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ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PROJECT DEVELOPMENT PROCESS MANUAL

Phoenix, Arizona
February, 2004

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1. INTRODUCTION

1.1 STATE HIGHWAY SYSTEM

The Arizona Department of Transportation (ADOT) is responsible for providing a statewide network of highways within Arizona which, by statute, is the State Highway System. To meet this responsibility, the State Transportation Board sets priorities for needed construction or reconstruction projects within funds available, and the Department plans and contracts to add these improvements to the State Highway System. The planning and development process for state-funded and federal-aid transportation facilities in Arizona includes the identification of public need; the determination of funding; and the planning, development, and construction of appropriate transportation facilities.

The legal responsibilities of the Arizona Department of Transportation are established in Title 28 of the Arizona Revised Statutes.

It is within the framework of the statutes that the Department plans, constructs, and maintains the State Highway System.

In order to discharge its statutory responsibilities, the Arizona Department of Transportation is organized into the Divisions of Motor Vehicle, Transportation Planning, Highways, Aeronautics, and Administrative Services with non-divisional staff units in support.

Two of these divisions have primary responsibilities in the State Highway System. Planning

of the Highway System is the responsibility of the Transportation Division while the implementation of the System and its operation and maintenance are the responsibility of the Highways System.

1.2 STATE ACTION PLAN

Two ADOT publications outline the functions and processes the Department uses for developing and administering the State Highway System program. They are: the *Action Plan for State-Funded Highway Projects on the State System*, dated July 8, 1983, 2nd edition (August 12, 1985), and the *Action Plan for Federal-Aid Highway Projects*, dated September 26, 1988.

In general terms, the Action Plan(s) sets forth the ADOT organizational structure, the assignment of responsibilities within the organization, and the procedures followed by the Department in planning and developing highway projects. The Action Plan(s) identifies and discusses the decision-making process for proposed highway projects being advanced through transportation planning and project development, and describes how and when public and other agency participation is obtained as well as how social, economic, and environmental impact considerations are addressed.

1.3 TRANSPORTATION PLANNING PROCESS

The Transportation Planning Process, as outlined in the ADOT Action Plan(s) involves a systematic analysis of transportation issues at the state, regional and community levels. It includes studies of transportation systems, corridors, and special improvements. The process is future oriented and provides direction to the succeeding Highway Development Process.

tion documents, administration of construction contracts, and initial project operation and maintenance in accordance with ADOT policy.

One of the products of the Transportation Planning Process is a five-year priority program for transportation capital improvements. Of particular importance to the Highway Development Process described in this Manual is the *Five-Year Highway Construction Program* which identifies the highway projects programmed for each of the five ensuing fiscal years from date of publication. Adoption and publication of the five-year program is under the direction and authority of the State Transportation Board.

1.4 PROJECT DEVELOPMENT PROCESS

The Project Development Process is administered by the Highways Division of ADOT and includes the location, design, and construction of new highways and related facilities as well as reconstruction or improvement of the existing system, all in accordance with the *Five-Year Highway Construction Program*.

1.5 PURPOSE OF MANUAL

The purpose of this Manual is to describe the Project Development Process and to provide a guide for the management of project scoping activities, project design and production of construc-

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2. HIGHWAYS DIVISION ORGANIZATION AND RESPONSIBILITIES

2.1 TECHNICAL ORGANIZATION

The Intermodal Transportation Division of ADOT is responsible for implementing and administering the Project Development Process from project inception through construction. Figure 2-1 presents the organizational structure of the Division, reflecting the organizational concept, the lines of authority and communication, and the relationship between all organizational entities.

Management and administrative responsibility for advancing a highway project through the Project Development Process lies with the Statewide Project Management Group or the Valley Transportation Project Management Group which report to the State Engineer through their respective Deputy State Engineers. Responsibility for technical aspects of the Project Development Process is distributed throughout the fourteen groups and nine districts which comprise the Division. In addition to the two Project Management groups, these are Right-of-Way, Transportation and Management Support, Roadway, Traffic Bridge, Transportation Planning, Maintenance, Construction, Materials, Equipment Services, MAG Life Cycle, Phoenix District Construction, and the nine Districts. A description of responsibilities in the project development process for each of these groups and their component sections follows below.

2.1.1 Program and Project Management Group

The Program and Project Management Group is responsible for the day-to-day management and monitoring of the project development process. The group comprises:

- ◆ *Statewide Project Management Section* - Provides technical supervision and leadership of the project managers for all ADOT projects including those managers who are assigned to other groups/sections.
- ◆ *Local Government Section* - Responsible for providing technical planning and engineering liaison and coordination between ADOT and all local agencies involved in planning and developing local government federal-aid highway construction projects throughout the State.
- ◆ *Program and Project Scheduling Section* - Responsible for coordinating project schedules, balancing ADOT resource requirements and for providing management reports for monitoring program and project progress. Provides technical assistance in preparing project work plans especially the work breakdown structure and resource requirements.

2.1.2 Roadway Group

The Roadway Group is responsible for the design and development of concepts, plans, and estimates for highway construction projects. Frequently the Group will

Figure 2-1 Highways Division
Organizational Structure

utilize engineering consultants to assist in these design services. From time-to-time, personnel will be assigned from the group as project managers reporting to Statewide Project Management Section. Responsibility for management and administration of technical activities rests with the group manager.

- ◆ *Pre-Design Program Management Section*- Responsible for the management of the Roadway Pre-Design Sections' on-call design consultants.
- ◆ *Pre-Design Sections* - Responsible for the technical management and production of Project Assessment Reports for candidate highway projects.
- ◆ *Studies Section* - Responsible for the technical management and production of Highway Corridor Study Reports and Design Concept Reports for candidate highway projects.
- ◆ *Design Program Management Section* - Responsible for the management of the Group's on-call design consultants. Develops and maintains design guidelines and standards for the Group.
- ◆ *Design Sections* - Responsible for the technical management and production of roadway designs and plans.
- ◆ *Roadway Support Section* - Responsible for the coordination and operation of the group's CADD system and responsible for the maintenance and operation of the highway design library.

- ◆ *Environmental Planning Section* - Responsible for the technical management of and preparation of environmental studies and reports. Responsible for scheduling and directing public meetings and hearings relative to the development of transportation projects.
- ◆ *Roadside Development Section* - Responsible for the technical management of and preparation of designs and plans for roadside improvements including rest areas, landscaping, state parks access and interior roads, and review of projects on Parkways, Historic, and Scenic Roads. Coordinates ADOT activities with the U.S. Forest Service.

2.1.3 Bridge Group

The Bridge Group is responsible for the design and preparation of plans for bridge and highway structures, bridge maintenance, hydrology, and drainage design. Occasionally, the Group will utilize engineering consultants to assist in these design services. From time-to-time, group personnel will be assigned as project managers reporting to Statewide Project Management Section. Responsibility for management and administration of technical activities rests with the group manager.

- ◆ *Bridge Design Sections* - Responsible for the technical management and preparation of designs and plans for bridges and appurtenant highway structures.
- ◆ *Bridge Drainage Section* - Responsible for the technical management and preparation of analyses, designs and plans for

highway drainage and of analyses of stream flows.

◆ *Bridge Management Section* - Responsible for an ongoing inspection program to determine bridge conditions and maintenance requirements. Initiates requests for major refurbishing and repair projects on bridges.

◆ *Bridge Technical Section* - Responsible for developing and maintaining computer design programs and the coordination and operation of the group's CADD system.

2.1.4 Traffic Engineering Group

The Traffic Engineering Group is responsible for the preparation of design exception accident analysis, construction zone traffic control plan, intersection analysis, traffic signal and illumination plans, signing plans, and pavement marking plans. Frequently the Group will utilize engineering consultants to assist in these design services. From time-to-time, group personnel will be assigned as project managers reporting to Statewide Project Management Section. Responsibility for management and administration of technical activities rests with the group manager.

◆ *Traffic Studies Section* - Responsible for the technical management of analyses and designs for the traffic engineering aspects of highway projects.

◆ *Electrical Design Production Section* - Responsible for the technical management of designs and preparation of plans for

the lighting and traffic signal aspects of highway projects.

◆ *Striping and Traffic Control Section* - Responsible for the technical management of designs and preparation of plans for the pavement markings and maintenance of traffic aspects of highway projects.

◆ *Sign Construction Review and Preliminary Design Review Section* - Responsible for the technical management of designs and preparation of plans for signing aspects of highway projects.

◆ *Traffic Records Section* - Responsible for assembling and maintaining data on the location and causes of traffic accidents on the state highways. These data are available for guidance on reconstruction and safety improvement projects.

2.1.5 Right-of-way Group

The Right-of-Way Group is responsible for acquiring rights-of-way required for state transportation facilities. Frequently, the group will utilize right-of-way consultants to assist in providing these services. Responsibility for management and administration of technical activities rests with the group manager.

◆ *Plans Sections* - Responsible for the technical management of and the production of right-of-way plans, acquisition documents, and condemnation exhibits.

- ◆ *Titles Section* - Responsible for the technical management of and preparation of property title reports, existing right-
- ◆ *Appraisal Section* - Responsible for the technical management of and the preparation of appraisals of property required for highway right-of-way.
- ◆ *Acquisition Sections* - Responsible for the technical management and performance of right-of-way negotiations including acquisition and relocation, and for agreements with other public agencies. When required, initiates condemnation action to obtain right-of-way by eminent domain.
- ◆ *Public Liaison Section* - Responsible for the technical management of the right-of-way advance acquisition program, for monitoring and scheduling right-of-way acquisition activities. Provides right-of-way-informational assistance to the public and participates in special acquisitions.
- ◆ *Fiscal Section* - Responsible for making payments for property acquired, provides accounting and budget control, and right-of-way consultant contracting liaison services.
- ◆ *Property Management* - Responsible for the technical management of properties owned by the Department and the demolition and disposal of acquired improvements to clear the right-of-way.
- ◆ *Utility and Railroad Engineering Section* - Responsible for coordinating proposed highway improvements with utility and railroad companies, resolving conflicts

of-way reports, and Transportation Board resolutions.

between utility or railroad facilities and highway improvements to clear the right-of-way for construction. Responsible for preparing and processing agreements with utility and railroad companies.

2.1.6 Transportation and Management Support Group

The Transportation Support Group is responsible for those development functions which directly support engineering design. These support functions include photogrammetry and mapping, engineering surveys, environmental planning, roadside development, and utility and railroad engineering. Frequently the several sections will utilize consultants to assist in these activities. From time-to-time, personnel will be assigned from the group as project managers reporting to Statewide Project Management Section. Responsibility for management and administration of technical activities rests with the group manager.

- ◆ *Photogrammetry and Mapping Section* - Responsible for technical management of and providing aerial photography, photogrammetry, and a variety of engineering maps for support of engineering studies, design, and other functions within ADOT.

- ◆ *Engineering Surveys Section* - Responsible for technical management of and for providing field survey services to support mapping, engineering

studies, design and other functions within ADOT.

- ◆ *Engineering Consultant Section* - Assists ADOT managers in administering the pre-award and
- ◆ *Special Programs Section* - A staff engineering section charged with carrying out programs related to ADOT's Quality and Productivity Initiative including Value Analysis, Pre-Construction Partnering, Constructability, and QPI Training and Facilitation.
- ◆ *Contracts and Specifications Section* - Responsible for cost estimates for the various phases of a project, preparation of specifications, assembly of bidding documents, and for advancing each construction project through the advertisement for bids and the award of construction contract by the ADOT Transportation Board.

2.1.7 Materials Group

The Materials Group is responsible for providing geotechnical analyses, pavement design, and materials testing services. The group is responsible for preparation of materials reports in support of engineering studies, design and other functions within ADOT. Frequently the several sections will utilize consultants to assist in these activities. From time-to-time, personnel from the group will be assigned as project managers reporting to Statewide Project Management Section. Responsibility for management and administration of technical activities rests with the group manager. Technical management of the several sections' technical

post-award processes for engineering consultant contracts and for developing and processing Joint Project Agreements.

activities remains with the section manager.

- ◆ *Materials Testing Sections* - Responsible for the quality assurance testing of materials used in construction.
- ◆ *Materials Geotechnical Sections* - Responsible for geotechnical investigations, sampling, testing, analysis and design of highway excavations and embankments.
- ◆ *Materials Pavement Section* - Responsible for the analysis and design of highway pavements. Responsible for establishing pavement performance criteria and pavement management procedures. Assists the districts in recommending pavement preservation projects.

2.1.8 Districts Operations Group

- ◆ *Equipment Section* - Responsible state-wide for the day-to-day maintenance of all the rolling equipment (vehicles, etc.) assigned to ADOT.
- ◆ *Engineering Districts* - The State of Arizona is divided into ten districts which are involved in the initial identification of highway needs and are responsible for construction, operation and maintenance of the highway facilities within their jurisdiction. The Districts provide advisory and review input to the Scoping and Design Phases of the Project

Development Process from the standpoint of project intent, constructability, operation, and maintenance of highway facilities. The Districts are actively involved in project progress throughout the The operation and maintenance functions of the Districts are, in essence, major Customers of the Project Development Process.

From time-to-time, personnel from the Districts will be assigned as project managers reporting to Statewide Project Management Section. Responsibility for management and administration of technical activities rests with the group manager, the District Engineers and the section/function managers.

Although organized to meet their individual missions, in general, each district has construction, operation and maintenance functions. (Note: In the Phoenix area, one district is responsible for construction activities only. A second district is responsible for maintenance and operation of the highways in this area.) Overall coordination and supervision of the several districts is provided by the Group manager.

District Construction Functions

- Responsible for the technical management of project construction activities within the district and for reviewing project plans for constructability.

District Operation Functions

- Responsible for operational aspects of the state highways in the district including reviewing and approving encroachment and access permits, freeway management systems, roadway signing and

process; however, their most significant involvement comes in the technical management of the Construction and Maintenance Phases of the Project Development Process.

striping, and traffic signal and lighting systems and responsible for reviewing project plans for traffic operation aspects. Operational improvement projects originate from these units.

District Maintenance Functions

- Responsible for the day-to-day maintenance of the highways within the district and responsible for reviewing project plans for maintainability and for advising design units of maintenance problems. Together with the design units, they are responsible for resolving conflicts involving design and maintenance considerations.

2.1.9 Construction Group

The Construction Group is responsible for the state-wide coordination of construction activities including managing the construction partnering activities, monitoring field reports, making contractor payments, disseminating construction process improvements to other groups, and providing construction specialists in support of the district construction staffs. Involvement in the Project Development Process is through the districts.

