existing ECP using the Environmental Assessment (EA) as the base document for investigation. Five distinct broad phases of development were identified as needed to complete an approved final EA. In addition, special issues of concern to Governmental Agencies and private groups leading to specific mitigation measures on highway projects were also examined. These special issues of concern were called Special Studies. Six of these were identified for closer study because they were believed to cause the greatest degrees of concern to project development.

While examining the ECP the problems causing project delays were uncovered and addressed. Recommendations are included in the report providing ideas for improving the current process to help scheduled project development be completed in a more consistent manner.

ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAY DEVELOPMENT GROUP

MARCH 1993

No 844

ENVIRONMENTAL CLEARANCE PROCESS QPI FINAL REPORT

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EXECUTIVE SUMMARY

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MISSION STATEMENT

The Environmental Clearance Process (ECP) is neither well-defined nor widely understood within ADOT. We the Environmental Quality Team (EQuaTe), accept the charge to investigate and develop strategies to increase awareness of the ECP and improve ADOT's effectiveness in implementing the Highway Development Process and Construction Program.

PROBLEM STATEMENT

Highway construction projects frequently experience delays in their bid advertisement dates due to the lack of approved special environmental studies or required permits not being completed or obtained within the time frame allotted in the project design development schedule. Furthermore, the ECP and its decision making process are not always clearly defined within ADOT. Individuals responsible for doing the work are not always well equipped to do quality work.

SIGNIFICANT EVENTS

In late May 1992 the Highway Development Group Quality and Productivity Initiative (QPI) assigned the first three ADOT processes to be analyzed by Total Quality Management (TQM) teams. Environmental Clearance was one of those processes selected. The team leader, John Carr, was chosen and authorized to form a team based on a list which provided Services and Agencies from which to obtain members. Joe Spadafino was assigned to serve as facilitator for the team.

By mid-June the team members were approved and met for four days to develop the problem statement, potential issues to be addressed, the Mission Statement, goals to be accomplished, and a high-level flowchart.

Team Building, Problem Solving, and Business Process Improvement (BPI) training were given to the team members in late June 1992. In July the Ernst and Young Consultant, Dave Farrell, was assigned to train and guide the team to complete a BPI on the ADOT ECP. He has met with us almost every week.

Our next task was to identify customers of the process and interview them to determine their needs, the degree of importance of those needs, and their level of satisfaction in having those needs met. From this data a priority list of needs was developed, and a variety of measurements determined to examine the existing process. At the same time the ADOT Environmental Planning Services (EPS) staff assisted the team in flowcharting the existing process from the viewpoint of

producing an Environmental Assessment (EA) following federal funding requirements. In addition, the high-level block diagram was refined, a shortened version of the clearance process was created to show the Categorical Exclusion (CE) process, and six environmental special study processes were studied and flowcharted. These special studies were selected as representing the most likely issues to affect project development out of more than thirty issues the EPS staff checks on all projects. The special studies chosen were Hazardous Materials, Cultural Resources, U.S. Army Corps of Engineers 404 Permitting combined with Arizona Department of Environmental Quality Water Quality 401 Permitting, Noise Analysis, and Air Quality. The EPS staff assisted in flowcharting these special studies as well.

In evaluating the nature of the existing process two limitations became quite clear. First, most elements in the process were imposed by federal or state regulations. Consequently, attempts to combine, delete, or reduce major parts of the process were prevented by legal restraints. Thus, unless the laws can be changed or reinterpreted, those legally required parts of the process cannot be altered. Also, while attempting to gather measurement data the retrieval efforts were frustrated by finding incomplete, inconsistent, or nonexistent data. Many sources of data collection were attempted. Few gave any useful data for measuring the existing ECP. Consequently, one of our recommendations addresses improving process documentation.

Measurement data was based originally on ninety-nine projects, selected as our sample out of one hundred and fifty projects, which were bid in the State Fiscal Year 1991-1992. Among these projects eighteen were environmentally cleared by way of an EA. The remainder were cleared as CEs with ten of them requiring special studies. After our first Final Report presentation we decided it was necessary to examine some of the data for the remaining 51 projects advertised for bid in FY 91-92. All of these projects were cleared as CEs. Out of this collection of data a number of charts and graphs were developed to help visually depict what is taking place to environmentally clear a project. Also, during our evaluation it became apparent that the part of our problem statement which indicated that project bid advertisement dates are <u>frequently</u> delayed for environmental reasons was not altogether verified by our sample of projects. Our data indicated that only 12% of our 99 sample projects were actually delayed for environmental issues. When we looked at all 150 projects bid in FY 91-92 we still found only 13% to be delayed for environmental concerns.

The next phase of our study took us out to interview representative groups of people who actually perform the process. The interviewees were asked questions regarding the accuracy of the existing flowchart, what problems they experienced, where rework occurred, what they would recommend to improve the process, and related questions. The results of the responses were assembled, categorized, combined, simplified, prioritized, and incorporated into the flowcharts.

From among all the responses we received from the customers, the process interviewees, the EPS staff, and the EQuaTe team members, we then selected the final recommendations. All recommendations were cross-checked with the needs of the customers, and the high priority concerns expressed throughout our study, to assure all major items were addressed. Eleven formal recommendations were written which included a discussion of the issues which promoted the need for each recommendation, an action plan and schedule for implementing the recommendation, a list of qualitative and/or quantitative benefits if the recommendation is implemented, estimated cost to implement the recommendations, and a list of other alternatives which may be considered in addition to the recommended alternative. Detailed follow-up measurements are given to improve our method of measuring the ECP and pinpointing areas needing improvement in the future.

Finally, a formal presentation was prepared to communicate the results of our study to the EPS staff, to managers of Sections and Services involved in the process, and to SLIM representatives.

Once approved for implementation each person identified as a member of a particular recommendation's implementation team will be given a copy of the recommendation and a cover letter explaining their involvement. An EQuaTe team member is assigned to each implementation team to provide input as to the intent of the recommendation and to assure the recommendation is implemented in a timely fashion.

RECOMMENDATIONS

EQuaTe has eleven recommendations to make in hopes of improving the ECP at ADOT. The four starred (*) recommendations were clearly rated the most important by all the participants in this study.

MANAGEMENT AND MEASUREMENT OF THE ENVIRONMENTAL CLEARANCE PROCESS

* Develop a Project Log to remain with the project file on which the dates of significant events occur that directly effect the ECP.

* Establish a cost management system using Activity Based Costing to determine the actual cost and cycle time for performing environmental activities and to provide a more thorough approach to tracking Cost of Quality.

• Determine the number of staff members needed to do quality environmental work in ADOT.

QUALITY OF THE ENVIRONMENTAL CLEARANCE PROCESS

• Conduct a historical review at the completion of construction projects which have significant environmental impacts, to evaluate how effectively environmental expectations were met.

• Conduct an environmental process review for each project, upon the completion of the environmental clearance letter, to encourage recommending methods that will improve the environmental documentation process.

• Retain two environmental consultant firms to prepare a full range of environmental documents and special studies under the direct supervision of EPS staff. Selection of acceptable firms will be made by EPS, based on the firms' past performance.

ENVIRONMENTAL CLEARANCE PROCESS IMPROVEMENT RECOMMENDATIONS

* Conduct project scoping earlier in project development. Match the proposed Priority Programming Process (PPP) by assisting project prioritization and by completing pre-engineering by Interdisciplinary Design Teams (IDT) before projects are included in the Five Year Highway Construction Program (FYHCP). During this scoping include more emphasis on identifying environmental issues by EPS staff and Environmental Scoping Teams (EST).

* Use a formal partnering process with each key Agency using a generic relationship focus, rather than project specific to lay the ground work for dealing consistently and predictably with project specific issues.

• The ECP should be described to all involved ADOT parties, including Highway Development, Construction and Maintenance personnel to insure that all environmental issues are easily recognized, documented, and mitigated in an efficient and professional manner.

- Allow for consideration of all prudent design alternatives, while addressing environmental mitigation measures, by permitting an acceptable degree of design criteria flexibility agreeable to ADOT and the affected Agencies.

- Develop a statewide graphic display using the county map series that would portray by color and other codes what environmental information is available regarding a selected segment of highway within the State System.

RECOMMENDATIONS FOR FURTHER STUDY

1. Evaluate a Geographical Information System (GIS) to match environmental resource data with their locations along highways in the State System. Compare a GIS with other computerized and non-computerized systems.

2. Evaluate the use of local and wide area computer networking systems to link EPS with other State and National agencies to retrieve useful environmental data for project specific locations.

3. Form a multi-agency team to evaluate the feasibility of performing concurrent intra-ADOT and interagency reviews of environmental and engineering documents.

PROBLEMS CARRYING OUT THE BPI

Most of us on the EQuaTe were participating in a formal Business Process Improvement (BPI) for the first time. We were bound to experience shortcomings along the way. Hopefully, future teams will benefit greatly from our trials. Briefly listed below are most of the problems we encountered in our effort to perform a complete BPI.

A. The team was initially given an overly optimistic schedule for completing a full BPI.

B. The team members conducted meetings on four full days on the BPI before receiving any formal training. Our facilitator both performed on the job training and facilitated our meetings.

C. When the team did receive formal training it initially concentrated on problem solving. This caused confusion since we expected training to specifically fill us in on the full BPI.

D. Actual formal BPI training was very brief.

E. Our BPI training caused us to reexamine our time commitment to complete our assignment. It was going to take much longer to complete.

F. Several schedule adjustments were required over the course of the study.

G. Team members and their supervisors were frustrated by the frequent shift to increasing time commitment to the assignment.

H. Conflicting rumors over SLIM's involvement in our study caused consternation among team members.

I. The Environmental Clearance Process (ECP) study proved to be much more involved and time consuming than was originally anticipated. Parts of the overall process would be substantial studies unto themselves.

J. Data collection proved to be only marginally successful for gaining useful measurement tools to evaluate the existing process. Lots of time consumed trying to make useful sense of what was available.

K. Much of the ECP is regulated by federal legislation. Attempts to improve the process were thereby hindered.

CHARTER

Arizona Department of Transportation

EQuaTe CHARTER

MISSION

As the Environmental Clearance Process (ECP) is neither well-defined nor widely understood within ADOT, we , the Environmental Quality Team (EQuaTe), accept the charge to investigate and develop strategies to increase awareness of the ECP and improve ADOT's effectiveness in implementing the Highway Development Process and Construction Program.

GUIDELINES

We agree to :

- *Meet regularly*
- *Respect each other's opinions*
- *Maintain an open and honest team environment*
- *Maintain our individual senses of humor*
- *Be willing to be vulnerable*
- *Be good listeners*
- *Encourage individual participation*
- *Call timeout when required*
- *Have fun*
- *Use team time effectively and productively*
- *Be supportive*

EQUATE TEAM MEMBERS

John Carr Team Leader	Highway Plans Services - ADOT Engineer-Assistant Manager
Bill Belt Team Member	Environmental Planning - ADOT Manager
Bob Epler Team Member	District II - ADOT Project Development Engineer
Marian Thompson Team Member	Advance Engineering - ADOT Team Leader
Karen Williams Team Member	Right-of-Way Operations - ADOT Right-of-Way Agent II
Steve Thomas Team Member	Federal Highway Administration Environmental Coordinator
Kevin Nelson Team Member	ENTRANCO Engineers, Planners, Surveyors
Joe Spadafino Facilitator	Highway Development - ADOT Engineer I
Dave Farrell Coach-Trainer	Ernst & Young
Ralph Ott Coach-Trainer	Ernst & Young

PROBLEM STATEMENT

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DEFINITION OF ENVIRONMENTAL CLEARANCE

PROBLEM STATEMENT

Highway construction projects frequently experience delays in their bid advertisement dates due to the lack of approved special environmental studies or required permits not being completed or obtained within the time frame allotted in the project design development schedule. Furthermore, the Environmental Clearance Process and its decision making process are not always clearly defined within ADOT. Individuals responsible for doing the work are not always well equipped to do quality work.

DEFINITION OF ENVIRONMENTAL CLEARANCE

As defined in this study, the Environmental Clearance Process is the formal process for documenting and evaluating the significant environmental issues and mitigation measures to be addressed in highway design projects. The final documents produced which complete this process are Categorical Exclusions, Environmental Assessments, and Environmental Impact Statements. Other environmental studies and documents may be required on highway projects to satisfy specific environmental concerns identified in the environmental clearance documents. These would include biological surveys and reports, hazardous waste identification and remediation, archaeological data identification and recovery, water quality (401) permits, and dredged and fill materials (Corps of Engineers 404) permits. Our team labelled these special studies. Time did not permit us to analyze special studies in detail beyond flowcharting six of the existing processes. Major special studies, those which most often can have a detrimental effect on project schedules, are significant enough to be studied for quality improvements individually. Future teams can be assigned to take a closer look at them. The flowcharting done by our team should be a great help and time saver to these future teams.

PROCESS IMPROVEMENT METHOD

PROCESS IMPROVEMENT METHOD

I Plan for How to Proceed

II Block Diagram [high-level view of The Environmental Clearance Process (ECP)] (see Appendix A)

A. Delineate boundaries of ECP
B. Identify suppliers and customers (see Appendix B)
C. Conduct interviews (see IDEAS FOR IMPROVEMENT)
D. Customer requirement ranking matrix

III Determine How the Existing Process is Performed

A. Process varies dependent on:

1. Type of project
2. Level of environmental work required
3. Type of environmental special studies required (see Appendix B)
4. Variations of process required by landowning agency
5. ADOT entity developing project

B. Select the processes to flowchart (see Appendix A)

1. Processes
   a. Environmental Assessments (E.A.s) for federal aid projects
   b. Categorical Exclusions (C.E.s)
2. Sub-processes
   a. Hazardous Materials
   b. Noise Analysis
   c. Air Quality
   d. U.S. Army Corps of Engineers 404/401 permit
   e. Cultural Resources

C. Obtain measurements of the existing process (see BASE LINE DATA and Appendix B)

1. Cycle times
   a. Processes
   b. Sub-processes
2. Activity times
   a. Processes
   b. Sub-processes
3. Costs
   a. For completing major milestones
   b. For completing the environmental clearance

D. Obtain information by walkthrough interviews (see IDEAS FOR IMPROVEMENT)

1. Develop questionnaire
2. Develop list of interviewees (see Appendix B)
   a. Determine Agencies to interview
   b. Determine ADOT Sections to interview
   c. Determine individuals from a & b to interview

IV. Collect Data

A. Identify potential sources

1. List of projects bid in the 1991-1992 Fiscal Year
2. Preconstruction Engineering Management (PCEM) Critical Path Method (CPM) schedule
3. 36 month construction schedules
4. Listing of projects for Project Development Committee (PDC) review
5. Environmental Planning Services (EPS) project file
6. Engineering files
7. Engineering Consultant Services (ECS) files
8. List of environmental issues
9. United States Forest Service (USFS) Integrated Resource Management (IRM) Process
10. Partnering Agreement between Washington DOT and Federal Highway Administration (FHWA), U.S. Army Corps of Engineers, U.S. Coast Guard, Washington Department of Ecology, Environmental Protection Agency (EPA), Washington Department of Fisheries, United States Fish & Wildlife Service (USFWS), Washington Department of Wildlife, and U.S. National Marine Fisheries
11. Existing flowcharts
    1. Highway Development Process
    2. Environmental Flowchart for Federal Highway Administration
    3. Location Section - Preliminary Engineering Process
    4. Consultant Management Services (CMS) - Major Tasks Flowchart - environmental tasks for specific projects
    5. PCEM project models

B. Reduce data recovery required by selecting 100 projects for obtaining Base Line Data [1]. - (see Appendix B - DATA COLLECTION SUMMARY OF 99 ORIGINALLY SELECTED PROJECTS - DATA COLLECTION SUMMARY OF 51 REMAINING PROJECTS CALCULATED CYCLE TIMES FOR 99 ORIGINALLY SELECTED PROJECTS)

1. Retain all EA projects
2. Randomly select non-EA projects from 150 to combine with EA projects to total 100 projects (see Appendix B - DATA SUMMARY OF 99 SELECTED PROJECTS AND CYCLE TIMES FOR 99 SELECTED PROJECTS)

V Evaluate Data Collection Results (see BASE LINE DATA and Appendix B)

A. ESTIMATED AVERAGE CYCLE TIME
B. AVERAGE CYCLE TIME
C. RANGE OF CYCLE TIME
D. NUMBER OF DAYS FOR CLEARANCE
E. ESTIMATED ACTIVITY TIME IN MONTHS
F. PROJECTS BID IN FY 1992 DELAYED BY THE ENVIRONMENTAL PROCESS - Based on the 99 Projects
G. ONLY 12% OF PROJECTS ARE DELAYED FOR ENVIRONMENTAL REASONS [2].
H. 12 PROJECTS REPORTING ENVIRONMENTAL PROCESS DELAYS
I. 12 PROJECTS REPORTING ENVIRONMENTAL-PARETO DIAGRAM
J. PROJECTS BID IN FY 1992 DELAYED BY THE ENVIRONMENTAL PROCESS [3]. - Based on the 150 Projects
K. ONLY 13% OF PROJECTS ARE DELAYED FOR ENVIRONMENTAL REASONS
L. 20 PROJECTS REPORTING ENVIRONMENTAL PROCESS DELAYS
M. 20 PROJECTS REPORTING ENVIRONMENTAL-PARETO DIAGRAM
N. ESTIMATED ACTIVITY TIME FOR EPS TO PRODUCE AN EA
O. ESTIMATED ACTIVITY TIME FOR CONSULTANTS TO PRODUCE AN EA

1. Due to a duplication the resultant total was 99 projects while a sample of 100 had been intended.

2. After a presentation by the EQuaTe team to the Deputy State Engineer for Highway Development and the Assistant State Engineers, the interpretation of causes for environmental delay was broadened to include issues other than the 33 special studies investigated on each project, such as issues of concern to land owning Agencies.

3. To verify our delay percentages, the original sample of 99 projects was expanded to include all 150 projects advertised for bid in FY 91-92 for limited research, such as reasons for and duration of bid date delays.

VI Evaluate Flowcharting/Walkthrough Results (see RECOMMENDATIONS EVALUATED)

A. Evaluate EQuaTe flowcharts and existing processes
   1. Which activities are required by law?
   2. Can any activities be eliminated?
   3. Can any activities be performed concurrently?

B. Review suggestions from customers and walkthrough interviewees

C. Generate independent suggestions from EQuaTe team members (see ALL Recommendations #16)

VII Develop Recommendations (see RECOMMENDATIONS DETAILED)

A. Generate criteria for evaluating suggestions

B. Evaluate all suggestions to determine recommendations

C. Specify Recommendations
   1. Identify issues
   2. State recommendations
   3. State action plan
   4. Determine schedule
   5. Determine costs
   6. Determine benefits
   7. Determine alternatives

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BASELINE DATA

DATA COLLECTION EVALUATION

1. Cost to Produce Environmental Documents	Success Rate	Degree of Difficulty	Confidence Level
Person - Hours	NS	-	-
Actual Cost (in Dollars)	NS	-	-
By EPS	NS	-	-
By Other ADOT Personnel	NA	-	-
By Consultants	NA	-	-
Non-Labor Costs reproduction, travel costs, graphics	NS	-	-
2. Key Dates			
Original Schedule vs. Actual Schedule	NS	-	-
Final Bid Advertisement Date vs. Original Bid Advertisement Date			
From PDC report	LS	4	C
From 36 month schedule	MS	3	A
From C&S bid processing notebook	MS	3	A
Project Milestone Dates			
From EPS project files	MN	5	B
Environmental Clearance Date			
From EPS project files	MS	4	B
From C&S project files	MS	4	B
Projects to PDC			
From PDC report	SC	3	B
Reason for Delay			
From PDC report	SC	3	B
Coordination Letter Dates Sent and Response Recorded			
From EPS project files	LS	4	A
Special Studies Cycle Times			
From EPS project files (actual)	MN	5	C
From interviews (estimated)	MN	5	C
Special Studies Number and Type			
From EPS files	MS	4	C
Environmental Clearance Total Cycle Time			
From past project data (files)	SC	3	C
From EPS staff (estimates)	SC	4	C
Milestone Cycle Time			
From EPS project files	NS	-	-
From EPS staff (estimate)	SC	4	C

	Success Rate	Degree of Difficulty	Confidence Level
3. Number of Final Documents Issues			
Design Clearance			
Categorical Exclusions	MS	3	A
Environmental Assessments	MS	3	A
Special Studies	MS	3	A
Construction			
Permits	NA	-	-
4. Flowcharting the Existing Process			
From EPS interviews	SC	4	B
From walk-through interviews	SC	4	B
5. Project Assessment (PA)	MS	3	A
6. Design Concept Report (DCR)	MS	3	A

LEGEND

Success Rate
- NA - Not Attempted
- NS - No Success
- MN - Minimal Success
- LS - Limited Success
- MS - Mostly Successful
- SC - Successful

Degree of Difficulty to Obtain Data
- 1 - Easy to get - Data already complete and summarized
- 2 - Mostly easy - Some data harder to retrieve
- 3 - Obtainable - All data available in some form
- 4 - Somewhat difficult - Most data retrievable, but hard to retrieve
- 5 - Very difficult - Data not available, or very difficult to retrieve

Confidence Level in Accuracy of Data
- A - Very high
- B - High
- C - Acceptable
- D - Low
- E - Very low

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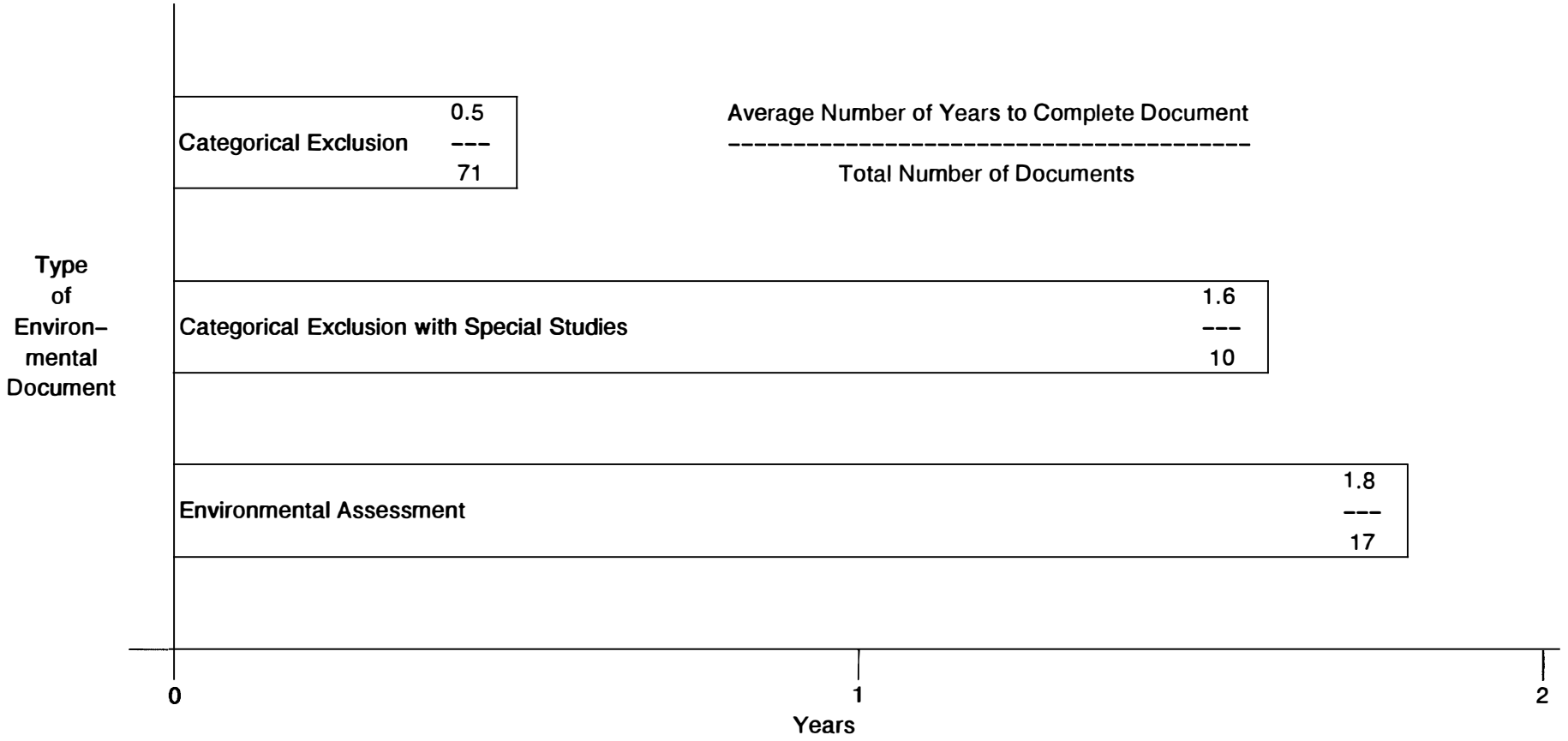
Estimated Average Cycle Time

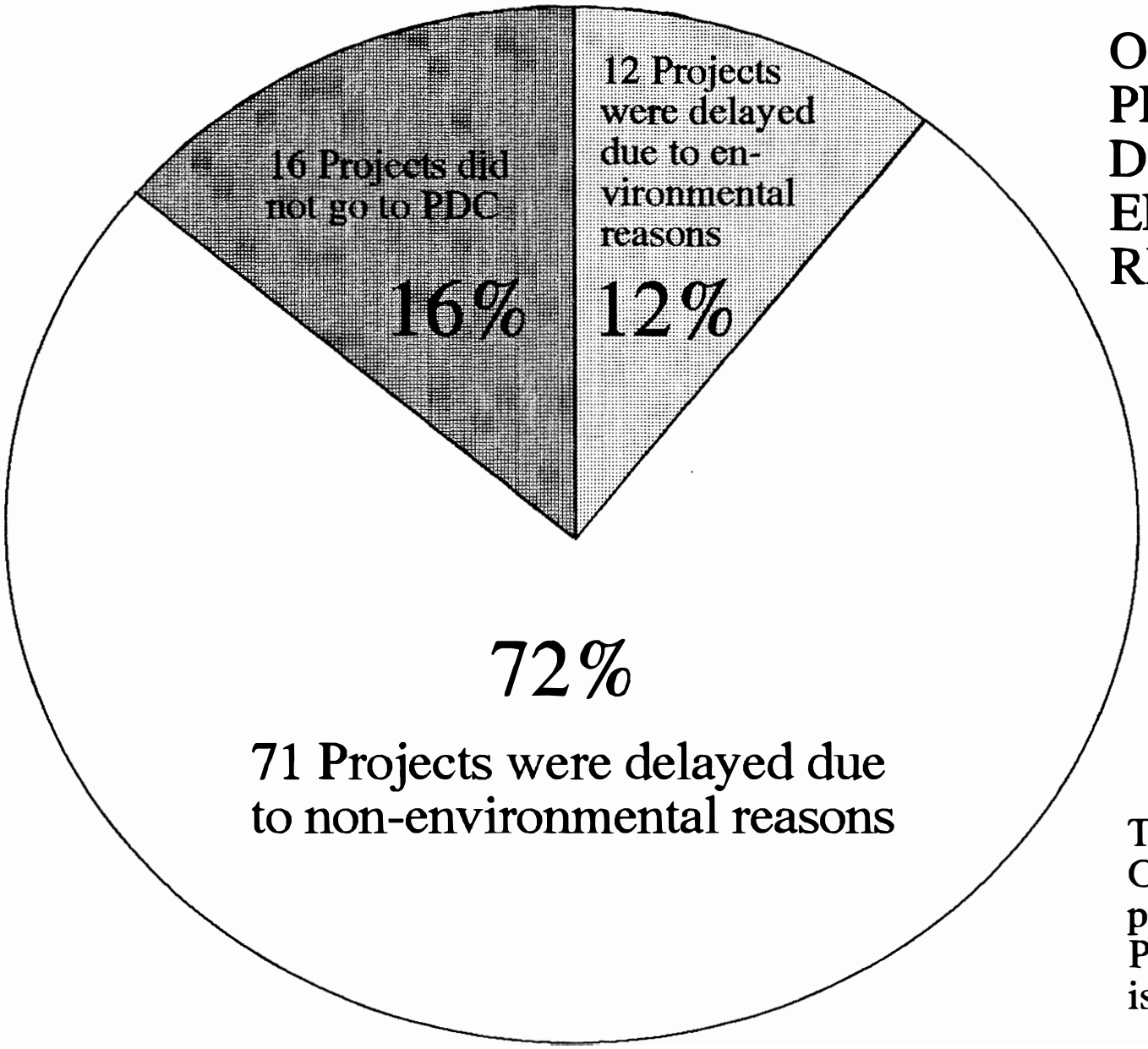


Data based on 99 selected projects out of 152 advertised for bid in Fiscal Year 1992 (July 1, 1991–June 30, 1992)

PROJECTS BID IN FY 1992 DELAYED BY THE ENVIRONMENTAL PROCESS

Based on the 99 Projects Originally Selected from FY 1992

PROJECT NUMBER	PROJECT NAME	TIMES TO PDC	ENV. TIMES TO PDC	ENVIRONMENTAL PROBLEM	TOTAL MOS. DELAY	ENV. MOS. DELAY	SCHED-ULED ADV. DATE	ACTUAL ADV. DATE	ACTUAL ENV. CLRNCE.
IR- 17-1(172)	INDIAN SCHOOL RD TI & RAMPS	12	5	HAZ MAT'L FOUND AFTER CLRNC	31	31	04/25/89	11/22/91	10/11/88
IR- 40-5(89)	WINDOW ROCK TI	4	1	NAV. RESPONSE TO SCOPE CHG	11	11	03/25/91	02/21/92	09/04/91
F- 022-2(37)	GRAND AV,AGUA FRIA BRS 312,313	13	4	HAZARDOUS MATERIALS	46	35	04/25/88	02/27/92	11/14/91
F- 022-3-569	DEVILS CANYON BRIDGE #0261	6	6	BIOLOGICAL EVALUATION	13	13	04/25/91	05/20/92	04/15/92
F- 026-2-515	TOWN OF SPRINGERVILLE MAIN ST	3	1	HAZARDOUS MATERIALS	1	0	02/25/92	03/26/92	09/25/91
F- 035-1(13)	BIG SANDY BRIDGE #0327	2	1	WETLANDS	4	2	05/25/91	10/03/91	09/26/91
F- 038-1(14)	ASH CREEK - SYCAMORE CREEK	8	5	E.A. APPROVAL	21	21	05/25/90	02/21/92	04/18/91
F- 039-1-510	HOOVER DAM - SOUTH, PH II	1	1	AZ GAME & FISH CONCERNS	24	24	05/25/90	05/26/92	04/01/92
F- 064-1-507	TUBA CITY, US160 & SR264	4	3	HAZ MAT'L FOUND AFTER CLRNC	20	19	04/25/90	12/16/91	06/16/89
RS- 631 (2)	ARIVACA TOWNSITE-ARIVACA JCT	4	1	LOCAL GOVT ENV DOC & APPR	9	4	11/25/90	08/06/91	08/15/90
M- 901-9(3)	LAKE MARY RD (I 17-WALAPAI DR)	13	8	LOCAL GOVT ENV DOC & APPR	23	18	10/25/89	09/24/91	09/16/91
S- 987- 503	VEKOL WASH AREA	6	1	CULTURAL RESOURCE SURVEY	20	6	05/25/90	02/01/92	09/20/90
	TOTALS	76	37		223	184			



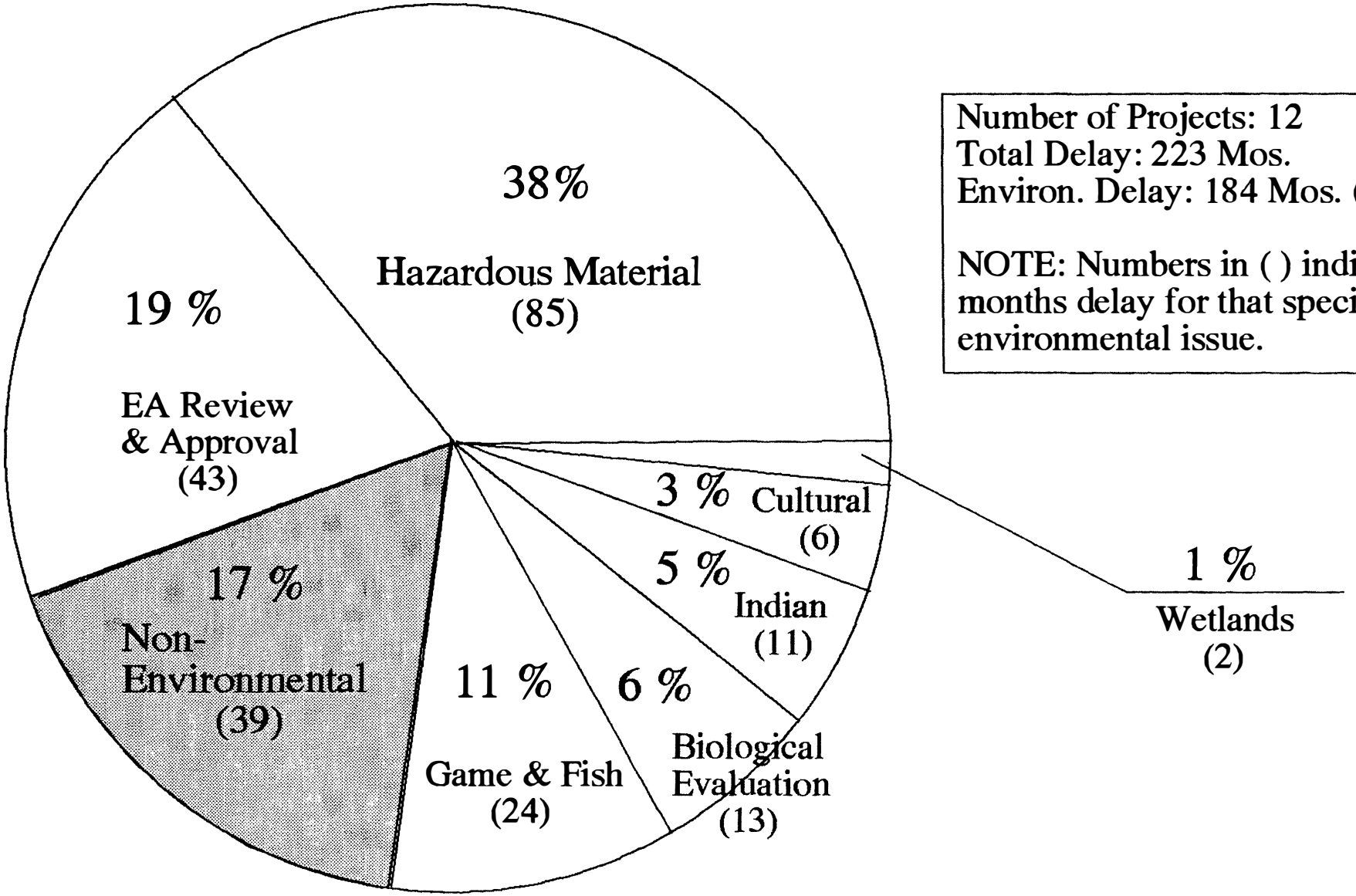
ONLY 12% OF PROJECTS ARE DELAYED FOR ENVIRONMENTAL REASONS

The Project Development Committee (PDC), addresses problems confronting projects. Project delay is one of the issues addressed at the PDC.