2.1.10 Maintenance Group

The Maintenance Group is responsible for the state-wide

coordination of maintenance activities, including maintenance planning, permits, maintenance contracts and purchasing, natural resources, interstate highway signing and lighting installation and maintenance, water and waste water engineering and maintenance

2.2 PROJECT ORGANIZATION

2.2.1 Project Team

The guiding philosophy for ADOT's Project Development Process is that of "Teamwork". The Project Team is the entity through which a project is developed. The Project Team is empowered to achieve the Department's objectives of quality, customer satisfaction, and efficiency.

While individual Team members have responsibilities for unique aspects of the project, **the Project Team as a whole is responsible for the total project.**

To achieve the Project Team's responsibilities, ADOT believes that the Project Team should include not only the technical staff who are actively involved in preparing the project documents, but also the project customers including the project initiators and the reviewing/approving agencies.

Project Team members are expected to fulfill the roles which they have been assigned in a professional and efficient manner; to focus on the objectives of the project; to deliver on commitments in a timely manner; and to treat the other Project Team members with respect and courtesy.

Management of projects through the Project Development Process is provided by the three key

operations. These activities are in support of the district maintenance staffs. Involvement in the Project Development Process is through the districts.

management roles of technical manager, project manager and technical leader. Staff filling these roles are supervised by group managers, and the Deputy State Engineer for Planning and Design.

Project requirements are provided by the Project Customer and by the Reviewing / Approving Agencies.

The general responsibilities of the various participants of the project organization are outlined below. More specific responsibilities are discussed in the following chapters on the development process. In all cases, individuals are granted the authority to carry out their responsibilities.

2.2.2 Technical Manager

The technical manager is responsible for scheduling and assigning work within each organizational unit and commits the resources necessary to each project. The technical manager monitors the status of project work within the unit and adjusts assignments and personnel as required to meet the unit's delivery date commitments.

The technical manager is responsible for the technical quality of the unit's work and establishes technical standards, policies and procedures. The technical manager oversees training of the unit's staff.

The technical manager is usually the manager of a group, section or district.

ADOT highway development projects are assigned to a project manager by the Deputy State Engineer for Planning and Design on the recommendation of the manager of Statewide Project Management Section (SPMS). For major or complex projects, the project manager generally will be from SPMS while for other projects, particularly those involving primarily one discipline (e.g., structures), the project manager may be assigned from a unit or section of that discipline (i.e., Bridge Group, District, etc.).

The project manager has the responsibility for ensuring that all project development steps are followed and for leading, assisting, delegating, and coordinating work efforts as required for the successful completion of all work tasks to meet the project objectives. The project manager is responsible for assuring that all Project Team members and stakeholders are adequately involved in the project development process.

The project manager has specific responsibility for the project scope, schedule and budgets and, with Project Team consensus, is empowered to make decisions regarding these items within the limitations presented in Chapter 7 of this Manual. The project manager monitors progress on project activities and assists the technical leader in taking action to correct negative variances from the approved plan.

The project manager is also responsible for coordinating and communicating with external agencies involved in the project.

2.2.3 Project Manager

Those technical, policy and project issues affecting the project which have not been resolved by Project Team consensus become the responsibility of the project manager to escalate to resolution using the Issue Resolution Process described in Chapter 7.

2.2.4 Technical Leader

A technical leader is assigned to a project by the technical manager of each discipline involved in the project. The technical leader is in responsible charge of that discipline's work performed on the project including technical content and quality, project staff work-task assignments and budgets, and schedule. The technical leader monitors and reports progress on assigned project activities and is responsible for taking action to correct negative variances from planned progress.

2.3 PROJECT CUSTOMERS

2.3.1 General

The customer is an integral part of the project development process by establishing the purpose of the project. The customer is the entity which instigates the project and/or will use, operate, or maintain the completed project. Any agency which has approval authority or a direct financial interest in the project is a customer.

For transportation projects, the primary customer is the taxpayer/user. On most projects, the District operations and maintenance staff, through the Many highway projects are initiated by other State agencies such as the Arizona State Park Department and the Arizona Parkway, Historic, and Scenic Roads Advisory Committee; and by outside agencies such as Metropolitan Planning Organizations, Councils of Governments, and individual local governments. Depending on the nature of the project, these customers may wish to be directly involved on the Project Team; generally, they are represented by the District staff or by an ADOT liaison unit.

The construction contractor, although an essential part of the Project Development Process, by virtue of being the recipient of the construction plans is another significant customer of the process.

2.3.2 Metropolitan Planning Organizations

There are three Metropolitan Planning Organizations (MPOs) in Arizona covering the Phoenix, Tucson, and Yuma metropolitan areas. MPOs have a minimum base population of 250,000. The function of an MPO is to provide a planning entity with broad public exposure and the capability to prepare long-range planning consistent with the area's needs. Under Federal regulations, this planning is necessary to support Federal funding requests. Serving large population areas, the three Arizona MPOs are the source of demand for many large capital

District Engineer, will represent the taxpayer/user and will have a significant role in the project development.

projects. The MPOs assist in formulating and defining the needs for capital projects. Currently, the project proponents work through their respective Councils of Governments (COGs). The COGs forward requests for projects through the ADOT District Engineer.

2.3.3 Councils of Government

Arizona has six Councils of Government (COGs). Among other functions, the COGs coordinate requests for local transportation projects, thus eliminating duplication and minimizing voids. The COGs also concentrate local efforts, accomplishing more than could be done as separate agencies.

Project requests from local governments move from the originator through the applicable COG to the District Engineer. The COGs ensure that all local agencies and the originator are in agreement. They also ensure resolution of any conflicts with other proposals. Each COG acts as a clearing house and establishes priorities for requests going to ADOT. The six Arizona COGs are an integral and key link in the ADOT Project Development Process.

2.3.4 Arizona State Parks Department

ADOT is responsible for providing design, design review, and construction engineering services to the State Parks Department for roads connecting the parks to the State roadways, roads within the parks, and other on-site facilities.

The Roadside Development Section provides liaison between ADOT and

2.3.5 Parkway, Historic, and Scenic Roads Advisory Committee

This Committee has responsibility for recommending to the Transportation Board the designation of a highway as a Parkway, an Historic Road or a Scenic Road. The Committee also has the responsibility for recommending the placement of Tourist Signs. The Committee is comprised of six citizens appointed by the Governor, a member of the State Tourism Advisory Board, and one representative each from the Historical Society, the State Parks Department, and ADOT.

The Committee establishes the priorities for tourist signing projects and for studies related to signing and designation of parkways and scenic or historic roads. The recommendations are forwarded to TPD for inclusion in the Five-Year Program.

2.3.6 ADOT Technical Units

ADOT technical units initiate many projects in meeting their responsibilities for the State Highway System. Corridor Studies are requested by the Transportation Planning Division based on their continuing analysis of the State Highway System. Pavement Preservation Projects originate with the

the State Parks Department. A list of priorities for new or reconstructed park roads, established by the State Parks Board, is submitted through Roadside Development Section to the Transportation Planning Division for inclusion in the Five-Year Program.

Pavement Management Section of the Materials Group. Many Operational Improvement Projects originate in the Districts while the Traffic Group initiates the ISTEHA/Hazard and Rail Crossing Projects and the Traffic Signals and Lighting Projects.

Bridge Reconstruction and Replacement Projects and Bridge Preservation Projects originate in the Bridge Group.

The several types of projects in the Roadside Development and Improvements category originate from the Districts, the Roadside Development Section and the Traffic Group with input from the Maintenance Group. The Motor Vehicles Department initiates Ports of Entry Projects.

2.4 PROJECT REVIEWING / APPROVING AGENCIES

Reviewing and approving agencies must be an integral part of the Project Team. Their input is essential to establishing the project's scope, schedule and budget.

The composition of the group of reviewing and approving agencies is unique to each project. The project initiating agency(ies) generally will have some degree of review and approval authority on the project. Agencies having

financial involvement in a project or having responsibility for affected public lands will normally have reviewing and approving status for the project. Agencies with regulatory responsibilities will need to review and approve the project.

Two Federal agencies, the Federal Highway Administration and the

2.4.1 Federal Highway Administration

The Federal Highway Administration (FHWA) is responsible for administering the Federal-aid program for funding transportation projects. The FHWA, therefore, must be satisfied that all Federal regulations, policies, and procedures have been followed on projects which are to have Federal funding. To meet this obligation, the FHWA monitors the development of projects and reviews the project documents for adherence to Federal funding requirements.

For certain classes of projects, the FHWA has been authorized by Congress to accept a project for funding based upon a certification that the project meets Federal requirements. This process is called "Certification Acceptance".

2.4.2 FHWA Certification Acceptance

The "Intermodal Surface Transportation Efficiency Act of 1991" (ISTEA, H.R. 2950) provides greater flexibility on behalf of state and local governments in determining transportation solutions via "Certification Acceptance" procedures by permitting FHWA to delegate

United States Forest Service, have project review and approval status with such frequency that the approval requirements and procedures between ADOT and these agencies have been documented. The involvement of other agencies may be determined on a project-by-project basis.

certain administrative responsibilities to ADOT.

ADOT's Certification Acceptance Program applies to all federal-aid projects administered by ADOT except those pertaining to:

- Transportation Planning and Research projects as contemplated under 23 U.S.C. 134, 135 and 307.
- Highway Safety projects as contemplated under 23 U.S.C. Chapter 4.
- Interstate Highway System projects.
- All new construction or reconstruction projects on the National Highway System (NHS) over \$10 million in construction costs as documented in the Project Assessment or Location/Design Concept Report.
- Any projects over \$2 million in construction costs which are sponsored by local agencies as documented in the Project Assessment or Location/Design Concept Report.
- Projects that ADOT and/or the FHWA elect to exclude from the Certification Acceptance Program.

- Projects contemplated in the "Intelligent Vehicle Highway System" Act of 1991 and any Freeway Management System projects.
- The approval or rejection of individual consulting engineering agreements, which are administered by ADOT under approved alternate procedures pursuant to 23 CFR 172.

The United States Forest Service has responsibility for the National Forest lands throughout the United States. Several routes of the state highway system pass through the National Forests. Certain types of projects on these routes will be subject to the review and approval of the Forest service. The *ADOT/USDA Forest Service Highway Design Guidelines Manual* presents the review and approval requirements of the Forest Service.

Liaison with the various National Forest administrators in Arizona is provided on all projects by the Roadside Development Section.

2.5 PROJECT DEVELOPMENT ADMINISTRATION

2.5.1 Group Manager

The group manager is responsible for technical and administrative supervision of the group's activities. Although not involved in the day-to-day activities of a project, the group manager reviews the assignments made by the technical managers and works with the technical managers to assure that adequate staff are available to meet the project requirements. The group manager authorizes the use of consultants to supplement

Additional information on Certification Acceptance Procedures may be found in the Agreement between ADOT and the Federal Highway Administration dated July 24, 1992.

2.4.3 United States Forest Service

the group's staff in order to meet project delivery requirements. Certain of the group managers serve on the Project Review Board.

2.5.2 Deputy State Engineer for Planning and Design

The Deputy State Engineer for Planning and Design (DSE/P&E) is responsible to the State Engineer for administering the Project Development Process. The Deputy State Engineer for Planning and Design chairs the Project Review Board (PRB), wherein the status of projects is monitored, and resolves issues which are elevated by technical and/or project managers. The Deputy State Engineer for Planning and Design approves or recommends to the Priority Planning Committee requested changes in project scope, budget and schedule. The DSE/P&E may consult with the PRB on these requests.

2.5.3 Project Review Board

The Project Review Board (PRB) is chaired by the Deputy State Engineer for Planning and Design with the managers of the District Operations Group and the Statewide Project Management Section as permanent members. Two additional members chosen

from the remaining group managers serve on a rotating basis.

The Project Review Board members assist the Deputy State Engineer for Planning and Design in overseeing the status of projects and in resolving project issues which have been elevated for resolution through the escalation process. It elicits information from the Program and Project. The PRB members also assist the Deputy State Engineer for Planning and Design in the efficient management of the Highways Division's resources throughout the Project Development Process.

The agenda for the PRB meetings will be set by the Deputy State Engineer for Planning and Design (DSE/P&E). Project managers submit items involving changes in project scope, schedule, and budget through P²S². Potential agenda items involving ADOT policy and technical matters may be submitted to the DSE/P&E by memorandum. The DSE/P&E will review submitted items, resolving some and placing the others on the PRB agenda.

Some items considered by the PRB require the approval of the Priority Planning Committee and/or the State Transportation Board.

2.5.4 Finance Committee

The Finance Committee has been established to assist the Deputy

Scheduling Section on projects which significantly deviate from their approved Project Work Plan and evaluates the remedial actions proposed by the project manager.

A significant and very important function of the Board is serving as a mentoring and coaching body for project managers.

State Engineer for Planning and Design and the Project Review Board in monitoring the impact of individual project cost and schedule changes on the overall development of the Five-Year Program.

The Finance Committee consists of four members: one from the Transportation Planning Division Programming Branch, one from the Administrative Services Division Resource Management Group, one representing the Deputy State Engineer for Planning and Design, and the Manager of Program and Project Management Section who chairs the Committee.

At its weekly meetings, the Finance Committee reviews financial implications of proposed project changes with the project manager and assists the project manager in identifying and assessing available funding alternatives.

2.5.5 Priority Committee

Planning Committee

¹ Arizona Revised Statutes 28-111 requires the Director to appoint a departmental committee to, among other things, recommend priorities on transportation facilities construction projects; to update and prepare annually a long-range statewide transportation facilities construction program covering the ensuing five fiscal years for submission to the transportation board; and to review the program during the fiscal year and to make recommendations the transportation board for any priority changes in or introduction of new projects to the program.

The Priority Planning Committee (PPC) is a management committee

2.5.6 MAG Life Cycle Office

The MAG (Maricopa Association of Governments) Life Cycle Office is responsible for preparing the semi-annual public certifications of the costs of all planned MAG System work including design and construction, right-of-way, and administrative items. The certification process deals with all changes in estimated costs on the funded and non-funded portions of the System to reflect progress, work completion, and projected project costs. Proposed changes in scope, schedule and budget for projects on the MAG System must be approved by the MAG Life Cycle Office.