99 SELECTED CONSTRUCTION PROJECTS OUT OF 150 WHICH WERE ADVERTISED FOR BID F.Y. 91/92

Source: PDC Report #PS003

12 PROJECTS REPORTING ENVIRONMENTAL PROCESS DELAYS
(Based on the 99 projects originally selected that were bid F.Y. 1992)
Proportion of Environmental Process Delays to Total Delays (in Months)

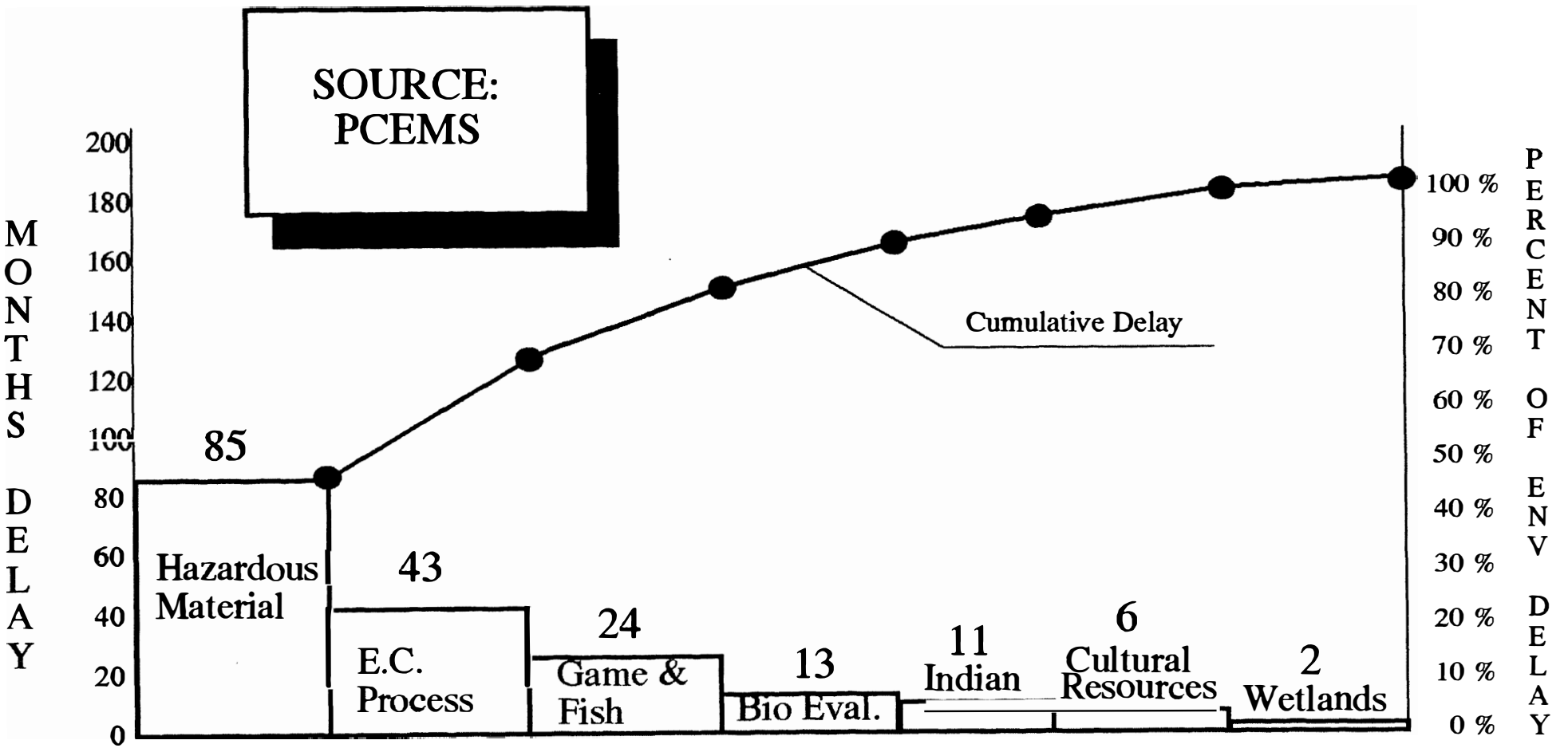


Number of Projects: 12
Total Delay: 223 Mos.
Environ. Delay: 184 Mos. (83%)

NOTE: Numbers in ( ) indicate months delay for that specific environmental issue.

12 PROJECTS REPORTING ENVIRONMENTAL PROCESS DELAYS

Pareto Diagram of Delays Due to Environmental Issues



Environmental Issues Ranked from Highest to Lowest # of Months Delay

HAZARDOUS MATERIAL RESPONSIBLE FOR 46% OF ENVIRONMENTAL DELAY

PROJECTS BID IN FY 1992 DELAYED BY THE ENVIRONMENTAL PROCESS

Based on the 150 Projects Advertised for Bid in FY 1992

PROJECT NUMBER	PROJECT NAME	TIMES TO PDC	ENV. TIMES TO PDC	ENVIRONMENTAL PROBLEM	TOTAL MOS. DELAY	ENV. MOS. DELAY	SCHED-ULED ADV. DATE	ACTUAL ADV. DATE	ACTUAL ENV. CLRNCE.
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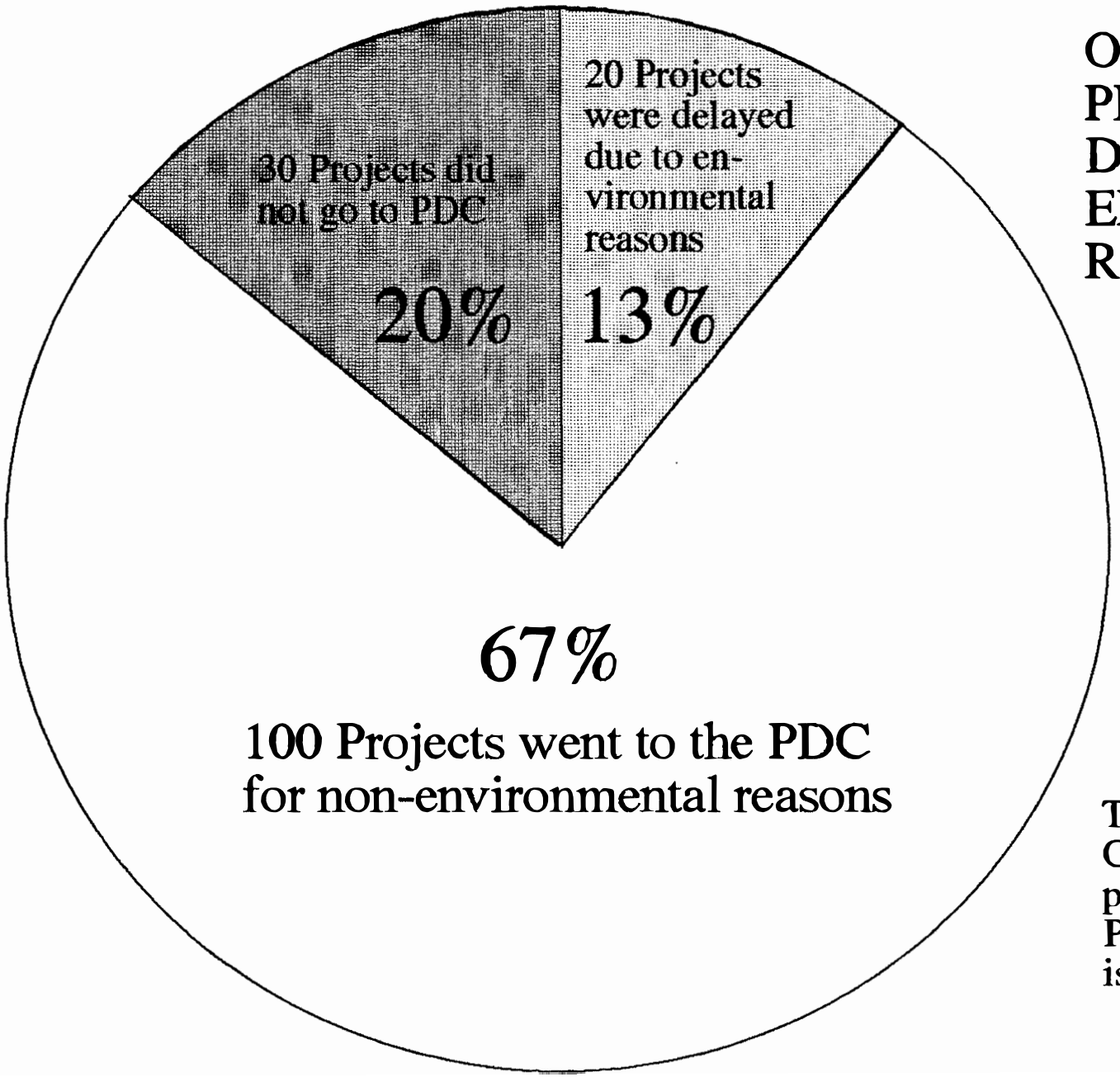
F- 022-3-569	DEVILS CANYON BRIDGE #0261	6	6	BIOLOGICAL EVALUATION	13	13	04/25/91	05/20/92	04/15/92
F- 026-2-515	TOWN OF SPRINGERVILLE MAIN ST	3	1	HAZARDOUS MATERIALS	1	0	02/25/92	03/26/92	09/25/91
STP- 033-1(9)	CAMERON - WEST	7	1	BIOLOGICAL EVALUATION	21	4	09/25/90	06/25/92	04/01/92
F- 035-1(13)	BIG SANDY BRIDGE #0327	2	1	WETLANDS	4	2	05/25/91	10/03/91	09/26/91
F- 038-1(14)	ASH CREEK - SYCAMORE CREEK	8	5	E.A. APPROVAL	21	21	05/25/90	02/21/92	04/18/91
F- 039-1-510	HOOVER DAM - SOUTH, PH II	1	1	AZ GAME & FISH CONCERNS	24	24	05/25/90	05/26/92	04/01/92
F- 064-1-507	TUBA CITY, US160 & SR264	4	3	HAZ MAT'L FOUND AFTER CLRNC	20	19	04/25/90	12/16/91	06/16/89
HES- 071-1(1)	SANDERS	9	4	ARCHAEOLOGICAL RECOVERY	16	9	02/25/91	06/25/92	04/18/92
S- 266- 503	SALT RIVER BRIDGE - NORTH	1	1	USFS APPROVAL REC'D LATE	1	1	05/25/92	06/25/92	04/08/92
S- 391- 501	EAGAR - SPRINGERVILLE	4	1	CLEARANCE FOR HAZMAT WELLS	14	1	01/25/91	03/25/92	09/25/91
RAM- 600-5-517	E. PAPAGO, IND BND-MCCLINTOCK	7	2	EPA APPROVAL, REMEDIATION	18	10	12/25/90	06/25/92	08/14/87
RS- 631 (2)	ARIVACA TOWNSITE-ARIVACA JCT	4	1	LOCAL GOVT ENV DOC & APPR	9	4	11/25/90	08/06/91	08/15/90
M- 824-9-511	KINO BLVD	7	3	HAZARDOUS MATERIALS	12	5	10/25/90	10/25/91	05/05/85
M- 901-9(3)	LAKE MARY RD (I 17-WALAPAI DR)	13	8	LOCAL GOVT ENV DOC & APPR	23	18	10/25/89	09/24/91	09/16/91
HES- 982 (146)	MAGEE RD, NORTHERN-ORACLE	5	2	LOCAL GOVT ENV DOC & APPR	8	8	12/25/90	08/25/91	08/28/90
S- 987- 503	VEKOL WASH AREA	6	1	CULTURAL RESOURCE SURVEY	20	6	05/25/90	02/01/92	09/20/90
	TOTALS	117	52		314	223			



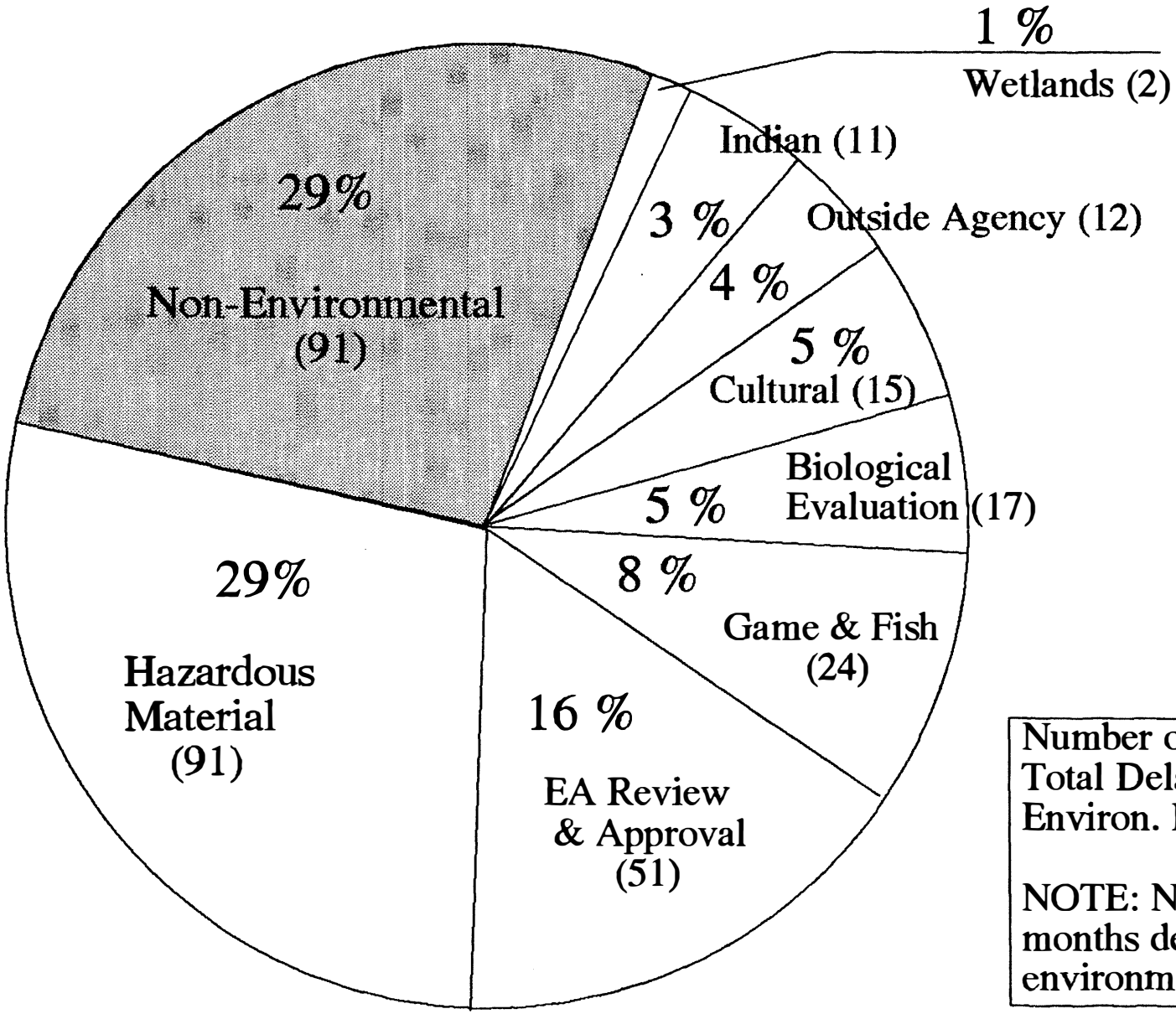
ONLY 13% OF PROJECTS ARE DELAYED FOR ENVIRONMENTAL REASONS

The Project Development Committee (PDC), addresses problems confronting projects. Project delay is one of the issues addressed at the PDC.

150 PROJECTS THAT WERE ADVERTISED FOR BID F.Y. 91/92

Source: PDC Report #PS003

20 PROJECTS REPORTING ENVIRONMENTAL PROCESS DELAYS
(Based on 150 Projects bid in F.Y. 1992)
Proportion of Environmental Process Delays to Total Delays (in Months)

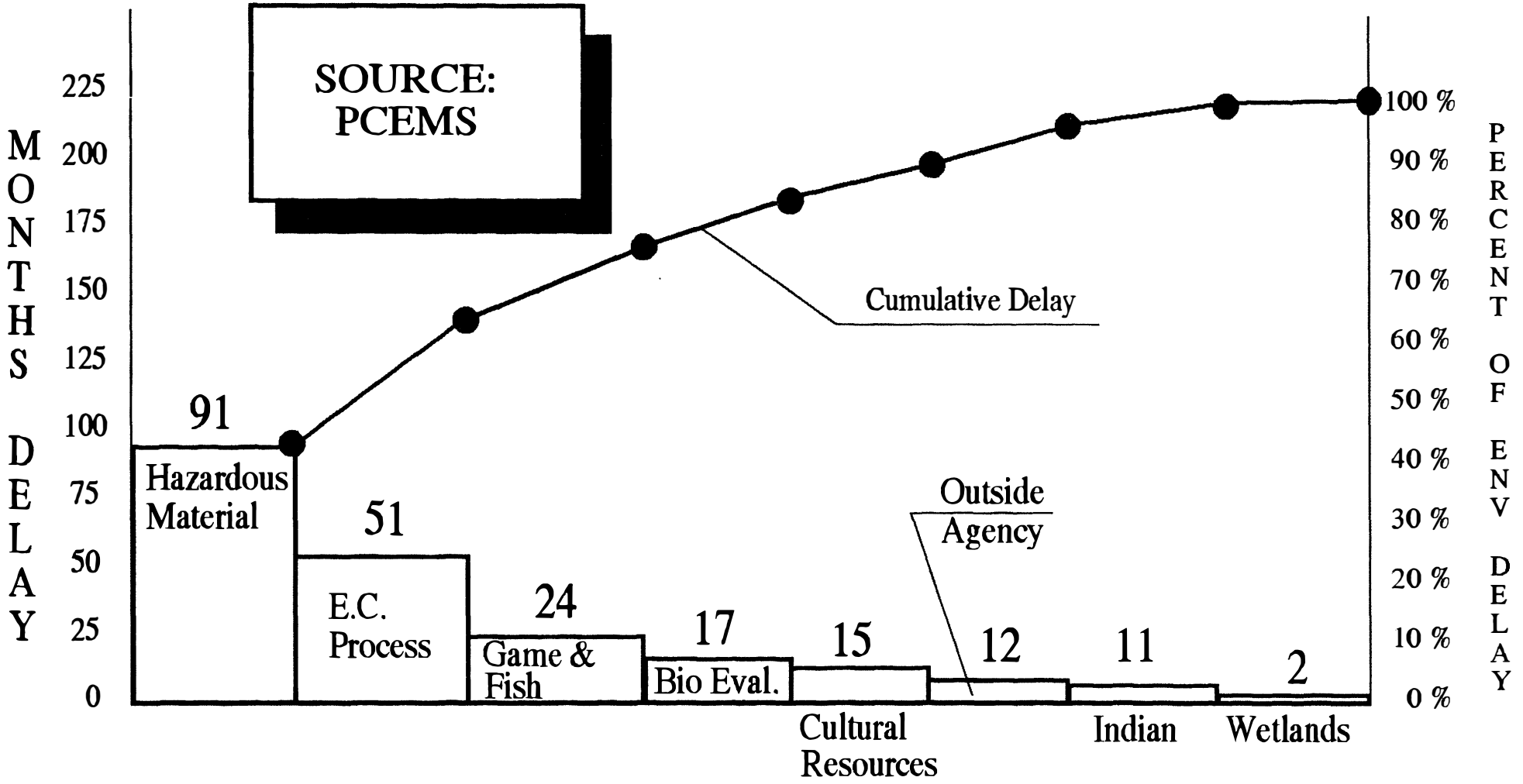


Number of projects: 20
Total Delay: 314 Mos.
Environ. Delay: 223 Mos. (71%)

NOTE: Numbers in ( ) indicate months delay for that specific environmental issue.

20 PROJECTS REPORTING ENVIRONMENTAL PROCESS DELAYS

Pareto Diagram of Delays Due to Environmental Issues



Environmental Issues Ranked from Highest to Lowest # of Months Delay

HAZARDOUS MATERIAL RESPONSIBLE FOR 41% OF ENVIRONMENTAL DELAY

DELAYED PROJECT BID ADVERTISEMENT

EQuate examined all 150 highway projects bid during the 1991-1992 FY to determine what percentage of all projects caused the bid advertisement date to be delayed due to environmental issues. The results showed that only 13% of the projects (20 out of 150) delayed the bid date for environmental reasons. The total environmental delay time for all 20 projects was 223 months or about 11 months per project on average.

LATE ENVIRONMENT CLEARANCES

One useful measurement of the ECP requires documenting the date a project receives environmental clearance. The current ADOT Highway Design Development Process expects environmental clearance (completed environmental documents like the EA and CE) to occur by the time project design achieves 30% completion. Our project sample did not permit us to determine the originally scheduled date for environmental clearance since the computer generated schedule data had already been purged from the system.

Even so, our Data Collection Summary of the 99 Originally Selected projects (see Appendix B) indicates that 39 of the projects were still awaiting formal clearance within three months of the actual bid advertisement date. This is usually beyond the 90% design development stage, well past the desirable 30% completion. Another 16 projects cleared between three and five months before actual bid advertisement date and probably were beyond the 60% project design development stage. That means at least 55 projects, more than half, probably had late environmental clearances according to original project schedules. Clearly, the actual environmental clearance date compared to its scheduled date would be a useful measurement to determine successful improvement to the ECP. Two of our recommendations, the Project Log, and the Cost Management System will permanently capture useful information to measure successful completion of the ECP.

IDEAS FOR IMPROVEMENT

IDEAS FOR IMPROVEMENT

Customers

CUSTOMER INTERVIEW QUESTIONS

1. What are your/your Agency's needs and expectations from the Environmental Clearance Process?

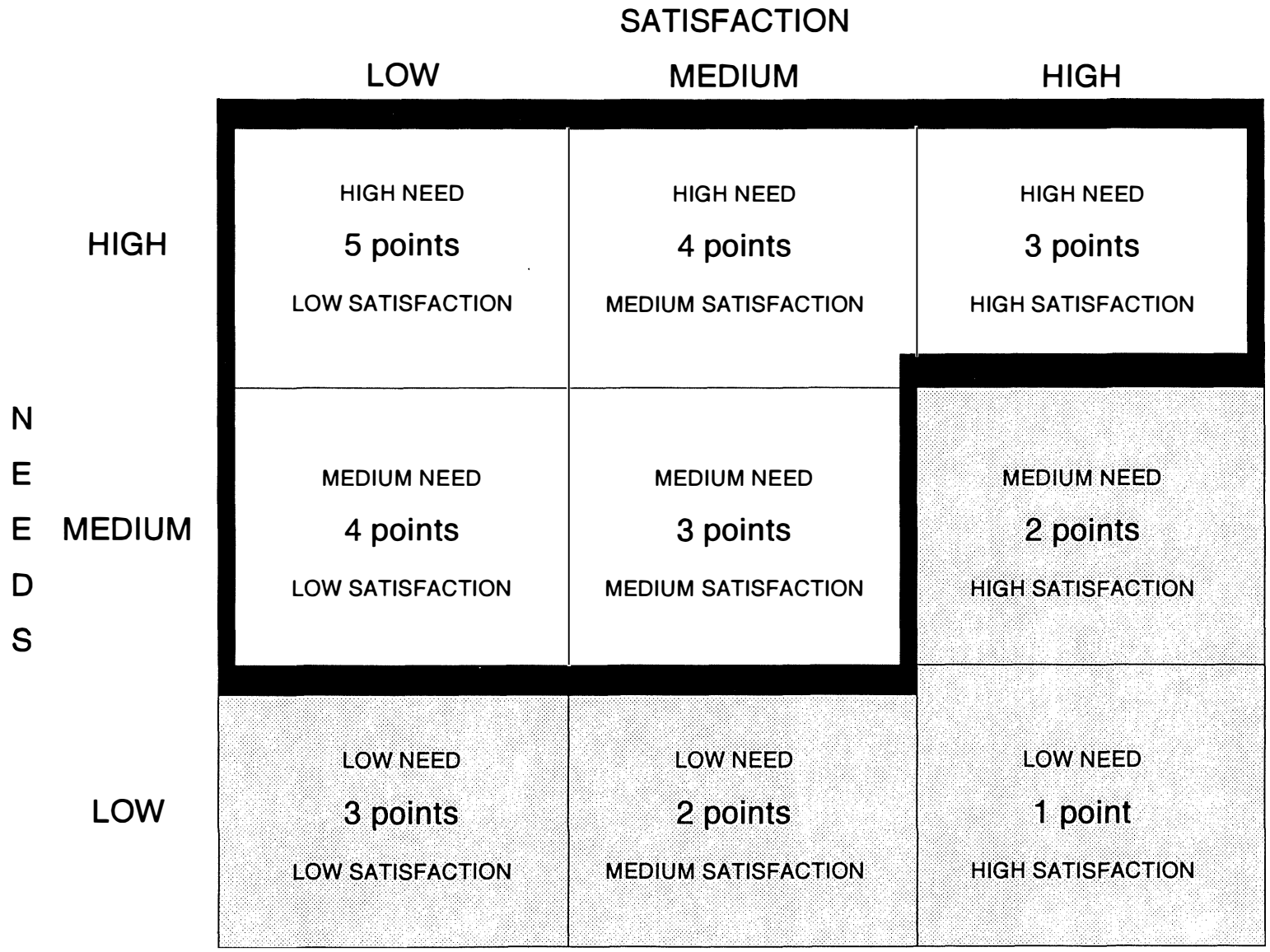
2. For each major item you mentioned, how important is it to you/your Agency? (High, Medium, Low)

3. How well are your/your Agency's expectations being met?

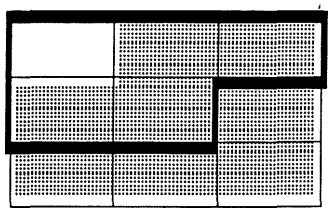
4. Do you have any suggestions for how the needs and expectations might better be met, or an objective method of measuring how well they are being met?

No 901

CUSTOMER SATISFACTION MATRIX



CUSTOMER REQUIREMENT RANKINGS



HIGH NEED - LOW SATISFACTION (5 Points)

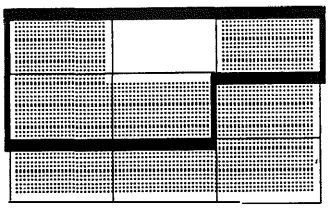
Internal Customers

Need copy of complete environmental documents. *
Inform others of changes in environmental policies (Distr.). *
All environmental issues addressed. ****
Timely clearance. *
Meet scheduled deadlines.
EPS work with engineers toward viable solutions.
Timely hazardous materials clearance.
Timely 404 permits.
Indian lands clearance.
USFS lands clearance.
Mitigation measures in plans and specifications. *
Complete the environmental activities as outlined in the Highway Development Manual and Project Schedule.
Start the environmental process on time in accordance with the project schedule.
Spell out the EA what the mitigation measures are. *

External Customers

Consultants knowledgeable and capable of documenting environmental issues.
Assure implementation of Forest Service requirements during construction.
Receive feedback on the T&E survey data - minor projects.
ADOT follow-up on the results of implementing the U.S. Fish and Wildlife Service regulations.
ADOT follow-up on executing agreements with the U.S. Fish and Wildlife on EA's.
Early involvement (FHWA).
EPS involved in the whole environmental process (FHWA).
Locals develop quality documents (FHWA).
Integrate environmental and design issues (FHWA).
Consistency of format (EA outline).
Single point of contact at ADOT.

HIGH NEEDS - MEDIUM SATISFACTION (4 Points)



Internal Customers

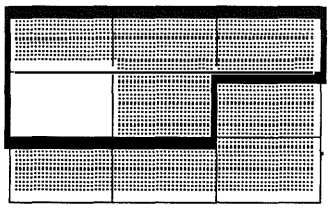
Complete list of mitigations in EA. ***
All environmental issues addressed. ***
Inform Districts of environmental requirements and time frames.
Give advance notice of public involvement activities. *
Include all appropriate agencies in scoping.
Must have EA to insure mitigation measures are in the plans.
Timely clearances. ***

Be more knowledgeable about environmental regulations.
Inform others of changes in policy.
EPS be focal point with external agencies.
EPS provide review of UHS consultant's reports.
EPS provide 404 permitting expertise and assistance.
Spell out in the EA what the mitigation measures are. **
Mitigation measures identified for the Forest Service, Bureau of Land Management, and State Land Department Lands.
Know the environmental process as other agencies see it. Know its effects.
Timely hazardous materials reports and estimates when required (R/W).
Early timely attention to special requests (R/W).
Timely activity updates on Prostat.

External Customers

Early involvement (COE, EPS).
Early identification of issues. ***
Early identification of 404 permit issues.
Cultural Resources coordination when there are multiple land owners.
Consistency of format (EA outline).
Consult with the Forest Service to determine the level of environmental analysis.
Perform scoping process.
Do environmental analysis with alternatives.
Do EA/EIS.
Keep a project record.
Prepare environment data and analysis to assist workload planning.
Provide documentation from EPS (Game & Fish, District).
Develop quality documents for ADOT projects (FHWA).
Need to comply with NEPA.
Define logical project termini.

MEDIUM NEEDS - LOW SATISFACTION (4 Points)

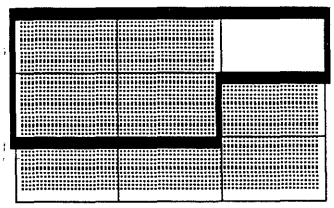


Internal Customers

None

External Customers

Need to know what projects are coming up on the schedule.
Prepare completed responses to ADEQ requests.
Develop interagency agreements to reduce reviews.



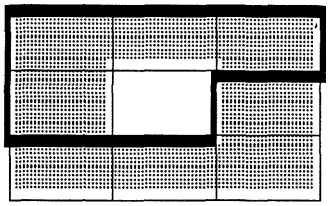
HIGH NEEDS - HIGH SATISFACTION (3 Points)

Internal Customers

EPS provide public hearing expertise.*
EPS provide leadership and expertise on environmental issues.
EPS be proactive with CMS.
Provide timely archaeological clearance.
EPS acquire all environmental approvals and permits - internal and external.

External Customers

Identify and evaluate all cultural resources with ADOT evaluation of consultant work.
Identify all required mitigation.
Provide mitigation plan to SHPO for approval.
Report the results of approved mitigation measures.
Incorporate SHPO comments in final report.
Provide complete consultation with all affected agencies.
Early involvement (Forest Service).
Provide a consistent format for the DCR.
Receive feedback on the T&E survey data - major projects.
Have a comprehensive discussion of project scope and limits.
ADOT be knowledgeable on steps to follow U.S. Fish and Wildlife Service regulations - up to survey completion.
ADOT follow-up on executing agreements with the U.S. Fish and Wildlife on EIS.
EPS provide early involvement with Arizona Game and Fish.



MEDIUM NEEDS - MEDIUM SATISFACTION (3 Points)

Internal Customers

All designers be knowledgeable regarding environmental issues.
Provide early identification of need for public involvement and hearing process.
Provide more definitive direction on noise reports.
Obtain early consensus with all stakeholders.
Clear programmed projects within corridor studies.