2.6 CONSULTANTS

The Arizona Department of Transportation frequently contracts with consultants to provide professional services for various studies, design, and other project development

appointed by the Director in accordance with the Arizona Revised Statutes¹. The PPC currently comprises the Directors of the Transportation Planning, Highways, Aeronautics and Administrative Services Divisions plus the Deputy State Engineer for Planning and Design as voting members. The PPC also includes a representative from the Arizona Department of Commerce and from the Joint Legislative Budget Committee as ad hoc non-voting members. The PPC holds public meetings each month to review proposed changes to the Five-Year Program and to determine those which will be recommended to the Transportation Board for approval.

activities. The role and responsibility of the consultant will vary significantly depending upon the needs of the Department. A scope of work prepared by ADOT² as part of each consultant contract describes project requirements, needed professional services, length of services, and responsibilities of the parties to the contract. Consultants may serve as technical leaders on the project team and may be the project manager.

2.6.1 General (Management) Consultant

A general consultant may be retained by ADOT to provide professional engineering services for various studies and to prepare corridor general plans. The general consultant may also provide project management

² The project manager is responsible for coordinating the preparation of consultant scopes of work by the involved technical units.

services including production of schedules and project information for use by ADOT in selecting engineering consultants, and managing the design work of the selected engineering consultants.

2.6.2 Limitations on use of Management Consultants

It is ADOT policy to limit the size of management consultant contracts so that the span of control of the management consultant is not excessive, as follows:

- Management consultants will normally be used on corridors where there is a
- Management consultants are not to be used for isolated design projects.

2.6.3 Engineering Consultants

- ◆ *Project Consultants* - Responsible for an engineering study or for the preparation of multi-discipline design and construction documents on a specific project. The project consultant reports to a project manager assigned by the Deputy State Engineer for Planning and Design. All work prepared by the project consultant is subject to review by the appropriate ADOT technical units for quality assessment and conformance with ADOT procedures and project requirements. The consultants remain responsible for the technical quality and accuracy of their work.
- ◆ *Specialty Consultants* - Responsible for preparing reports, design, and plans for an ADOT technical unit. The specialty consultant reports to

limited time-frame for project development. Such corridors should have intensive design workloads and an established construction schedule.

- Management consultants may be used for longer corridors or multiple corridors to complete the corridor general plans and to oversee a finite number of design contracts.
- Management consultants are not to be used for corridor wide assignments of undefined duration.

a technical leader assigned by the unit's technical manager. All work prepared by the specialty consultant is subject to review by the technical unit for quality assessment and conformance with ADOT procedures and project requirements. The consultants remain responsible for the technical quality and accuracy of their work.

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3. PROJECT DEVELOPMENT PROCESS

3.1 PROGRAM DEVELOPMENT PROCESS

The Project Development Process for highways is a part of ADOT's overall Transportation Program Development Process. Regarding highways, the Program Development Process brings together ADOT's Transportation Planning, Administration Services, and Highways Divisions and the State Transportation Board to identify highway transportation needs, to develop solutions to these needs, to determine available funds, to establish priorities for these highway needs, and to implement the solutions on a priority basis.

The Program Development Process follows the requirements of the Arizona Revised Statutes and the various Federal laws and regulations regarding the Federal-aid program for highways. The Program Development Process is fully described in the ADOT publications *Action Plan for State-Funded Highway Projects on the State System*, 2nd Edition, and *Action Plan for Federal-Aid Highway Projects*.

The Program Development Process is divided into the Planning and Programming Process and the Project Development Process. The following steps briefly describe these processes.

The Program Development Process steps are presented in diagram form in Figure 3.1.

3.2 PLANNING AND PROGRAMMING PROCESS

The Planning and Programming Process includes all the transportation planning and analysis required to identify and prioritize transportation issues at the state, regional and local community levels. It includes the study of transportation systems, corridors and special issue problems, and the preparation of capital investment programs for transportation improvements. It provides direction to the succeeding project development process.

3.2.1 The Regional Transportation System Plan (Step 1)

The Regional Councils each develop a Regional Transportation System Plan based upon their coordinated, comprehensive, continuing planning process.

3.2.2 Regional Transportation Priority Recommendations (Step 2)

The Regional Councils make priority recommendations for Federal-aid transportation projects in their region and for the construction and improvements of facilities on the State Highway System.

3.2.3 State Transportation Plan (Step 3)

The Transportation Planning Division prepares a State Transportation Plan based on their long-range planning process. The State Transportation Plan is presented to the public for broad-scope comments and input.

The Transportation Planning Division also prepares a Status and Performance Report for the state legislature every five years. The purpose of the study ("Needs Study") is to identify the five- and ten-year transportation needs of Arizona and to evaluate the status and condition of transportation systems and analyze transportation needs.

In addition to identifying overall state transportation needs and performance, the report provides valuable technical information as an adjunct to the State Transportation Plan, transportation corridor studies, and the priority programming process.

3.2.4 Priority Programming Process (Step 4)

The State Transportation Board determines which corridors or facilities should proceed on through the planning process and allocates funds for the appropriate studies.

3.2.5 Transportation Corridor Planning Studies (Step 5)

The Transportation Planning Division performs transportation corridor planning studies as a The Highways Division performs corridor locations studies to determine the preferred location of the planned facility within

part of the systems planning process. These studies focus on areas of State transportation network service deficiencies identified in the State Plan and Needs Study and provide analysis on the effects of differing levels and types of transportation investments applied to these links. The Corridor Planning Studies are generally performed by the Transportation Planning Division or its consultant. However, with prior approval of ADOT, a local government may be permitted to conduct such a study for a State transportation facility in accordance with the Action Plan. Final approval of the study remains with ADOT.

The corridor planning study products will include the type of facility to be constructed, treatment of transit, cost estimates, funding sources, and priority recommendations to the Transportation Board. The planning study may include a preliminary determination of the number and type of travel lanes and general interchange locations. The geographic limits of the area within which a facility can satisfy the purpose of the corridor may also be determined. In addition, major impacts and benefits of the corridor may be more clearly defined and the degree of public and local agency support may be identified.

3.2.6 Corridor Location Study (Step 6)

the general corridor established in corridor planning studies of Step 5. The location study will evaluate and compare several

discrete highway corridors considering the social, environmental, engineering, and cost criteria that would be applied to final roadway alignment studies. At this stage of development, however, data gathering and detailed design analyses are limited to those levels necessary to identify any "fatal flaws" and to compare the alternative specific corridors. The corridor location study will recommend the best of

Note: Step 1 through 15 are discussed in greater detail in the text of this Chapter.

Major projects such as new highways on new locations may require all of the process steps identified above. Less complex projects such as the improvement or reconstruction of existing facilities may require only selected steps of the process as applicable to the individual project.

- * Federal Highway Administration approvals required on Federal-Aid projects that are not covered under Certification Acceptance Procedures.

Figure 3.1 ADOT PROGRAM DEVELOPMENT PROCESS

the specific corridors for the facility.

Public involvement is sought throughout the study process. Public involvement activities are conducted early in the process where the project is explained, the alternative corridors are displayed and described, and public input is received. Depending upon the complexity of the corridor location study, additional public involvement activities may be held as the study progresses. The final recommendation is circulated to local jurisdictions with notices to the public of the availability of the final study results.

The corridor location study will include environmental studies necessary to prepare an environmental overview of the general corridor with appropriate data for each specific corridor. The objective of the environmental overview is to describe the social, economic, and environmental character of the study area, to identify potential obstacles and issues associated with the study area, and to evaluate the study area alternatives. The environmental overview documents are developed to the extent that the environmental issues are identified and that appropriate courses of action are developed.

Having the study recommendations for a preferred corridor location, the State Transportation Board may designate a preliminary transportation corridor through adoption of a formal resolution. The adopted resolution is filed with the office of the appropriate county recorder as an official public notice of the intended transportation facility.

Agreement to cooperate in preservation of the designated preliminary transportation corridor is sought with agencies having jurisdiction along the corridor. The ADOT Highways Division works with developers and with planning and zoning agencies to avoid encroachment upon the designated preliminary corridor. Where unavoidable encroachment is imminent, the integrity of the corridor may be preserved through advance acquisition for protective purposes as described in Step 8 below.

3.2.7 Priority Programming (Step 7)

The annual development of a five-year project-specific capital improvement program concludes the transportation planning effort. This program reflects the general priority recommendations identified in the State Transportation Plan, the Status and Performance Report prepared by the Transportation Planning Division, and corridor and special planning studies. Additional priority program input is provided by ADOT Districts, ADOT technical units, ADOT management, local and regional planning agencies including the Councils of Governments, and the general public.

The initial activity in the prioritization process is the preparation of a list of potential projects. This list is assembled by the Transportation Planning Division from needs identified in the transportation planning effort including recommendations from the various ADOT technical units.

The Highways Division analyzes the potential projects to establish the scope of the project, to prepare a reasonable estimate of the construction and engineering costs, and to determine the time frame required to prepare the project for construction. While these "scoping activities" provide input to the Priority Programming Process, they are considered to be a part of the Project Development Process described in Section 3.3.

Using the priority programming process, the Transportation Board selects those projects which are to proceed through design, final environmental documentation, full right-of-way acquisition and construction. The activities are funded on a year-to-year basis, but once the design process starts, the project is expected to move through to construction even though construction might not be scheduled within the five-year program time frame.

3.2.8 Advance Acquisition of Right-of-Way (Step 8)

When Federal-aid funds for right-of-way are involved on a state highway project, advance right-of-way acquisition requires prior approval of the Director of the Arizona Department of Transportation and the Division Administrator of the Federal Highway Administration. On state highway projects with no Federal-aid involved in right-of-way, the ADOT Director may authorize advance acquisition. In either case, acquisition of the land may be authorized within the adopted preliminary corridor (Step 6) utilizing the funds allocated by the State Transportation Board

through the Priority Program (Step 7).

When there is no Federal-aid involved in right-of-way costs, advance acquisition may be carried out by a local public agency after an approved route plan has been adopted by the governing board of the agency. If Federal funds are used for right-of-way costs, advance acquisition must be specifically authorized on a parcel-by-parcel basis by the Federal Highway Administration.

In all instances, advance acquisition should take place only if it is necessary to prevent significant development in the corridor, to relieve financial hardships on property owners, or if property owners are suffering an undue hardship because their property is in the designated corridor.

Advance right-of-way acquisition may take place until normal project acquisition begins (Step 11). This may cover a period of several months to several years.

3.3 PROJECT DEVELOPMENT PROCESS

In general, the Project Development Process includes all the engineering, construction, and administrative functions required to advance a highway transportation project from conception through design and construction and into the operation and maintenance of the project. The process is accomplished through a systematic interdisciplinary approach involving the entire Highways Division. Other ADOT divisions, local, state, and federal agencies, advisory organizations,

and engineering consultants may also be involved.

Although the development process varies somewhat depending on specific project requirements and varied interdisciplinary approaches, it generally comprises four distinct phases - Project Scoping, Design and Pre-Construction Activities, Construction, and Operation/Maintenance Phases.

Data from the Scoping Phase is used by the Transportation Planning Division and the Transportation Board in the Priority Programming Process (Step 7).

3.3.1 Scoping Phase - Project Location and Definition (Step 9)

The Scoping Phase activities are applied to projects evolving from the transportation corridor studies and to individual projects coming directly into the priority planning process to meet specific transportation needs.

3.3.1.1 Corridor Studies
Following adoption of the preferred corridor location, the study process continues with the preparation of a Project Implementation Report. This report is intended to define the individual sequential steps necessary to develop the ultimate corridor goals. The data from the implementation report will be used by the Transportation Board in establishing funding priorities for the individual projects.

Preparation of the implementation report often requires more Data from Step 9 (the Scoping Phase of Project Development) are the basis for preparing the annual *Five-Year Highway*

definitive design data than were developed in the corridor studies. These data are provided through a Location/Design Concept study. (If the highway location is not an issue, only a Design Concept study is required.) The report on the concept study presents the recommended alignment within the preferred corridor, engineering and environmental issues associated with the recommended alignment, potential solutions for these issues, the costs for developing the corridor through construction and the overall time frame for completing the corridor to the desired level.

3.3.1.2 Individual Projects
Individual projects are also analyzed to establish the project scope, the issues involved and potential solutions, estimated costs and the development time frame to construction. For individual projects, the analysis is documented by a Scoping Letter, a Project Assessment Report, or by a Location/Design Concept Report.

As a part of Scoping Process, environmental investigations are prepared, preliminary right-of-way constraints are established and utility issues are determined to fully define the development of the project.

3.3.2 Priority Programming (Step 7), Continued

Construction Program (Five-Year Program). The Transportation Planning Division and the State Transportation Board use the

individual project objectives, estimated costs, and development time frames to establish priorities for constructing the candidate projects. The Five-Year Program becomes the guide for the remainder of the Project Development Process. (It should be noted that not all potential projects are accepted into the Five-Year Program after being scoped. While they may be valid projects, they may not rank high enough in priority to be included in the Five-Year Program.)

3.3.3 Design Phase and Pre-Construction Activities (Step 10)

Following acceptance into the program, projects advance to the Design Phase and Pre-Construction Activities where a number of design, environmental, utility and right-of-way activities take place.

The functions of the Design Phase are generally performed by the Arizona Department of Transportation or its consultant. However, with prior approval of ADOT, a local government (or its consultant) may be permitted to perform the functions of this phase for a state highway facility in accordance with the appropriate Action Plan. Final decisions for state highway facilities are the statutory responsibility of ADOT and the State Transportation Board as provided for in Title 28 of the Arizona Revised Statutes, as amended.

The design is finalized and documents are prepared for bid and construction. The environmental documentation process is completed, and environmental recovery and mitigation efforts are

undertaken. Utility plans and agreements are prepared, right-of-way plans are developed and necessary rights-of-way are acquired (see Step 11) so that utility and right-of-way clearances can be given prior to bid advertisement. Also during this Phase, any joint project agreements are developed and executed. Special provisions are developed and included in the contract documents for prospective bidders.

3.3.4 Design Phase - Right-of-Way Acquisition (Step 11)

The final project right-of-way requirements are established as a part of the project design process. The Right-of-Way Group in the Highways Division is responsible for the coordination and processing of all right-of-way matters.

Advance right-of-way acquisition may only occur as discussed in Section 3.2.8 (Step 8) and must be accomplished in compliance with the requirements of the Arizona Revised Statutes and the Federal Regulations.

Normal acquisition (i.e., other than advance acquisition) of right-of-way can be authorized after acceptance of the project in the Five-Year Program. Normally, all rights-of-way are acquired prior to the advertisement for construction bids.

3.3.5 Design Phase - Advertising for Bid (Step 12)

Upon authorization of the Director of the Highways Division, or designee, the project is advertised for bid in

accordance with state law by the Contracts and Specifications Section of the Highways Division.

All elements of each bid received for the project within the authorized time limit are verified by the Contracts and Specifications Section to determine the lowest qualified bid.

A staff recommendation regarding award of the contract is made to the Director of the Highways Division. In consultation with the ADOT Director, the Highways Division Director makes a recommendation to the State Transportation Board regarding the award of contract.

When a contract is to be awarded, the State Transportation Board at an open public meeting will make the award to the lowest qualified bidder. The Transportation Board reserves the right to table or reject the award of contract.

When a contract is not to be awarded for a state highway project, the State Transportation Board determines what future action is to be taken with regard to the project.

3.3.7 Construction Phase (Step 14)

After the contract is awarded, the contractor is responsible for constructing the project in accordance with the terms, conditions, and provisions set forth in the contract.

Contract administration, construction surveillance, and work inspection for the project is furnished by ADOT through the appropriate District Engineer's staff in conjunction with the

3.3.6 Design Phase - Award of Contract (Step 13)

Construction Engineering Group's staff.

Qualified local agencies may request approval from FHWA and ADOT to self administer the construction inspection portion of the local government contracts.

3.3.8 Construction Phase - Project Acceptance (Step 15)

Final inspection and acceptance of the completed project is the responsibility of the District Engineer in whose district the project is located, or a designee.

The Project Acceptance function concludes the Construction Phase and the ADOT Action Plan process and procedures. However, the Project Development Process continues beyond the Construction Phase for one year into the operation and maintenance of the facility.

3.3.9 Operation and Maintenance Phase

Including a one-year period of operation and maintenance in the Project Development Process ensures a high level of communication and feedback to the design and construction staff as to the project quality and appropriateness of the design and construction solutions.

Feedback regarding the overall operation and maintenance of the State's highway system provides

input on highway needs to the Program Development Process.

Program and project management are integral and essential to the Project Development Process. It is only through the proper management the Highways Division's program and each of its constituent projects that ADOT can achieve its goals of reducing rework and unnecessary work and improving the quality of products and services to its customers.

3.4.1 Program Management

3.4.1.1 Construction Program

The basis for managing the program and its projects is the *Five-Year Construction Program* adopted each year by the State Transportation Board. The product of the Program Development Process, this document identifies each of the construction projects programmed for initiation in each of the five ensuing fiscal years, together with their estimated costs. Specific project expenditures budgeted for right-of-way acquisition and for design consultants may be included in the program.

The Five-Year Program is a primary tool for communicating ADOT's plans with its external and internal customers including the travelling public, the legislature, the local governments, contractors and its own staff. Adherence to the program is an essential factor in providing quality service to the ADOT customers.

3.4.1.2 Managing the Program

Fiscal Year and amount of project funding obligations of projects are listed in the Five-Year

3.4 PROGRAM AND PROJECT MANAGEMENT

Program. A variety of unanticipated issues can cause schedule slippage or the need to move the program to an earlier start. Schedule impacts range from failure to complete a critical connecting component as originally scheduled to a decision to defer some part of the original program. The State Transportation Board looks to the Priority Planning Committee to monitor the Five-Year Program and to recommend amendments to the Program for Board approval.

Under the direction of the Deputy State Engineer for Planning and Engineering, the Program and Project Scheduling Section (P²S²) establishes a Master Schedule of all project activities necessary to meet the project commitments presented in the Five-Year Program. The status of each project activity is monitored to determine variations from the master schedule. P²S² also maintains and monitors a file of the current estimated costs for each project in the Program. These costs are monitored for variations from the programmed costs.

3.4.1.3 Program Changes

Individual project changes affecting the scope, the scheduled milestones or the budgets are made by P²S² staff upon the recommendation of the project manager, acting for the Project Team, with appropriate approvals. Project changes affecting the Program (fiscal year or significant cost increases) require the approval of the Deputy State Engineer for Planning and Engineering, the Priority Planning Committee, and

the Transportation Board. (See Section 7.9 for additional information regarding program changes.)

At ADOT, a "Project" is defined as "...any effort having a scope, schedule, budget, and desired outcome satisfactory to the Customer." Project Management is defined as "...a process wherein projects are developed from concept to completion through a team effort."

Management of a project is based upon a Project Work Plan which defines the project objectives, the scope of the project and the scope of each of the involved technical units, a schedule of activities necessary to accomplish the project scope, and the resources required for each activity.

Project technical leaders are responsible for their unit's adhering to the Project Work Plan. The project manager is responsible for monitoring the overall status of the project.

3.4.2.1 Project Work Plan Each project has its own Project Work Plan for each phase comprising that phase's schedule of activities, its scope of services, and the budgets -- pre-construction and construction -- as appropriate.

A Project Work Plan (PWP) is primarily an internal communication device which allows the technical units to coordinate their work, avoiding rework and unnecessary work caused by the unilateral decisions and changes made by another unit. It guides the several ADOT technical units in accomplishing their assignments on each phase of a

3.4.2.2 PWP Changes Adherence to the PWP is monitored by the

3.4.2 Project Management

project. On those project phases having consultant involvement, the PWP will guide the project manager and Engineering Consultant Services in negotiating consultant contracts.

The PWP is a dynamic document, able to accommodate the inevitable changes arising from the project design and discovery process. First developed at the early stages of the Scoping Phase, the Scoping PWP is modified as the scoping process becomes better defined. After a project is accepted into the Five-Year Program, the final activity of the Project Scoping Phase is the development of the Design Phase PWP.

The Design Phase Project Work Plan supports the Five-Year Program and details how the cost and schedule commitments for design and pre-construction activities will be met.

The Construction and Maintenance Phase Project Work Plans most importantly detail the coordination between the design functions and the construction and maintenance functions during the remainder of the Project Development Process.

The development and administration of the Project Work Plan is the responsibility of the project manager. However, the technical aspects--scope, activities, resource requirements, and durations--originate with the technical units.

project manager. With the concurrence of the Project Team,

the project manager is empowered to make certain changes in the project scope, schedule and budget. Changes beyond the limits of project manager empowerment (See Section 7.9.1) require the approval of the Deputy State Engineer for Planning and Engineering. In certain instances, the approval of the Priority Planning Committee or the State Transportation Board may be required. Authorized changes in the PWP are forwarded to P²S² for updating the program master schedule. (See Section 8 for additional information regarding Project Work Plan changes.)

3.4.3 Project Priority Process

Projects in the Five-Year Program are generally given priority based on the criticalness of their schedules, i.e. the amount of float in the schedule. The less positive float in a project schedule, the higher the project's priority.

ADOT's resources are distributed to project activities based upon their relative priorities. Those activities on a project's critical path have the highest priorities. For resource allocation purposes, these priorities are established at the start of an activity. In general, critical path activities once started should not be stopped or interrupted even though the project's priority may change during the duration of the activity. The exception to the rule is when a Critical Project is at risk in meeting its schedule. Critical Project activities take priority over all other projects even if it requires stopping or interrupting work on a critical path activity.

The priority classification of Critical Project has been established by ADOT in recognition that a limited number of projects may have an overwhelming importance to the public and require special attention. Not more than five percent of the projects in the Five-Year Program will be designated as Critical Projects. It is not expected that a project will be designated as critical at the time of programming unless there is a schedule problem at that time. The criteria to be used to consider designating critical projects are as follows:

Tier 1 (Most Value)

- ◆ Meeting schedule commitments to communities or other customers;
- ◆ Avoiding funding lapses or taking advantage of opportunities for additional funding;
- ◆ Emergency projects.

Tier 2

- ◆ Public sensitivity.

Tier 3

- ◆ Meeting important dates such as canal dry-ups and weather-related construction seasons;
- ◆ Avoiding critical events such as major crowd generators and mating seasons for endangered animals;
- ◆ Potential structural failures;
- ◆ Significant safety and maintenance issues;
- ◆ Public health issues;
- ◆ Relationship to other projects such as bidding projects together.

Authority to designate critical projects rests with the Project Review Board (PRB). Petitions to designate a project as "critical" may come from the project manager, the State Engineer's Office, a member of the PRB or other ADOT Divisions. The petition must include a Resource management is used by ADOT to assure that its personnel and capital resources are utilized in a cost-effective and efficient manner. The basis for resource management is the aggregate of all project schedules and resource requirements. By comparing required resources with available staff and consultants, reasonable decisions can be made as to the best distribution of work assignments to meet the Five-Year Program commitments.

Resource management is the responsibility of the Deputy State Engineer for Planning and Engineering, or designee, working with the group managers. Meetings are held monthly, following project progress updates, to confirm the coming month's workload for the groups and to address the workload projections for the succeeding two months and a period of six months thereafter. As a part of the monthly program update, Program and Project Scheduling Section will analyze the total program resource requirement and make recommendations as to additional resources required or for adjustments to project schedules.

For reasonable decisions to be made regarding resource allocations, it is necessary to have realistic estimates of resources required to complete each activity, the remaining duration of each activity, and

justification, based on one or more of the criteria listed above.

3.5 RESOURCE MANAGEMENT

accurate assessments of the ADOT staff and private consultants available for project work.

The ADOT available staff each month is the actual number of people assigned to a unit less estimated administrative time (holidays, annual leave, sick leave, etc.) and less so-called "agency work" (special reports for the legislature, short-term studies, minor updates of standards, etc.). Any "agency work" efforts which will materially affect the availability of staff for project work should be managed and monitored using the project management procedures outlined in this manual.

Preparing and updating estimates of resource requirements and durations for activities is the responsibility of the technical units. Group managers are responsible for establishing guidelines for estimating the effort associated with the various activities and component work tasks normally performed by their technical units. Technical managers should monitor the progress reported by their technical leaders and stand ready to counsel where corrective action is required.

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4. PROJECT SCOPING PHASE

4.1 SCOPING PHASE OBJECTIVE

It is the Department's intent that the Scoping Phase activities will produce a well-defined engineering approach to solving a transportation issue with a reasonable life-cycle cost considering impacts to the environment, the community and the State as a whole. The proposed scope, schedule, and budget will be the basis for establishing the project's priority for implementation.

4.2 GENERAL

The Project Scoping Phase includes all activities necessary to advance a project from its inception as a solution to a transportation need through its being accepted into the **Five-Year Highway Construction Program** (Five-Year Program).

In addition to the traditional "design" groups (Roadways, Bridges, Traffic, etc.), the Project Scoping Phase generally includes involvement by a number of other ADOT technical units (Materials Group, Right-of-Way Group, etc.), the District Engineer, and outside agencies whose efforts are essential to establishing the full scope of a project prior to programming. It is the responsibility of the project manager to coordinate and lead the activities of the Project Team which represents all the ADOT units and outside agencies necessary to take a project successfully through the Project Scoping Phase.

4.3 PROGRAMMING

Projects are developed as solutions to transportation needs. In today's environment, it is inevitable that there are more needs than the available transportation funds can satisfy. The Programming Process is intended to select from the many needs those projects which best meet the criteria to be candidates for the Five-Year Program.

Potential highway projects come from various organizations including ADOT districts, ADOT Transportation Planning Division, (TPD) other state agencies, local councils of governments, local governments, and the federal government. A list of potential projects submitted by the initiating entities is assembled annually by TPD. Working with the Highways Division's senior staff, the TPD staff critique and prioritize the potential projects. From the list of potential projects, TPD staff and ADOT management prepare a short-list of those projects deemed to be the best candidates to be considered for the Five-Year Program.

The list of suggested potential projects may include "Corridor Studies" (See Section 4.2 below) which require significant analysis before their component projects can be considered as candidates for the Five-Year Program. TPD staff and ADOT management evaluate the suggested

corridor programs and determine those which warrant study.

TPD anticipates that a large pool of candidate projects will be required each year for the ranking process which determines those projects which will be accepted into the Five-Year Program. The size of the pool, including those scoped projects which didn't make the cut the previous year, will be roughly twice the number which are expected to be included in the Program.

The Five-Year Program is a policy document and requires review and comment by the public before it is adopted by the State Transportation Board. Necessarily, the time between determination of the candidate projects and the initial ranking of projects for the Five-Year Program may be quite short. However, it is the intent of the Department that most of the candidate projects will be fully scoped for consideration in the coming evaluation period. Projects requiring a greater scoping effort than can be completed in the limited time frame may need to be deferred to a succeeding year for ranking.

4.4 STRATEGIC PLAN FOR PROJECT SCOPING

Preparing scoping documents for the candidate projects will require developing a strategic plan to meet the schedule for project ranking and to efficiently utilize ADOT's resources.

Upon receiving the list of candidate projects from TPD, the The manager of the Programming and Project Scheduling Section

managers of Statewide Project Management Section (SPMS) and Pre-Design Management Section, together with senior staff members, assess the candidate projects to determine a presumptive level of scoping documentation required for each and, with TPD, to establish study priorities. The simplest projects may require only a Scoping Letter (SL). More complicated projects may require a Project Assessment (PA), while major projects and those with environmental issues may require a Design Concept Report (DCR) or Location/Design Concept Report (L/DCR) and Environmental Assessment (EA). PA's and SL's will not be sufficient for projects requiring environmental action.

Thus, in general, Scoping Letters should be sufficient for defining projects such as pavement overlay projects, minor landscaping projects, and rock-slope scaling projects.

Design Concept Reports should generally be prepared for all individual major projects such as roadway improvements, traffic interchanges, bridge, rest areas and points-of-entry especially where new right-of-way is required. Corridor improvements will generally require a corridor study with a Location/Design Concept Report (or DCR where location is not an issue) including a strategy for implementation.

In general, all other projects should be defined by a Project Assessment.

(P²S²) works with SPMS staff and the appropriate technical

managers to roughly appraise the resource requirements and activity durations for preparing the scoping documents for the candidate projects. Using these data, P²S² prepares a tentative master schedule for the scoping documents to match the resources available to ADOT, including consultants. The Pre-Design Management Section obtains TRACS numbers for the studies.

4.5 PROJECT TEAM

The Deputy State Engineer for Planning and Engineering assigns each of the scoping studies to a project manager who is responsible for assembling and coordinating the Project Team through the scoping study to final evaluation for acceptance into the Five-Year Program and then, as appropriate, through the remainder of the Project Scoping Phase and on through the Design, Construction, and Maintenance Phases.¹

Following appointment, the project manager and a representative of the Pre-Design Sections consult with the District Engineer and the project initiator to review the candidate project's problem statement and to establish the objectives for the study. Based on the study objectives and the resource requirements and activity durations established in the strategic planning, the project manager contacts the managers of

the involved technical units to appoint technical leaders to represent their units on the Project Team. The project manager contacts the assigned Team Members to begin the preparation of the Scoping Phase Project Work Plan. (See Section 4.14.)