External Customers

Provide a single point of contact.
Provide a critical review of consultant work.
Initial environmental scoping is adequate, but detailed information is inadequate.
Provide detailed project descriptions (Arizona Game and Fish).
Get to the real issues in the environmental documents.

IDEAS FOR IMPROVEMENT

Process Walk-Through

EQUATE WALK-THROUGH INTERVIEWS

Questions and Responses

1. Is this flowchart accurately indicative of the process?

   (Responses were indicated on a copy of the flowchart. Appropriate changes were incorporated into the flowchart.)

2. Does the flowchart accurately show process stop and start?

   (Responses were indicated on a copy of the flowchart. Appropriate changes were incorporated into the flowchart.)

3. Are all tasks necessary? What tasks could be eliminated? (VA, NVA)

   Main Flowchart

   IRM Process - processes should be the same for all Agencies.
   Eliminate portions of the IRM Process depending on the type of project.
   Predraft/Initial Draft/DEA make all comments on one rough draft.
   Eliminate either the EPS Project Leader review of the Predraft EA or the ADOT review of same.
   Make the EPS review concurrent with the ADOT review.
   Combine review of FEA by internal ADOT services and incorporate comments from internal ADOT services and instead, hold a comment resolution meeting with affected parties. This could also eliminate the final steps where we send the FEA to FHWA for review, incorporate their comments, then send the revised version back to FHWA for approval. We would already have come to agreement on the contents of document.
   Eliminate some reviews.

   SPECIAL STUDIES DID NOT FEEL THAT ANY STEPS COULD BE ELIMINATED

4. What are major milestones?

   (Responses were indicated on a copy of the flowchart. Appropriate changes were incorporated into the flowchart.)

5. What are the cycle times for the milestones?

   (Responses are summarized on Major Milestones Summary Charts.)

6. How much actual time is spent doing these tasks?

   (Responses are summarized on Major Milestones Summary Charts.)

7. What among these steps creates major time delays?
   What, Where, How much delay

   Main Flowchart

   Time awaiting responses from outside Agencies (9)
   Scoping - too much optimism that environmental issues can be easily mitigated.
   Resolving issues with outside Agencies (2)
   Obtaining insurance
   New impacts to project introduced (change in scope) (2)
   Multiple public meetings before public hearing
   Too many levels of review
   Review periods exceeded
   Forest Service review of 100% plans where delays are critical

   Special Studies

   44 Delays in rights-of-entries
   44 Uncertain jurisdictional limits
   44 Preparation of public notice
   44 Receipt of 401 from ADEQ
   HM Phase 3 - Define problem
   HM Phase 4 - Remediation
   HM Contractor not paying subcontractor
   HM Delays in rights-of-entries
   HM Coordination from ADEQ & response
   HM Approvals from ADOT, ADEQ, EPA
   HM Lab Work
   NA Full noise analysis for each alternative
   NA Insufficient traffic and engineering data
   NA Schedule to allow writing of report
   CR Agencies sit on permit applications - Lack of Agency sense of urgency
   CR Weather conditions (2)
   CR Consultation with other Agencies/ Circulation of documents to other Agencies (3)
   CR Right-of-entry delays (2)
   AQ Waiting for traffic data
   AQ Project not in T.I.P.

#8

What are areas of significant delay?

Main Flowchart

Report review times
Resolving issues from public input
Inconsistency in outside Agencies requirements
Outside Agency coordination (3)
U.S. Forest Service interaction
Design changes that require additional survey data and additional public involvement (3-6 months)
Negotiating mitigation with outside Agencies
Lack of decision making authority by outside staff reviewers
Outside Agency veto authority
Disputes between outside Agencies
Outside Agencies require full product before review
Inadequate initial scoping
Additional work due to new alternatives
Agency review cycles 30-90 days
Political resistance
Forest Service delay P.A. concurrence

Special Studies

HM	Approvals from ADOT, ADEQ, EPA (2)
44	Waiting for COE & ADEQ to complete work
44	Waiting for ADOT responses to technical questions
NA	Computer problems
NA	Getting information from others
CR	Reviews by outside Agencies (2)
CR	Repeat reviews due to poor consultant work
AQ	Project not in T.I.P.
AQ	Traffic data
AQ	Waiting for R/W to determine receptors

#9

How could response time be improved?

Main Flowchart

More EPS staff resources
Face-to-face contact with Agencies
Memorandum of understanding and intergovernmental agreements (6)
Improve trust and partnering (3)
Establish firm dates with outside Agencies (2)
Realistic schedules (2)
Key players at meeting from outside (2)
Agreed upon review time - ADOT is not considered a priority
Establish firm dates with ADOT and FHWA
PA/DCR should focus on worst-case condition
Various reviewers using same document use different colors for making comments
More meetings
Have project leader more involved
One consultant do all studies on a corridor (corridor study, PAs, DCRs)
Do all projects as if FED AID
Earlier prescoping and purpose and need
Commitment to schedules of review
Agency coordination
Staff (EPS) increase
Forest coordinator for each forest as needed
More positive PDC environment
At final allow 3 weeks for PSE review

Special Studies

HM Reduce personnel turnover in ADEQ
HM Involve ADEQ earlier
HM Better ADOT/ADEQ coordination
HM Eliminate ADEQ
44 Knowing COE needs
44 Training on COE needs
WQ Memorandum of Agreement to establish response times for reviews and approvals
NA Knowledgeable project leaders Consultants who understand how abatement works and how to respond to federal requirements
CR Develop Memorandum of Agreements with outside Agencies and allow ADOT to take lead and spread federal funds across more projects
CR Need more time to draw up Memorandum of Agreements
CR Agency promptness
CR Streamline SHPO review process
CR ADOT lead in consultations

#10

What keeps error free work from being done?

Main Flowchart

Firm commitments from Agencies
Changes in emphasis on rules and regulations
Lack of time to study each document and respond (2)
Too many projects (2)
Delays causing restarts
Poor work done by environmental subconsultants
Scope changes
Lack of up front knowledge of project at scoping
Lack of communication
Each service determines own environment and extent
Comments not addressed
Quality control, senior review, document control
Mid-cycle Agency review

Special Studies

HM Rush to completion
HM Too many meetings
HM Shortcutting process
44 Lack of knowledge of COE requirements
NA Changes in project design or slope not communicated
NA Variation in quality of consultants work
NA Lack of adequate time for review of consultant's reports
CR Work load too heavy for personnel available
CR Shortage of quality time
CR Poor working conditions: HVAC, noisy, crowded
CR Using consultants that do inadequate work

#11

Where does rework occur?

Main Flowchart

Agency coordination
File continuity
Changes in emphasis by outside Agencies
Changes in ADOT concerns
Reviewing documents and responses
Project leader too involved in environmental details
Changes in scope (2)
Design changes (3)
Poor quality of environmental subconsultants
ICOs (issues, concerns, and opportunities) not addressed in design
Changes in regulations and philosophies
Conflicts within Agencies
Mistakes
Re-coordinate with affected Agencies
Conversion of funding
Corridor study on ongoing projects
Additional alternative due to outside Agency or public comment (2)
Environmental issues not identified early enough
Lack of early and complete involvement of Agencies
Repeat field reviews

Special Studies

HM Defining the phase of contamination
HM Poor quality lab work
HM Trying to shortcut process
HM Repeat sampling
44 Lack of knowledge of COE requirements
44 Submitting incomplete information to COE
NA Additional work from citizen's complaints after construction
NA Noise analysis should be done to provide information to alternate selection process
NA Noise analysis for local government projects
CR Incorrect information at beginning of project
CR Changing project requirements, limits, and funding
CR Repeated reviews due to poor quality consultant work
CR EPS staff not on selection panels
CR Incorrect base data (i.e., R/W width)
AQ Revised traffic data or geometrics
AQ ADEQ slow in responding
AQ ADEQ frequently updates data

#12

Are the tools available to do the job? If not, what would help to do the job better?

Main Flowchart

Lessons in filing
Larger, quieter work area (6)/ergonomics
More EPS personnel (3)
Creative and unique designs
Too little time for quality
More consultants
Need more computers and printers (4)
Better use of five-year plan
Highway Development Process Manual needs to be finished/ revised
Mitigation follow-up/post-construction monitoring
Library (3)
Conference room (2)
More Roadside Development staff
Efficient H.V.A.C. (2)
Training, including NHI
Timely notification of current regulations

Special Studies

NA Computer hardware and software problems (not user friendly)
NA More time
NA Better computer equipment
NA No Wang
NA Bookshelves for individual offices

#13

In Utopia, how could the process be improved?

Main Flowchart

Reduce formal documentation
Revise DEA process
Bring design sections into picture
Designers/districts trained by EPS on issues
Build trust between Agencies (2)
More authority by ADOT on issues
More sharing of information between EPS planners
Regional sensitivity to environmental concerns
Good partnering with all Agencies (3)
Good designs
Interactive computer network (cons., ATS, Agencies) (2)
Social concerns addressed
Ongoing communication and cooperation with ADOT and public-(?)(2)
Gym in basement (2)
School districts would not ask for hold-harmless clause
ADEQ and COE would not require permits
Wider survey areas
Intent of law, instead of letter of law
Follow five-year program by Action Plan
Start special studies earlier
Project leader must lead in coordinating with EPS
Prompt escalation of issues
Better communication with outside Agencies
Better definition of processes of other Agencies
Schedule and notify critical staff of Field Reviews; let them decide on attendance
Become a true partner with U.S.F.S.
Raise ADOT attitudes toward U.S.F.S.
Rai$e$
Equal pay for equal work/responsibilities
Pre-L/DCR scoping with ADOT, FHWA
Someone with authority willing to make decisions

Special Studies

HM Action levels unrealistic
HM Reduce reporting requirements
HM Shorten number of phases
HM Don't contaminate in the first place
44 Require 404 permitting in Arizona only for perennial streams (2)
44 Exempt all ephemeral streams (2)
44 Other ADOT Sections apply for 404
NA Knowledgeable project leaders
NA Coordination between EPS and project leaders
NA EPS to have say about whether consultant works for ADOT again
CR EPS able to be more selective about consultants
CR All information obtained earlier
CR Unlimited funding
CR Timely acquisition of all permits and TREs
AQ Project in T.I.P. earlier
AQ T.I.P. contact should be TPD not EPS
AQ More user-friendly manuals

IDEAS FOR IMPROVEMENT

EQuaTe

16.	**EQUATE - BRAINSTORMING (BIG PICTURE)**	
16.1	Network with document on CRT in and out of ADOT (LAN, WAN)	
16.2	Networking between ADOT and other agencies - EG Direct access to Az Game and Fish T & E file	
16.3	Eliminate Pre-Draft	3 / 1 / 0
16.4	Reduce circulation of pre-draft	
16.5	Develop MOU's with other agencies	5 / 2 / 0
16.6	Get EA outline approved and acceptable to all agencies	
16.7	ADOT needs design standards and guidelines for when exceptions OK	
16.8	Do away with standards	
16.9	Adopt a standard practice of doing NEPA documents	
16.10	Standardize environmental process between agencies	1 / 1 / 0
16.11	ADOT establish written procedures	
16.12	ADOT - Delegate authority / empower employees	4 / 2 / 0
16.13	Establish / limit timeframes for reviews (agreed upon in advance)	5 / 2 / 0
16.14	ADOT needs environmental procedures training (list specifics)	1 / 1 / 0
16.15	Secure long-range inter-agency commitment through environmental documentation for corridor studies	9 / 2 / 1
16.16	ADOT liaison with other agencies - one person per each agency as necessary	
16.17	"Pat Higgins" for other agencies	
16.18	More environmental input on projects before put into 5-year program	5 / 2 / 0
16.19	Internal liaisons (such as between environmental and TPD)	
16.20	Establish cross-training program between ADOT, USFS, COE, etc.	

16.21	Internal cross-training within ADOT / within EPS	2 / 1 / 0
16.22	Draft PA before project is programmed to include environmental issues	5 / 1 /1
16.23	Single consensus meeting at each stage of review, single meeting, stay until all issues resolved, attendees have authority to make decisions	9 / 3 / 0
16.24	Eliminate consensus meeting when possible	
16.25	Establish sub-consultant approval process	
16.26	improve selection process - accountability for past performance, reduce time for process	6 / 2 / 0
16.27	Assign inter-disciplinary team to address environmental and R/W requirements as part of PA before programmed. Team to follow project through completion	30 / 7 / 5
16.28	Establish a formal tiering procedure for PA - environmental document for corridor studies	1 / 1 / 0
16.29	Project leader responsible for getting permits	
16.30	Detailed public involvement plan for each project where applicable	
16.31	Detailed checklist of items that need to be considered (such as In TIP?, typical section, culvert extensions, etc.), update periodically	
16.32	More partnering of complex projects	8 / 2 / 0
16.33	Combined checklist / traveler	
16.34	Substitute coordination meeting for letters	
16.35	Establish guidelines for limitations ($/time) on approved studies requested by outside agencies	
16.36	Establish procedures for timely decisions by management, particularly where design criteria, project scope, and $ don't match	8 / 3 / 0
16.37	Common interpretation of NEPA by various agencies (Common public hearing process, etc.)	3 / 2 / 0
16.38	Establish consistency / guidelines in public information process and involvement	

RECOMMENDATIONS EVALUATED

RECOMMENDATIONS EVALUATION PROCESS

The first step in evaluating all recommendations made to EQuaTe was to combine common recommendations and tabulate the number of times it occurred. These recommendations came from our customer interviews, walk-through interviews, and EQuaTe ideas. Next, these recommendations were categorized under fifteen major topics. EQuaTe added a sixteenth category which resulted from brainstorming high level issues of importance to us. We used the walking delphi method to rank the issues of greatest importance to us under each category. We were to consider the feasibility of accomplishing the recommendations and the potential to improve the process and/or products.

All the recommendations receiving votes were then listed. The ones receiving the most first place votes were placed at the top of the list.

Another round of combining and categorizing this prioritized list followed. The Environmental Planning Services staff assisted EQuaTe in this process and in determining the final list of recommendations.

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ALL RECOMMENDATIONS

Total Weight / # Votes / # 1st Place Votes

EVALUATION CRITERIA:

1) Feasibility
2) Potential to improve the process and/or products

1.	**BUREAUCRACY ELIMINATION - Removing unnecessary tasks**	
1.1	Realistic schedules (2)	11 / 4 / 2
1.2	Key players at meeting from outside (3)	17 / 5 / 2
1.3	Various reviewers using same document use different colors for making comments	4 / 1 / 0
1.4	Have project leader more involved	10 / 5 / 0
1.5	One consultant do all studies on a corridor (corridor study, PA's, DCR's)	
1.6	Agency coordination (2)	20 / 5 / 2
1.7	More positive PDC environment	3 / 1 / 0
1.8	More authority by ADOT on issues	9 / 3 / 0
1.9	ADEQ and COE would not require permits	
1.10	Intent of law, instead of letter of law	
1.11	Someone with authority willing to make decisions	9 / 4 / 0
1.12	ADOT lead in consultations	5 / 1 / 1
1.13	Require 404 permitting in Arizona only for perennial streams (2)	3 / 1 / 0
1.14	Exempt all ephemeral streams (2)	
1.15	EPS to have say about whether consultant works for ADOT again (2)	9 / 5 / 0
2.	**DUPLICATION ELIMINATION - Removing identical activities**	
2.1	Eliminate portions of the IRM Process depending on the type of project	

2.2 Eliminate either the EPS Project Leader review of the Pre-Draft EA or the ADOT review of same

2.3 More meetings

2.4 Wider survey areas

2.5 Pre-L/DCR scoping with ADOT, FHWA

2.6 Other ADOT Sections apply for 404

3. VALUE-ADDED - Contribution to meeting customer requirements

3.1 PA/DCR should focus on worst-case condition (2)

3.2 Reduce formal documentation

3.3 Bring design sections into picture (2)

3.4 Build trust between agencies (5)

3.5 Social concerns addressed

3.6 Become a true partner with U.S.F.S.

3.7 Raise ADOT attitudes toward U.S.F.S.

3.8 Involve ADEQ earlier

4. SIMPLIFICATION - Reducing complexity of process

4.1 Predraft/Initial Draft/DEA make all comments on one rough draft

4.2 Combine review of FEA by internal ADOT services and incorporate comments from internal ADOT services and instead, hold a comment resolution meeting with affected parties. This could also eliminate the final steps where we send the FEA to FHWA for review, incorporate their comments, then send the revised version back to FHWA for approval. We would already have come to agreement on the contents of document.

4.3 Eliminate some reviews (2)

4.4 Earlier prescoping and purpose and need (2)

4.5	Commitment to schedules of review (3)	
4.6	Revise DEA process	
4.7	Prompt escalation of issues	
4.8	Streamline SHPO review process	
4.9	Reduce reporting requirements	
4.10	Shorten number of phases	
4.11	Project in T.I.P. earlier (2)	
4.12	T.I.P. contact should be TPD not EPS	
4.13	EPS acquire all environmental approvals & permits internal & external	
5.	**PROCESS CYCLE - TIME REDUCTION - Compress cycle-time**	
5.1	Make the EPS review concurrent with the ADOT review	
5.2	Agreed upon review time - ADOT is not considered a priority	7 / 2 / 1
5.3	Establish firm dates with ADOT and FHWA	
5.4	At final allow 3 weeks for PSE review	
5.5	Timely notification of current regulations	
6.	**ERROR PROOFING - Making it difficult to do the activity incorrectly**	
6.1	Lessons in filing	1 / 1 / 0
7.	**UPGRADING - Use of capital equipment and/or improved working environment**	
7.1	Larger, quieter work area (6)/ergonomics (1)	5 / 2 / 1
7.2	Need more computers and printers (4)	9 / 4 / 0
7.3	Library	
7.4	Conference room (2)	

7.5	Efficient H.V.A.C. (3)	
7.6	Bookshelves for individual offices	
7.7	More user-friendly manuals	
8.	**SIMPLE LANGUAGE - Reducing the complexity of the way we write and talk**	
9.	**STANDARDIZATION - Having all employees doing an activity the same way**	
9.1	IRM Process - processes should be the same for all agencies	16 / 7 / 1
9.2	Memorandum of understanding and intergovernmental agreements (8)	18 / 6 / 2
9.3	Do all projects as if FED AID (2)	13 / 5 / 2
10.	**CUSTOMER-SUPPLIER PARTNERSHIPS - Upgrading performance of both**	
10.1	Continuity of staff through the whole highway development process	4 / 3 / 0
10.2	Adequate staffing (3)	3 / 1 / 1
10.3	Interdisciplinary teams	14 / 5 / 4
10.4	Environmental staff at District level	1 / 1 / 0
10.5	Delegation of Authority	2 / 1 / 0
10.6	Create a new Environmental position within TPD	
10.7	Create a TPD liaison position within EPS	3 / 1 / 1
10.8	Designate/train current TPD employee in environmental issues	
10.9	Designate current EPS employee to be liaison with District	
10.10	Single point of contact at ADOT	4 / 3 / 0
10.11	Project compatibility with Forest Plan	
10.12	Face-to-face contact with agencies (1)	

10.13	Improve trust and partnering (4)	5 / 2 / 1
10.14	Establish firm dates with outside agencies (4)	4 / 2 / 0
10.15	Staff (EPS) increase	
10.16	Forest coordinator for each forest as needed	
10.17	More EPS personnel (3)	2 / 2 / 0
10.18	More consultants	
10.19	More Roadside Development staff	
10.20	Agency promptness (3)	
10.21	Timely acquisition of all permits and TRE's	

11. BIG PICTURE IMPROVEMENT - Creative ways to drastically change processes

11.1	More EPS staff resources	7 / 3 / 1
11.2	Creative and unique designs	6 / 2 / 0
11.3	Regional sensitivity to environmental concerns	8 / 3 / 1
11.4	Good designs	
11.5	Gym in basement (2)	
11.6	Rai$e$	3 / 2 / 0
11.7	Equal pay for equal work/responsibilities	
11.8	Reduce peronnel turnover in ADEQ	
11.9	Eliminate ADEQ	
11.10	More time (2)	2 / 1 / 0
11.11	Don't contaminate in the first place	
11.12	Unlimited funding	

12.	**AUTOMATION - Applying tools, equipment, and computers**	
12.1	Hotline for latest environmental laws (4)	9 / 3 / 1
12.2	Distribution system for updates	
12.3	Local area network (2)	15 / 4 / 3
12.4	Bulletin Board System	2 / 1 / 0
12.5	Documentation Systems	1 / 1 / 0
12.6	Data Inventory	5 / 2 / 0
12.7	Develop Brochures - Newsletter - Updates Electronic bulletin board	1 / 1 / 0
12.8	Interactive computer network (cons., ATS, agencies) (3)	8 / 3 / 1
12.9	Computer hardware and software problems (< > User friendly)	
12.10	Better computer equipment	3 / 2 / 0
13.	**TRAINING / EDUCATION**	
13.1	Formal Education Program	4 / 2 / 1
13.2	Knowledge of Current Environmental Process	5 / 2 / 1
13.3	Understanding of Other Agencies Processes	2 / 1 / 0
13.4	Understanding Changing Laws (2)	
13.5	Communications between states	
13.6	Standard Presentation Improve the current presentation Video tape the presentation Require attendance	2 / 1 / 0
13.7	Specialized Presentation Require attendance	
13.8	Expand on the Highway Development Process Manual section dealing with the environmental clearance process	1 / 1 / 0
13.9	One-on-one training	
13.10	Workshops	4 / 2 / 1

13.11	Quality and Productivity Institute involvement by trainers	
13.12	National Highway Institute courses	
13.13	Attend interagency training - usually free Forest Service, Environmental Protection Agency, Corps of Engineers, etc. Require attendance	3 / 1 / 1
13.14	Planned training for new recruits Require attendance	1 / 1 / 0
13.15	Cross-training Environmental Planning Services personnel to other ADOT services and vice versa.	3 / 2 / 0
13.16	Cross-training within Environmental Planning Services	11 / 5 / 2
13.17	Designers/districts trained by EPS on issues	3 / 1 / 1
13.18	Better definition of processes of other agencies	2 / 1 / 0
13.19	Knowing COE needs	
13.20	Training on COE needs	
13.21	Knowledgeable project leaders Consultants who understand how abatement works and how to respond to federal requirements	
13.22	Knowledgeable project leaders	1 / 1 / 0

14.	**PROJECT TRACKING / COORDINATION**	
14.1	Tracking of projects/program in EPS	5 / 3 / 1
14.2	Project Monitoring	
14.3	Earlier notification of change in scope (4)	5 / 2 / 1
14.4	Closer coordination w/Districts	2 / 1 / 0
14.5	Involve R/W and environmental in location process	2 / 1 / 0
14.6	Develop a process for EPS to review and comment on "list" of potential projects from District prior to their approval.	

14. 7	Mitigation follow-up/post-construction monitoring	2 / 1 / 0
14. 8	More sharing of information between EPS planners	
14. 9	Good partnering with all agencies (3)	9 / 4 / 2
14. 10	Ongoing communication and cooperation with ADOT and public (?) (2)	
14. 11	Project leader must lead in coordinating with EPS	3 / 1 / 1
14. 12	Better communication with outside agencies	4 / 2 / 1
14. 13	Schedule and notify critical staff of Field Reviews; let them decide on attendance	
14. 14	Better ADOT/ADEQ coordination	
14. 15	Memorandum of Agreement to establish response times for reviews and approvals	4 / 2 / 0
14. 16	Develop Memorandum of Agreements with outside agencies and allow ADOT to take lead and spread federal funds across more projects	5 / 3 / 1
14. 17	Coordination between EPS and project leaders; integrate design and environmental issues (2)	
14. 18	All information obtained earlier	1 / 1 / 0
14. 19	Early Involvement (COE, EPS, FHWA, USFS, AZ G&F)	

15. PROJECT SCHEDULE

15. 1	Shelf Projects	1 / 1 / 1
15. 2	Flexibility in Scheduling	5 / 5 / 5
15. 3	Flexibility in Construction Program	
15. 4	Better use of five-year plan	
15. 5	Follow five-year program by Action Plan	1 / 1 / 1
15. 6	Start special studies earlier	

PREFERRED RECOMMENDATIONS PRIORITIZED

Ranking: TOP CHOICES In order of 1st Place Votes
Then, # of Votes

EVALUATION CRITERIA:

1) **Feasibility**
2) **Potential to improve the process and/or products**

		WT/VT/1st
16.27	Assign inter-disciplinary team to address environmental and R/W requirements as part of PA before programmed. Team to follow project through completion	30 / 7 / 5
15.2	Flexibility in Scheduling	5 / 5 / 5
10.3	Interdisciplinary teams	14 / 5 / 4
12.3	Local area network (2)	15 / 4 / 3
9.2	Memorandum of understanding and intergovernmental agreements (8)	18 / 6 / 2
1.2	Key players at meeting from outside (3)	17 / 5 / 2
1.6	Agency coordination (2)	20 / 5 / 2
9.3	Do all projects as if FED AID (2)	13 / 5 / 2
13.16	Cross-training within Environmental Planning Services	11 / 5 / 2
1.1	Realistic schedules (2)	11 / 4 / 2
14.9	Good partnering with all agencies (3)	9 / 4 / 2
9.1	IRM Process - processes should be the same for all agencies	16 / 7 / 1
11.1	More EPS staff resources	7 / 3 / 1
11.3	Regional sensitivity to environmental concerns	8 / 3 / 1
12.1	Hotline for latest environmental laws (4)	9 / 3 / 1
12.8	Interactive computer network (cons., ATS, agencies) (3)	8 / 3 / 1
14.16	Develop Memorandum of Agreements with outside agencies and allow ADOT to take lead and spread federal funds across more projects	5 / 3 / 1

14. 1	Tracking of projects/program in EPS	5 / 3 / 1
16. 15	Secure long-range inter-agency commitment through environmental documentation for corridor studies	9 / 2 / 1
5. 2	Agreed upon review time - ADOT is not considered a priority	7 / 2 / 1
10. 13	Improve trust and partnering (4)	5 / 2 / 1
13. 1	Formal Education Program	4 / 2 / 1
13. 2	Knowledge of Current Environmental Process	5 / 2 / 1
13. 10	Workshops	4 / 2 / 1
14. 3	Earlier notification of change in scope (4)	5 / 2 / 1
14. 12	Better communication with outside agencies	4 / 2 / 1
1.12	ADOT lead in consultations	5 / 1 / 1
10. 2	Adequate staffing (3)	3 / 1 / 1
10. 7	Create a TPD liaison position within EPS	3 / 1 / 1
13. 13	Attend interagency training - usually free Forest Service, Environmental Protection Agency, Corps of Engineers, etc. Require attendance	3 / 1 / 1
13. 17	Designers/districts trained by EPS on issues	3 / 1 / 1
14. 11	Project leader must lead in coordinating with EPS	3 / 1 / 1
15. 1	Shelf Projects	1 / 1 / 1
15. 5	Follow five-year program by Action Plan	1 / 1 / 1
16. 22	Draft PA before project is programmed to include environmental issues	5 / 1 / 1
10. 1	Continuity of staff through the whole highway development process	4 / 3 / 0
10. 10	Single point of contact at ADOT	4 / 3 / 0
11.2	Creative and unique designs	6 / 2 / 0
14. 15	Memorandum of Agreement to establish response times for reviews and approvals	4 / 2 / 0

16.5	Develop MOU's with other agencies	5 / 2 / 0
16.12	ADOT - Delegate authority / empower employees	4 / 2 / 0
16.13	Establish / limit timeframes for reviews (agreed upon in advance)	5 / 2 / 0
16.18	More environmental input on projects before put into 5-year program	5 / 2 / 0
16.23	Single consensus meeting at each stage of review, single meeting, stay until all issues resolved, attendees have authority to make decisions	9 / 3 / 0
16.26	improve selection process - accountability for past performance, reduce time for process	6 / 2 / 0
16.32	More partnering of complex projects	8 / 2 / 0
16.36	Establish procedures for timely decisions by management, particularly where design criteria, project scope, and $ don't match	8 / 3 / 0
16.37	Common interpretation of NEPA by various agencies (Common public hearing process, etc.)	3 / 2 / 0

4.2 Combine review of FEA by internal ADOT services and incorporate comments from internal ADOT services and instead, hold a comment resolution meeting with affected parties. This could also eliminate the final steps where we send the FEA to FHWA for review, incorporate their comments, then send the revised version back to FHWA for approval. We would already have come to agreement on the contents of document.

4.7 Prompt escalation of issues

EPS CATEGORIZATION OF TOP RANKED RECOMMENDATIONS

AGENCY COORDINATION

1. Partner with Agencies
   Develop agreement and commitment to improve trust, education, knowledge, and process and communication.

   - All applicable Agencies in priority order
   - Agreed upon schedules and reviews
   - Agreed upon points of contact
   - Consistency within Agencies
   - Revive ineffective MOAs/MOUs
   - Prompt escalation of issues (4.7)

TEAM

1. 16.27 Re: ID teams of empowered key players (1.2, 16.12, 16.18, 16.22).

2. 16.36 team establishes procedures for timely notification and decisions by empowered employees and management (16.23, 14.3).

   Project leader should:

   - Establish progress meetings.
   - Distribute status reports.
   - Maintain list of team members and area of responsibility/expertise ADOT, Agency, Consultant members 10.10.

3. Team commitment to partnering agreement.

4. Involvement of EPS staff through construction.

5. Discuss opportunity for creative and innovative design.

6. Empowered employees, delegated authority.

7. 4.2-joint concurrent review process.

RESOURCES

1. Establish computer networking within ADOT and between Agencies.

   a. Within EPS
   b. Within ADOT
   c. With Agencies and Consultants, etc.

2. Staffing analysis

   - Investigate Staff vs. Consultant mix
   - Investigate EPS staffing requirements

3. Resource library of existing data

   - GIS inventory and overlay of existing surveys
   - Manual filling system of prior surveys

EDUCATION

1. Road show "to other ADOT."
2. Participate in post-construction reviews.
3. "Lessons learned" at project clearance completion.
4. Internal cross-training.
5. 13.13
6. Formal education for new and old employees in environmental issues (Employee Development).

SCHEDULES

1. All services involved participate in developing realistic and flexible schedules for each project.
2. (15.5) link into priority planning projects.

OTHER

1. 9.3 (Federal Aid).
2. Empowered employees.
3. Address communication issues.
4. Mitigation monitoring
5. Creative, innovative, and unique design solutions to environmental concern. Need to provide to ADOT designers information and license to design environmentally. Tap into AASHTO Environmental Design Task Force and other states.
6. More flexible, more cost effective mitigations.
7. 16.26 Re: Consultant selection.

RECOMMENDATIONS DETAILED

MANAGEMENT AND MEASUREMENT OF THE ENVIRONMENTAL CLEARANCE PROCESS

Project Log
Cost Management System
Staffing Analysis

PROJECT LOG

I. Issue:

The EQuaTe Team had difficulty obtaining cycle-time information in an attempt to evaluate the Environmental Documentation process. Even while conducting in depth file searches to obtain significant environmental event dates, the information was not easily obtained and was sometimes missing.

II. Recommendation:

A. Develop a Project Log to remain with the project file. On it will be recorded the dates of significant events that directly affect the environmental evaluation process.
B. Schedule a cycle-time calculation by which all activity periods can be measured.

III. Action Plan:

A. Develop a Project Log listing all major events which can be appended to the project file - Manager Environmental Planning Services (EPS).
B. Review the Project Log with EPS project assessment personnel for comment and revision - Manager EPS.
C. Finalize the Project Log and distribute to each EPS Supervisor - Manager EPS.
D. Develop a monthly summary report to compile the results of completed Project Logs on completed projects - Manager EPS.

IV. Schedule:

A. Develop Project Log - December 10, 1992
B. Review by EPS Staff - December 20, 1992
C. Print final Project Log - December 22, 1992
D. Supply Project Log to each EPS Supervisor - January 1, 1993
E. Develop monthly summary report - February 1993

V. Cost:

Initial			
A. Develop Project Log	1 person X 4 hours	X $29.08 =	$116.32
B. Review Project Log	8 people X 1 hour	X $20.03 =	$160.24
C. Print final & distribute	2 people X 2 hours	X $13.00 =	$ 52.00
D. Develop monthly summary	1 person X 8 hours	S $21.70 =	$173.60
		TOTAL =	$502.16

Annual (EPS staff)*

A.	Complete Project Log	8 people X 10 hours X $20.03 =	$1,600.00
B.	Complete Summary	1 person X 12 hours X $21.70 =	260.00
		TOTAL =	$1,860.00

* Consultants preparing environmental documents will also be filling out these forms on their projects.

VI. Benefits:

A. Provides an easily prepared document which indicates to management the cycle-times of significant activities.
B. Allows management to identify those activities which need review to reduce environmental documentation time.
C. Provides a historical record of agency coordination.
D. Measurable benefits from these activities are:

1. Assists in reducing environmental documentation time.
2. Assists in reducing costs of environmental documentation.
3. Improves overall environmental documentation.
4. Information can assist in establishing accurate schedules and therefore assist in reducing project delays.

The Project Log provides a list of major milestone dates. These dates will be recorded for all design and study projects. Cycle times for major milestones and the total Environmental Clearance Process (ECP) can then be calculated from these dates. Other features of the log include lines to record who bid the work (in-house or by consultant), type of environmental documents, studies, and permits completed, a post-construction monitoring indicator, and space for pertinent comments.