4.6 CONSULTANTS

ADOT's general policies regarding the use of engineering consultants is presented in Section 2.6 of this manual. Additional information on the use of engineering consultants is presented in the discussion of Resource Management in Section 3.5.

Consultants may be used to perform any of the activities associated with the Scoping Process. Generally, the consultants used for Scoping Letters, Project Assessments, and short time-frame Design Concept Reports will be Specialty Consultants working under "On-Call Contracts". Since these consultants are already selected and under contract, they can be quickly mobilized for the individual scoping efforts. In such cases, the cognizant technical manager requests that Engineering Consultant Section issue a Task Order Request for the required services. The Scoping Phase Project Work Plan serves as a basis for preparing the consultant's scope of services and for negotiating the fees for the services.

On Corridor Studies and complex Location/Design Concept Reports the multi-disciplinary requirements and the longer time-frame for the study permit the selection of a consultant(s) for

¹ It is intended that a Project Team will remain with a project from conception to one year after end of construction. Maintaining the same Project Team members throughout the life of a project may be difficult, particularly on long-duration projects. However, Team continuity must be a high priority objective for the Highways Division.

the specific requirements of the scoping study. In such cases, the Pre-Design technical leader requests Engineering Consultant Section (ECS) to initiate the selection process. The Scoping Phase Project Work Plan is the basis for developing the consultant scope of services and for negotiating the fees for the services.

4.7 INDIVIDUAL PROJECTS

During the Project Scoping Phase, candidate individual projects are developed to the extent necessary to achieve Department consensus on design concept, scope, schedule and budget. Candidate individual projects are highway related "stand-alone" projects which are candidates for being considered for scheduling in the Five-Year Highway Construction Program for design and construction. They may be dependent upon or lead to other projects; however, they are scoped and evaluated as discrete projects.

The scoping document produced to define individual projects may be a Scoping Letter, a Project Assessment, or a Location/Design Concept Report.

4.7.1 Scoping Letter

A Scoping Letter is the simplest method of documenting a project's scope schedule and budget. It is prepared for all projects not requiring a detailed analysis for project definition. Such projects would include pavement surface treatment, traffic signals and lighting improvements, bridge preservation, etc. Such projects

typically do not involve environmental issues nor approvals by other agencies -- constraints which would require a higher level of scoping document.

The appropriateness of a Scoping Letter as a scoping method will be established for each of the projects in these categories during the Strategic Planning Stage described above.

Projects covered by a Scoping Letter usually involve a single technical discipline. Generally they originate within a technical unit of ADOT and usually require commencement of construction in the same fiscal year which they were initiated. Funds for the specific project are allocated from a line item in the Five-Year Program covering the general category of project. Funding approval is by the person responsible to the Transportation Board for the line item.

4.7.1.1 Scoping Letter Project Team Preparation of a Scoping Letter is the responsibility of the technical unit most closely associated with the preparation of the construction documents. Normally, the Deputy State Engineer for Planning and Engineering will appoint as project manager the individual who will be serving as technical leader for the primary discipline. As project manager, the individual will maintain liaison with the District and with the initiating unit and will coordinate the activities of the Project Team, including the preparation of a work plan for the scoping effort. As technical leader, the individual will set up the field reconnaissance, as

required, and prepare the Scoping Letter.

4.7.1.2 Scoping Letter Project Objectives The project objectives established by the Project Team including the project initiator and the District serve as a guide for determining the project scope. The project objectives should note any ancillary needs, constraints or other pending projects which may impact the project scope.

4.7.1.3 Scoping Letter Background Information The Project Team should assemble available and appropriate background information on the project including past and present conditions at the site, existing plans, maintenance records, inspection records, utility locations, right-of-way constraints, basic traffic data, other proposed projects in the area, etc; -- information about items or issues which may affect the project scope, schedule and budget.

4.7.1.4 Scoping Letter Field Review Following assembly of the background information, the Project Team assesses the need for a field review of the project site. In general, a field review will provide the Project Team with valuable insight for project definition; however, the information available to the Team may be such that little additional knowledge will be gained by a visit to the site and a field review all (or any) Team members may not be effective use of time.

4.7.1.5 Initial Scoping Letter
The Initial Scoping Letter (ISL)

should be prepared immediately following the field review, if any. The ISL should be as brief as practical but must contain the project objective, the proposed solution, and data to define the scope, schedule and budget for developing the project. The technical content of the Scoping Letter will be in accordance with the policies and procedures established by the individual technical units. The general requirements of a ISL are as follows:

- ◆ *Title* should include project identification data as provided by Program and Project Scheduling Section;
- ◆ *Introduction* contains the project location information, the purpose of the project and the project objectives.
- ◆ *Background Information* is a compilation of past and present conditions at the site, existing plans, maintenance records, inspection records, utility locations, right-of-way constraints, basic traffic data, etc, to the extent that such data impact the project scope, schedule, or budgets. Non-pertinent information should not be included.
- ◆ *Project Scope* is a simple statement of the construction work to be done including a listing of the major components of the work.
- ◆ *Development Considerations* includes those items and concerns which will have an effect on the development schedule. Statements regarding the absence of environmental

issues, other agency approvals, etc should be given here.

- ◆ *Cost Estimates and Milestone Schedule* presents the estimated construction cost and a tentative milestone development schedule.

4.7.1.6 Initial Scoping Letter Review Upon completion of the ISL, the Project Team circulates the document to the managers of the involved technical units and to the District Engineer for

² In accordance with 23 CFR Part 771, actions that do not individually or cumulatively have a significant effect on the environment are Categorical Exclusions and normally do not require an Environmental Assessment or Environmental Impact Statement. Categorical Exclusions are separated into two groups. The first group is a fixed list of actions which do not require further National Environmental Policy Act (NEPA) documentation. The second group includes actions which require documentation on a case-by-case basis to demonstrate that criteria for Categorical Exclusions are satisfied, and that significant environmental effects will not result. Recommendations for Categorical Exclusions are the responsibility of the Environmental Planning Section.

review and comment. Comments received are addressed by the Project Team. If consensus is not achieved on the project as defined in the ISL, or if environmental or other approval issues are identified, the Deputy

State Engineer for Planning and Engineering (DSE/P&E) should be notified and advised that a higher level of scoping document will be required to define the project.

4.7.1.7 Final Scoping Letter Upon resolution of comments, the ISL is revised and a Design Project Work Plan (PWP) is prepared by the Project Team. The Final Scoping Letter is circulated by the Project Team for approval. Scoping Letters are approved by the District Engineer, the project initiator, the project manager and the Group Manager for the technical unit where most of the design effort will be done.

The project manager submits the approved Scoping Letter for funding approval to the person responsible for the program line item. A copy of the funding approval is forwarded to the Program and Project Scheduling Section for information with the design schedule.

4.7.2 Project Assessment

The purpose of the PA is to obtain consensus on the potential project scope, major design features, milestone development schedule, and development and construction budgets based upon available information and a field review. The PA is the basis for consideration of a project for inclusion in the Five-Year Program.

In general, a Project Assessment (PA) is prepared for highway projects requiring physical construction of the roadway and where environmental categorical

exclusions² are sufficient. Individual projects defined through the preparation of a Corridor Study, a Design Concept Report, or a Project

4.7.2.1 Project Assessment Project Team The project manager assigned by the DSE/P&E works with the Pre-Design technical leader, the district representative(s), and the initiating agency to establish the project objectives and to develop a problem statement. The project manager assembles the Project Team (Section 4.5) and coordinates the preparation of a preliminary work plan for the Project Assessment including scope, activity durations and resource requirements. Project Team roles and responsibilities, coordination and review procedures are established by consensus at this time.

The technical preparation of the Project Assessments is the responsibility of the Pre-Design Sections represented on the Project Team and following the detailed procedures for the PA preparation in the *Roadway Design Guidelines Manual*. Environmental Categorical Exclusion (CE) documentation, if required, is the responsibility of the Environmental Planning Section represented on the Project Team.

The project manager is responsible for maintaining liaison with the initiating agency and other involved agencies and for ensuring adequate involvement of the other Team members in the preparation of the PA and CE.

Where appropriate, the Project Team coordinates design partnering activities with other agencies.

Implementation Report (see Section 4.6.3) do not require a PA.

The project manager is responsible for assuring adherence to the requirements of the ADOT Action Plan.

4.7.2.2 Project Assessment Project Objectives - The project objectives established by the Project Team including the project initiator and the District serve as a guide for determining the project scope. The project objectives should note any ancillary needs, constraints or other pending projects which may impact the project scope.

4.7.2.3 Project Assessment Background Information - The assembly of background information is essential for understanding the constraints which will shape the project. The Project Team is responsible for obtaining all available information on the past and present conditions at the project site, the existing horizontal and vertical geometry, the roadway typical cross section, any bridges or drainage structures, existing utility data, existing right-of-way and the general ownership of adjacent properties, basic traffic data, and traffic accident histories and analysis. An analysis of the controlling design criteria for the existing facility is prepared as a part of the background information.

Using the background information, the Project Team develops a range of engineering solutions which will meet the project objectives including phased implementation of the ultimate solution.

4.7.2.4 Project Assessment Field Review - The Pre-Design technical leader should coordinate with the project manager and other Team members to determine a date for a field review and to develop a preliminary list of those who should be invited to attend the field review. The schedule should allow time prior to the field review for data collection and review, preliminary controlling design criteria evaluation, development of an initial concept for the project and preliminary design exception recommendations.

Those attending the field review should include representatives of the District Engineer, the project initiating section or agency, involved ADOT groups or sections, FHWA, and as appropriate, the National Forest Service, Nation Park Service, Indian Tribes and Bureau of Indian Affairs, local government agencies, railroads, irrigation districts, and utility companies.

At least two and preferably four weeks notice should be given to those invited.

The field review is an opportunity to confirm the project objectives with the attendees and to solicit information regarding any additional problems that need to be addressed as a part of the project.

Prior to the field review, the attendees should review any pre-programming information received from TPD and P²S², the project problem statement and objectives, existing project background data, and the preliminary Controlling Design Criteria report.

It is recommended that a video recording of the existing

facility be made in both directions during the field review drive-through of the project. This will give a permanent record of the existing features -- particularly those of major concern such as guardrail, slopes, drainage structures, right-of-way, utilities, etc. that will impact the project.

Following the drive-through, the initial concept and the preliminary design exception recommendations should be discussed with the attendees.

If outside agencies are involved in the project, a design partnering meeting may be appropriate to establish a common approach to the project scoping process.

From time-to-time, the field review will disclose conditions indicating that a PA will not adequately define the project. In such cases, the PA process should be discontinued and the preparation of a DCR should be initiated using the escalation process.

4.7.2.5 Initial Project Assessment

The Initial Project Assessment (IPA) should be prepared immediately following the field review. The required elements of an IPA are as follows:

- ◆ The project identification data as provided by Transportation Planning Division and/or Program and Project Scheduling Section;
- ◆ The project location information, the purpose of the

project and the project objectives.

- ◆ A compilation of past, present and/or existing conditions including a description of the roadway cross section, any
- ◆ The major construction components of the project in general terms but with just enough detail given to guide the designer in preparing the construction documents. Depending upon the nature of the project, specific items to be presented include preliminary horizontal and vertical alignment, typical roadway cross section, preliminary pavement section, a geotechnical assessment of the site, borrow pit locations, etc.
- ◆ A list of items and concerns that will have an effect on the development schedule and content of the project construction documents. Such items may include utility requirements, involvement of outside agencies, seasonal considerations, etc.
- ◆ Cost Estimates and Tentative Development Time Frame to provide the information required by TPD to rate and rank the project for inclusion in the Five-Year Program. Cost estimates should be based upon the best available data with estimating contingency factors appropriate for the confidence level of the estimated quantities. Cost estimates should be provided for design activities, right-of-way acquisition, ADOT-paid utility relocations, and construction costs including allowance for field engineering and general contingencies.

major or drainage structures, the existing right-of-way and the adjacent land ownership (in general terms), any utility locations, basic traffic data, etc.

Upon completion of the IPA, the Pre-Design technical leader circulates the IPA to technical managers and to involved outside agencies for review and comment. The project manager monitors the timely return of comments and their resolution. Comments received are addressed by the project team. If necessary to achieve consensus, the project manager will hold a comment resolution meeting and/or a formal scope consensus meeting.

Lacking a consensus that the project is adequately defined by the IPA, the project manager will advise the DSE/P&E and P²S² and recommend the preparation of a DCR for the project.

4.7.2.6 *Final Project Assessment*

The Final PA accompanied by a Project Determination Memorandum requesting Department Consensus and approval, is circulated by the project manager for consensus by the managers of the Roadway, Traffic, Transportation Support, Structures, Materials, and Right-of-Way Groups and the District Engineer(s). Receiving a consensus of the group managers that the project is defined, the Final PA is approved by the Roadway Group Manager, The District Engineer, the project manager and the initiating agency.

On projects involving state, federal, or Indian land, the landowner is included in the

scoping process. Local governments will also be involved whenever the project is located within an incorporated area. A written concurrence in the Final On federal-aid projects not covered by Certification Acceptance, FHWA is included in the PA review process. The ADOT approved PA is forwarded to FHWA by the project manager with a written request for agency approval. Written FHWA notification of acceptance of the PA is considered federal approval.

Unless the project location and /or design concept are issues requiring additional study, the approved PA becomes the basis for inclusion in the Five-Year Program and for subsequent project design.

The project manager forwards the approved PA to TPD for further evaluation of the project as a candidate for the Five-Year Program. The estimated costs for construction, utility relocation, and right-of-way acquisition; a time frame for design and construction; and any known schedule constraints, including predecessor projects, should be clearly identified in the transmittal to TPD.

4.7.3 Location/Design Concept Report

A Design Concept Report (DCR) or a Location/Design Concept Report (L/DCR) is prepared for those projects which cannot be fully addressed by a Project Assessment. In most cases, projects requiring the preparation of environmental documents for clearances will be scoped using the DCR or L/DCR process. The need for either a

PA is required from the public landowner prior to circulation for Department approval.

DCR or a L/DCR to define a project is established during the Strategic Planning Stage described above. The recommendation is confirmed during the field review.

The determination of need for a DCR rather than a PA may be made during the development of a PA by the Project Team with the consensus of the Roadway Group Manager.

4.7.3.1 Design Concept Report Project Team

The project manager assigned by the DSE/P&E works with the Pre-Design technical leader, the district representative(s), and the initiating agency to review the project problem statement and to establish the objectives of the scoping study. The project manager assembles the Project Team (Section 4.5) and coordinates the preparation of a preliminary work plan for the DCR or L/DCR including scope, activity durations and resource requirements. Project Team roles and responsibilities, coordination and review procedures are established by consensus at this time.

The Pre-Design Sections of the Roadway Group are responsible for preparing the DCR or L/DCR but the State Roadway Engineer may request the reports be prepared by other service units or by engineering consultants.

Environmental Planning Section is responsible for the preparation of environmental documentation. The Manager of the Transportation

Support Group may request the documentation be prepared by consultants.

Detailed procedures for preparation of the DCR and L/DCR are presented in the *Roadway*. The project manager is responsible for maintaining liaison with the initiating agency and other involved agencies and for ensuring adequate involvement of the other Team members in the PA preparation. Where appropriate, the Project Team coordinates design partnering activities with other agencies.

The project manager is responsible for assuring adherence to the requirements of the ADOT Action Plan.

4.7.3.2 Design Concept Report Background Information

The assembly of background information is essential for understanding the constraints which will shape the project. The Project Team is responsible for obtaining all available information on the past and present conditions at the project site, the existing horizontal and vertical geometry, the roadway typical cross section, any bridges or drainage structures, existing utility data, existing right-of-way and the general ownership of adjacent properties, basic traffic data, and traffic accident histories and analysis.

An analysis of the controlling design criteria for the existing facility is prepared as a part of the background information.

Design Guidelines Manual. Procedures for preparing the environmental documentation have been developed by the Environmental Planning Section.

4.7.3.3 *Design Concept Report Field Review*

The Pre-Design technical leader should coordinate with the project manager and other Team members to determine a date for a field review and to develop a preliminary list of those who should be invited to attend the field review. The schedule should allow time prior to the field review for data collection and review, preliminary controlling design criteria evaluation, development of an initial concept for the project and preliminary design exception recommendations.

Those attending the field review should include representatives of the District Engineer, the project initiating section or agency, involved ADOT groups or sections, FHWA, and as appropriate, the National Forest Service, Nation Park Service, Indian Tribes and Bureau of Indian Affairs, local government agencies, railroads, irrigation districts, and utility companies.

At least two and preferably four weeks notice should be given to those invited.

The field review is an opportunity to confirm the project objectives with the attendees and to solicit information regarding any additional problems that need to be addressed as a part of the project.

Prior to the field review, the attendees should review any pre-programming information received from TPD and P²S², the project problem statement and objectives, existing project background data, and the preliminary Controlling Design Criteria report.

It is recommended that a video recording of the existing facility be made in both directions during the field review drive-through of the project. This will give a permanent record of the existing features -- particularly those of major concern such as guardrail, slopes, drainage structures, right-of-way, utilities, etc. that will impact the project.

Following the drive-through, the initial concept and the preliminary design exception recommendations should be discussed with the attendees.

If outside agencies are involved in the project, a design partnering meeting should be conducted to establish a common approach to the project scoping process.

4.7.3.4 *Initial Location/Design Concept Report*

The required elements of an Initial Location/Design Concept Report are similar to those for the Initial Project Assessment given above in Section 4.5.2.4 with appropriate modifications to fit the specific project.

Upon completion of the initial DCR or L/DCR, the Pre-Design technical leader circulates the initial DCR or L/DCR to technical managers and involved outside agencies for review and comment. The project manager monitors the timely return of comments and their resolution. Comments received are addressed by the project team. If necessary to achieve consensus, the project manager will hold a comment resolution meeting and/or a formal scope consensus meeting.

Environmental investigations are conducted concurrently with the development of the Initial Location/Design Concept Report. See Section 4.9 for the environmental study requirements.

The project manager is responsible for assuring the coordination of the environmental documents and the L/DCR during their preparation.

Upon completion of the environmental documents, the Environmental Planning Section (EPS) technical leader circulates them to technical managers and involved outside agencies for review and comment. The project manager monitors the timely return of comments and their resolution.

Copies are also made available to the public.

4.7.3.6 *Location/Design Public Hearing*

The State Action Plan or Federal-aid regulations will generally require a public hearing for projects being scoped under the L/DCR process. Procedures to be followed in the public hearing are outlined in the State Action Plan and in the *Environmental Planning Section Procedures Manual*.

The project manager is responsible for seeing that the public hearing is held as required by these policies and regulations. The Environmental Planning Section (EPS) is responsible for planning and conducting the public hearings. See Sections 4.9 and 4.11 for

4.7.3.5 *Design Concept Report Environmental Analysis*

additional discussion on this topic.

Comments received from the public hearing are addressed by the Team. EPS is responsible for communicating the resolution of comments to the public.

4.7.3.7 *Final Location/Design Concept Report*

The Final DCR or L/DCR accompanied by a Project Determination Memorandum requesting Department consensus and approval, is circulated by the project manager for consensus by the managers of the Roadway, Traffic, Transportation Support, Bridges, Materials, and Right-of-Way Groups and the appropriate District Engineer(s). Receiving a consensus of the group managers that the project is defined, the Final DCR or L/DCR is approved by the Roadway Group Manager, the District Engineer, the project manager, and the initiating agency.

On projects involving state, federal, or Indian land, the landowner is included in the scoping process. Local governments will also be involved whenever the project is located within an incorporated area. A written concurrence in the final DCR or L/DCR is required from the public landowner prior to circulation for Department Approval.

On federal-aid projects not covered by Certification Acceptance, FHWA is included in the DCR or L/DCR review process. The ADOT approved DCR or L/DCR is forwarded to FHWA by the project manager with a written request for agency approval.

Written FHWA notification of acceptance of the DCR or L/DCR is The approved DCR or L/DCR serves as the basis for consideration of the project for inclusion in the Five-Year Program and for subsequent project design.

The project manager forwards the final L/DCR to TPD for further evaluation as a candidate for the construction program. The estimated costs for construction, utility relocation, and right-of-way acquisition; a time frame for design and construction; and any known schedule constraints, including predecessor projects, should be clearly identified in the transmittal to TPD.

4.7.4 Controlling Design Criteria Evaluation

Using as-built plans and a field reconnaissance, existing roadways programmed for improvement are evaluated by Pre-Design staff for compliance with ADOT's controlling design criteria. The *ADOT Roadway Design Guidelines Manual* presents a guide for determining which projects require evaluation and the procedures for evaluation.

The evaluation identifies existing design features not conforming to ADOT recommended design criteria such as: lane and shoulder widths; vertical and horizontal alignment; stopping sight distance; superelevation; design speed; grade; cross slope; vertical clearance; bridge width, structural capacity and railing; design traffic volumes; intersection sight distance; etc.

The evaluation either describes how the non-conformance is to be resolved or provides justification for non-remedial action. Reasons such as

considered federal approval.

excessive cost, future remedial projects, environmental concerns, or a history of no or insignificant accidents might support a non-remedial action.

There are three stages in preparing the Controlling Design Criteria Report. The initial report is prepared and submitted for review prior to the Scoping Phase field review. Following the field review, the report is finalized and submitted for review and preliminary approval by the Pre-design Technical Manager.

If design exceptions are recommended, the report is forwarded to the Traffic Studies Section with a request for an "Accident Evaluation for Design Exceptions." This report becomes a part of the formal request for approval of design exceptions.

If non-remedial action is recommended, a formal request is submitted to the manager of the Roadway Group by the Pre-Design Technical Leader. Design exceptions are considered approved upon the signing of the request by the Roadway Group Manager.

On Federal-aid projects covered by Certification Acceptance Procedure, a copy of the approved design exception request is forwarded to FHWA for information purposes.

On Federal-aid projects not covered by the Certification Acceptance Procedure, the formal request signed by the Roadway Group Manager is submitted by the project manager to FHWA with the PA, DCR or L/DCR.

The Pre-Design technical leader is responsible for assuring that proper documentation supporting the non-remedial action is If FHWA finds errors or otherwise does not grant approval of the design exceptions, the Roadway Group Manager is responsible for seeing that the appropriate ADOT sections are notified and that corrective action is taken.

The Controlling Design Criteria Report should include :

- ◆ An Executive Summary;
- ◆ A summary of the design features of the existing highway and a comparison with the desired criteria.
- ◆ A statement of the specific design exceptions recommended and the engineering analysis and opinions supporting the recommendations;
- ◆ Photographs, if applicable;
- ◆ Accident Evaluation for Design Exceptions, as appropriate.

4.8 CORRIDOR STUDIES

Urban controlled access highway programs, route corridor reconstruction programs, and other major state highway system programs can have significant environmental, social, economic and political impacts because of their complex nature and magnitude. These programs require extensive study and evaluation of the entire corridor prior to segmenting it into manageable design and construction projects (individual projects).

included with the PA, DCR or L/DCR.

4.8.1 Corridor Study Project Team

Transportation Corridor planning studies are prepared by a Pre-Design Section or by engineering consultants. The studies may focus on the location of transportation corridors, a new route location within a defined corridor, or the evaluation of existing facilities for rehabilitation. Because of the nature of these projects, early involvement of Environmental Planning Section (EPS) and Right-of-Way Group is essential. The project manager is responsible for assuring the adherence to the requirements of the ADOT Action Plan.

The project manager assigned by the DSE/P&E works with the Pre-Design and EPS technical leaders, the district representative(s), and the initiating agency to establish the Corridor Study objectives and to develop a problem statement. The project manager assembles the Project Team and coordinates the preparation of a work plan for the Corridor Study including scope, activity durations and resource requirements. Project Team roles and responsibilities, coordination and review procedures are established by consensus at this time.

If consultants are required (see Section 4.6), the project manager verifies that sufficient funds have been set aside to perform all aspects of the study.

After the project team, including consultants, is identified, the project manager conducts a study

scoping meeting with all involved agencies. This meeting is generally held in conjunction with a field review of the site.

The Pre-Design technical leader should coordinate with the project manager and other Team Members to determine a date for a field review and to develop a preliminary list of those who should be invited to attend the field review. The schedule should allow time prior to the field review for data collection and review and development of proposed alternative corridors.

Those attending the field review should include representatives of the District Engineer, the project initiating section or agency, involved ADOT groups or sections, FHWA, and as appropriate, the National Forest Service, Nation Park Service, Indian Tribes and Bureau of Indian Affairs, local government agencies, railroads, irrigation districts, and utility companies.

At least two and preferably four weeks notice should be given to those invited.

The field review is an opportunity to confirm the project objectives with the attendees and to solicit information regarding any additional problems that need to be addressed as a part of the project.

It is recommended that a video recording of the existing facilities in the corridors be made in both directions during the field review drive-through of the project. This will give a permanent record of the existing features that may impact the project.

4.8.2 Corridor Study Field Review

If outside agencies are involved in the project, a design partnering meeting should be conducted to establish a common approach to the project scoping process.

4.8.3 Preliminary Information

The Project Team will develop proposed alternative corridors, typical sections, etc., to guide the preparation of the Initial Corridor Report. The recommendations for alternative corridors will be supported by the results of the Scoping Meeting, the site visit, an initial controlling design criteria analysis, drainage considerations, an environmental overview and available right-of-way and utility data.

A brief report with sufficient depth to explain the alternative corridor locations will be distributed by the Project Team to the involved ADOT technical units, the District Engineer and local corridor jurisdictions. Comments on the report will be received and, if necessary, a comment resolution meeting will be held.

4.8.4 Public Information Meeting

With definition of the proposed alternative corridors for the study, a Public Information Meeting should be held in the project vicinity to explain the study and to solicit comments from the public and interested organizations.

4.8.5 Initial Corridor Report

The Initial Corridor Location Report will present the evaluation and comparison of the several discrete highway corridors considering the social, environmental, engineering and cost criteria that would be applied to final roadway alignment alternatives. Due to the size of the affected area, these evaluations will usually be based upon data of record from ADOT and cooperating agencies, specific project input from interested ADOT units, local jurisdictions, and other State and Federal agencies.

The required elements of the Initial Corridor Report are as follows:

- ◆ The project identification data as provided by Transportation Planning Division and/or Program and Project Scheduling Section;
- ◆ An Executive Summary of the essential information and conclusions more fully developed in the remainder of the report;
- ◆ An overview description of the study area and the individual corridors including location and vicinity maps;
- ◆ A listing of environmental issues, concerns, and opportunities;
- ◆ A description of each alternative and briefly listing the advantages and disadvantages of each;
- ◆ A summary of drainage analysis and hydrologic data sufficient to determine the differences between alternative corridors;
- ◆ A tentative identification of right-of-way needs, land use and ownership (public or private);
- ◆ A list identifying utility companies which may be impacted by each alternative;
- ◆ Cost Estimates for each alternative;
- ◆ An evaluation matrix showing each alternative versus the issues, concerns, and opportunities identified during the study;
- ◆ The Project Team recommendations with a statement of the preferred alternative and the supporting reasoning;
- ◆ Any additional Information including typical sections used in the analysis, plan and profiles drawings for each alternative, and cross sections at critical locations.

Interim draft copies of the studies are distributed to the Project Team representing all involved service units and the appropriate district office(s). Each recipient is asked to review and comment on the document and to concur in approving the report for printing. The printed Initial Corridor Location Report will be circulated by the Project Team to all affected ADOT Groups and Sections, the District Engineer, FHWA, cooperating public land and resource agencies, local jurisdictions (including copies for public

libraries) and other affected agencies and interest groups.

A Public Information Meeting will be conducted by EPS and the Project Team where the project will be explained, alternative corridors will be displayed and explained, and public input will be received.

4.8.6 Final Corridor Location Report

The Final Corridor Location Report will be prepared based upon the findings of the Initial Report, comments from the public and the preferred corridor selected by the Roadway Group Manager. The required elements of the Final Report are similar to those of the Initial Report except that it is focused on the preferred corridor. The Final Report comprises:

- ◆ The project identification data as provided by Transportation Planning Division and/or Program and Project Scheduling Section;
- ◆ An Executive Summary of the essential information and conclusions more fully developed in the remainder of the report;
- ◆ An overview description of the study area and the individual corridors including location and vicinity maps;
- ◆ A listing of environmental issues, concerns, and opportunities;
- ◆ The preferred alternative including a full description of the alternative and the reasons it is superior to all other alternatives based upon

Review of the initial report will result in approval of the preferred corridor for further development by the Roadway Group Manager. The Project Team will respond to written comments by issuing a Summary of Comments to those who made comments.

findings of Initial Corridor Location Report, review comments and comments from the public.