All design projects will now include this Project Log in the front of the environmental project file. The environmental project leader (in-house or consultant), will be responsible for accurately recording these dates. EPS will assemble all completed Project Logs regularly to update key measurement charts and graphs in order to monitor the progress of implementing improvements to the ECP. Charts and graphs shown in this final report will be among those updated. Other graphical representations may be developed in the future using this data to better portray measurements of the process.

VII. Alternatives:

A. Do not develop a Project Log. Assemble data from project files.
B. Add an addendum to the Environmental Clearance Completion Review, as defined in these recommendations, that incorporates cycle-times.
C. Prepare a single log that lists significant dates and cycle-times that is maintained by the Supervisor of EPS personnel.
D. Utilize a computer traveller that resides on the desk of all EPS staff. They can use PCs to actively record data and manage project progress.

PROJECT LOG

PROJECT NAME _____

PROJECT NO. _____ TRACS NO. _____

PROJECT DESCRIPTION _____

_____

BID ADVERTISEMENT DATE _____ _____ _____

EPS PROJECT LEADER _____

ADOT PROJECT LEADER _____

CONSULTANT _____

TYPE OF ENVIRONMENTAL DOCUMENT _____

	DATE
FILE START	_____
EPS ASSIGNMENT	_____
INITIAL PA/DCR	_____
FIELD REVIEW	_____
SCOPING MEETING	_____
FINAL PA/DCR	_____

COORDINATION LETTERS AGENCY	DATE SENT	RESPONSE DATE* DUE	ACTUAL	CYCLE TIME (working Days)

* note NR = no response

SPECIAL STUDIES	CONSULTANT	DATE REQUESTED	DATE RECEIVED	CYCLE TIME (working days)
CULTURAL RESOURCES				
SURVEY				
TESTING				
DATA RECOVERY PLAN				
DATA RECOVERY				
AGENCY APPROVAL				
AIR QUALITY				
NOISE ANALYSIS				
HAZARDOUS MATERIALS				
PISA (Pre-Phase I)				
ISA (Phase I)				
PSI (Phase II)				
DSI (Phase III)				
BIOLOGICAL EVALUATION				
AGENCY APPROVAL				
OTHER				

	ADOT APPROVAL DATE	FHWA APPROVAL DATE
DEA/DEIS		

	DATE	LOCATION
PUBLIC MEETINGS		

PUBLIC HEARING NOTICE/OFFER	DATE	PUBLICATION
1st		
2nd		

	DATE	LOCATION
PUBLIC HEARING		
COMMENT PERIOD CLOSED		

DATE

FEA/FEIS

ADOT APPROVAL _____

FHWA APPROVAL _____

USFS DECISION NOTICE _____ FOREST _____

CE COMPLETION _____

EPS CLEARANCE MEMO/LETTER _____

TOTAL CYCLE TIME (FILE START TO CLEARANCE) _____

COMMENTS _____

_____

_____

_____

INVOLVEMENT (Y/N)	POST CONSTRUCTION MONITORING (Y/N)	
[ ]	[ ]	T & E SPECIES
[ ]	[ ]	PROTECTED NATIVE PLANTS
[ ]	[ ]	PRIME & UNIQUE FARMLAND
[ ]	[ ]	WETLANDS/RIPARIAN
[ ]	[ ]	FLOODPLAIN ENCROACHMENT
[ ]	[ ]	SEC 404 (NATIONWIDE PERMIT)
[ ]	[ ]	SEC 404 (INDIVIDUAL PERMIT)
[ ]	[ ]	SEC 401 CERTIFICATION
[ ]	[ ]	SECTION 4(f) RECREATION
[ ]	[ ]	SECTION 4(f) REFUGE
[ ]	[ ]	SECTION 4(f) CULTURAL
[ ]	[ ]	SECTION 6(f) PARKLANDS
[ ]	[ ]	SOLE SOURCE AQUIFER
[ ]	[ ]	HAZARDOUS MATERIALS
[ ]	[ ]	SCENIC ROAD
[ ]	[ ]	ARCHAEOLOGICAL SITE
[ ]	[ ]	HISTORICAL SITE
[ ]	[ ]	SECTION 106 CONSULTATION
[ ]	[ ]	NOISE ABATEMENT
[ ]	[ ]	NPDES
[ ]	[ ]	VISUAL
[ ]	[ ]	AIR QUALITY ATTAINMENT
[ ]	[ ]	OTHER

COST MANAGEMENT SYSTEM

I. Issue:

The EQuaTe Team dedicated a significant amount of time and energy to determine costs of the Environmental Clearance Process (ECP) but were unable to obtain accurate and definitive data from existing systems and programs. Thus, it was not possible to determine the cost of producing environmental clearance documents.

II. Recommendation:

Establish a cost management system using Activity Based Costing to determine the actual cost and cycle time for performing environmental activities and to provide a more thorough approach to tracking Cost of Quality.

III. Action Plan:

A. Utilize Environmental Planning Services (EPS) staff to develop activity codes for EPS that coincide with major environmental milestone activities - Manager EPS. Completion date February 26, 1993.

B. Submit codes to ADOT Accounting for approval - Manager EPS. Completion date March 31, 1993.

C. Publish and distribute activity codes to all applicable services and solicit their participation in using these codes - Manager EPS. Completion date April 30, 1993.

D. Request consultants to provide invoices with a breakdown of costs that would coincide with the activity codes - Contract Administrator, Engineering Consultant Services (ECS). Completion date April 30, 1993.

E. Use the Project Log, as defined in these Recommendations, for EPS project files by both ADOT staff and consultants - Manager EPS. Begin use by February 26, 1993.

F. Work with TRACS staff to develop usable reports to assist in identifying environmental costs and cycle times - Manager EPS. Completion date September 30, 1993.

G. Develop a schedule to compile and review environmental costs and cycle times and prepare a monthly summary. Assign to appropriate person and have first summary completed by September 30, 1993 - Manager EPS.

IV. Schedule:

See Action Plan for schedule dates.

V. Costs:

Implementation:

A. EPS staff time to implement Action Plan
8 people X $20.03/hour X 2 hours = $320.48

B. ADOT Accounting staff time to review and approve the new activity codes
1 person X $13.00/hour X 8 hours = $104.00

C. Data processing set-up costs
1 person X $31.87/hour X 4 hours = $127.48

D. ECS staff time
11 people X $24.22/hour X 1 hour = $266.42

E. Consultant time to implement new codes
1 person X $50.00/hour X 8 hours = $400/consultant

Assume (20 consultant firms)
$400 X 20 Firms = $8,000.00

Total Implementation Costs:

ADOT costs (A, B, C, D)	=	$818.38
Consultants Costs (E)	=	$8,000.00
Total Implementation Cost:	=	$8,818.38

Additional on-going annual costs:

A. Bi-weekly time sheet data entry
1 person X $13.00/hr X 2 hrs/pay X 26 pay = $676.00

B. EPS staff time to complete bi-weekly time sheets
14 people X $20.03/hr X .1 hrs/pay X 26 pay = $729.09

C. Average other ADOT staff time to support plan
50 people X $24.22/hr X .1 hrs/pay X 26 pay = $3,148.60

D. Average consultant time to support plan
50 people X $50/hr X .1 hrs/pay X 26 pay = $6,500.00

E. Data processing report costs
1 person X $24.22 X 1 hr/month X 12 months = $290.64

Total additional on-going annual costs: $11,344.33

VI. Benefits:

A. The ability to track and compare environmental costs and cycle times.
   Examples:
   - Total cycle time to produce an environmental document
   - Total cost to produce an environmental document
   - Major milestone cycle time to produce an environmental document
   - Major milestone cost to produce an environmental document
   - In-house vs. consultant
   - EPS consultant vs sub-consultant
   - Projects currently underway vs. past projects

B. Improve EPS resource management and workload forecasting/scheduling.

C. Better able to spot areas needing quality improvement.

D. Better determine future program budgeting and staffing.

E. Verification of Milestone Dates by Project Log dates.

F. Will indicate the best areas for opportunity for improvement.

The Activity Based Costing System will use environmental Activity Codes input on Bi-Weekly Time Sheets (BTS). New BTS activity codes will be created which more precisely identify the major milestones in the ECP. The new activity codes will enable EPS management to pinpoint actual activity costs and activity times for major milestones as well as the total ECP.

All ADOT personnel who perform environmental related work will use these new activity codes, including those monitoring and reviewing the work of others.

In order to capture this same information from environmental consultants their scope of work will include a requirement to supply actual hours spent on specific environmental activities. EPS activity codes will be provided to consultants to use on their monthly billings. Consequently, consultant hours spent on each activity will be itemized. Human Resource Management System (HRMS) will then enter the consultants data coincident with ADOT BTS data. Project Management reports summarizing all environmental costs per major milestone can then be provided. These reports will be designed by EPS and HRMS personnel to provide periodic summaries of the time and money spent on each project.

VII. Alternatives:

A. Establish a separate TRACS project number for environmental activities. This will require a separate budget for environmental activities as they are currently included in the design budget.

B. Do nothing to change the current system.

C. Maintain current system, but generate additional sorts of existing data per project.

STAFFING ANALYSIS

I Issues:

It is difficult to project staffing needs because:

A. Environmental regulations are constantly changing and increasing.
B. No management system exists to determine staffing needs.

II Recommendation:

Determine the number of staff members needed to do quality environmental work in ADOT.

III Action Plan:

A. Establish a 3 member task team which includes one member of the EQuaTe Team, one member from Environmental Planning Services (EPS), and one member from another ADOT org with organizational staffing experience.
B. Collect, summarize, and evaluate data.
    1. Determine the right balance of specialized personnel within ADOT required to complete environmental work on projects.
    2. Review the distribution of work of the environmental staff between ADOT and consultants.
    3. Review the balance between EPS on-call consultants and sub-consultants administered through Statewide Project Management Section (SPMS) or Advance Engineering Services (AES).

IV Schedule:

A. Project Log (see Recommendation)
B. Cost Management System (see Recommendation)
C. Task Team - September 1993
D. Organize, evaluate data, and prepare final report - 3-6 months

V Costs:

3 team members X $24.22/hour X 60 hours = $4,360
Note: Refer to other recommendations for costs of Project Log and Cost Management System.

VI Benefits:

A. Improve staff management
B. More efficient use of consultants

VII Alternatives:

A. Maintain existing staffing levels.

QUALITY OF THE ENVIRONMENTAL CLEARANCE PROCESS

Post-Construction Environmental Review
Environmental Clearance Completion Review
Assurance of Quality Consultants

POST CONSTRUCTION ENVIRONMENTAL REVIEW

I. Issue

Post construction monitoring of environmental mitigation measures is infrequently conducted and should receive more emphasis.

II. Recommendations

A. Upon completion of each project of significant environmental impact, the Environmental Planning Services (EPS) project leader and, as needed, key staff personnel representing major areas of ADOT that were instrumental in developing the project, and when appropriate, agency personnel, will review the history of the activities leading to its completion.
B. The review team will prepare a report identifying the progress of the project to include those elements that went well and those elements that did not meet expectations.
C. The report will make recommendations as to changes in procedures or policies that would improve all aspects of similar highway development projects.
D. The report will cover all aspects of the project from inception to project completion, including post mitigation monitoring.
E. EPS personnel attend currently held formal post construction endeavors that include significant environmental issues.

III. Action Plan

A. The EPS project leader will call a meeting of key project staff personnel, to include key District and construction personnel, following issuance of the project completion memo.
B. The team will prepare an after action report to include recommendations for improvement to the process.
C. The report will be circulated throughout ADOT and will be included in the EPS project files - EPS Project Leader.
D. Recommendations for process improvement will be submitted to the senior management Quality Process Improvement Team for approval and directions for implementation - Team (as mentioned in A).

IV. Schedule

A. Conduct post construction review - within 60 days of project completion.
B. Prepare action plan - within 90 days of project completion.
C. Circulate action plan and quality improvement recommendation to senior management - within 190 days of project completion.

D. Receive senior management response - within 230 days of project completion.

V. Cost (Assumes 15 Project Reviews Per Year)

A. Set up meeting
1(person) X 4(hours) X $24.22 X 15 = $1,453.20

B. Review meeting
8(people) X 8(hours) X $24.22 X 15 = $23,251.20/year

C. Report preparation
1(person) X 8(hours) X $24.22/hour X 15 = $2,901.40/year

D. Senior Management Response
1(person) X 8(hours) X $38.28 X 15 = $4,593.60
TOTAL = $32,204.40

E. Implementation of improvements - variable costs

VI. Benefits

A. The post construction review will capture all lessons learned while ideas are still fresh.
B. Recommendations will improve the development of similar projects in the future.
C. Increase in customer satisfaction. (Customer includes ADOT and other Agencies).
D. Increase confidence and cordiality with agencies.
E. Measurable benefits from this activity are:

1. More cost effective mitigation.
2. Fewer design delays as measured by environmental issue causing bid advertisement delays.
3. Fewer delays in resolving environmental mitigation as measured in activity and cycle time.

VII. Alternatives

A. Do not hold a post construction review.
B. Have the post construction review conducted by the project manager/leader only.
C. Circulate project improvement recommendations to middle management only.
D. Environmental Planning Staff be invited to formal post construction reviews.

ENVIRONMENTAL CLEARANCE COMPLETION REVIEW

I. Issue

The Environmental Documentation Process could be improved within Environmental Planning Services (EPS) by sharing innovative and effective procedures with other members of the EPS staff.

II. Recommendations

A. The EPS project leader will conduct an environmental process review upon completion of the environmental clearance letter.

B. The review will provide a summary of major environmental activities accomplished during the environmental documentation process.

C. The review memorandum will contain recommendations as to methods that will improve the documentation process and a listing of all key personnel contacted during the process.

D. The review and recommendation will be circulated throughout EPS with approval by the manager of EPS who will implement appropriate process improvement changes.

III. Action Plan

A. Upon completion of the EPS clearance memo the EPS project leader will review the environmental document and prepare an evaluation of those activities that went well and those that failed to meet expectations.

B. The reviewer will make recommendations reflecting improvements on process, procedures, and policies that could enhance future similar environmental processes.

C. The memorandum and recommendation will be submitted to the manager of EPS for approval and implementation - EPS Project Leader.

IV. Schedule

A. The EPS Project Leader - conduct EPS documentation review.
B. The EPS Project Leader - prepare process improvement recommendation.
C. Submit the review memorandum to the manager of EPS.
D. EPS manager will approve and implement appropriate recommendations.

V. **Cost** (Assume 30 Project Reviews Per Year)

A. Conduct review

1(person) X $26.61/hour X 2 hours X 30	=	$798.30
1(person) X $20.03/hour X 2 hours X 30	=	$1,201.80
1(person) X $21.70/hour X 4 hours X 30	=	$2,604.00

B. Prepare recommendations

1(person) X $26.61/hour X 2 hours X 30	=	$1,596.60

C. Approve recommendations

1(person) X $31.87/hour X 2 hours X 30	=	$1,912.20
TOTAL	=	$8,112.90

D. Implementation of improvements - variable cost

VI. **Benefits**

Reduce Errors

A. The EPS clearance review will capture lessons learned while ideas are still fresh.
B. Recommendations will improve development of similar environmental documents.
C. Measurable benefits from these activities are:

1. More cost effective mitigation.
2. Reduce delay time in obtaining agency coordination.
3. Fewer delays in environmental documentation.

VII. **Alternatives**

A. Do not conduct an EPS clearance review.
B. Combine EPS clearance review with the Post Construction Environmental Review.

ASSURANCE OF QUALITY CONSULTANTS

I. Issue

A. Environmental documentation and permitting are often included in the scope of design contracts. Since in many cases these services are not provided by the prime consultant, the firms selected to perform this work are sometimes not experienced or qualified to serve in this capacity. DBE status has been an issue in the selection of firms to prepare environmental documentation, rather than employing subconsultants that provide services in areas that overlap with the prime consultants capabilities.

B. Environmental Planning Services (EPS) staff, in many cases, are not involved on the selection panels for projects that include work that they will be administering. Consequently, the issue of poor past performance is not adequately addressed and the panel may not understand the capabilities of a subconsultant or the requirements for the environmental portion of the work.

C. Environmental Planning Services staff, on occasion, have had to spend an excessive amount of time supervising, editing, writing/rewriting, and coordinating the work of underqualified firms.

D. The ADOT Project Leader must ensure that the prime consultant be responsible to assure the quality of work in general, and specifically work performed by the environmental subconsultant.

II. Recommendation

In order to improve the quality of work being done by consultants for EPS, the following major steps should be implemented:

A. EPS will work with Engineering Consultants Services (ECS) to develop a better system for rating and documenting the performance of firms with environmental contracts with ADOT. This rating will be utilized in future selection processes.

B. Firms whose work is determined by EPS to be unacceptable will be ineligible to propose or be proposed on future work until they can demonstrate competence in the areas where they wish to work. A probationary period may be acceptable.

III. Action Plan

A. Meeting between the Managers of EPS and ECS will be held to raise and address issues pertinent to hiring the most qualified firms to undertake assignments from EPS and to utilize the performance of those firms in future selections.

B. Prepare a Consultant Selection Guide to detail revisions in selection procedures to provide the most qualified firms for assignments from EPS. The Action Plan would be prepared by designated staff members from EPS and ECS. Selection procedures prepared by EPS coordinators and an ECS staff member.

The Action Plan will address the issues of determining if another separate firm should be selected to prepare the environmental documentation or whether the firm doing the engineering work will do the environmental documentation. On major or highly specialized projects, EPS will select a firm specifically for coordination and development of the environmental documentation. The EPS staff will prepare the scope of work for selection of on-call consultants that will complete environmental documentation.

C. Action Plan to be reviewed by Section Managers.

D. Implement Action Plan.

IV. Schedule

A. Managers of EPS and ECS meet in February of 1993.

B. Consultant Selection Guide developed in March of 1993.

C. Consultant Selection Guide reviewed in April of 1993.

D. Implement approved Action Plan in May of 1993.

V. Costs

A. Staff time to develop and support Action Plan process. Estimated staff time 90 hours to address selection processes and develop on-call contracts.

(1 employee)(90 hours)($24.22/hr) = $2,180.00
(2 employees)(40 hours)(20.03/hr) = $1,600.00
TOTAL = $3,780.00

B. Staff time to explain measures to be implemented to other Sections and consultants.

(1 employee)(10 hours)($24.22/hr) = $ 240.00
TOTAL = $7,800.00

VI. Benefits

A. Better quality environmental documents.

B. Better utilization of staff in EPS.

C. More consistent and effective communications with outside Agencies. (Some Agency staff interviewed noted that sometimes they receive calls from ADOT consultants who do not appear to understand the process and seem inexperienced).

D. Better productivity for each dollar invested.

E. It is estimated that 30% of one full time equivalent staff person's time is spent per year supporting firms that are not doing good work. These firms in many cases are subconsultants and EPS staff had little or no involvement in the selection. Eliminating this situation will improve working relationships with consultants and the effectiveness of EPS staff.
Savings: 0.3 X 2080 X $20.03/hour staff = $12,498.

VII. Alternatives

A. Utilize two or three on-call firms to prepare all consultant EA and EIS documents for ADOT.

B. Establish a prequalified list or roster of firms to prepare environmental documents.

C. EPS personnel to prepare all environmental documents. This will require additional EPS full time employees.

ENVIRONMENTAL CLEARANCE PROCESS IMPROVEMENT RECOMMENDATIONS

Pre-Programming Project Scoping
Agency Coordination
Environmental Education
Creative Design
Environmental Resources Maps

PRE-PROGRAMMING PROJECT SCOPING

I. Issue

Projects are not well defined in scope and cost prior to placement into the Five-Year Highway Construction Program (FYHCP) in specific fiscal years. This frequently results in revisions to scopes of work, budgets, and/or schedules during project design. ADOT management, project leaders, and liaison's time is wasted at Project Development and Finance Committee meetings trying to make necessary adjustments.

Environmental impacts and issues are not sufficiently identified and evaluated before projects are programmed to determine significant potential problem and impacts to project scopes, schedules, and budgets.

II. Recommendations

Include a three level project environmental evaluation process in the new priority construction program process now under development by the QPI Priority Planning Team. This environmental evaluation would include a cursory overview of all candidate projects by District and Environmental Planning Services (EPS) personnel in Levels 1 and 2. For those projects suspected of producing greater environmental impacts, an environmental scoping team will be formed to review them more closely in the field and office in Level 3.

III. Action Plan

The QPI Priority Planning Team (PPT) is currently revising the process for prioritizing projects to include in each new FYHCP. As the PPT now defines it, all projects for which Advance Engineering Services (AES) prepares a Project Assessment (PA) will now have PAs prepared before they are eligible for inclusion in the FYHCP.

A three level approach will be used to evaluate the projects recommended by District staff for inclusion into the FYHCP. This recommendation primarily focuses on the environmental involvement for input to this process. Broader involvement by other affected Services are not intended to be addressed in detail here, though some of their involvement is described due to interaction with the ECP.

LEVEL 1 REVIEW

Level 1 is a quick evaluation of the complexity of each project with a determination as to the type of environmental document required to environmentally clear the project. In Level 1 the District Engineer and manager of EPS will each designate a staff member to meet and review the District's

trimmed list of candidate projects in each category. These will be projects submitted to District by public and local jurisdictions as well as federal and state jurisdictions and other sources. These will also include projects originating from various ADOT Services identifying specific needs, such as Materials Pavement Services selection of pavement preservation projects. District will insure that all projects to be considered have a clear, simple description of project need and limits.

This list will be sent in advance to the manager of EPS. To prepare for the Level 1 meeting with the District Engineer, the manager will review available records and conduct planning level consultations with other Environmental Planning Services staff to identify obvious potential environmental issues. Scope, schedule, and budget issues related to each project will be briefly evaluated, and the expected level of environmental documentation will be determined. The EPS manager will share this information with the District Engineer for consideration in determining final project rankings.

During Level 1 the EPS manager and District Engineer will develop a list of candidate projects requiring more detailed environmental study during the Levels 2 and 3 reviews. They will also list the type of environmental related disciplines needing staff representation to evaluate in greater detail the environmental issues for each of these projects. This team will be called the project Environmental Scoping Team (EST) (see "Team Membership" below). Ideally, the EST will also become part of the project Interdisciplinary Design Team (IDT). Upon completion of the Level 1 review the District Engineer will send a list of the projects needing additional study to appropriate Section/Service managers. They should begin assigning personnel to these ESTs. The EPS manager will contact affected outside environmental agencies regarding their possible involvement in evaluating proposed projects.

For many projects, this Level 1 review will provide detail of environmental issues sufficient for inclusion into the Project Definition Analysis and Project Assessments developed in Levels 2 and 3. Others, due to project complexity or the type of potential environmental issues, may require more detailed environmental study.

According to the proposed PPP the District Engineer will now send his prioritized list of candidate projects to the State Engineer and the Director of the Transportation Planning Division. Their staffs will evaluate these proposals. They will then send on acceptable single project proposals to AES to prepare Proposals for Definition Analysis (PDA). The PDA is a brief project definition and scoping paper. At this point EPS will also receive this list of projects. For all projects on this list, which are also on the EPS list of projects needing more detailed environmental evaluation, the EPS staff will conduct a Level 2 review.

LEVEL 2 REVIEW

The Level 2 review steps up the environmental evaluation another notch to help discover hidden impacts to project scope, schedule, or budget. Appropriate EPS staff will conduct the Level 2 reviews. The staff may contact EST members and other affected ADOT Sections/Services and outside agencies to help gain a better understanding of expected environmental impacts resulting from the proposed type of highway construction work.

EPS staff will complete the Level 2 review by writing an environmental impact summary. The summary will be sent to AES for inclusion into their PDA.

Following review of the completed PDAs, the list of candidate projects will be further reduced in the PPP to include only those projects which are to receive full scoping with Project Assessments (PA). By this time the Environmental Scoping Team members, identified in the Level 1 review, should be named and contacted by AES to attend on-site field reviews of individual projects.

LEVEL 3 REVIEW

During the Level 3 review the Interdisciplinary Design Teams will perform detailed scoping efforts to fully define the intent of work on each project. Work items will be quantified and given a cost estimate from which a total project cost will be determined. The Environmental Scoping Team will focus on the impacts of environmental issues as they could affect project scope, costs, and schedule. Other Agencies affected by the work will be invited to provide their input and to "buy into" the scope of work. AES will compose the PA for each project to summarize the findings and input from the Interdisciplinary Design Team, including the environmental summary. This recommendation has focused on the PA as the main scoping document to be produced. Keep in mind that Design Concept Reports and corridor studies will also be done before individual projects are included in the FYHCP.

An important element in this project definition process is the increasing involvement of key team members at various stages of project definition development. In fact, EQuaTe recommends the following criteria define the roles of the Environmental Scoping and Interdisciplinary Design Teams.

<u>Team Membership</u>

A. District engineers will provide ADOT Section/Service managers with a list of candidate FYHCP projects for which Environmental Scoping Teams and team members will be selected. These teams will become involved as AES prepares to develop PAs for projects. When environmental issues are minor an EPS staff member alone can provide sufficient environmental input to include in the PA.

B. The EST should include at least a representative of EPS, Right-of-Way, Advance Engineering, District, and Highway Plans or Statewide Project Management Services on major reconstruction projects as well as other pertinent disciplines determined in the Level 1 meeting. A FHWA representative should be given an opportunity to provide input. Keep in mind that the EST is only part of the larger IDT.

C. Each EST and IDT member will make a commitment to remain on the team from inception through post-mitigation monitoring. Team members need to attend pertinent project related meetings and reviews.

D. The first meeting of the EST will have as its purpose the forging of a Design Partnering Agreement. The EST will also make a commitment to the large interdisciplinary team project design partnering agreement. Both of these agreements could be made at the same partnering session.

E. The EST and IDT will establish the times and procedures for decision making by empowered employees and management.

F. The EST and IDT members will be prepared to make decisions at progress meetings or agree upon a time frame for decisions to be made.

G. The EST and IDT will establish a Team Decision Log to document all major decisions by signing the log at each major stage of project development and have authority to commit their Section/Service or Agency to the decisions.

H. In the event that a team member cannot continue with the team and must be replaced, previous commitments will not be revisited without majority team consensus.

The project leader (IDT Leader) shall:

A) Maintain a list of EST and IDT members (name, agency discipline represented, phone, address).
B) Establish progress meetings and notify members.
C) Distribute status reports and meeting minutes.
D) Maintain the Team Decision Log.

IV Schedule

Implementation of this recommendation will officially take place once the Priority Programming Team implements its new Priority Programming Process. Involvement of EPS, the EST, and the IDT as defined in this recommendation are based on specific activities identified in the proposed PPP. Unofficially, this recommendation could be implemented any time a new list of projects is submitted by each District

Engineer for consideration of inclusion in the FYHCP. Timing of involvement in the three levels of environmental review would be consistent with the timing of the three related PPP activities identified in this recommendation. The timing for implementing this recommendation would also be dependent upon adequate staffing by all involved Sections/Services and Agencies to attend Project Assessment field reviews. Since the number of PAs to be performed will increase over the number now being produced.

V Cost

Assuming all projects which currently receive PAs will also receive them in the proposed PPP, there would be no additional cost for these activities. However, since the number of PAs needed to be developed in the proposed PPP will increase and this recommendation calls for more input by affected parties during this process, there does appear to be the need for additional person-hours spent on the Level 3 reviews. Also, EPS and District staff will need to allot time to the Level 1 and 2 reviews. NOTE: At this time EPS does not have enough staff to allot more hours.

Level 1

2 people X $29.08/hr X 16 hrs = $930

Level 2

2 people X $29.08/hr X 16 hrs = $930
2 people X $21.70/hr X 16 hrs = $700

Level 3

10 projects X 10 people X $26.61 X 16 hrs = $42,580
10 projects X 1 person X $24.22 X 320 hrs = $77,500*
Subtotal = $122,640 per District
For 4 Districts.....Total Cost = $490,560 per year

* ($160,000 Consultant)

EPS Staff Cost

Level 1

1 person X $29.08/hr X 16 hrs = $465

Level 2

1 person X $29.08/hr X 16 hrs = $465
1 person X $21.70/hr X 16 hrs = $350

Level 3 (Additional Projects)

10 projects X 1 person X $26.61 X 16 hrs = $4,260

Subtotal = $5,540

For 4 Districts.....Total Cost = $22,160

Level 3 (Typical Yearly Projects)

70 projects X 1 person X $24.22 X 16 hrs = $27,130

Total EPS Staff Cost = $49,290

FTE equivalent = $49,290/2080 = $23.70/hr
This is equivalent to 1 FTE Grade Level 20

Under EPS staff cost this EPS staff member is assumed to be involved not only on the additional PAs due to the new process, but their time is also counted on all PAs done under current policy, since their involvement in PA development now is limited. No additional costs were included for Design Concept Reports and Corridor Studies on the assumption that these activities are already being performed by EPS. They will just be done early in the process.

VI Benefits

A. Earlier involvement by EPS, the EST, and the IDT in project scoping should result in earlier recognition of problem impacts before projects are committed to specific scope of work, budget, and schedule.

B. Improved ability to fulfill project scope, schedule and budget by better and earlier understanding of the major impacts to project development.

C. Consistent, committed team membership will be more cohesive and thus help reduce rework caused by revisiting issues which have already had action taken on them.

D. Fewer delays in project schedule due to empowered team members making decisions according to an agreed upon procedure.

E. Improved ADOT coordination and relations with affected parties by assuring that all mitigation measures on a project have been satisfactorily implemented.

F. By dealing with specific issues and potential problems earlier in project development while the project is initially being scoped, many unanticipated factors, which cause rework and delay later during project design, can be avoided.

G. The number of project bid advertisements delayed due to environmental reasons will be reduced because projects with significant environmental impacts will more likely be identified earlier, before projects are included in the FYHCP, so scheduling impacts can be considered when placing the projects in specific fiscal years.

H. Please see the SUMMARY OF COSTS AND BENEFITS section of this report for estimated net savings derivable from the recommendations in this report.

VII. Alternatives

A. Reduce the number of levels at which EPS reviews candidate FYHCP projects from three to two or one in any combination desired with the participants at each level remaining as proposed in this recommendation. This would reduce the amount of time EPS and/or other personnel would be required to dedicate to scoping projects. It might also reduce the effectiveness with which the projects environmental issues can be adequately identified and impacts determined, and/or hinder reducing the number of projects which must be reviewed at each level.

B. Use a Level 1 environmental review only and require District staff to submit candidate projects to Environmental Planning Services for advanced scoping prior to finalizing project priorities, schedules, and cost estimates. An EPS approval would need to accompany the final list of projects from District. This would place the burden on District staff to schedule and obtain a timely review by EPS staff.

C. Use a Level 1 environmental review only and have District send its final prioritized list of projects through TPD's Priority Programming Process by way of Environmental Planning Services for review and comment. This would place the burden of scheduling work on EPS staff to accomplish the review within the overall times allowed for the preparation of the Five-Year Program.

D. Use environmental consultants to perform the environmental evaluations as outlined in this recommendation. This would be appropriate if the consultant would remain as a team member of the EST throughout the life of the project. However, it would hinder continuity of team membership if they did not stay on the project beyond development of the PA.

AGENCY COORDINATION

I Issues

There is a perceived lack of cooperation and sensitivity between ADOT and other Agencies.

The cycle time of project environmental activities appears excessive. Lengthy review and negotiation of environmental concerns between ADOT and outside Agencies result in delays to project schedules.

II Recommendation

Use a formal partnering process using a generic relationship focus rather than project specific.

A. Individual partnering with single Agencies to establish the basic way to do business together.

B. Multiple Agency partnering to establish the basic way of doing business, attempting to attain consistency among all participants, or at least agreement on basic issues.

For A and B

1. Create the basic relationships which will support project specific partnering initiatives.

2. In addition to traditional partnering objectives, the general partnering objectives will include resolution of various issues:

    a. Identify each Agency's basic goals and objectives.
    b. Establish and develop a commitment to project schedule and review date adherence.
    c. Establish Points of Contact within each Agency and ADOT.
    d. Establish issue resolution/escalation process.
    e. Clarify decision making responsibility and authority.
    f. Develop procedures for project specific partnering for project development and agree on required level of associated environmental effort.
        1) Corridor Studies
        2) Location/Design Concept Reports
        3) Project Assessments
        4) Corridor Assessments
    g. Include District maintenance personnel.

3. For USFS partnering, amend existing MOU as required or recommit to follow MOU.

4. For FHWA partnering, develop various additional clarifications:
   a. Define logical termini.
   b. On a statewide basis, identify routes and route segments with logical termini.
   c. Identify what conditions require corridor studies.
   d. Identify which of these routes and route segments will require corridor studies.
   e. Identify which of these corridor studies require various corridor alternatives.
   f. Define "spot improvements."

III Action Plan

A. Solicit Agency participation - Assistant Director
   One-on-one or workshop setting
   (Propose Dates)

B. Request for development partnering - Manager EPS
   1. Determine participant list - Manager EPS
   2. Establish an agenda - Manager EPS
   3. Establish date - Manager EPS

C. Appoint facilitator - Manager EPS, Partnering Coordinator
D. Determine location, facilities - Manager EPS/U.S. Travel
E. Give notification of meeting - Manager EPS
F. Conduct session - Facilitator
G. Follow-up/implementation - ADOT and Agency

IV. Schedule

Partnering sessions can be scheduled beginning the second quarter of 1993. All partnering sessions will be completed within a two year period.