- ◆ Engineering data for the preferred alternative including plan and profile sheets, typical sections, drainage analyses and hydrologic data, right-of way needs, land use and general ownership, utility data, and cost estimates.
- ◆ An appendix including condensed descriptions of the alternative corridors that were studied in the Initial Report, general engineering data and other information regarding these alternatives, cost estimates and the evaluation matrix from the Initial Report.

The draft final study document, with a Study Approval Memorandum requesting Department consensus and approval, is circulated by the Project Team for consensus from the managers of the involved technical units and the appropriate District Engineer(s).

The memorandum presents a synopsis of the study describing the issues, alternatives considered, and preferred resolution. With a consensus of the technical managers, the Final Corridor Location report will be printed and distributed to FHWA, ADOT technical units, local jurisdictions and cooperating public land and resource

agencies. A notice will be mailed by EPS to all other groups and individuals included in the Initial review notifying them of the Final Report's availability.

On studies or programs that may involve federal-aid on the subsequent design and/or construction of the highway improvement, the Federal Highway Administration (FHWA) is included in the document review process. The ADOT approved study document is forwarded to FHWA by the project manager with a written request for agency approval. Written FHWA acceptance of the study document is considered Federal approval.

On projects involving state, federal, or Indian land, the landowner is included in the study process. Local governments will also be involved whenever the project is located within an incorporated area. A written concurrence in the final study document is required from the public landowner prior to ADOT approval.

4.8.7 Project Implementation Report (General Plan)

The Project Implementation Report is prepared to define the individual sequential steps necessary to develop the ultimate corridor concept defined in the Final Corridor Study Report. For controlled access highway corridors or for complex multiple project corridor, the Implementation report will be based upon a General Plan representing an approximately 15% complete design along an entire corridor. The documents comprising the General Plan should include plan and profile,

The Final Report will have the approval signatures of the Roadway Group Manager, the District Engineer, and the project manager.

typical sections, preliminary drainage requirements, right-of-way requirements, bridge type selection, traffic analysis, and preliminary geotechnical investigations. Other design work is involved depending upon the circumstances and scope of the development program.

Prior to commencing work on the Project Implementation Report, the Project Team prepares a work plan for developing the Report. Based upon the work plan, the DSE/P&E determines what portion, if any, of the work is to be done by ADOT staff.

Throughout the development of the Implementation Report, the project manager maintains liaison with the affected public agencies and monitors the project to assure compliance with the requirements of the ADOT Action Plan.

The Project Implementation Report will be prepared for the preferred alternative only. The Project Team will investigate interim construction and timing that will address specific problem areas discovered during the Corridor Study; extend the useful life of the existing facility before major reconstruction would be needed; and result in a phased implementation of the ultimate design concept with a minimum amount of "throw-away". The goal of the study is to develop a cost-effective implementation plan.

Issues that must be resolved or revisited prior to construction, such as environmental clearance, intergovernmental agreements, right-of-way acquisition, and utility relocation will be identified and discussed.

Construction and development cost estimates for each proposed project will be prepared for programming purposes. The

- ◆ The project identification data as provided by Transportation Planning Division and/or Program and Project Scheduling Section;
- ◆ An Executive Summary of the essential information regarding individual project descriptions, costs, and development time-frames as documented in the remainder of the report;
- ◆ An overview description of the study area and the preferred alternative including location and vicinity maps;
- ◆ A description of the existing corridor;
- ◆ A general description of the ultimate facility with plan and profile sheets, typical sections, etc.
- ◆ An Implementation Plan including:
 - Remedial Projects identified during the corridor study which address acute capacity and operational problems and which should be implemented as soon as funding becomes available,
 - Interim Projects that will extend the useful life of the existing facility or delay the

Project Team will document the proposed order of construction along with any information, such as forecast traffic volumes, which will provide guidance as to when certain projects may be needed.

The required elements of the Project Implementation Report are as follows:

- need to reconstruct to the ultimate design concept, and
 - Ultimate Projects with phased implementation to address ultimate design concept needs, balance earthwork and provide usable segments prior to full construction of the concept.
- ◆ The project timing including a description of the analysis leading to the classification of projects as Remedial, Interim or Ultimate. Also included should be trigger events such as projected traffic volumes, development of major traffic generators, etc that will warrant the initiation of the individual projects. Finally, phasing consideration such as earthwork, traffic control, local agreements, environmental considerations, utilities, etc that would require one project to precede another should be documented.
- ◆ Cost estimates for the construction and development of each of the individual projects;
- ◆ A listing of local government agreements both existing and needed prior to construction, a discussion of public lands involvement, and environmental clearance items, that must be

resolved or revisited prior to construction.

Interim draft copies of the studies are distributed by the Project Team to all involved technical units and the appropriate district office(s). Each recipient is asked to review and comment on the documents. With a consensus of the technical units, the Implementation Report will be circulated to TPD, FHWA, cooperating public land and resource agencies, and local jurisdictions. The Project Team On studies or programs that may involve federal-aid on the subsequent design and/or construction of the highway improvement, the Federal Highway Administration (FHWA) is included in the document review process. The ADOT approved study document is forwarded to FHWA by the project manager with a written request for agency approval. Written FHWA acceptance of the Project Implementation Report is considered federal approval.

Copies of the Project Implementation Report and approval documentation are distributed by the project manager to all involved service units and the appropriate district office(s). The completed and approved study will identify candidate individual projects for inclusion in the Five-Year Program. The Project Implementation Report serves as the basis for preparing the individual project work plans, including scope, schedule, and budgets, by their respective Project Teams.

will respond to written comments by issuing a Summary of Comments to those who made comments.

The Final Project Implementation Report will include appropriate modifications resulting from the review comments. The Final Project Implementation Report, approved by the Roadway Group Manager, the District Engineer, and the Project Manager will be forwarded to the Deputy State Engineer for Planning and Engineering for concurrence in the implementation strategy.

4.9 SCOPE CONSENSUS STUDY

During the PA (or DCR or L/DCR, as appropriate) process, the Project Team may find it advantageous to organize a one-day Scope Consensus Study to achieve an agreement between the involved parties as to what a particular project is to be. This study is a consensus meeting which utilizes the systematic approach and tools of the value analysis methodology to solve scoping problems and build genuine consensus. Project Teams are encouraged to use this approach on appropriate projects.

Special Programs Section should be notified when the project manager recognizes a significant consensus problem and decides to organize a consensus study. Working with the project manager, Special Programs Section is responsible for organizing the study team, setting the meeting date and time and assembling appropriate documents. The study team will conduct a one-day study, make recommendations for the scope, and recommend implementation procedures. Special Programs Section will provide assistance to the project manager in organizing and conducting the meeting.

The team for this type of study will consist primarily of persons directly involved with the development of the project who will be selected and organized by the project manager, with consultation from Special Programs Section. Appropriate materials, documents, and training will be provided to project managers and study team members by Special Programs Section.

4.10 VALUE ANALYSIS

All projects with an estimated construction cost of \$5 million or more and being of average or greater complexity will be value analyzed at either the Initial Project Assessment, Initial L/DCR or the Pre-Initial Design stages.

In addition, all projects of a complex nature should be considered for Value Analysis regardless of estimated cost. The project manager will determine, in consultation with Special Programs Section, at which stage the Value Analysis will be performed. See Section 5.5 for a discussion of the procedures for the Value Analysis.

4.11 ENVIRONMENTAL ANALYSIS

Environmental documentation and clearance must be achieved prior to acceptance into the Five-Year Program. Some approving agencies have limitations on the time between environmental clearance and the start of construction and may not be able to give a final environmental clearance. In such cases, a conditional approval will be sufficient for programming the project.

Under the direction of the Environmental Planning Section (EPS), an appropriate environmental analysis is conducted for all highway projects during the Project Scoping Phase. It is the responsibility of the project manager to assure that the environmental analysis is coordinated with the activities of the Pre-Design Sections.

The environmental process to be followed is determined by the type of project and the

significance of the environmental impacts identified during the planning effort. Projects requiring preparation of an Environmental Assessment or Environmental Impact Statement involve public participation, including scoping and information meetings as well as formal hearings.

The determination as to when public meetings and/or public hearings are desired or required for state projects is the responsibility of the Manager of Environmental Planning Section. On Federal-aid projects, the determination is made in consultation of FHWA.

EPS is responsible for advertising and managing all public meetings and hearings. The Project Team concurs in the EPS approach to public involvement, works with EPS in the preparation of documents and exhibits for public meetings. EPS conducts all public meetings, responds to public concerns, indicating action taken with regard to specific requests, and ensures consideration of public concerns in the design process. The project manager monitors the public meeting process.

If possible, both the project location and design concepts will be presented in a single environmental document and addressed in a combined location/design public hearing. On complex and involved projects, separate public hearings for location and design may be held as determined by the Manager of Environmental Planning Section in consultation with the Project Team.

An extensive presentation of the environmental evaluation and documentation process is given in the State Action Plan(s). Detailed procedures are described in the July 1988 *Environmental Planning Section Procedures Manual*.

4.12 RIGHT-OF-WAY ACTIVITIES

The Right-of-Way Group is responsible for obtaining any temporary rights of entry for activities necessary for preparing the project scoping studies. Such activities may include surveying, geotechnical investigation, hazardous or toxic waste investigations and archaeological inspection.

Also during the Project Scoping Phase, preliminary right-of-way requirements are determined and assessed for probable acquisition costs and potential acquisition problems. Information from this evaluation assists the Project Team in comparing possible solutions to the project.

In some instances, advanced acquisition of required right-of-way becomes feasible.

The project manager is responsible for coordinating the right-of-way activities with those of the other involved technical units.

4.13 UTILITY ISSUES

The Utility and Railroad Engineering Section technical leader is responsible for working with the other members of the Project Team throughout the Project Scoping Phase to identify

utility (including railroad) issues which will impact project development.

The Utilities and Railroad Engineering Section technical leader will maintain contact with the utility owners during the study and coordinate the flow of utility information to and from the Project Team.

In some instances, relocation of utilities in advance of regular construction will be required to economically and efficiently complete the development of the project.

4.14 OUTSIDE AGENCY COORDINATION

At the beginning of the Project Scoping Phase, the project manager, the Pre-Design and Environmental technical leaders, the District Engineer and the initiating agency, identify outside agencies that may be affected by, or interested in, the project. It is the responsibility of the project manager to assure adequate coordination with these outside agencies throughout the project development process. Those agencies with a significant interest in the project should be included on the Project Team.

Affected outside agencies are notified of ADOT's intent to construct improvements and, subsequently, are informed of the project's progress to ensure coordination. In instances where the project abuts existing improvements, affected agencies are given an opportunity to review studies and submit comments.

For projects involving a joint effort between ADOT and other governmental agencies (or private entities), the Joint Projects Administration Branch (JPAB) of the Engineering Consultant Section is notified of the need for a Joint Project Agreement by the project manager. The project manager, in consultation with JPAB, leads the negotiates on the terms of agreement with the other agency(s) and ensures the development of the scoping documents in accordance with the terms of the agreement. The project manager must ensure that the necessary agreements have been received prior to incorporating the joint work in the final scoping documents. Agreements must be reached before the joint work will be included in the Five-Year Program.

The Joint Projects Administration Branch is responsible for preparing and obtaining a Resolution signed by the Director authorizing entry into an agreement. JPAB prepares the draft agreement and distributes it, among others, to the project manager for review by the Project Team. After securing an executed agreement from the other parties and the Deputy State Engineer for Planning and Engineering, JPAB forwards the executed agreement to the Attorney General for approval and files the approved, executed agreement with the Secretary of State. Copies of the executed agreement are forwarded to the project manager for distribution to the Project Team.

4.15 PUBLIC COORDINATION

On projects with potential significant environmental impacts, the public coordination

effort during the environmental analysis is provided by the Environmental Planning Section as discussed in Section 4.4. At other times, public coordination and communication is the responsibility of the project manager, usually through the appropriate technical leader.

As the Project Team develops the work plan for the scoping effort, consideration should be given to the appropriate level of public coordination warranted by the project. The public information staff of SPMS should be consulted by the project manager in developing the work plan for public coordination.

Public information meetings are held to inform citizens of the proposed project improvements and to receive input relative to local needs and concerns. Notice of the project scope and meeting date are published in local newspapers and mailed to adjoining property owners. The project manager should seek the assistance of Environmental Planning Section staff in preparing for public meetings.

Exhibits and handouts are prepared to assist in the presentation of the project at the public information meeting. The meeting should have an open-house setting and should consist of informal one-on-one responses to the concerns of the public. A questionnaire may also be distributed at the meeting to solicit written comments.

Property owners adjoining the proposed project have special concerns regarding how the new construction will affect their property and especially how construction will be scheduled, implemented, and access

maintained. These concerns must be thoroughly investigated and discussed with the property owner so that the final construction documents suitably describe the methods of matching new to Coordination with the property owners is the responsibility of the Right-of-Way Group technical leader. The Project Team should utilize the services of the Right-of-Way Group in contacting and discussing the project with adjacent property owners to avoid confusion and conflicting statements from ADOT.

4.16 PROJECT SCOPING REVIEW

4.16.1 General

Scoping documents are distributed by the appropriate technical leader to the technical sections, the District Office and interested agencies for formal review/ coordination when the document is at the initial and final stages. Each technical unit's Quality Plan provides the technical review procedures to be followed.) Informal review and/or coordination of the scoping documents will occur on a continuing basis throughout the development process.

The review process may vary from project to project depending upon the nature of the project. The project manager, technical leaders, district representatives and outside agency representatives and the project initiators establish the review procedures to be followed at the beginning of the scoping process.

See the Appendix for additional information on Project Scoping Review procedures.

existing improvements, and present a workable staging plan and traffic control plan during construction.

4.16.2 Field Review

One or more formal field reviews are normally held as a part of the Project Scoping Process. The initial field review is conducted near the beginning of the scoping process to discuss the project scope and criteria, and to identify development considerations. The field review is attended by the project manager, District representatives, and other involved parties. The District representatives should include the resident engineer assigned to the project team and may include the District Engineer and the District Maintenance Engineer. The District representatives should be fully prepared to discuss the maintenance concerns, safety and political issues, site conditions, and other factors affecting the project scope and objectives.

Depending upon the complexity of the project, a second field review may be warranted at the review of the initial scoping documents.