V Cost (ADOT cost only)

Per Agency/Partnering Session

Facilities.....$1,000.00 per day
Facilitator.....$1,500.00 per day
ADOT Personnel Time
10 People @ 24.22/hour X 8 hours = ...$1,938.00
Follow-up/Implementation.....$14,000.00
(assume 4-full day meetings)
Total.....$17,000.00/Agency
8 Agencies X $17,000.00 per Agency = $136,000.00 TOTAL

Agencies (A is highest priority)	High, Medium, Low Probability of success Ease of working with	Volume of Proj
A Forests*		
A Coconino	M	H
A Apache-Sitgreaves	H	M
A Kaibab	H	L
A Prescott	M	M
B Tonto	M	H
C Coronado	H	L
A ADEQ and EPA	H	M
B USFWS and AGF	H	H
C COE and L.A.	H	L
D BLM	H	L
Tribes	L	L

* Conduct 3 Partnering Sessions with the Forest Services. Conduct one each for Tonto and Coronado, and one to include Coconino, Apache-Sitgreaves, Kaibab, and Prescott.

VI Benefits

A. Conveys that ADOT is willing to cooperate with and is sensitive to key Agency's requirements.

B. Provides an opportunity for interaction between ADOT and partnering Agency personnel in a positive environment.

C. Provides an opportunity for general, rather than project specific dialogue, between ADOT and partnering Agency.

D. Improves relationship and communication between ADOT and partnering Agency reducing negotiation and environmental clearance process cycle times.

VII Alternatives

A. Partner each individual project with significant environmental issues.

B. Develop individual MOUs between ADOT and each of the key Agencies.

C. Develop a single MOU between ADOT and all of the key Agencies.

ENVIRONMENTAL EDUCATION

I Issue

Environmental issues are becoming a major concern of the general public resulting in increased political emphasis and more restrictive federal/state rules and regulations. This is further impacted by the fact that the environmental documentation and mitigation process is not widely understood within ADOT or among outside Agencies.

II. Recommendation

A. The Environmental Clearance Process (ECP) should be described to all levels of management to include highway development, construction and maintenance personnel to insure that all environmental issues are easily recognized, documented and mitigated in an efficient and professional manner. The following activities will accomplish this recommendation:

B. Develop a presentation to be given to ADOT Highway Development Group employees and District personnel that will explain the environmental planning process.

1. Describe regulatory requirements relating to design for:
   a) Cultural resources
   b) Hazardous materials
   c) 401 Water Quality Permits
   d) 404 Dredge and Fill Permits
   e) Threatened and endangered plant and animal species
   f) National Pollutant Discharge Elimination System (NPDES)
   g) Noise abatement
   h) Air quality
   i) Other issues of regional importance (visual, socioeconomic, etc.)
   j) Public involvement

2. Describe activities to be monitored during construction.

3. Describe the post construction monitoring program.

4. Describe various mitigation alternatives.

5. Describe environmentally sensitive issues.

2. Prepare a video tape of the presentation for distribution throughout ADOT.

III. Action Plan

A. Develop overall presentation outline - Manager Environmental Planning Services (EPS)
B. Develop subject matter presentation by discipline - EPS staff
C. Rehearse presentation - EPS staff
D. Make one presentation to Highway Development personnel - EPS staff
E. Make one presentation to ADOT District personnel - EPS staff
F. Video record presentation - Manager EPS
G. Distribute copies of video for presentation to Highway Development and District personnel

IV. Schedule

A. Develop presentation outline - 3rd quarter 1993
B. Develop script - 3rd quarter 1993
C. Initial presentation - 4th quarter 1993
D. Video - 2nd quarter 1994

V. Cost

A. Script outline
1 (person) X $31.87/hr X 4 hrs/person = $127.48

B. Prepare script
10 (people) X $24.22/hr X 16 hrs/person = $3,875.20

C. Rehearse
10 (people) X $24.22/hr X 4 hrs/person = $968.80

D. 2 Presentations
10 (people) X $24.22/hr X 8 hrs/person X 2 = $3,875.20

E. Video Production - ADOT in-house prepared 45 min. tape*
10 (people) X $24.22/hr X 40 hrs/person = $9,688.00
($180 per minute of film)

F. Distribute Video
1 (person) X $14.86/hr X 4 hrs = $59.44
TOTAL = $18,594.12

* This estimate assumes in-house prepared video.
For Consultant prepared film ($1,000 per minute):
45 minutes X $1,000 = $45,000.

VI. Benefits

A. Provides Highway Development and District personnel with information relating to environmental concerns.
B. Alerts Highway Development and District personnel to design and maintenance activities that may be impacted by environmental rules, regulations, and laws.

C. Provides early identification of environmental issues which may be avoided, reduced, or mitigated thereby reducing redesign costs.

D. Identifies personnel within EPS as points of contact when environmental issues arise.
E. Educates Highway Development and Operations personnel on how cooperation in successfully negotiating and implementing environmental mitigations can improve future relations with affected outside agencies.
F. Measurable benefits from these activities are:

1. Reduced design changes.
2. Fewer construction delays.
3. More cost effective mitigation.
4. More complete identification of environmental issues.

VII. Alternatives

A. EPS manager and staff continue to present informational methods.
B. Develop program for presentation by one person covering all environmental areas of concern instead of each specialist presenting their own area of expertise.
C. Use a professional organization by contract to make presentations.
D. Establish a position at Employee Development or train Employee Development Staff to perform environmental training.

CREATIVE DESIGNS

I Issues

The pre-design phase too often includes a preconception as to the project scope and design. This preconception limits the parameters by which the initial design is established and leads to a design which requires adjustments at the 30% to 90% design phase or does not yield the best solution. These adjustments negatively impact both scheduling and budgeting.

II Recommendation

A. Flexibility in design criteria is necessary in the pre-design phase to allow for consideration of all alternatives. These alternatives should then be reduced to the most prudent and feasible alternative to consider all potential environmental impacts and include environmental mitigation measures. Once the preferred alternative is selected, it should be taken into design and not changed unless impacts are discovered that cannot be avoided, minimized, or mitigated. The environmental mitigation effort should, however, remain sufficiently flexible to meet the final design criteria.
B. Apply creative designs to address design challenges.
C. Apply principle of "the best mitigation is avoidance".
D. Encourage partnering between highway designers, ADOT management, and Agencies.
E. Promote environmental sensitivity in ADOT design philosophy.

III Action Plan

A. The project design team should follow the policy in the Highway Development Process Manual to identify environmental impacts concurrent with engineering alternatives.
B. The project design team should develop a prioritized list of desirable and necessary avoidance for each project (e.g., wetlands cannot be infringed upon while common trees should be avoided, but not at the expense of listed plant species).
C. The project design team should establish flexible guidelines for highways in environmentally sensitive areas that allow evaluation of any recommended solutions. In establishing the guidelines the following items should be **considered where applicable:**
    1. Consider bargaining with mitigation; offer feasible mitigation in lieu of infeasible mitigation or extensive environmental studies.
    2. Consider curvilinear highways in rough terrain.
    3. Design alignments to minimize earthwork, surface and vegetation disturbance, and negative visual effects by following the contours of the earth.

4. Evaluate separate horizontal and vertical alignments for each direction of divided highways where feasible.
5. Consider flexible typical sections and develop guidelines for their applications in certain circumstances.
6. Consider desirable and minimum design speeds and develop guidelines for their applications in certain circumstances.
7. Advocate flatter slopes which can be re-vegetated instead of being concerned only with reducing size of footprint.
8. Evaluate methods for protecting animals and traffic from one another.
9. Pursue methods for minimizing impacts to protected species.
10. Consider expansion of wildlife refuges, wilderness areas or parks as a mitigation option.
11. Ensure contractor compliance with all applicable state and federal laws, rules, and regulations.
12. Consider bridges for wildlife crossings even though culverts may be more economical.
13. Pursue funding possibilities for mitigation not currently available (i.e., bicycle path construction).
14. Evaluate Agencies' suggestions or designs that are not ADOT standard, on a case by case basis.
15. Gather information about mitigation methods and creative designs developed by other States and Agencies.
16. Develop a tree replacement program.

IV Schedule

A. Project design teams should develop project-specific prioritized lists of issues, concerns, and opportunities for twelve months. EPS Manager assemble all these lists.
B. EPS Manager to form a task team from among the project design teams to organize the information from A. above.
C. Task team to evaluate and write guidelines for highways in environmentally sensitive areas during the second twelve month period.
D. Task team to obtain management approval and implement guidelines for highways in environmentally sensitive areas during the third twelve month period.

V Costs

A. One-time costs

Cost of Task Teams

1. Evaluate and write guidelines	
(5 members)(2 hrs/wk)(52 wks)($40/hr)	= $20,800
2. Obtain approval and implement guidelines	
(5 members)(1 hr/wk)(52 wks)($40/hr)	= $10,400
(10 managers)(40 hrs)($40/hr)	= $16,000
TOTAL	= $47,200

B. Ongoing Costs

1. Additional environmental evaluation during engineering design.
2. Establishing alternatives to standard typical sections, design speeds, etc.
3. Training designers to use and modify alternate standards.
4. Evaluating additional alternatives and alignments.
5. Additional engineering and construction cost of more geometrically complex and possibly longer roadways.
6. Developing and evaluating animal collision prevention methods.
7. Evaluating methods for species impact minimization.
8. Higher construction costs, in some cases, due to plant avoidance, salvage, or penalties for loss.
9. Land purchase as mitigation.
10. Tree value or tree replacement costs.
11. Higher construction cost for bridges instead of culverts.
12. Bicycle path construction and possibly maintenance.
13. Gathering information about mitigation and creative designs.

VI Benefits

A. Less damage to Arizona's environmental resources.
B. Increased ADOT credibility with Agencies and the Public.
C. Reduced earthwork costs.
D. Reduced salvage costs.
E. Reduced mitigation costs through reduced environmental impacts.
F. Reduced project development costs through better partnering among ADOT and other Agencies (i.e., less impasses).
G. Reduced construction costs in some cases.
H. Satisfaction of persons working toward minimizing negative environmental impacts of highways.

VII Alternatives

Project design teams to partner design and environmental guidelines on a project specific basis.

ENVIRONMENTAL RESOURCES MAPS

I Issue

There is no central repository for environmental data that would provide a reference for planning and design personnel as to what information is available or not known about a selected segment of highway.

II Recommendation

Develop a statewide graphic display using the county map series that would portray by color and other codes what environmental information is available regarding a selected segment of highway within the State system.

III Action Plan

A. Obtain a complete set of county maps and filing cabinet.

B. Determine method of display (e.g., overlays, various symbols, etc.)

C. Display by color code environmental activities and surveys that have been completed on each segment of State highway.

D. Display information related to:
   1. Cultural resources
   2. Hazardous materials
   3. Biological evaluations
   4. Air analysis reports
   5. Noise analysis reports
   6. National Pollutant Discharge Elimination System surveys (NPDES).

E. Obtain a person in temporary status such as a summer hire, ADOT redeployment personnel, etc.

F. Have temporary personnel mark the county maps under the direction of the prime environmental planning person who is responsible for that discipline.

G. Limit input information to past surveys that have been completed within the last 5 years.

H. As environmental information is obtained or surveys are performed, the new information will be added to the display.

Manager, Environmental Planning Services (EPS) responsible for Action Plan.

IV Schedule

A. Obtain temporary personnel - September 30, 1993.

B. Complete coding of each county map set - March 31, 1994.

V Costs

28 weeks X 5 days X 8 hours = 1120 hours
1 person X $20.03 X 1120 hours = $24,400 TOTAL

VI Benefits

A. Greater availability of recent survey information to EPS planners and consultants.

B. Reduced time in reviewing draft PA/DCRs.

C. Reduced time in advising consultants and ADOT personnel as to status of environmental information.

VII Alternatives

A. Do not produce Environmental Resources Maps.

B. Prepare a set of file drawers containing files of resource surveys and dates by route number.

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ENVIRONMENTAL CLEARANCE PROBLEMS ADDRESSED IN RECOMMENDATIONS

NUMBER OF DAYS FOR ENVIRONMENTAL CLEARANCE

The Number of Days for Clearance charts in Appendix B graphically depict where the greatest concentration of project environmental clearances occur over time. One notable similarity in all the charts is that the largest number of clearances for all clearance categories occurs in the shortest time period. The remainder clearances drop off sharply to the next time period and then gradually decrease in number over time. The only category which less dramatically follows this pattern is that for Environmental Assessments (EAs). EAs are so individualized that their amounts of time to complete vary over a wide range of time.

Out of 99 projects studied 50 received environmental clearance within six months of starting environmental activities. Three of these projects received EAs. Also, 69 projects were cleared environmentally within one year, with four of these receiving EAs.

The major reasons for project environmental clearances taking longer than one year are summarized on the chart called REASONS FOR LONG ENVIRONMENTAL CLEARANCE PROCESS following this written summary.

1 TO 1-1/2 YEAR ECP

Seven of the eleven projects, cleared between 12 and 18 months, were projects without any environmental concerns. The Environmental Planning Services (EPS) staff gave seven of these projects a low priority on their work schedule. With limited resources, the staff diverted their energies to more pressing projects. Even though four of these seven projects had their bid advertisement dates delayed, only one of the projects was delayed due to an environmentally related issue. That issue involved preparation and review of the environmental document, which was done by a consultant hired by a local government. The local government environmental process is completely separate from that done by ADOT. EPS staff reviews these documents at the request of the local government, but has no other input to its preparation. Local governments handled four of these seven projects.

Three of the remaining four projects in this group were affected by changes in scope of work. Such changes required EPS to address any environmental concerns which would be affected by this new work on the project. All three of these projects did require additional environmental studies to clear the project for construction. The issues were biological evaluation, hazardous materials, and cultural resources. Only one eventually caused a delay to advertise the project for bids due to the environmental issue.

1-1/2 to 2 YEAR ECP

The next group of projects were cleared between 18 and 24 months. Again, change in scope of work was a major contributor to the long time frame to environmentally clear the projects. It affected four of eight projects. Though three of these projects required biological evaluations, these studies were not the cause of any project bid advertisement delays. These same three projects, along with another in the next group, were to be bid together. The change in scope really only applied to one project, but affected the other three due to their being bid together.

The other major issue in this group was agency coordination which affected three projects. One involved an Indian community which was slow in responding to archaeological surveying and testing requirements. Another involved a slow responding Park Service which gave a low priority to this ADOT project in their work load. The other involved an agency requiring mitigation of safe passage for animals crossing the State highway. The ADOT ECP had to wait for the completion of a study on the desert Bighorn sheep before mitigation with the State agency sponsoring the study could be worked out. This issue caused 24 months delay to project bid advertisement. It was the only project in this group to cause an environmentally created delay.

The last project in this group had a consultant prepare the environmental document. A lack of an aggressive project manager and EPS project leader monitoring their work was attributed as the main cause for less than timely work on the document.

2 TO 3 YEAR ECP

The next group of projects took two to three years to complete their environmental documents. Three of the seven projects had special environmental studies needed. One of these was the result of a change in scope of the project. A wetlands issue arose on another of these projects due to poor maintenance of a metal culvert which plugged up and caused water to pond. This caused a two month delay in the bid advertisement.

Two other projects had agency coordination problems. Both concerned relations with Forest Services. On one the Forest Service archaeologist was slow to take action on field archaeological investigations. On the other the Forest Service imposed strict adherence to completing the Integrated Resource Management process even though it was introduced in the middle of the project, and they were already overloaded with ADOT projects. This process required an Environmental Assessment even though the Federal Highway Administration accepted only a Categorical Exclusion to environmentally clear the project. It cost the project almost two years of bid delays.

Of the two remaining projects in this group, one was a local government project. A consultant prepared the environmental document, but the contract money ran out before the document was completed. The city needed assistance from EPS to help show them how to complete the document. This delayed the project bid for a year and a half. The other project experienced poor consultant preparation of the environmental document requiring much rework to complete. There was also a scope of work change causing environmental rework, and eleven months of project bid delay.

3 TO 4 YEAR ECP AND 5-1/2 YEAR ECP

In the last two groups two were local government projects. Both took three to four years to clear. One had a dispute regarding right of access being revoked to local users. Neither of these projects were delayed for environmental reasons.

The third project, taking three to four years to clear, had been environmentally surveyed and cleared for hazardous materials. However, further into project design the Geotechnical Section found gas in the soil during their drilling for test samples. A full hazardous materials study and removal was then undertaken. The project lost two and a half years in delay to the bid advertisement date.

The last project topped the list with almost five and a half years time required to environmentally clear the project. Again, initially the problem was hazardous materials. In the end, the roadway alignment was shifted to avoid the site. However, the project also switched from state funding to federal funding requiring a higher level of environmental investigation. Later, another project was added to this one, essentially changing the project scope, and requiring an Environmental Assessment to address it. Total environmentally caused bid advertisement delay was 31 months.

EVALUATION OF FINDINGS

A number of EQuaTe's recommendations address the environmental clearance problems discussed above. Listed in the second chart below are the major problem areas discovered and the recommendations put forth to improve the process. See the individual recommendations for detailed discussion of the improvements.

REASONS FOR LONG ENVIRONMENTAL CLEARANCE PROCESS

30 Projects Taking Longer Than One Year to Clear Environmentally

Project Number	Project Name	Type of Clear-ance	Work Days to Clear	Major Reasons for Long Clearances									
				Environmental Issue				Scope Change	Agency Coord.	Local Govt.	Con-sultant	Project Mgmt.	Low Priority
				BE	HM	CR	WL						
F - 022-2(37)	GRAND AVE, AGUA FRIA BRS 312, 313	EA	1350		X			X					
IR - 17-1(172)	INDIAN SCHOOL RD TI & RAMPS	CW	846		X								
S - 214- 309	SR360 - SCENIC DR (IDAHO RD)	EA	828							X			
M - 700-4(3)	75TH AV (INDIAN SCHOOL-CAMELBACK)	EA	765							X			
F - 038-1(14)	ASH CREEK - SYCAMORE CREEK	EA	692						X				
M - 901-9(3)	LAKE MARY RD (I-17 - WALAPAI DR)	EA	637							X	X		
IR - 40-5(89)	WINDOW ROCK TI	CE	626								X		
BRF - 037-3(5)	S FORK BADGER CRK BR #0100 *	CW	594	X				X					
F - 027-1-519	SHOW LOW - SHUMWAY, UT II	EA	568						X		X		
F - 026-1-932	CORDUROY CREEK BRIDGE #0216	EA	533			X							
F - 035-1(13)	BIG SANDY BRIDGE #0327	EA	522				X						
IM - 40-5(92)	APACHE CO LINE - PINTA TI	CE	480			X			X				
F - 063-1-512	NEW WATER RD - QUARTZSITE	CE	474					X					
F - 039-1-510	HOOVER DAM - SOUTH, PH II	CE	451						X				
F - 039-1-509	COTTONWOOD RD - MP 59	EA	419									X	
BRF - 037-3(6)	SOAP CREEK BR #0101 *	EA	413	X				X					
BRF - 037-3(8)	BLUE CLAY WASH BR #0114 *	CE	408	X				X					
F - 060-1-510	KEAMS CYN - STEAMBOAT	CW	389			X			X				
BRF - 037-3(7)	JACOB WASH BR #0113 *	CW	387	X				X					
IM - 17-1(209)	16TH ST - BUCKEYE RD	CE	359								X		X
RS - 347 (16)P	MARICOPA RD, PAPAGO RD - SR84	EA	342			X		X		X			
S - 244- 513	NAVAJO RESERVATION BDY, MP 368	CE	340							X			X
RS - 316 (22)	RAY MINE - SUPERIOR	CE	332							X			X
RS - 631 (2)P	ARIVACA TOWNSITE - ARIVACA JCT	CE	322							X			X
F - 071-1-508	ST JOHNS - NORTH	CE	315										X
FIR - 40-2(107)	SELIGMAN-PINEVETA, (EB) UT II	CE	312										X
F - 027-1-518	NAVAJO BLVD, HOLBROOK	CE	310										X
F - 056-1-504	ROBLES JCT - AVRA VALLEY RD	EA	274		X			X					
N - 900- 549	KARTCHNER CAVERNS STATE PARK	EA	270						X				
F - 022-3-569	DEVILS CANYON BRIDGE #0261	EA	254	X				X					

RECOMMENDATIONS TO ADDRESS PROBLEM AREAS

RECOMMENDATION	PROBLEM AREA						
	Env. Issues	Scope Change	Agency Coord.	Local Govt. *	Env Con-sultant	Project Mgmt. #	Low Priority
MGMT. & MEASUREMENT RECOMMENDATIONS							
Project Log +							
Cost Management System +							
Staffing Analysis @							■
QUALITY RECOMMENDATIONS							
Post-Construction Environmental Review	■	■	■		■		
Environmental Clearance Completion Review	■	■	■		■		■
Assurance of Quality Consultants					■		
PROCESS IMPROVEMENT RECOMMENDATIONS							
Pre-Programming Project Scoping	■	■					
Agency Coordination			■				
Environmental Education	■		■		■		
Creative Designs	■		■				
Environmental Resources Maps	■	■	■				

* Local Governments' ECP is not related to ADOT's ECP.

\# Project Management issue has already been addressed by EPS.

\+ Project Log and Cost Management System are both aimed at improving how ADOT's ECP is measured. They do not address project-specific issues.

@ Staffing Analysis is related to the measurement recommendations in that a certain amount of measurement data is needed to conduct the staffing analysis.

SUMMARY OF COSTS AND BENEFITS

DETERMINATION OF COSTS AND BENEFITS

Each recommendation contains a Cost Section detailing the costs expected to implement them. EQuaTe produced the ESTIMATED BENEFITS FROM REDUCED REWORK chart on the next page in consultation with the ADOT Sections listed in the chart. Each Section was asked what percentage of their staff's work is rework and what percentage of their rework is due to environment issues. These percentages were multiplied times each Section's total annual employee related expenses. To this was applied an expected percentage reduction in rework EQuaTe expects its recommendations will make in improving the Environmental Clearance Process. The TOTAL estimated benefits expected from reduced rework was $1,041,500.

The second sheet below, entitled BENEFIT FORMULAS, gives the basic formulas used to derive expected benefits. Under Reduced Rework are the formulas used to determine the ESTIMATED BENEFITS FROM REDUCED REWORK discussed above. The second category, Unnecessary Work, lists the cost savings possible by reducing the number of times a project must go to the Project Development Committee due to a Recommended Project Change caused by an environmental issue. Finally, the Construction Cost Savings is based on impacts to District personnel who must shift people resources to other locations when projects, they expected to construct, get delayed due to environmental problems.

The last two sheets of this section, RECOMMENDATIONS COST/BENEFIT SUMMARY, summarize all the costs to implement the recommendations, along with all the financial benefits. The net results show a potential first year net savings of $370,000 with additional future year annual net savings of $620,000.

ESTIMATED BENEFITS FROM REDUCED REWORK

Office	Affected FTEEs*	Avg. Grade	Avg. Hourly	Annual ($1,000s)	% Total Rework	% Rework due to Envi.	Est. % Reduction	$ Benefits
Direct Involvement (1)								
EPS	13		$14.80	$400	30%	100%	50%	$60,000
AES in-house	22	20	$24.22	$1,108	10%	70%	75%	$58,200
consultant	5		$60.00	$624	30%	70%	75%	$98,300
SP in-house	8	21	$26.61	$443	5%	50%	75%	$8,300
consultant	5		$60.00	$624	5%	50%	75%	$11,700
Indirect Involvement (2)								
AES in-house	22	20	$24.22	$1,108	40%	10%	75%	$33,200
consultant	30		$60.00	$3,744	40%	50%	75%	$561,600
SP in-house	8	21	$26.61	$443	10%	50%	75%	$16,600
consultant	20		$60.00	$2,496	10%	50%	75%	$93,600
R/W in-house	118	18	$20.03	$4,916	10%	5%	75%	$18,400
consultant	15		$50.00	$1,560	10%	5%	75%	$5,900
HPS	53	21	$26.61	$2,933	12%	10%	75%	$26,400
C&S	12	20	$24.22	$605	20%	2%	75%	$1,800
Districts	20	24	$34.93	$1,453	1%	100%	75%	$10,900
RDS	3	18	$20.03	$125	15%	5%	75%	$700
Materials	3	18	$20.03	$125	25%	5%	75%	$1,200
BDS	69	19	$21.70	$3,114	20%	2%	75%	$9,300
EPS in-house cons. monitors	5	19	$21.70	$226	20%	75%	75%	$25,400
TOTAL								$1,041,500

*FTEE = Full Time Employee Equivalent

Notes: (1) Direct Involvement is performance of environmental work and administration of consultants doing environmental work.
(2) Indirect Involvement is engineering and other work which is not directly environmental.

BENEFIT FORMULAS

REDUCED REWORK:

# of affected FTEEs x Average hourly pay = Annual salaries

Annual salaries x % of total rework x % rework due to environmental x estimated % reduction in rework (env.) = $ Benefit

(see chart entitled "Estimated Benefits from Reduced Rework" on previous page)

UNNECESSARY WORK

Trips to PDC due to environmental = 52 for F.Y. 91'-92'

Weekly PDC meeting preparation:

Project Leader -	1 person	x $29.08 (Grade 22)	x 3.5 hours	= $102
Designer -	1 person	x $21.70 (Grade 19)	x 2.0 hours	= $ 43
Supervisor -	1 person	x $31.87 (Grade 23)	x 0.5 hours	= $ 16
Other Svc. Rep. -	1 person	x $29.08 (Grade 22)	x 1.0 hours	= $ 44
Supervisor -	1 person	x $31.87 (Grade 23)	x 0.5 hours	= $ 16
At the meeting:				
Project Leader -	1 person	x $29.08 (Grade 22)	x 0.5 hours	= $ 15
Service Rep. -	1 person	x $29.08 (Grade 22)	x 0.5 hours	= $ 15
PDC members -	10 people	x $38.28 (Grade 25)	x 0.5 hours	= $191
			Total	$442

Rounded to $500
x 25 meetings
= $12,500

CONSTRUCTION COST SAVINGS:

Assume 2 projects are affected and $39/day long term travel per person

2 projects x 8 people/project x 5 days/week x 35 weeks x $39/person/day
= $109,200

RECOMMENDATIONS
COST / BENEFIT SUMMARY

I Management and Measurement of the Environmental Clearance Process

Recommendation Name	One-time Expense	On-going Annual
Project Log	$ 500	$ 1,860
Cost Management System	8,820	11,340
Staffing Analysis	4,360	0
Total Costs	$13,680	$13,200

II Quality of the Environmental Clearance Process

Recommendation Name	One-time Expense	On-going Annual
Post Construction Env. Review	$ 0	$32,200
Env. Clearance Completion Review	0	8,110
Assurance of Quality Consultants	7,800	0
Total Costs	$7,800	$40,310

III Environmental Clearance Process Improvement Recommendations

Recommendation Name	One-time Expense	On-going Annual
Pre-Program Project Scoping	$ 0	$490,560
Agency Coordination	136,000	0
Environmental Education	18,590*	0
Creative Designs	47,200	0
Environmental Resources Maps	24,400	0
Total Costs	$226,190	$490,560

Note:
* Environmental Education expense assumes that the video will be produced in-house. If by consultant, the expense would be $45,000.

COSTS SUMMARIZED:

I Management and Measurement	$ 13,680	$ 13,200
II Quality of ECP	7,800	40,310
III Improvement Recommendations	226,190	490,560
TOTAL COSTS	$247,670	$544,070

RECOMMENDATIONS
COST / BENEFIT SUMMARY

BENEFITS SUMMARIZED:

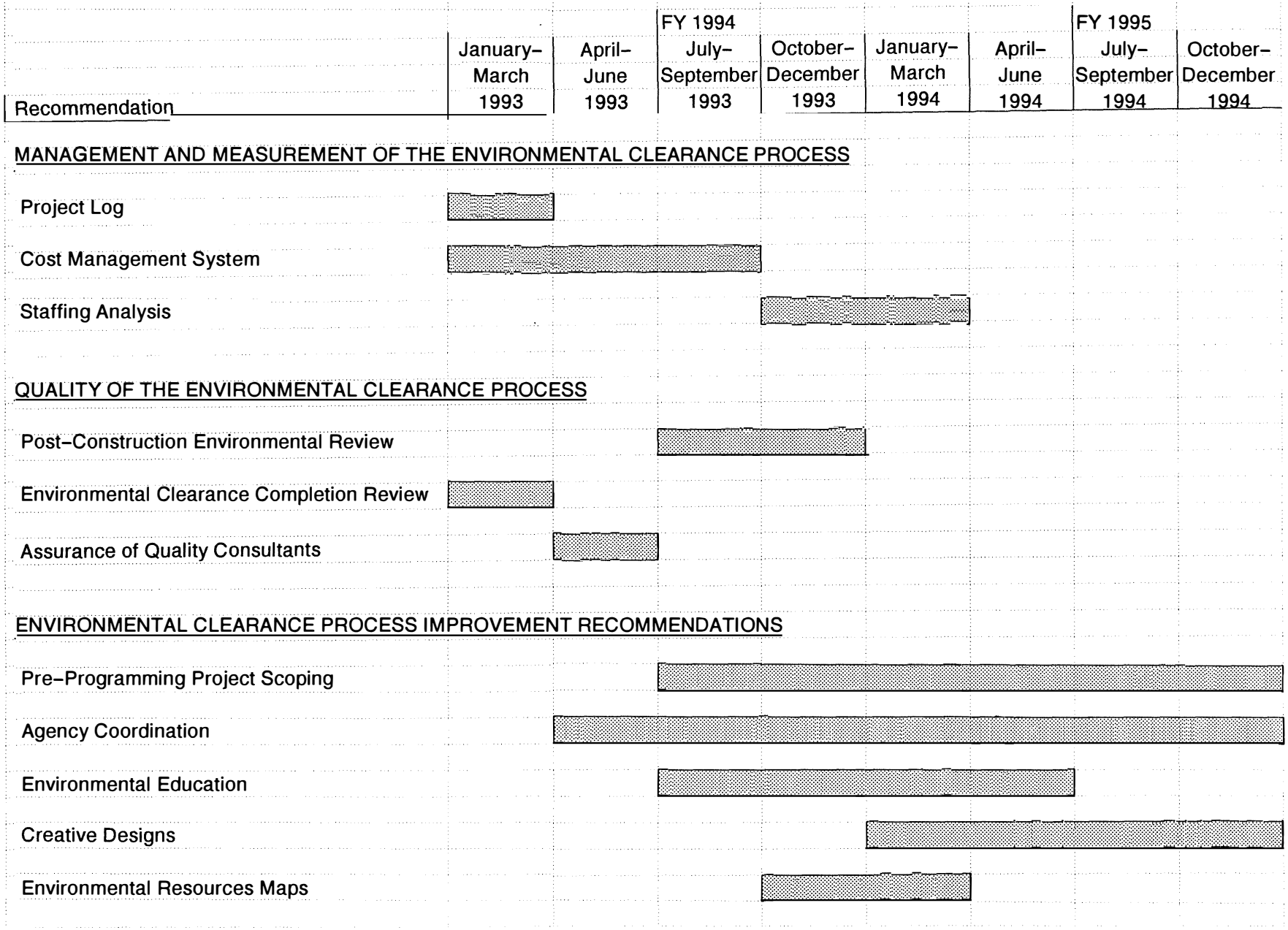
Reduced Rework	$1,041,500
Unnecessary Work	12,500
Constr. Cost Savings	109,200
TOTAL BENEFITS	$1,163,200

NOTE - See formulas on previous page for explanation of Benefit calculations.

POTENTIAL FIRST YEAR BENEFITS		$1,163,200
FIRST YEAR COSTS (Includes One-Time Implementation Expense Plus First Year On-Going Annual Expense)		
$247,670 + $544,070		$ 791,740
FIRST YEAR SAVINGS (Benefits - Costs)	=	**$ 371,460**
ON-GOING ANNUAL BENEFITS		$1,163,200
ON-GOING ANNUAL COSTS		$ 544,070
ON-GOING ANNUAL SAVINGS (Benefits - Costs)	=	**$ 619,130**

IMPLEMENTATION PLAN

IMPLEMENTATION PLAN



FOLLOW-UP MEASUREMENTS

FOLLOW-UP MEASUREMENTS

Two EQuaTe recommendations create firm follow-up measurement tools for obtaining future Environmental Clearance Process (ECP) costs, cycle-times, and activity times. One is the Project Log, and the other is a Cost Management System. See the recommendations with these titles in this report for more detailed descriptions of these tools under the Benefits section of each recommendation.

These two recommendations will capture the following data to measure the ECP:

1. Cycle time, activity time, and costs to complete the ECP and produce a specific environmental document like an Environmental Assessment, Environmental Impact Statement, or Categorical Exclusion with or without special studies.

   The EQuaTe study has developed some preliminary statistics on timely ECP completions for our 99 selected projects (see the Late Environmental Clearances discussion at the end of the BASE LINE DATA section of this report). This data can be used as a base from which to compare the completion dates for future groups of projects.

   EQuaTe has also produced a summary of the number of projects taking longer than one year to achieve the environmental clearance (see Number of Days for Environmental Clearance under ENVIRONMENTAL CLEARANCE PROBLEMS ADDRESSED IN RECOMMENDATIONS in this report).

2. Key original project model dates will be captured on the Project Log. These will be compared against revised and actual completion dates to measure the success rate of completing ECP milestones according to original schedule. Milestone dates to be recorded include:

   Start file
   EPS staff assigned project
   Initial PA/DCR
   Field review(s)
   Scoping meeting
   Final PA/DCR
   Coordination letters
   DEA/DEIS
   Public meetings
   Public hearing notice/offer
   Public hearing
   FEA/FEIS
   CE completion
   EPS clearance memo

3. Capture cycle time, activity time, and costs to complete special environmental studies. The project models have key milestone activities and dates for more detailed and time consuming special studies. New EPS BTS activity codes have been developed to capture activity time and costs.

4. Record the original project bid advertisement date along with any officially revised dates. Include a comment to say what the major reason was for revising the date. This will record both environmental and non-environmental reasons for the delay.

   EQuaTe gathered data to show the results of project delays due to environmental reasons (see Delayed Project Bid Advertisements near the end of BASE LINE DATA in this report). The results can be used as base line data to compare to future FY projects.

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TEAM COST

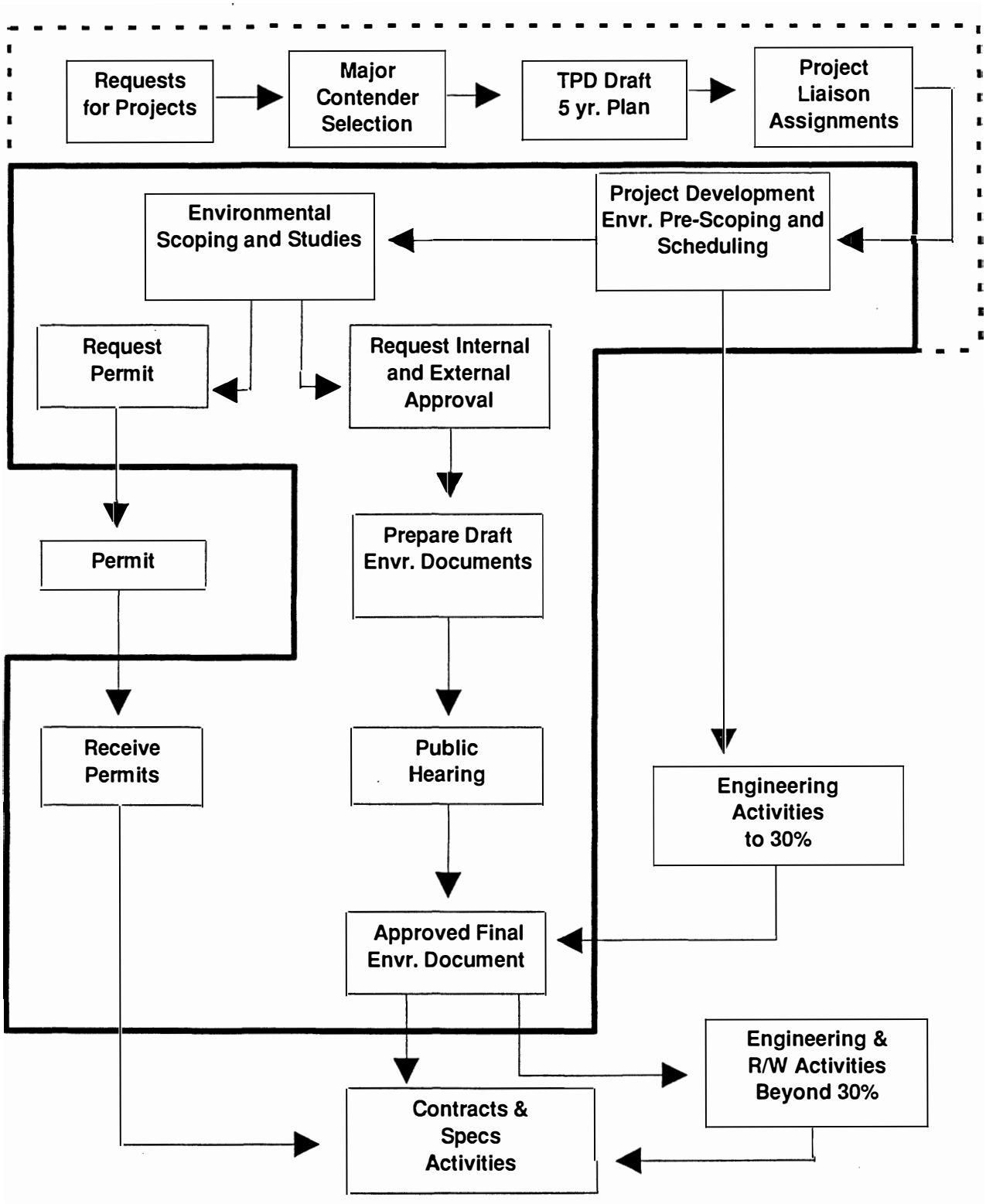
TEAM COST

- The team met June 15-18, 1992 full time.
- It met once a week for eight hours a day from July 14, 1992 - September 16, 1992.
- From September 22, 1992 to January 20, 1993 - The team met for about sixteen hours a week.
- From January 26, 1993 to March 13, 1993 - half the team met for 8 to 16 hours a week.
- They also carried out assignments at times other than during meetings.
- The team received 32 hours of Team Building and Problem Solving training between June 22 - 29, 1992.
- We contracted the services of an Environmental Consultant to be a member of our team.
- We also enlisted the services of an Ernst and Young Consultant for approximately once a week from July 14, 1992 through January 20, 1993.
- The consultant was with us about 2 to 3 hours per week between January 26 and March 13, 1993.

Team member participation costs	**= $65,000**
Consultant team member cost	**= $10,000**
Ernst and Young consultant cost	**= $60,000**
Total Cost of Study	**= $135,000**

APPENDICES

APPENDIX A



DETAILED BLOCK DIAGRAM
ENVIRONMENTAL PROCESS

APPENDIX A

The flowcharts for the Environmental Clearance Process and Special Studies, in Appendix A, are printed under a separate cover.

APPENDIX B

SPECIAL STUDIES INVESTIGATED ON EACH PROJECT

a. Land Use (existing and proposed)
b. Land Ownership
c. Social (includes schools, churches, medical facilities, police, fire houses, residences, relocation, etc.)
d. Economics (includes commercial and industrial enterprises, employment, local tax base, etc.)
e. Minority (neighborhoods, businesses, residences, etc.)
f. Natural Resources (water, lands, air, etc.)
g. Section 4(f) (parks, recreation, wildlife refuges, lakes, streams, school playgrounds, etc.)
* h. Cultural Resources (includes historical and archaeological)
i. Farmlands (prime, unique, statewide importance)
* j. Water Quality
* k. Section 404 (dredged and fill materials)
l. Endangered Species (plants and wildlife)
m. Native Plants (State Native Plant Law)
n. Floodplains
o. Wetlands
* p. Air Quality Report
* q. Noise Study Report
r. Wild and Scenic Rivers
s. Natural Areas and Trails
t. Scenic Roads and Parkways
u. Local Traffic Pattern
v. Existing and any additional right-of-way
w. Energy Usage
x. Construction Impacts (of temporary nature)
y. Pedestrian/Bicycle/Equestrian Facilities
z. Visual Qualities
a.a. Material Pits and Haul Roads
a.b. Utilities
a.c. Erosion Control
a.d. Other Modes of Transportation
a.e. Sole Source Aquifer
* a.f. Hazardous Waste
a.g. Riparian Habitat

* These special studies issues were selected by the EQuaTe team for more detailed study of their processes.

LIST OF CUSTOMERS

CUSTOMERS OF THE ENVIRONMENTAL CLEARANCE PROCESS

EXTERNAL - OUTSIDE AGENCIES

U.S. Army Corps of Engineers

State Historic Preservation Office - Advisory Council

U.S. Forest Service

Environmental Protection Agency

Arizona Department of Environmental Quality

Arizona Game and Fish Department/U.S. Fish and Wildlife Service

Bureau of Indian Affairs - Indian Communities

Bureau of Land Management

Arizona Department of Agriculture

City/County Agencies

State Land Department

Bureau of Reclamation

Soil Conservation Service

INTERNAL - FHWA AND ADOT SERVICES

Federal Highway Administration

Highway Plans Services

Statewide Project Management Services

Right-of-Way Operations Services

Districts I, II, III, IV

Contracts and Specifications Services

Utility & Railroad Engineering Services

Advance Engineering Services

Engineering Survey Services

Roadside Development Services

Preconstruction Engineering Management (PCEM)

See "Participants in the Environmental Clearance Process Study" in Appendix B for names of individuals who contributed input to this study.
(No 899)

PARTICIPANTS IN THE ENVIRONMENTAL CLEARANCE PROCESS STUDY

The Environmental Quality Team (EQuaTe) wishes to acknowledge and thank all those who have contributed their time, ideas, and concerns to our effort:

Dave Allocco	ADOT Contracts and Specifications
Judy Aranda	Parsons Deleuw
Doug Barber	Apache-Sitgreaves National Forest
Dave Bender	Federal Highway Administration
Bert Bertleson	Sverdrup
Ervin Boren	ADOT District IV
Dee Bowling	ADOT Environmental Planning Services
Ron Christofferson	Arizona Game and Fish Department
Steve Clifford	ADOT Human Resources Development
Ed Corral	ADOT Roadside Development Services
Dennis Davis	PBQD
Mike Dawson	ADOT Environmental Planning Services
Jim Dorre	ADOT District III
Chuck Eaton	ADOT Urban Highway Section
Linda Edwards	ADOT Environmental Planning Services
Dave Elack	ADOT Contracts and Specifications
Pete Eno	ADOT Right-of-Way Services
Fred Garcia	ADOT Environmental Planning Services
Carwin Gardner	ADOT Right-of-Way Operations
Bob Gasser	State Historic Preservation Office
Jim Glasgow	ADOT District II
Gabe Grijalva	ADOT Consultant Management Services
Pat Higgins	Tonto National Forest
Chuck Hoffman	ADOT Environmental Planning Services
Steve Jimenez	ADOT Urban Highways Section
Dan Lance	ADOT District I
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Cindy Lester	Army Corps of Engineers
Todd Ligon	ADOT Environmental Planning Services
John Louis	ADOT Assistant State Engineer
Jim Matt	Arizona Department of Environmental Quality
Art May	ADOT Advance Engineering Services
Victor Mendez	ADOT Preconstruction Engineering Management
Don Metz	U.S. Fish and Wildlife Service
Bob Mickelson	ADOT Deputy State Engineer
Kevin Nelson	Entranco
Terry Otterness	ADOT Highway Plans Services
Bettina Rosenberg	ADOT Environmental Planning Services
George Ruffner	EcoPlan Associates
Sue Ruttman	U.S. Fish and Wildlife Service
Bruce Scott	Scott, Allard, Bohanan
Mickey Seigel	Dames and Moore
Craig Seppelfrick	ADOT Environmental Planning Services
Lyle Stone	Archaeological Research Services
Tom Sullivan	ADOT Environmental Planning Services
Jeff Swan	ADOT District IV
Ed Swanson	Arizona Department of Environmental Quality
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Dave Walker	Arizona Game and Fish Department
Bill Wessel	Tonto National Forest
Steve Wilcox	ADOT Consultant Management Services
Mark Yalung	ADOT Consultant Management Services
Larry Yeager	ADOT Environmental Planning Services

DATA COLLECTION SUMMARY OF THE 99 ORIGINALLY SELECTED PROJECTS

Project Number	Project Name	Category	Project Manager Org.	Original Bid Advert. Date	Final Bid Advert. Date	Months Moved	Calculated Clearance Date	Actual Clearance Date	Days Diff	Special Studies	
										Major Types	Total No.
I - 10-1-506	BRIDGE #1203 & # 1204	CE	EP	01/25/92	01/29/92	0		06/12/91			
FIR - 10-3(266)	SACATON REST AREA	CE	EP	04/25/90	01/21/92	21		06/12/91			
IR - 10-3(331)	44TH ST - SOUTHERN AV	CE	EP	11/25/91	03/31/92	4		10/11/90			
I - 10-3-506	SACATON REST AREA	CE	EP	04/25/90	01/25/92	21		06/12/91			
I - 10-3-513	RIGGS RD TI	CE	EP	11/25/91	11/20/91	0		10/07/91			
IR - 10-3-515	BASELINE RD - WARNER RD	CE	EP	02/25/92	02/19/92	0		12/03/91		CR	1
IR - 10-4(118)	MARANA - AVRA VALLEY	CE	EP	08/25/91	09/27/91	1		11/01/90			
FIR - 10-5(67)	PARK AVE - W BENSON TI	CE	EP	09/25/91	01/08/92	3		09/24/91			
IM - 10-6(113)	LUZENA - BOWIE	CE	EP	06/25/92	06/11/92	0		08/23/91			
IR - 10-8(3)	STWDE RESRCH PRGM - 6 SITES	CE	EP	11/25/91	05/01/92	5		03/02/92		CR	1
IR - 10-8(4)	CRESCENT DEMO PROJECT/MARANA	CE	EP	09/25/91	09/25/91	0		08/20/91			
IR - 15-1(39)	NEVADA ST LINE - UTAH ST LINE	CE	EP	10/25/91	11/22/91	0		09/09/91			
IM - 15-1(46)	N RDSD PKNG-N CEDAR POCKET RA, SB	CE	EP	06/25/92	06/26/92	0		12/31/91			
IR - 17-1(172)	INDIAN SCHOOL RD TI & RAMPS	CW	EP	04/25/89	11/22/91	31		10/11/88		HM	1
IM - 17-1(209)	16TH ST - BUCKEYE RD	CE	EP	11/25/90	05/21/92	18		08/25/91			
IR - 19-1(107)	IRVINGTON RD TI - JCT I-10	CE	EP	12/25/90	09/16/91	8		05/16/90			
FIR - 40-1(75)	CALIFORNIA SL - MCCONNICO TI	CE	EP	10/25/91	12/23/91	1		09/09/91			
FIR - 40-1(76)	MCCONICO TI - E KINGMAN TI	CE	EP	06/25/91	04/26/92	10		11/06/90			
FIR - 40-2(107)	SELIGMAN-PINEVETA, (EB) UT II	CE	EP	01/25/91	01/28/92	12		05/16/90			
FIR - 40-2(108)	WILLOW CREEK - JOLLY RD	CE	EP	01/25/92	01/27/92	0		04/01/91			
IR - 40-4(139)	COUNTY LINE - MINNETONKA	CE	EP	02/25/92	04/27/92	2		08/08/91			
IR - 40-5(89)	WINDOW ROCK TI	CE	EP	03/25/91	02/21/92	11		09/04/91			
IM - 40-5(92)	APACHE CO LINE - PINTA TI	CE	EP	12/25/91	02/20/92	1		01/20/92			
IR - 40-5(93)	CEDAR POINT TI - NEW MEXICO ST LN	CE	EP	01/25/92	02/21/92	0		03/29/91			
IR - 40-8(2)	YAVAPAI CO LINE-NEW MEXICO ST LN	CE	EP	09/25/91	11/27/91	2		09/20/91			

Project Mgr Orgs: EP-Env Planning Svcs, CM-Cons Mgmt Svcs, UH-Urban Hwy Sect, AE-Adv Engrg Svcs

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Project Number	Project Name	Category	Project Manager Org.	Original Bid Advert. Date	Final Bid Advert. Date	Months Moved	Calculated Clearance Date	Actual Clearance Date	Days Diff	Special Studies	
										Major Types	Total No.
F -013-1-507	TOWN OF HUACHUCA CITY, PH I	CE	EP	02/25/92	01/31/92	0		11/12/91			
F -022-2(37)	GRAND AVE, AGUA FRIA BRS 312, 313	EA	EP	04/25/88	02/27/92	46		11/14/91		44	1
F -022-2-531	HASSAYAMPA RIV HABITAT AREA	CE	EP	10/25/91	10/07/91	0		09/03/91			
F -022-3-560	MIAMI-PEDESTRIAN OVERPASS	CE	EP	03/25/92	03/30/92	0		12/31/91			
F -022-3-566	QUEEN CREEK - JCT SR 177	CE	EP	04/25/92	05/21/92	0		01/06/92		CR NA	2
F -022-3-569	DEVILS CANYON BRIDGE #0261	EA	EP	04/25/91	05/20/92	13		04/15/92		BE CR	2
F -022-3-573	SOSSAMAN RD - MERIDIAN RD (EB)	CE	EP	03/25/92	03/31/92	0		02/11/92			
BRF -022-4(30)	BR #0372	CE	EP	02/25/92	06/18/92	3		08/22/91		CR	1
F -023-1-519	RAINBOW WASH BRIDGE #466	CE	EP	01/25/92	12/27/91	0		10/30/91			
F -025-1-519	TOWN OF WICKENBURG, PH III	CE	EP	06/25/92	06/25/92	0		03/18/92			
F -026-1-932	CORDUROY CREEK BRIDGE #0216	EA	EP	06/25/91	10/09/91	3		11/26/90		CR	1
F -026-2-515	TOWN OF SPRINGERVILLE, MAIN ST	CW	EP	02/25/92	03/26/92	1		09/25/91		CR HM	2
F -026-2-520	VERNON - SPRINGERVILLE	CE	EP	05/25/92	05/28/92	0		08/05/91			
F -027-1-518	NAVAJO BLVD, HOLBROOK	CE	EP	02/25/92	04/29/92	2		11/25/91			
F -027-1-519	SHOW LOW - SHUMWAY, UT II	EA	EP	01/25/92	03/26/92	2		03/05/92		BE CR	2
F -029-1-511	SR 69 @ SHERATON HOTEL ENTRANCE	CE	EP	11/25/91	02/11/92	2		12/17/91			
STP -031-1(38)	WINKELMAN - CHRISTMAS	CE	EP	04/25/92	05/21/92	0		07/02/91		CR	1
F -035-1(13)	BIG SANDY BRIDGE #0327	EA	CM	05/25/91	10/03/91	4		09/26/91		BE CR 44	3
F -035-1-512	JUNCTION I-40 - SOUTH	CW	EP	11/25/91	01/29/92	2		10/01/91		CR	1
F -035-1-513	BURRO CREEK - JCT SR 97	CE	EP	03/25/92	05/06/92	1		02/20/92			
F -035-1-526	COTTONWOOD CANYON @ BRIDLE CREEK	CE	EP	03/25/92	03/31/92	0		01/27/92			
F -035-1-532	COTTONWOOD CANYON BANK PROTECTION	CE	EP	04/25/92	03/31/92	0		09/24/92			
F -035-1-533	BRIDAL CREEK BANK PROT (MP 159.5)	CE	EP	04/25/92	03/31/92	0		01/27/92			
BRF -037-3(5)	S FORK BADGER CRK BR #0100	CW	EP	03/25/91	08/26/91	5		09/28/90		BE	1
BRF -037-3(6)	SOAP CREEK BR #0101	EA	EP	07/25/90	08/06/92	24		11/11/90		BE	1

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										Major Types	Total No.
BRF -037-3(7)	JACOB WASH BR #0113	CW	EP	03/25/91	08/26/91	5		09/17/90		BE	1
BRF -037-3(8)	BLUE CLAY WASH BR #0114	CE	EP	03/25/91	08/26/91	5		09/17/90			
F -038-1(14)	ASH CREEK - SYCAMORE CREEK	EA	EP	05/25/90	02/21/92	21		04/18/91			
F -039-1(25)	KINGMAN - HOOVER DAM	CE	EP	01/25/92	03/25/92	2		04/01/92			
F -039-1-509	COTTONWOOD RD - MP 59	EA	CM	04/25/91	05/26/92	13		04/02/91			
F -039-1-510	HOOVER DAM - SOUTH, PH II	CE	EP	05/25/90	05/26/92	24		04/01/92			
F -045-1-511	BUFFALO - KNOX ROAD	CE	EP	02/25/92	03/27/92	1		09/26/91			
F -045-1-512	SR 587, JCT SR 87 - POWERLINE	CW	EP	11/25/91	11/25/91	0		09/26/91		CR	1
F -056-1-504	ROBLES JCT - AVRA VALLEY RD	EA	CM	01/25/91	10/31/91	9		09/17/90		CR	1
F -060-1-510	KEAMS CYN - STEAMBOAT	CW	EP	01/25/92	03/31/92	2		02/26/92		CR	1
F -063-1-512	NEW WATER RD - QUARTZSITE	CE	EP	12/25/91	03/11/92	2		03/02/92			
F -063-1-516	CITY OF SAN LUIS, PH I	CW	EP	03/25/92	06/24/91	-9		11/14/91		CR	1
F -063-1-520	YUMA PROVING GROUND	CE	EP	04/25/92	04/24/92	0		07/24/91		CR	1
F -063-1-522	CASTLE DOME WASH BRIDGE #583	CE	EP	11/25/91	11/05/91	0		09/05/91		CR	1
F -064-1-507	TUBA CITY, US160 & SR264	CW	EP	04/25/90	12/16/91	20		06/16/89		HM	1
F -068-1-508	MP 3.3 - MP 5.2	CE	EP	06/25/92	06/24/92	0		03/05/92		CR	1
F -068-1-510	BULLHEAD CITY - KINGMAN	CE	EP	05/25/91	07/03/91	1		06/18/91			
F -071-1-508	ST JOHNS - NORTH	CE	EP	03/25/92	03/31/92	0		04/20/92		CR NA	2
F -074-1-503	JCT US 60 - EAST SECTION	CE	EP	02/25/92	12/11/91	-2		10/15/91			
F -074-1-504	ORTEGA LAKE SECTION	CE	EP	05/25/92	05/28/92	0		03/24/92		CR	1
F -077-1-507	MP 11.0 - KLAGETOH	CE	EP	02/25/92	02/25/92	0		03/27/91			
F -079-1-501	DUNCAN - SAND WASH	CE	EP	03/25/92	03/04/92	0		05/28/91		CR	1
F -081-1-505	TOWN OF FLORENCE, PH II	CE	EP	08/25/91	07/25/91	-1		05/15/91			
S -214- 309	SR360 - SCENIC DR (IDAHO RD)	EA	EP	04/25/90	01/31/92	21		09/18/91		CR	1
S -244- 513	NAVAJO RESERVATION BDY, MP 368	CE	EP	03/25/92	04/20/92	0		08/05/91			

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										Major Types	Total No.
RS -259 (7)P	CORNVILLE RD, MP 0.57-MP 1.70	EA	EP	10/25/93	07/23/92	-15		01/30/92			
STP -273 (7)	DOS CABEZAS - JCT SR 181	CE	EP	02/25/92	04/27/92	2		03/25/92			
S -315- 505	BAILEY WASH - MP 30	CE	EP	03/25/92	02/21/92	-1		12/09/91			
RS -316 (22)	RAY MINE - SUPERIOR	CE	EP	01/25/92	01/24/92	0		07/31/91		CR	1
RS -347 (16)P	MARICOPA RD, PAPAGO RD - SR84	EA	CM	09/25/91	09/30/91	0		12/11/89			
S -391- 502	TOWN OF EAGAR, PH 1	CE	EP	03/25/92	03/26/92	0		02/19/92		CR	1
M -500-4(2)P	59TH AVE (CAMELBACK - BETHANY)				04/25/92	0					
M -500-5(6)P	51ST AVE (NORT.-BUTLER/PEO-OLIV)				09/25/91	0					
M -503-5(3)P	CAMELBACK RD (43RD - 75TH AVE)	EA	EP	09/25/90	09/27/91	12		06/07/90			
S -588- 503	SANTA CRUZ WASH BRIDGE #0421	CE	EP	12/25/91	11/26/91	0		09/30/91			
RS -631 (2)P	ARIVACA TOWNSITE - ARIVACA JCT	CE	EP	11/25/90	08/06/91	9		08/15/90		CR	1
M -700-4(3)	75TH AV (INDIAN SCHOOL-CAMELBACK)	EA	EP	10/25/91	10/28/91	0		03/05/91		CR	1
M -702-6(1)P	MCQUEEN RD (CHANDLER - WARNER)	CE	EP	09/25/91	08/22/91	-1		03/21/91			
M -704-5(2)P	WARNER RD (DOBSON - ARIZONA AVE)	CE	EP	09/25/92	08/22/91	-13		04/02/91			
M -818-3(1)P	RAY RD (DOBSON RD - MCQUEEN RD)	CE	EP	09/25/91	08/22/91	-1		03/21/91			
M -847-7(2)P	HARDY ROAD	CE	EP	12/25/90	01/29/92	13		06/14/90			
N -900- 548	KITT PEAK RD @ MP 7.5	CW	EP	04/25/92	04/10/92	0		03/06/92		CR	1
N -900- 549	KARTCHNER CAVERNS STATE PARK	EA	RD	06/25/92	06/16/92	0		05/29/92		CR	1
M -901-9(3)	LAKE MARY RD (I-17 - WALAPAI DR)	EA	EP	10/25/89	09/24/91	23		09/16/91		CR	1
M -951-3-503	JCT SR84 - PUEBLO ST	CE	EP	06/25/92	04/23/92	-2		01/10/92			
BRZ -984 (62)P	AVE 37E @ SALINITY CANAL	CE	EP	03/25/91	11/08/91	7		09/14/90			
BRZ -984 (63)P	AVE 36E @ SALINITY CANAL	CE	EP	03/25/91	11/08/91	7		09/14/90			
BRZ -984 (65)P	TEXAS HILL DRAINAGE @ 55E	CE	EP	03/25/91	11/08/91	7		09/14/90			
S -987- 503	VEKOL WASH AREA	CE	EP	05/25/90	02/01/92	20		09/20/90			

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Category Symbols: CE-Categorical Exclusion, CW-Cat Excl with Special Studies, EA-Environmental Assessment

PROJECT NUMBER	PROJECT NAME	START FILE	ENV. CLEARANCE	WORK DAYS DIFF.	CATE-GORY
CATEGORICAL EXCLUSIONS, NO SPECIAL STUDIES					
IR - 19-1(107)	IRVINGTON RD TI - JCT I-10	30-Aug-89	16-May-90	178	CE
FIR - 40-2(107)	SELIGMAN-PINEVETA, (EB) UT II	17-Feb-89	16-May-90	312	CE
M -847-7(2)P	HARDY ROAD	11-Jun-90	14-Jun-90	2	CE
RS -631 (2)P	ARIVACA TOWNSITE - ARIVACA JCT	04-May-89	15-Aug-90	322	CE
BRZ -984 (65)P	TEXAS HILL DRAINAGE @ 55E	05-Jul-90	14-Sep-90	49	CE
BRZ -984 (62)P	AVE 37E @ SALINITY CANAL	03-Jul-90	14-Sep-90	50	CE
BRZ -984 (63)P	AVE 36E @ SALINITY CANAL	03-Jul-90	14-Sep-90	50	CE
BRF -037-3(8)	BLUE CLAY WASH BR #0114	01-Feb-89	17-Sep-90	408	CE
S -987- 503	VEKOL WASH AREA	14-Nov-89	20-Sep-90	213	CE
IR - 10-3(331)	44TH ST - SOUTHERN AV	03-Oct-90	11-Oct-90	6	CE
IR - 10-4(118)	MARANA - AVRA VALLEY	26-May-90	01-Nov-90	109	CE
FIR - 40-1(76)	MCCONICO TI - E KINGMAN TI	25-Sep-90	06-Nov-90	29	CE
M -818-3(1)P	RAY RD (DOBSON RD - MCQUEEN RD)	08-Nov-90	21-Mar-91	91	CE
M -702-6(1)P	MCQUEEN RD (CHANDLER - WARNER)	08-Nov-90	21-Mar-91	91	CE
F -077-1-507	MP 11.0 - KLAGETOH	13-Feb-91	27-Mar-91	29	CE
IR - 40-5(93)	CEDAR POINT TI - NEW MEXICO ST LN	05-Oct-90	29-Mar-91	120	CE
FIR - 40-2(108)	WILLOW CREEK - JOLLY RD	26-Sep-90	01-Apr-91	129	CE
M -704-5(2)P	WARNER RD (DOBSON - ARIZONA AVE)	08-Nov-90	02-Apr-91	100	CE
F -081-1-505	TOWN OF FLORENCE, PH II	11-Apr-91	15-May-91	23	CE
F -079-1-501	DUNCAN - SAND WASH	03-Jul-90	28-May-91	226	CE
FIR - 10-3(266)	SACATON REST AREA	25-Apr-91	12-Jun-91	33	CE
I - 10-1-506	BRIDGE #1203 & # 1204	12-Jun-91	12-Jun-91	0	CE
I - 10-3-506	SACATON REST AREA	12-Jun-91	12-Jun-91	0	CE
F -068-1-510	BULLHEAD CITY - KINGMAN	30-May-91	18-Jun-91	13	CE
STP -031-1(38)	WINKELMAN - CHRISTMAS	28-Sep-90	02-Jul-91	190	CE
F -063-1-520	YUMA PROVING GROUND	05-Mar-91	24-Jul-91	97	CE
RS -316 (22)	RAY MINE - SUPERIOR	04-Apr-90	31-Jul-91	332	CE
F -026-2-520	VERNON - SPRINGERVILLE	09-Apr-91	05-Aug-91	81	CE
S -244- 513	NAVAJO RESERVATION BDY, MP 368	29-Mar-90	05-Aug-91	340	CE
IR - 40-4(139)	COUNTY LINE - MINNETONKA	19-Feb-91	08-Aug-91	117	CE
IR - 10-8(4)	CRESCENT DEMO PROJECT/MARANA	14-Aug-91	20-Aug-91	4	CE
BRF -022-4(30)	BR #0372	06-Feb-91	22-Aug-91	135	CE
IM - 10-6(113)	LUZENA - BOWIE	17-Oct-90	23-Aug-91	213	CE
IM - 17-1(209)	16TH ST - BUCKEYE RD	21-Mar-90	25-Aug-91	359	CE
F -022-2-531	HASSAYAMPA RIV HABITAT AREA	14-Aug-91	03-Sep-91	14	CE
IR - 40-5(89)	WINDOW ROCK TI	07-Mar-89	04-Sep-91	626	CE
F -063-1-522	CASTLE DOME WASH BRIDGE #583	19-Jun-91	05-Sep-91	54	CE
FIR - 40-1(75)	CALIFORNIA SL - MCCONNICO TI		09-Sep-91	0	CE
IR - 15-1(39)	NEVADA ST LINE - UTAH ST LINE	09-Sep-91	09-Sep-91	0	CE
IR - 40-8(2)	YAVAPAI CO LINE-NEW MEXICO ST LN	05-Aug-91	20-Sep-91	32	CE
FIR - 10-5(67)	PARK AVE - W BENSON TI	24-Sep-91	24-Sep-91	0	CE
F -045-1-511	BUFFALO - KNOX ROAD	26-Aug-91	26-Sep-91	21	CE
S -588- 503	SANTA CRUZ WASH BRIDGE #0421	18-Jun-91	30-Sep-91	72	CE
I - 10-3-513	RIGGS RD TI	20-Jun-91	07-Oct-91	75	CE
F -074-1-503	JCT US 60 - EAST SECTION	26-Aug-91	15-Oct-91	34	CE
F -023-1-519	RAINBOW WASH BRIDGE #466	15-Aug-91	30-Oct-91	52	CE
F -013-1-507	TOWN OF HUACHUCA CITY, PH I	07-Nov-91	12-Nov-91	3	CE
F -027-1-518	NAVAJO BLVD, HOLBROOK	31-Aug-90	25-Nov-91	310	CE
IR - 10-3-515	BASELINE RD - WARNER RD	15-Oct-91	03-Dec-91	34	CE
S -315- 505	BAILEY WASH - MP 30	08-Dec-91	09-Dec-91	1	CE
F -029-1-511	SR 69 @ SHERATON HOTEL ENTRANCE	07-Dec-91	17-Dec-91	7	CE
F -022-3-560	MIAMI-PEDESTRIAN OVERPASS	01-Nov-91	31-Dec-91	41	CE
IM - 15-1(46)	N RDSD PKNG-N CEDAR POCKET RA, SB	23-Sep-91	31-Dec-91	68	CE
F -022-3-566	QUEEN CREEK - JCT SR 177	31-May-91	06-Jan-92	151	CE
M -951-3-503	JCT SR84 - PUEBLO ST	20-Jun-91	10-Jan-92	140	CE
IM - 40-5(92)	APACHE CO LINE - PINTA TI	21-Feb-90	20-Jan-92	480	CE
F -035-1-526	COTTONWOOD CANYON @ BRIDLE CREEK	06-May-91	27-Jan-92	183	CE
F -035-1-533	BRIDAL CREEK BANK PROT (MP 159.5)	01-May-91	27-Jan-92	186	CE
F -022-3-573	SOSSAMAN RD - MERIDIAN RD (EB)	04-Feb-92	11-Feb-92	5	CE
S -391- 502	TOWN OF EAGAR, PH 1	08-Jan-92	19-Feb-92	29	CE
F -035-1-513	BURRO CREEK - JCT SR 97	04-Apr-91	20-Feb-92	221	CE
F -063-1-512	NEW WATER RD - QUARTZSITE	13-Apr-90	02-Mar-92	474	CE
IR - 10-8(3)	STWDE RESRCH PRGM - 6 SITES	28-Jan-92	02-Mar-92	23	CE
F -068-1-508	MP 3.3 - MP 5.2	23-Sep-91	05-Mar-92	113	CE
F -025-1-519	TOWN OF WICKENBURG, PH III	05-Mar-92	18-Mar-92	9	CE
F -074-1-504	ORTEGA LAKE SECTION	25-Jul-91	24-Mar-92	167	CE
STP -273 (7)	DOS CABEZAS - JCT SR 181	22-Apr-91	25-Mar-92	232	CE
F -039-1-510	HOOVER DAM - SOUTH, PH II	15-Jun-90	01-Apr-92	451	CE
F -039-1(25)	KINGMAN - HOOVER DAM	30-Nov-91	01-Apr-92	85	CE
F -071-1-508	ST JOHNS - NORTH	18-Jan-91	20-Apr-92	315	CE
F -035-1-532	COTTONWOOD CANYON BANK PROTECTION	04-Feb-92	24-Sep-92	160	CE
		NUMBER	71	9322	SUM
				131	AVG
				141	STD

PROJECT NUMBER	PROJECT NAME	START FILE	ENV. CLEARANCE	WORK DAYS DIFF.	CATE-GORY
CATEGORICAL EXCLUSIONS, WITH SPECIAL STUDIES					
IR - 17-1(172)	INDIAN SCHOOL RD TI & RAMPS	30-May-85	11-Oct-88	846	CW - NOT GRAPHED
F -064-1-507	TUBA CITY, US160 & SR264	26-Oct-88	16-Jun-89	160	CW - NOT GRAPHED
BRF -037-3(7)	JACOB WASH BR #0113	03-Mar-89	17-Sep-90	387	CW
BRF -037-3(5)	S FORK BADGER CRK BR #0100	17-May-88	28-Sep-90	594	CW
F -026-2-515	TOWN OF SPRINGERVILLE, MAIN ST	26-Oct-90	25-Sep-91	230	CW
F -045-1-512	SR 587, JCT SR 87 - POWERLINE	01-Aug-91	26-Sep-91	39	CW
F -035-1-512	JUNCTION I-40 - SOUTH	21-Mar-91	01-Oct-91	133	CW
F -063-1-516	CITY OF SAN LUIS, PH I	07-Nov-91	14-Nov-91	5	CW
F -060-1-510	KEAMS CYN - STEAMBOAT	09-Aug-90	26-Feb-92	389	CW
N -900- 548	KITT PEAK RD @ MP 7.5	06-Dec-91	06-Mar-92	63	CW
		NUMBER	8	1840	SUM
				230	AVG
				210	STD
ENVIRONMENTAL ASSESSMENTS					
RS -347 (16)P	MARICOPA RD, PAPAGO RD - SR84	01-Aug-88	11-Dec-89	342	EA - NOT GRAPHED
M -500-4(2)P	59TH AVE (CAMELBACK - BETHANY)	19-Apr-90	06-Jun-90	33	EA
M -500-5(6)P	51ST AVE (NORT.-BUTLER/PEO-OLIV)	19-Apr-90	06-Jun-90	33	EA
M -503-5(3)P	CAMELBACK RD (43RD - 75TH AVE)	19-Apr-90	07-Jun-90	34	EA
F -056-1-504	ROBLES JCT - AVRA VALLEY RD	15-Aug-89	17-Sep-90	274	EA
BRF -037-3(6)	SOAP CREEK BR #0101	20-Mar-89	11-Nov-90	413	EA
F -026-1-932	CORDUROY CREEK BRIDGE #0216	12-Oct-88	26-Nov-90	533	EA
M -700-4(3)	75TH AV (INDIAN SCHOOL-CAMELBACK)	16-Feb-88	05-Mar-91	765	EA
F -039-1-509	COTTONWOOD RD - MP 59	01-Aug-89	02-Apr-91	419	EA
F -038-1(14)	ASH CREEK - SYCAMORE CREEK	15-Jul-88	18-Apr-91	692	EA
M -901-9(3)	LAKE MARY RD (I-17 - WALAPAI DR)	03-Mar-89	16-Sep-91	637	EA
S -214- 309	SR360 - SCENIC DR (IDAHO RD)	01-Jun-88	18-Sep-91	828	EA
F -035-1(13)	BIG SANDY BRIDGE #0327	28-Aug-89	26-Sep-91	522	EA
F -022-2(37)	GRAND AVE, AGUA FRIA BRS 312, 313	30-Jun-86	14-Nov-91	1350	EA
RS -259 (7)P	CORNVILLE RD, MP 0.57-MP 1.70	15-Feb-91	30-Jan-92	240	EA
F -027-1-519	SHOW LOW - SHUMWAY, UT II	30-Nov-89	05-Mar-92	568	EA
F -022-3-569	DEVILS CANYON BRIDGE #0261	12-Apr-91	15-Apr-92	254	EA
N -900- 549	KARTCHNER CAVERNS STATE PARK	02-May-91	29-May-92	270	EA
		NUMBER	17	7866	SUM
				463	AVG
				339	STD

DATA COLLECTION SUMMARY OF THE 51 REMAINING PROJECTS

Project Number	Project Name	Category	Project Manager Org.	Original Bid Advert. Date	Final Bid Advert. Date	Months Moved	Calculated Clearance Date	Actual Clearance Date	Days Diff	Special Studies	
										Major Types	Total No.
IR - 8-2(94)	GILA BEND REST AREA - FREEMAN OP	CE	EP	08/25/91		0		10/11/90			
IR - 10-2(141)	BURNT WELL - TONOPAH	CE	EP	09/25/91		0		09/06/90			
I - 10-2-513	HASSAYAMPA RIV BR #1645 & #1646	CE	EP	10/25/91		0		10/22/91			
IR - 10-3(333)	ELLIOT RD TI	CE	CM	05/25/91	08/25/91	3					
STP - 10-3(337)	40TH STREET @ I-10	CE	EP	06/25/92	06/25/92	0					
I - 10-5-917	AJO WAY - COUNTRY CLUB	CE	EP	02/25/92		0					
IM - 10-6(112)	BENSON - TEXAS CANYON	CE	EP	06/25/92	06/25/92	0		10/10/91			
I - 17-1-516	EB FRNT ROAD(DURANGO) 22ND/23RD	CE	EP	04/25/91	06/25/92	14		06/01/90			
IR - 19-8(1)	STWDE RESRCH PRGM - 6 SITES	CE	EP	11/25/91	05/25/92	6		03/02/92			
IR - 40-1(69)	NEEDLE MT TI - SR 95	CE	CM	06/25/91	09/25/91	3					
I - 40-3-502	WOODY MTN UP EB #1132	CE	EP	08/25/91		0					
IR - 40-5(77)	KEAMS CANYON TI	CE	CM	05/25/91	09/25/91	4		09/22/87			
IR - 40-8(1)	STWDE RESRCH PRGM - 7 SITES	CE	EP	11/25/91	05/25/92	6		03/02/92			
F -022-2-530	HASSAYAMPA RIV HABITAT AREA	CE	EP	05/25/92	06/25/92	1		02/24/92			
F -022-2-532	WKNBRG ECL-MRSTN RROP PH II	CE	EP	11/25/91		0					
F -022-2-540	CITY OF GLENDALE, PH I	CE	CM	08/25/91		0		07/11/91			
F -022-3-571	QUEEN CREEK BRIDGE #406	CE	EP	10/25/91		0					
F -022-3-572	QUEEN CREEK TUNNEL @ MP 228.4	CE	EP	08/25/91		0		08/05/91			
F -023-1-518	SR 85, GILA BEND - COSMO	CE	EP	11/25/91	11/25/91	0					
F -026-1(19)*	SALT RIVER CANYON BR #0129	CE	CM	03/25/89	02/25/92	35		11/23/87			
F -026-1-520*	SALT RIVER CANYON REST AREA	EA	EP	02/25/92	02/25/92	0		01/27/92			
STP -028-1(34)	ELLSWORTH RD, JCT US 60	CE	EP	06/25/92		0		06/26/92			
F -028-1(36)	SR360, MCCLINTOCK & DOBSON	EA	UH	09/25/90	10/25/91	13					
F -031-1(35)	CHRISTMAS - FOREST BDY	CE	EP	06/25/91	10/25/91	4		10/17/90			
F -031-1-533	ORACLE JUNCTION - NORTH	CE	EP	05/25/92	05/25/92	0		11/04/91			
STP -033-1(9)	CAMERON - WEST	EA	CM	09/25/90	06/25/92	21		05/20/92			

* Originally separate projects, F-026-1(19) & F-026-1-520 were combined into 1 project, not "bid together". Separate environmental clearances were obtained for each.

Project Mgr Orgs: EP-Env Planning Svcs, CM-Cons Mgmt Svcs, UH-Urban Hwy Sect, AE-Adv Engrg Svcs

Category Symbols: CE-Categorical Exclusion, CW-Cat Excl with Special Studies, EA-Environmental Assessment

DATA COLLECTION SUMMARY OF THE 51 REMAINING PROJECTS

Project Number	Project Name	Category	Project Manager Org.	Original Bid Advert. Date	Final Bid Advert. Date	Months Moved	Calculated Clearance Date	Actual Clearance Date	Days Diff	Special Studies	
										Major Types	Total No.
BRF -037-3(9)	HOUSE ROCK CREEK BR #0115	CE	EP	03/25/91	08/25/91	5					
F -045-1-510	CITY OF CHANDLER, PH I	CE	CM	08/25/91		0		07/10/91			
F -051-2-514	COLD CREEK BRIDGE SB #258	CE	EP	07/25/91		0		07/11/89			
F -053-1-531	MCDOWELL RD - SHEA BLVD	CE	CM	11/25/91	01/25/92	2		01/14/92			
F -053-2-520	COLCORD RD - JCT RIM RD	CE	EP	03/25/92	03/25/92	0					
HES -071-1(1)	SANDERS	CW	EP	02/25/91	06/25/92	16		04/15/92			
STP* -084-1(10)	KOLB RD (VALENCIA RD-ESCALANTE)	CE	EP	10/25/91	04/25/92	6		07/11/91			
S -266- 503	SALT RIVER BRIDGE - NORTH	CE	EP	05/25/92	06/25/92	1		04/08/92			
S -391- 501	EAGAR - SPRINGERVILLE	CE	EP	01/25/91	03/25/92	14		09/25/91			
SBP -483- 501	TANGERINE RD (1ST AV - US89)	EA	CM	06/25/88	08/25/91	38		06/02/87			
S -581- 505	HUALAPAI RES-PEACH SPRINGS	CE	EP	02/25/92		0		10/31/91			
RAM -600-1-513	PIMA, MCKELLIPS & THOMAS	EA	UH	10/25/90	09/25/91	11					
RAM -600-2-506	SQUAW PEAK, NORTHERN AV-SHEA BLVD	EA	UH	03/25/91	05/25/92	14		05/20/88			
RAM -600-5-507	E PAPAGO, INDIAN BND WH-JCT 101L	EA	UH	06/25/90	05/25/92	23		08/14/87			
RAM -600-5-512	EAST PAPAGO, JCT I-10 - 40TH ST	CE	UH	01/25/92	11/25/91	-2					
RAM -600-5-517	EAST PAPAGO, IND BND - MCCLINTOCK	EA	UH	12/25/90	06/25/92	18		08/14/87			
M -702-4(1)P	DOBSON RD (ELLIOT RD - FRYE RD)	CE	EP	09/25/91	08/25/91	-1		04/02/91			
M -824-9-511	KINO BLVD	EA	UH	10/25/90	10/25/91	12		05/22/85			
N -900- 521	LAKE HAVASU STATE PARK	EA	EP	06/25/92	06/25/92	0		05/07/92			
N -900- 522	FOREST BDY - PENA BLANCA LAKE RD	CE	EP	02/25/92		0		11/12/91			
N -900- 935	QUARTERMASTER DEPOT, YUMA	EA	EP	06/25/89	04/25/92	34					
F -900-0(50)	STWDE RESRCH PRGM - 6 SITES	CE	EP	11/25/91	05/25/92	6		03/02/92			
HES -982 (146)P	MAGEE ROAD, NORTHERN-ORACLE	CE	EP	12/25/90	08/25/91	8		08/28/90			
BRZ -984 (50)P	GRAVEYARD WASH BRIDGE	EA	EP	04/25/91	10/25/91	6		06/05/89			
BRZ -984 (51)P	STOCKTON WASH BRIDGE	EA	EP	04/25/91	10/25/91	6		06/05/89			
BRZ -984 (64)P	AVE 16E @ WELLTON - MOHAWK CANAL	CE	EP	03/25/91	11/25/91	8		11/20/90			

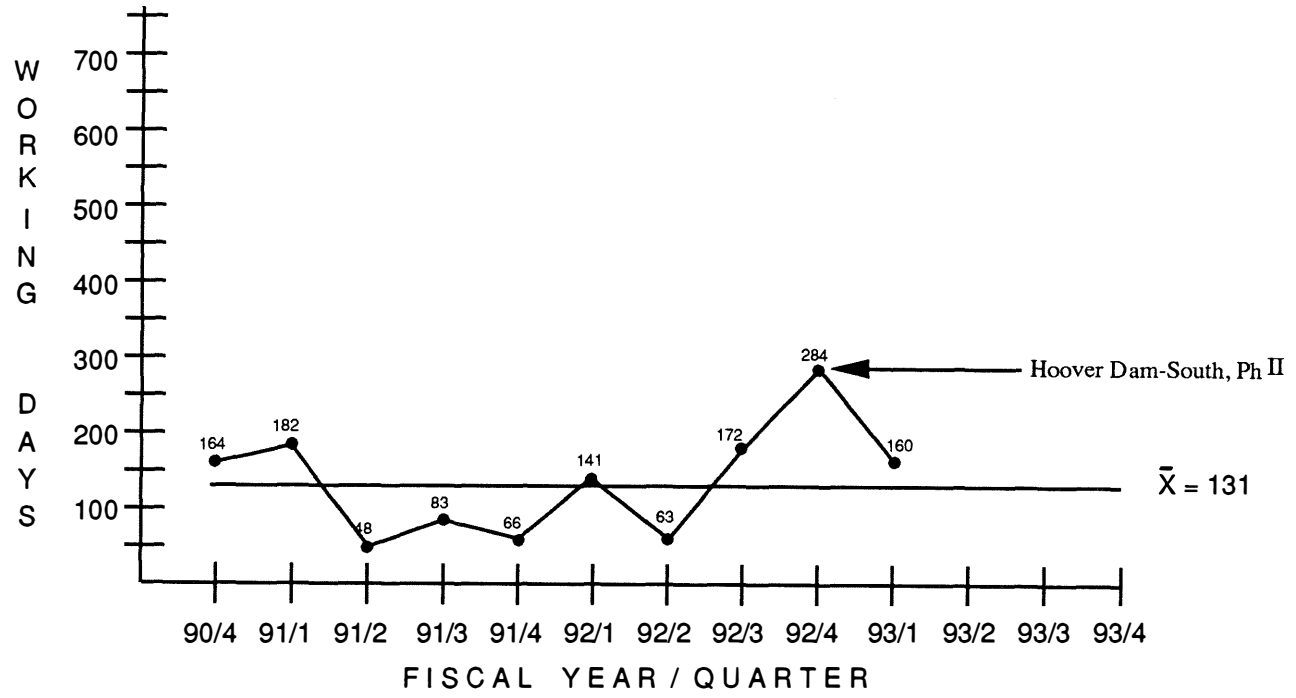
Project Mgr Orgs: EP-Env Planning Svcs, CM-Cons Mgmt Svcs, UH-Urban Hwy Sect, AE-Adv Engrg Svcs

Category Symbols: CE-Categorical Exclusion, CW-Cat Excl with Special Studies, EA-Environmental Assessment

EXPLANATION OF "HIGH POINTS"

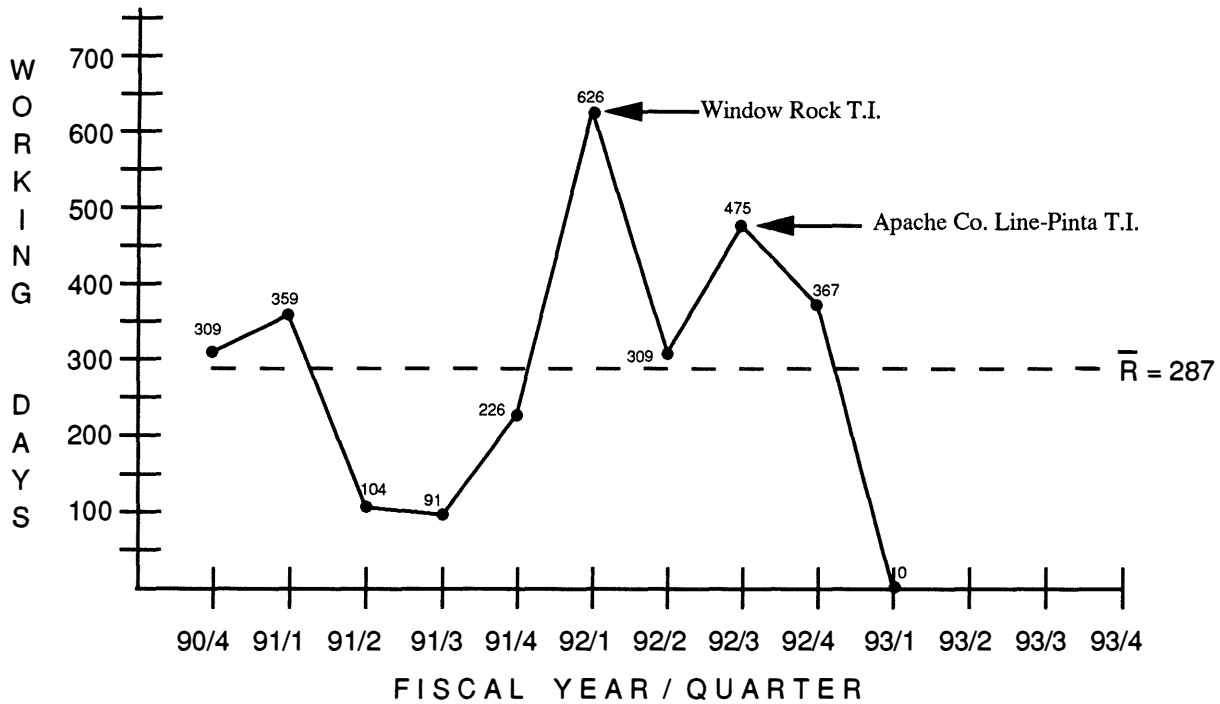
Six projects produced peaks in Average Cycle Time and Range of Cycle Time in the charts that follow. All of these projects also appear in the discussion and charts found under the title ENVIRONMENTAL CLEARANCE PROBLEMS ADDRESSED IN RECOMMENDATIONS in this report. See that topic for an explanation of the causes for their long ECP cycle times and what recommendations EQuaTe proposed to address the problems identified.

Average Cycle Time (in Working Days) for
CATEGORICAL EXCLUSIONS WITHOUT SPECIAL STUDIES
Completed in the Fiscal Quarter Indicated

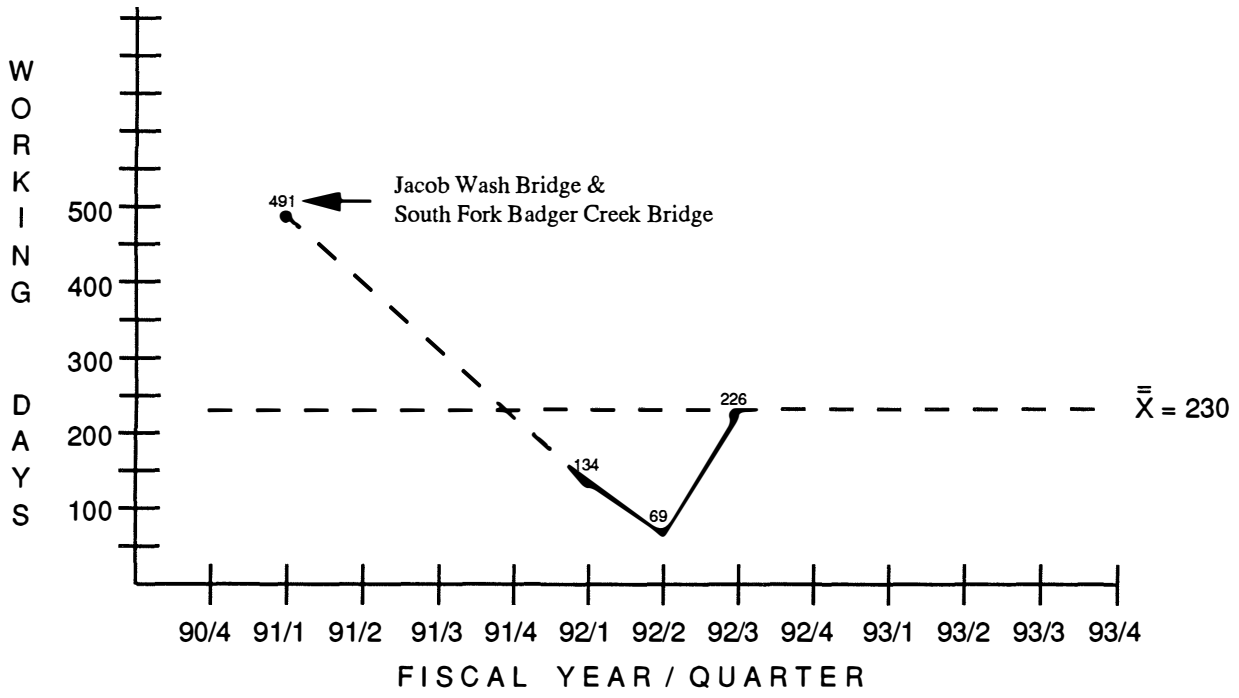


Number of CE/WOs Issued by Quarter	3	6	3	4	8	19	10	14	3	1

Range of Cycle Time (in Working Days) for
CATEGORICAL EXCLUSIONS WITHOUT SPECIAL STUDIES
Completed in the Fiscal Quarter Indicated

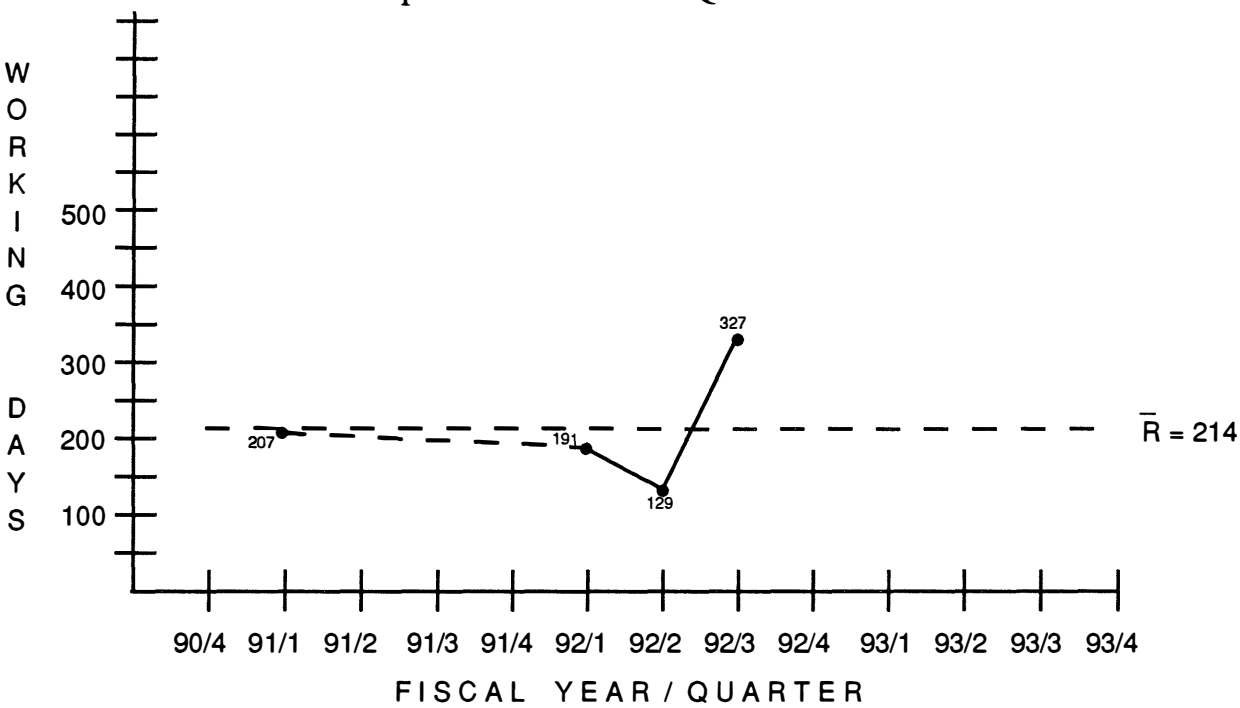


Average Cycle Time (in Working Days) for
CATEGORICAL EXCLUSIONS WITH SPECIAL STUDIES
Completed in the Fiscal Quarter Indicated

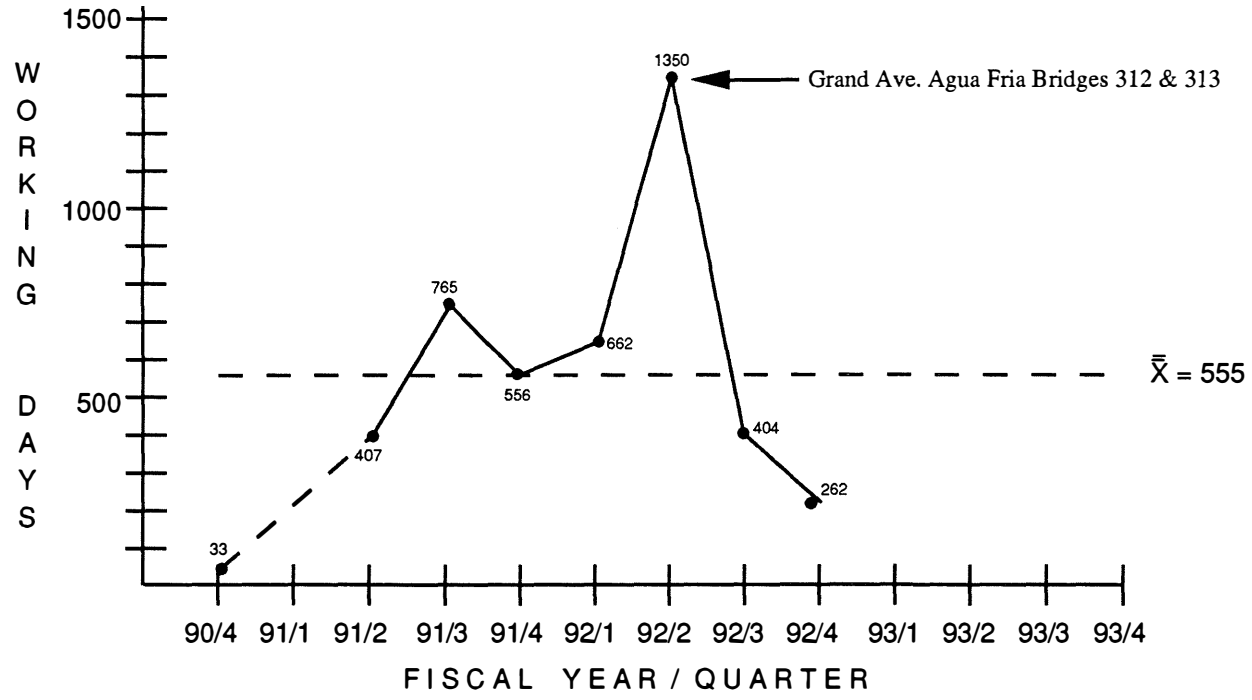


Number of CE/Ws Issued by Quarter	0	2	0	0	0	2	2	2	0

Range of Cycle Time (in Working Days) for
CATEGORICAL EXCLUSIONS WITH SPECIAL STUDIES
Completed in the Fiscal Quarter Indicated

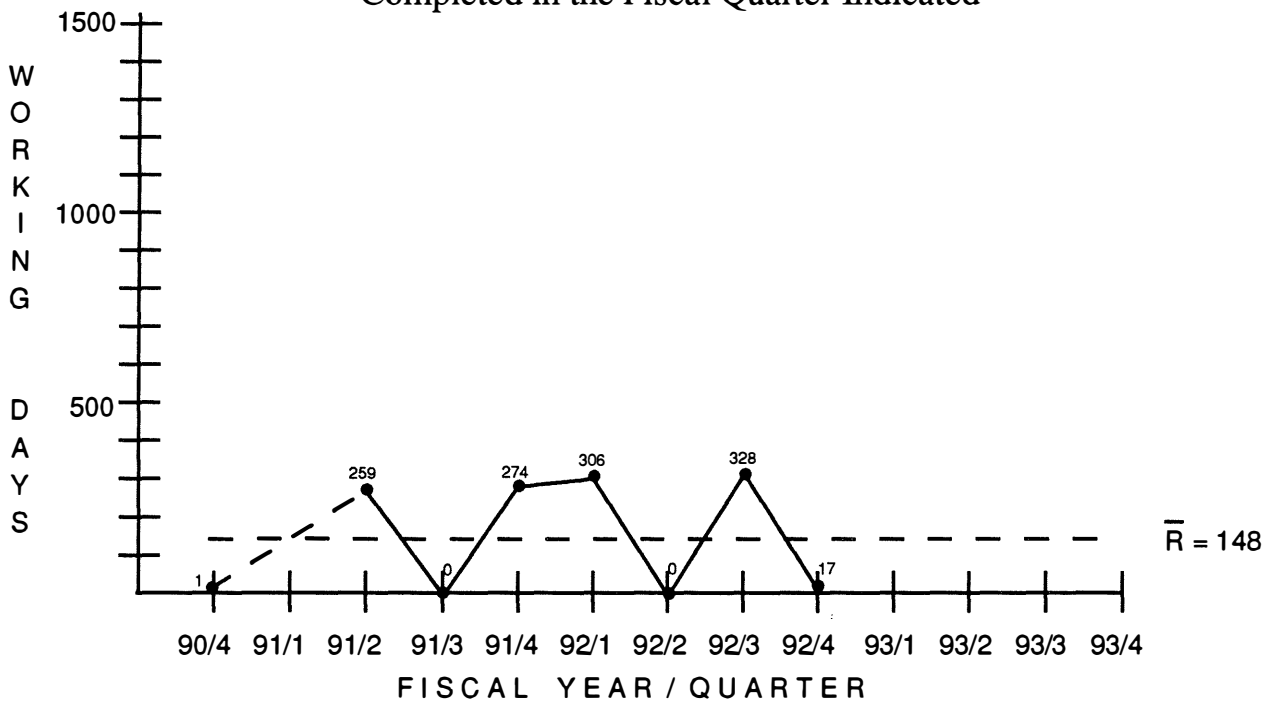


Average Cycle Time (in Working Days) for
ENVIRONMENTAL ASSESSMENTS
Completed in the Fiscal Quarter Indicated



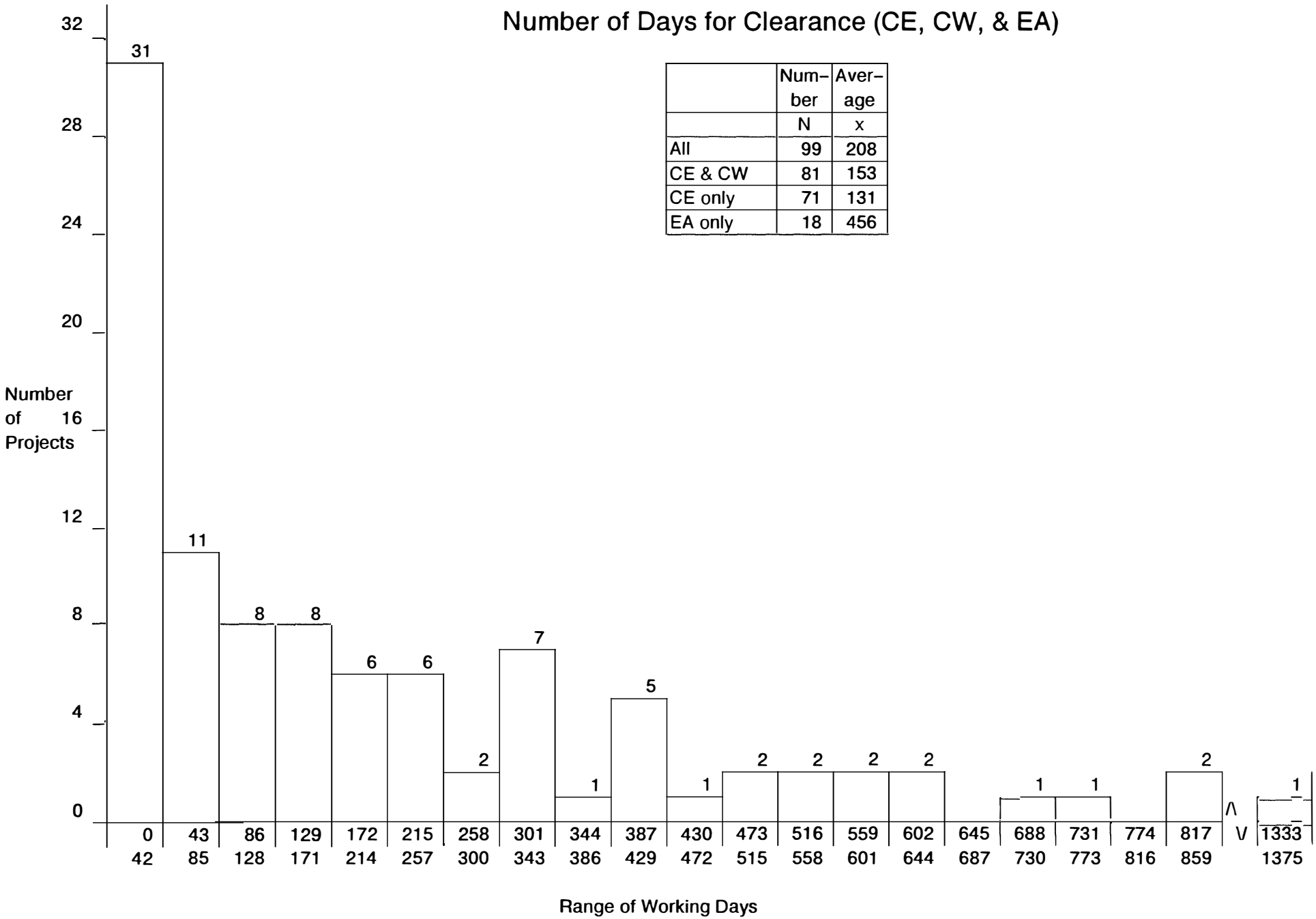
Number of EAs Issued by Quarter	3	0	3	1	2	3	1	2	2

Range of Cycle Time (in Working Days) for
ENVIRONMENTAL ASSESSMENTS
Completed in the Fiscal Quarter Indicated



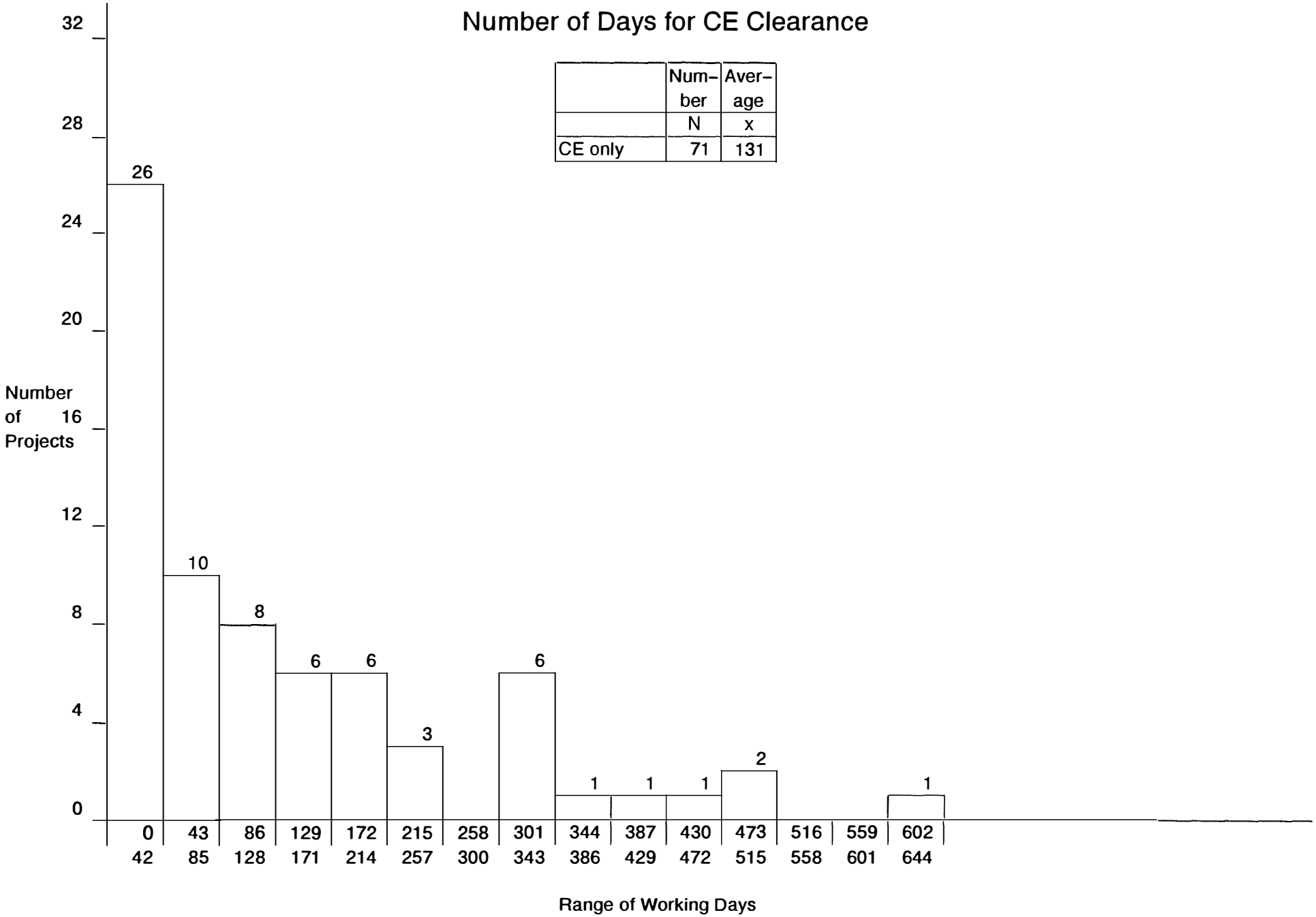
Number of Days for Clearance (CE, CW, & EA)

	Number	Average
	N	x
All	99	208
CE & CW	81	153
CE only	71	131
EA only	18	456



Number of Days for CE Clearance

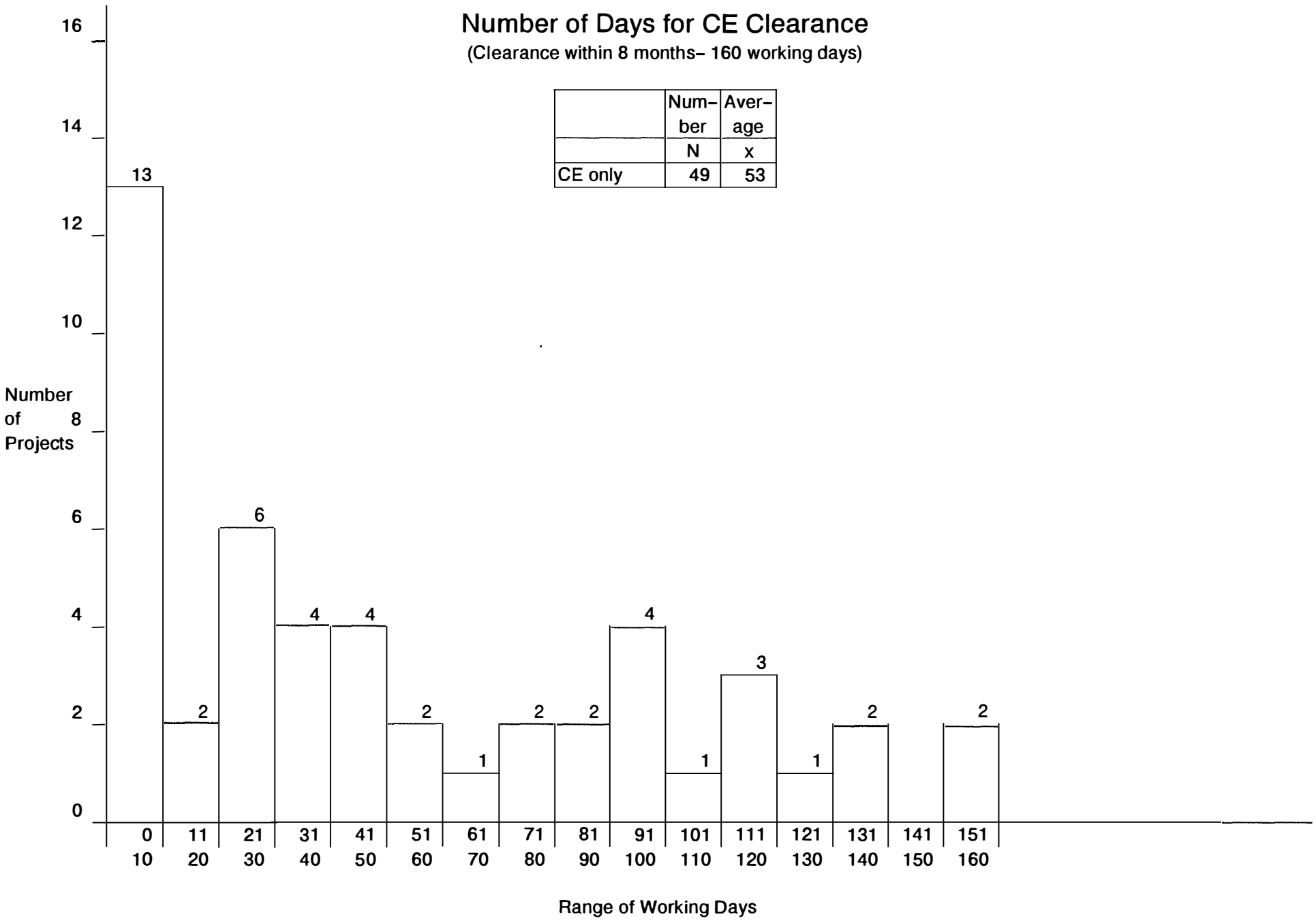
	Number	Average
	N	x
CE only	71	131



Number of Days for CE Clearance

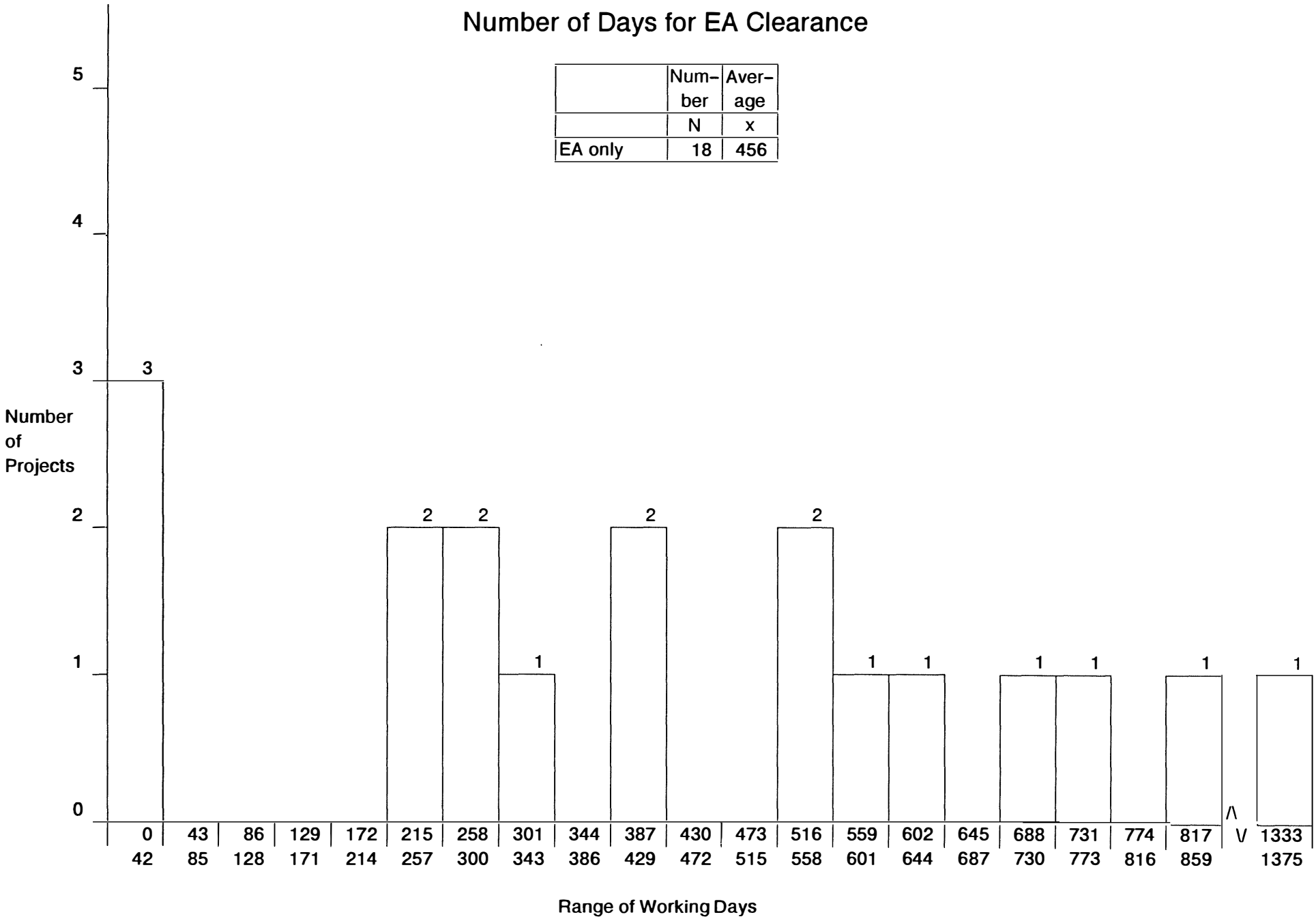
(Clearance within 8 months– 160 working days)

	Num–ber	Aver–age
	N	x
CE only	49	53



Number of Days for EA Clearance

	Number	Average
	N	x
EA only	18	456



ACTIVITIES/TASKS SUMMARIES

EQuaTe realizes the value of having actual activity times for specific environmental activities and milestones on individual projects. In our attempts to capture this information, we were frustrated by the lack of complete, accurate data. So we turned to the Environmental Planning Services (EPS) staff to give us their best estimates of how long it takes to perform the tasks listed on these summaries. From these estimates we then calculated the times for selected milestones (recorded on the Major Milestone Summaries). This is the only information available with which to compare future activity and milestone cycle times with those to be captured by EPS on their new Project Log and bi-weekly time sheet (BTS) activity codes (see the Project Log and Cost Management System recommendations).

Most EPS project files gave us acceptable Environmental Clearance Process (ECP) cycle times. The average cycle time for completing Environmental Assessments (EA) was 463 working days or 1.8 years. This compares with the EPS staff estimate of 834 working days or 3.3 years. The EPS estimate more nearly reflected the average cycle time for the actual projects taking the longest time to complete the ECP.

Using the EPS staff estimate, we also see that an estimated 4.5 months of activity time is involved with 3.3 years of cycle time to complete an EA done by EPS staff. This amounts to activity time being 11% of cycle time. No exact activity times were available from existing sources.

As the EPS manager acquires measurable data from the Project Logs and BTS activity code monthly reports, a better comparison will be made possible to give the manager a picture of what degree of success the improvements are having on the ECP. Since the average cycle time for EA development is in years it will be some time before the effects of the recommended improvements will be noticed.

ACTIVITIES/TASKS SUMMARY

Category: Environmental Assessment

EPS Prepares EA

Activity Number	Activity Name	Estimated Cycle Time (work days)			Estimated Activity Time (hours)												Value Added (hours)			
					EPS			Other ADOT			Consultant			Total			Non-Regulatory		Regulatory	
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	VA	NVA	VA	NVA
1.1	Start project file	5	60	30	1	4	1.5							1	4	1.5	1	1		
1.3	Attend pre-PA field review	7	125	20	6	24	10							6	24	10	3	7		
1.6	Review Initial PA	40	250	75	1	4	2							1	4	2	2			
1.10	Comment on Initial PA	3	6	4	1	6	3							1	6	3	1.5	1.5		
2.1	Receive Final PA	30	250	60	0.2	0.5	0.3							0.2	0.5	0.3	0.1	0.2		
2.7	Notify EPS PL of staff & dsn chgs	2	250	180	4	12	5							4	12	5	4	1		
5.1	Begin special studies	20	500	35	4	8	5							4	8	5	4	1		
3.1	Mail coordination letters	5	10	7	4	24	7							4	24	7	2	5		
2.27	Assemble & evaluate data	20	500	52	16	1800	235	2	16	12				18	1816	247	48	200		
4.2	Determine level of agcy involvement	24	240	61	24	58	30	4	76	19				28	134	49	25	25		
2.29	Prepare pre-DEA document	30	540	85	24	420	114	2	6	4				26	426	118			88	30
2.37	Write transmittal letter	10	45	19	4	100	30	2	10	6				6	110	36	24	12		
2.42	Address resolution of comms in DEA	16	160	37	4	48	16	6	18	10				10	66	26	19	19	19	19
2.46	Submit DEA to FHWA	2	20	8	5	20	11	4	40	20				9	60	31			15	16
7.1.1	Recv signed DEA, trigger Pub Hrg	1	30	10	1	8	2							1	8	2			1	1
7.3	Write transmittal letter	3	15	5	3	20	10							3	20	10	10			

ACTIVITIES/TASKS SUMMARY

Category: Environmental Assessment

EPS Prepares EA

Activity Number	Activity Name	Estimated Cycle Time (work days)			Estimated Activity Time (hours)												Value Added (hours)			
					EPS			Other ADOT			Consultant			Total			Non-Regulatory		Regulatory	
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	VA	NVA	VA	NVA
2.40.1.4	Recv request for Public Hearing	25	40	33	8	32	17							8	32	17			3	14
2.40.1.8	Issues resolved, request withdrawn	5	20	9	7	40	12							7	40	12			6	6
8.1	Hold Public Hearing	15	40	28	20	140	45	40	20	8				60	160	53			26	27
8.1.2	Comment per.: 30 days EA/45 EIS	10	60	32	4	48	18	4	48	18				8	96	36			9	27
8.12	Insure all issues were addressed	5	60	23	8	120	32	8	16	10				16	136	42	14	6	14	6
8.15	Incorp internal & FHWA comments	8	20	9	8	40	15	2	20	10				10	60	25			15	10
11.1	FHWA Issues FONSI	3	50	12	3	64	11							3	64	11			11	
	TOTALS	289	3291	834	160	3041	632	74	270	117				234	3311	749	158	279	207	156

ACTIVITIES/TASKS SUMMARY

Category: Environmental Assessment

Consultant Prepares EA and Special Studies

Activity Number	Activity Name	Estimated Cycle Time (work days)			Estimated Activity Time (hours)												Value Added (hours)			
					EPS			Other ADOT			Consultant			Total			Non-Regulatory		Regulatory	
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	VA	NVA	VA	NVA
1.1	Start project file										1	4	2	1	4	2	1	1		
1.3	Attend pre-PA field review				6	24	10							6	24	10	3	7		
1.6	Review Initial PA				1	4	2							1	4	2	2			
1.10	Comment on Initial PA				1	6	3							1	6	3	1.5	1.5		
2.1	Receive Final PA				0.2	0.5	0.3							0.2	0.5	0.3	0.1	0.2		
2.7	Notify EPS PL of staff & dsn chgs				2	6	2				2	6	3	4	12	5	4	1		
5.1	Begin special studies										4	8	5	4	8	5	4	1		
3.1	Mail coordination letters										8	36	15	8	36	15	5	15		
2.27	Assemble & evaluate data										24	2040	640	24	2040	640	150	490		
4.2	Determine level of agcy involvement				19	58	32	6	76	21	9	90	39	34	224	92	8	7		
2.29	Prepare pre-DEA document										40	340	54	40	340	54			40	14
2.37	Write transmittal letter										40	180	75	40	180	75	50	25		
2.42	Address resolution of comms in DEA				4	20	8	6	18	10	40	60	32	50	98	50	12	13	12	13
2.46	Submit DEA to FHWA				4	40	15				30	80	34	34	120	49			25	24
7.1.1	Recv signed DEA, trigger Pub Hrg				1	8	2							1	8	2			1	1
7.3	Write transmittal letter										16	32	24	16	32	24	24			

ACTIVITIES/TASKS SUMMARY

Category: Environmental Assessment

Consultant Prepares EA and Special Studies

Activity Number	Activity Name	Estimated Cycle Time (work days)			Estimated Activity Time (hours)												Value Added (hours)			
					EPS			Other ADOT			Consultant			Total			Non-Regulatory		Regulatory	
		Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	VA	NVA	VA	NVA
2.40.1.4	Recv request for Public Hearing				8	32	17							8	32	17			3	14
2.40.1.8	Issues resolved, request withdrawn				7	40	12							7	40	12			6	6
8.1	Hold Public Hearing				20	140	45				40	100	49	60	240	94			47	47
8.1.2	Comment per.: 30 days EA/45 EIS										18	60	23	18	60	23			6	17
8.12	Insure all issues were addressed				8	120	40				30	100	42	38	220	82	26	15	26	15
8.15	Incorp internal & FHWA comments										16	60	25	16	60	25			18	7
11.1	FHWA Issues FONSI				2	4	2				2	25	11	4	29	13			13	
	TOTALS				83	503	190	12	94	31	320	3221	1073	415	3818	1294	291	577	197	158

MAJOR MILESTONES SUMMARY

Category: Env. Assessment

Activity Number	Activity Name	Cycle Time (work days)			Activity Time (hours)				Value Added (hours)			
						Other	Con-		Non-Regulatory		Regulatory	
		Min	Max	Avg	EPS	ADOT	sult-ant	Total	VA	NVA	VA	NVA
	Start File											
	Rec Final PA	85	691	189								
	Start Spec Stud	22	750	215								
	Compl Spec Stud											
	Send Coord Ltrs	5	10	7								
	Rec Coord Ltrs	44	740	113								
	ADOT Appr DEA	56	745	141								
	FHWA Appr DEA	1	50	18								
	Hold Public Hrg	33	75	47								
	ADOT Appr FEA	38	180	92								
	FHWA Appr FEA	4	54	14								
	Clearance Ltr	1	2	1								
	TOTALS in hours											
	in days	289	3297	837								

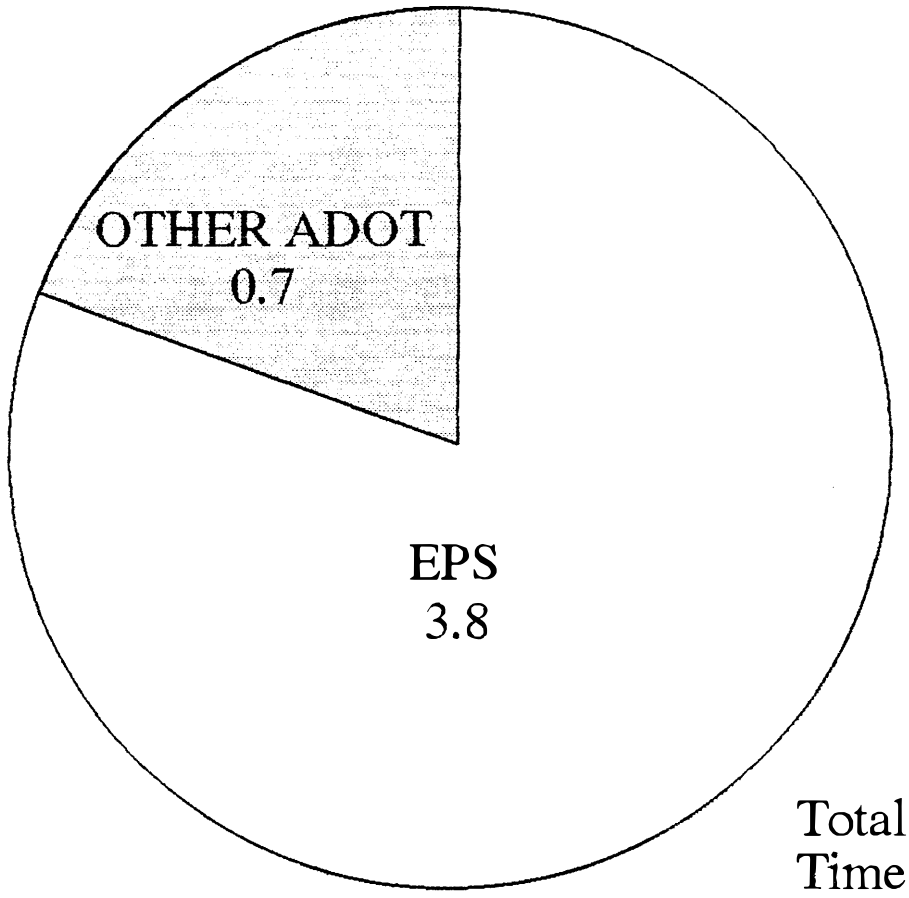
MAJOR MILESTONES SUMMARY

Category: Env. Assessment

PA, DCR in-house, EPS prepares EA

Activity Number	Activity Name	Cycle Time (work days)			Activity Time (hours)				Value Added (hours)			
									Non-Regulatory		Regulatory	
		Measured	Estimated	Base	EPS	Other ADOT	Consultant	Total	VA	NVA	VA	NVA
	Start File											
	Rec Final PA		189		16.8			16.8	7.6	9.7		
	Start Spec Stud		215		10			10	8	2		
	Compl Spec Stud											
	Send Coord Ltrs		7		7			7	2	5		
	Rec Coord Ltrs		113		265	31		296	123	225		
	ADOT Appr DEA		141		160	20		180	43	31	127	55
	FHWA Appr DEA		18		13	20		33			16	17
	Hold Public Hrg		75		84	8		92	10		35	47
	ADOT Appr FEA		64		65	38		103	14	6	38	43
	FHWA Appr FEA		14		13			13			13	
	Clearance Ltr		1		1	0		1				
	TOTALS in hours				634.8	117		751.8	207.6	278.7	229	162
	in days		837		79.4	14.6		94	26	34.8	28.6	20.3

ESTIMATED ACTIVITY TIME FOR ENVIRONMENTAL PLANNING SERVICES TO PRODUCE AN ENVIRONMENTAL ASSESSMENT



Total Activity Time = 4.5 mos.

Personnel Performing the Work:

EPS - ADOT Environmental Planning Services Staff

OTHER ADOT - Statewide Project Management Section & Advance Engineering Services Staff

(Data based on the average EPS staff estimates assuming all activities were performed.)

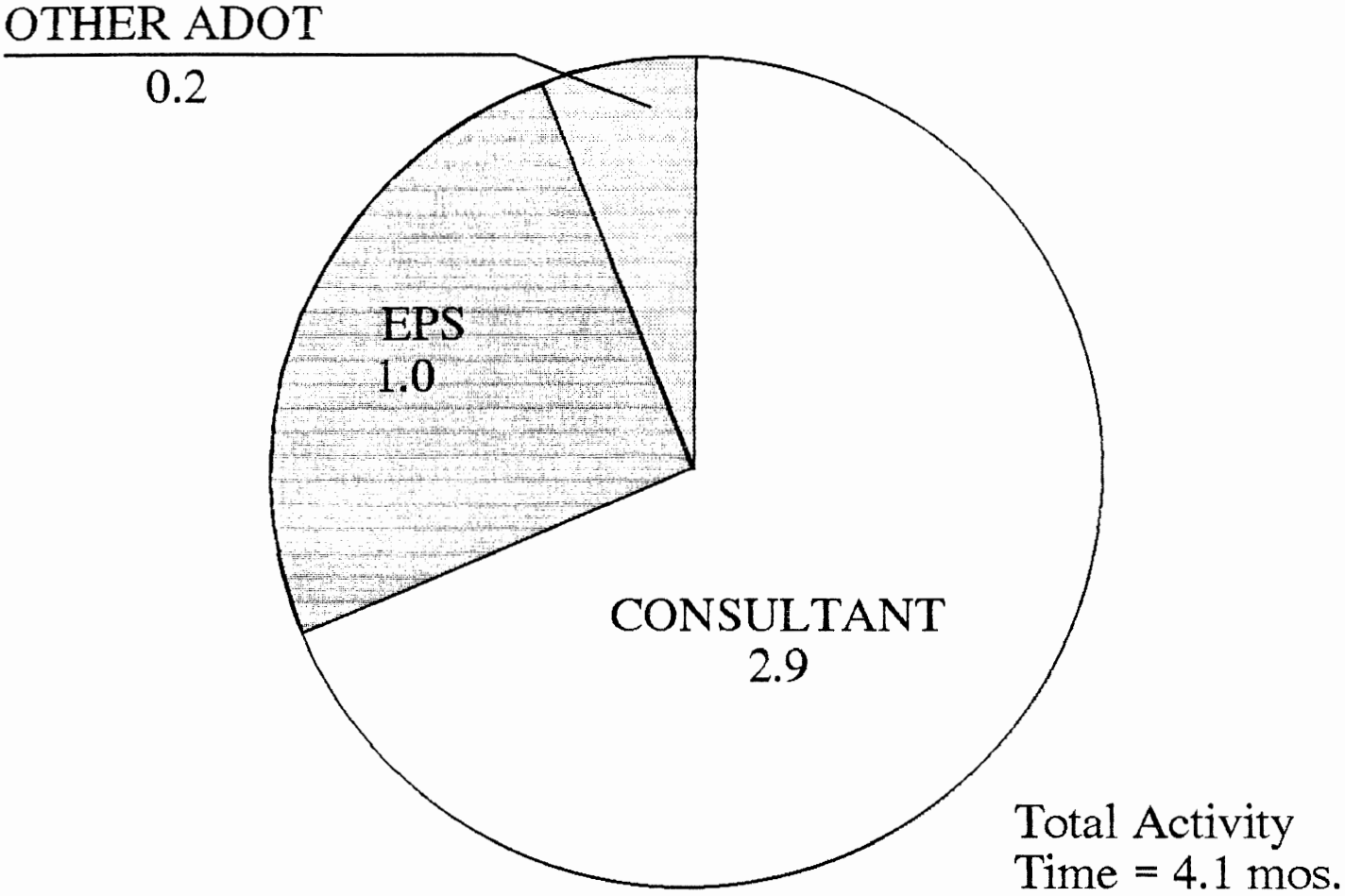
MAJOR MILESTONES SUMMARY

Category: Env. Assessment

PA/DCR & EA by Consultant

Activity Number	Activity Name	Cycle Time (work days)			Activity Time (hours)				Value Added (hours)			
									Non-Regulatory		Regulatory	
		Measured	Estimated	Base	EPS	Other ADOT	Consultant	Total	VA	NVA	VA	NVA
	Start File											
	Rec Final PA		189		16.8		2	18.8	8.6	10.7		
	Start Spec Stud		215		10		10	20	8	2		
	Compl Spec Stud											
	Send Coord Ltrs		7				15	15	5	15		
	Rec Coord Ltrs		113		32	21	39	92	158	497		
	ADOT Appr DEA		141		8	10	261	279	62	38	52	27
	FHWA Appr DEA		18		17		34	51			26	25
	Hold Public Hrg		47		45		49	94	24		62	84
	ADOT Appr FEA		92		40		54	94	26	15	44	22
	FHWA Appr FEA		14		2		13	15			13	
	Clearance Ltr		1		1		1	2				
	TOTALS in hours				171.8	31	478	680.8	291.6	577.7	197	158
	in days		837		21.5	3.9	59.7	85.1	36.5	72.2	24.6	19.8

ESTIMATED ACTIVITY TIME FOR CONSULTANTS TO PRODUCE AN ENVIRONMENTAL ASSESSMENT



Personnel Performing the Work:

EPS - ADOT Environmental Planning Services Staff

OTHER ADOT - Statewide Project Management Section & Advance Engineering Services Staff

CONSULTANT - The ADOT Selected Consultant Producing the Environmental Studies and Documents

(Data based on the average EPS staff estimates assuming all activities were performed.)

APPENDIX C

RECOMMENDATIONS FOR FURTHER STUDY

I Geographic Information System (GIS)

A. A GIS could be of significant value in determining environmental considerations and information available for a particular area of length of highway. The EQuaTe team discussed the costs, efficiency, and effectiveness of a GIS and determined that it should be evaluated by a team who could devote more time and have greater expertise in this area. The implementation of a GIS should be compared to other computerized and non-computerized systems.

B. A GIS is currently being implemented by CADD System Services. During this implementation, Environmental Planning Services should be consulted and environmental information should be included in this data base.

C. The implementation of a personal computer data-based system should be evaluated as an alternative.

II Networking System

Local and wide area networks could be of great benefit to all potential users of environmental information. The EQuaTe team decided that this issue requires more time and expertise than is available to the team. It is recommended that a study be performed to evaluate various networking systems including the FAST system, which is being implemented by some construction organizations.

III Concurrent Reviews

Intra-ADOT and interagency reviews typically occur serially. Each entity is reluctant to share documents with other reviewers before being satisfied with content.

The EQuaTe team discussed the potential cycle time reduction of performing concurrent reviews. It was determined that concurrent reviews are desirable, but will be difficult to structure and implement. It is recommended that a multi-agency team evaluate this possibility.

APPENDIX D

LIST OF ACRONYMS

ADOT	Arizona Department of Transportation
AES	Advance Engineering Services
BPI	Business Process Improvement
CE	Categorical Exclusion
CPM	Critical Path Method
DCR	Design Concept Report
DE	District Engineer
EA	Environmental Assessment
ECP	Environmental Clearance Process
ECS	Engineering Consultant Services
EPS	Environmental Planning Services
EQuaTe	Environmental Quality Team
EST	Environmental Scoping Team
FHWA	Federal Highway Administration
FTE	Full Time Employee
FTEE	Full Time Employee Equivalent
FY	Fiscal Year
FYHCP	Five-Year Highway Construction Program
HPS	Highway Plans Services
IDT	Interdisciplinary Team
IRM	Integrated Resource Management
LDCR	Location Design Concept Report
PA	Project Assessment
PCEM	Preconstruction Engineering Management
PDA	Proposal Definition Analysis
PDC	Project Development Committee
PPC	Priority Programming Committee

PPP	Priority Programming Process
PPT	Priority Planning Team
QPI	Quality and Productivity Initiative
SPMS	Statewide Project Management Services
TQM	Total Quality Management
USFS	United States Forest Service
USFWS	United States Fish Wildlife Service