4.17 SCOPING PHASE PROJECT WORK PLANS

Project Work Plans (PWP) are prepared at various times throughout the Project Scoping Phase to guide the preparation of the studies and reports. (See Chapter 7 for information on the requirements for preparing a PWP.) In each case, the

compilation of the PWP is the responsibility of the project manager using data provided by The preliminary Scoping Phase Project Work Plan is prepared following finalization of the strategic plan for accomplishing the scoping studies and holding the project objectives meeting. The project manager should meet with the project team and review the tentative resource requirements and activity durations prepared for the candidate projects. These data, together with the master plan milestone dates, should form the basis for the scoping work plan.

The Scoping Phase PWP should be prepared for all projects being scoped. Where consultants will be used in developing scoping documents, the PWP will form the basis for selecting the consultants and negotiating their scope of services, fees, and delivery dates. The PWP should reflect the involvement of all disciplines participating the scoping process.

The preparation of scoping documents is a process of discovery; as such, changes in the PWP are to be expected. The plan should be reviewed from time-to-time and revised to fit the project needs. If during the PA process it is determined that a DCR will be required to adequately define the project, a new PWP should be developed to reflect the change in project scope. A review of the PWP is appropriate at the completion of the field review so that any changes in the requirements of the project may be reflected in an updated plan.

See Chapter 7 for additional discussion of Project Work Plan revisions.

the technical leaders and technical managers.

4.18 DESIGN PHASE PLANNING

The final activities of the Scoping Phase involve planning the Design Phase and Preconstruction Activities for those projects which have been accepted into the Five-Year Program. The Project Team is responsible for preparing a plan for developing the project construction contract documents for constructing the project to meet the requirements of the Five-Year Program. The Design Phase Project Work Plan prepared by the Project Team is used by the Program and Project Scheduling Section (P^2S^2) in establishing the overall Program Master Schedule. The Project Team's initial schedule may be adjusted by P^2S^2 to meet ADOT's resource management objectives.

5. Design Phase and Pre-Construction Activities

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5. DESIGN PHASE AND PRE-CONSTRUCTION ACTIVITIES

The Design Phase of the Project Development Process involves the preparation of design and construction documents responsive to the project's objectives and suitable for competitive bidding. During the same time-frame, other Pre-Construction activities (such as archeological or environmental mitigation, advance utility relocation, etc.) necessary to prepare the project for construction are taking place. At the conclusion of the Design Phase and Pre-Construction Activities, all necessary clearances and agency approvals have been obtained and the project is ready for bid advertisement and construction.

5.1 INITIATION OF DESIGN PHASE AND PRE-CONSTRUCTION ACTIVITIES

By the conclusion of the Project Scoping Phase, a project has a well defined scope, a preliminary schedule showing all activities, durations and relationships, and pre-construction and construction budgets. The project has been accepted into the ADOT Five-Year Construction Program with a design start date based on the approved schedule.

Depending upon the project circumstances, there may be a substantial time lag following the Scoping Phase before the start of actual design activities. During this time, the project manager remains actively responsible for The project manager will notify each involved technical leader and their technical manager of

the project and maintains contact with the project initiators and other interested parties.

If the time lag between the close of the Scoping Phase and the scheduled start of of actual design activities is greater than six months, the project manager will review the project scoping documents with the appropriate District Engineer or their representative to determine if there have been any substantial changes in the project objectives or conditions. This review should take place approximately six months before the scheduled start of design activities.

Substantial changes in project objectives or site conditions may require modifications to the scoping documents and, consequently, review of the project's acceptance into the Five-Year Program. The project manager must assess the impact of such changes and promptly notify the Deputy State Engineer for Planning and Engineering if the project scope, schedule, or construction budget must be revised in excess of the empowerment guidelines presented in Chapter 7.

The status of environmental documents is to be reviewed with Environmental Planning Services to determine the current appropriateness of these documents.

any known modifications to the project scope and ask for confirmation or modification of

the Project Work Plan's schedule and required resources based on current knowledge. The project manager will also ask each involved technical manager to confirm the availability of staff or on-call consultant resources for those activities assigned to the technical unit and to identify the need, if any, for additional consultants. The project manager, working with the technical leaders and Program and Project Scheduling Section (P²S²) will update the Project Work Plan to reflect any agreed-upon changes.

After consulting with the technical leaders, the project manager will determine the need for early start of field surveys and geotechnical and environmental investigations. The project manager is responsible for the coordination between Right-of-Way Group and the units requiring for rights-of-entry for these activities.

At that time, but at least five months before the scheduled start of design, the project manager will advise the P²S² manager that the Project Work Plan is current and request a confirmation as to the involvement, if any, of consultants in the project design based on the availability of ADOT staff in accordance with the To provide Project Team continuity, the original members of the scoping team should continue through the Design Phase of Project Development. After the technical leaders concur with the responsibility assignments, the project manager, working with Program and Project Scheduling Section, will revise the chart of project activities to reflect the activity responsibilities of the technical leaders, including consultants¹.

requirements of the overall program. The P²S² manager will so advise the project manager prior to four months before scheduled start of design.

If consultants are required for any part of the project design effort, the project manager will so notify Engineering Consultant Section at least 130 days prior to the scheduled start of the consultant's services. With the notification, the project managers will supply a synopsis of the services to be performed plus a copy of the Project Work Plan with the desired services indicated in the scope, schedule, and budget. Engineering Consultant Section will be responsible for organizing and overseeing the consultant selection process, including contract negotiation. Until a formal Notice to Proceed is issued, all communication with the potential or selected consultants will be through Engineering Consultant Section.

Upon determination of the role of consultants in the project, the project manager will advise the technical leaders of the activities which will be assigned to their units and for which they will be responsible.

¹ It is the intent of this document that the project development process be independent of whether the work is being done by ADOT staff or consultants, excluding consultant contract administration. Statements referring only to consultants will be identified as such. Therefore the terms "technical manager" or "technical leader" or "project manager" apply equally to ADOT staff and consultant staff persons filling those roles unless the context indicates otherwise.

5.2 QUALITY PLANS

"We will consistently provide our customers products and services that meet mutually agreed-upon requirements."

--ADOT Quality Policy

The project manager will notify technical leaders of a pending design kick-off meeting and request the preparation of a Project Quality Plan for each of the technical areas. These quality plans will be discussed and coordinated at the kickoff meeting. Following the kickoff meeting, the project manager will incorporate the quality plans into the Project Work Plan.

5.2.1 Quality Principles

The implementation of ADOT's Quality Policy is based on the following principles:

Quality is the responsibility of every individual working on a project. Quality is achieved by individuals carefully performing their work.

Quality is produced by adequate planning, coordination, supervision, and technical direction; proper definition of job requirements and procedures; and use of appropriately skilled personnel.

Quality is encouraged by accommodating innovation and the creative application of technical principles and judgement in accordance with the requirements of the project.

Quality is enhanced through the assessment of the completeness and accuracy of the work by individuals who are not directly responsible for performing the

work (independent check and review).

Quality is assessed by auditing the implementation of quality procedures.

5.2.2 Section Quality Plans

The individual ADOT Group Managers are responsible for overseeing and monitoring the development of technical standards and quality plans for each of the sections under their supervision. Technical standards outline the technical procedures which are to be followed and the minimum technical criteria which apply throughout the section. Quality plans are the procedures to be followed to meet the technical standards.

The technical standards and quality plans should recognize the benefits to be gained from a standardized approach to the preparation of studies, designs and plans. However, they should permit and encourage the use of different approaches where the efficiency of the work and the technical integrity of the final product is not compromised.

The quality plans for the sections should include the following items:

- A. Identification of section key personnel and definition of specific section responsibilities.
- B. Technical review process.
- C. Checking procedures.
- D. A program to train employees in quality procedures.
- E. A process to monitor and document quality activities.

Technical review should be distinguished from checking. Checking is for verification of the accuracy and completeness of the documents; technical review is for assessment of the overall design concept of the project. Neither process requires or benefits from the arbitrary imposition of the personal preferences of the checker or reviewer.

As a minimum, the technical review process should:

- A. Determine the adequacy of the design process to achieve the desired project goals;
- B. Evaluate the general selection and sizing of materials and equipment;
- C. Determine if all viable alternatives have been considered;
- D. Determine the practicality of the design concept;
- E. Determine if legal and physical restraints were considered;
- F. Determine if the design theory, concepts, and project layout are logical;
- G. Determine applicability of computer programs used;
- H. Determine if technical specifications are sufficiently comprehensive;
- I. Determine the constructability of the selected design; and
- J. Verify that data provided to other sections have been

properly used and are still appropriate.

Each section's training programs should provide an opportunity for the staff to become familiar with the design and quality standards and processes that are required in their section.

5.2.3 Project Quality Plans

Each project technical leader is responsible for developing a specific quality plan for the technical unit's work on a project. The project manager will assemble the project quality plan from the technical leaders' plans.

The specific quality plans will be based upon each section's general quality plan and will include the section staff assigned to key project positions and their individual responsibilities to the project and the quality process. Modifications to the section's general quality plans will be made as necessary to meet the specific checking and technical review requirements of the project. The project quality plan should include a training program such that all project staff are familiar with the project design and quality processes and their individual responsibilities for those processes.

The project manager is responsible for monitoring the Project Quality Plan and verifying that the quality process is being documented.

5.3 DESIGN PROCESS

Actual design procedures vary depending on the type and complexity of the project. Project design and construction documents may be prepared by ADOT staff or by engineering consultants. In either case, the management of the project, the design process and the end results are the same.

Whether done by staff or consultants, the design documents produced for each design stage are similar, requiring the same degree of accuracy and completeness. The documents are developed in conformance with the guidelines set forth in Section 5.6 of this Manual.

The objective of the design process is to develop comprehensive design and construction documents including plans, specifications, and estimates (PS&E) for construction of transportation facility improvements. Design elements are completed in accordance with the concepts and guidelines presented in the various technical documents developed during the Project Scoping Phase (Scoping Letter, Project Assessment, (Location/)Design Concept Report, Corridor Studies, Route Location Studies, Implementation Plan, environmental documents) and the Project Work Plan (scope, schedule, quality plan, and budgets). In addition, design is governed by guidelines contained in the design manuals prepared by the various ADOT design groups and the requirements of sound engineering practice. For projects designed by engineering consultants, the design is also governed by the terms and conditions of the consultant's contract.

Quality PS&E production is a primary objective throughout the design. This objective is facilitated by a document review process occurring in four separate stages -- Stage I Review (15% Review), Stage II Review (30% Review), Stage III (60% Review), and Stage IV (95% Review) -- followed by the completion of the bidding documents. Each stage involves the development of documents as prescribed in Section 5.6, followed by a review as outlined in Section 5.8.

5.4 DESIGN START-UP

Several activities must take place immediately upon commencement of the design process to ensure that all parties proceed on schedule with their work.

5.4.1 Design Kick-off Meeting

The project manager schedules, organizes, and conducts the project design kick-off meeting which is held immediately prior to the start of design activities. Attendees may include representatives from participating ADOT sections, the cognizant District office(s), FHWA, engineering consultants, and other local, state and federal agencies as appropriate.

At the meeting, the project manager will review the Project Work Plan (scope, schedule, and budgets) and Project Quality Plan with the participants, confirm project roles and responsibilities and coordinate the delivery of design data between technical units. The meeting may include a site visit; however, attendance by ADOT staff and consultants at a site visit should be limited to those who

will be actively and responsibly engaged in the project.

As discussed in Section 7.4.2, a Design Partnering Conference may be an appropriate method of facilitating communication within the Project Team. If required, the Partnering Conference should be held in conjunction with the kick-off meeting.

5.4.2 Temporary Rights of Entry

In accordance with the project schedule, the Right-of-Way Group arranges for temporary rights of entry onto property outside of ADOT right of way for the purpose of conducting field surveys and geotechnical and environmental investigations. Whenever possible, these activities are initiated and often completed in advance of design start-up. The need for early start of the field work will have been identified by the Project Team during the Scoping Phase and confirmed in the initiation of the Design Phase (see Section 5.1).

5.4.3 Survey Permit

A survey permit is required from the appropriate district office prior to beginning of field survey or geotechnical and environmental investigation work within ADOT right of way except when the work is performed by ADOT personnel. The project manager will assist consultants in obtaining the district permits. It is recommended that the project manager notify the All projects with an estimated construction cost of \$5 million or more and being of average or greater complexity will be value analyzed either during the Scoping Phase or at the Stage I Review. In addition, all complex

district office of any pending field work to be done by ADOT staff prior to beginning the field work.

5.4.4 Field Data Collection

The technical leaders for the field surveys and investigations should attend the kick-off meeting (or with early start, an *ad-hoc* meeting with those requesting the surveys and investigations) discuss the requirements for and extent of information to be gathered. The objective of this meeting is to ensure obtaining all necessary field data on the first attempt. Although judgement must be used, obtaining extra data is often more efficient than sending the field crews back for additional data.

Drawings showing an approximate plan, profile, and typical section information are often required for geotechnical and environmental investigations as well as for identifying preliminary right-of-way and temporary right-of-entry requirements. Generally, drawings from the Project Scoping Phase will be sufficient for this purpose. If not, preparation of these drawings should be one of the earliest activities undertaken.

5.5 VALUE ANALYSIS

projects should be considered for Value Analysis regardless of the project's estimated cost. Teams for these studies will be composed primarily of staff not involved with the development of the project and will be organized

by the Special Programs Section (SPS). The Special Programs Section staff will lead and/or facilitate the study or contract for such services where appropriate. SPS will prepare a report of the study findings and, after consultation with the project manager, circulate the report to group managers and to the appropriate technical managers for review. SPS will monitor the review process and advise the project manager on those items which are recommended to be incorporated in the project design.

The Project Team will implement the appropriate recommendations and the project manager will advise the Special Programs Section of the recommendations to be implemented.

The process results will be conveyed to the Value Study Team and technical managers and entered into the Value Analysis database by the Special Programs Section.

The project manager is responsible for contacting the Special Programs Section to schedule the value study preferably two months in advance of the proposed study. The project manager will advise the Special Programs Section on disciplines to be represented on the study team. The project manager may participate in the study.

In addition to the cost and complexity thresholds, value studies may be requested from time to time by group level, or higher, management. In such cases, the group manager will request the project manager to initiate the study, working through the SPS as described

above. The requesting manager will be kept informed of all phases of the value analysis study.

More information on all aspects of the Value Analysis Program is contained in procedure documents available from the Special Programs Section. The project manager is requested to become familiar with this important program, and to consider it to be a powerful tool for consensus building, problem solving, and cost saving -- not as "inspection" or "peer review". The objective of the Value Analysis Program is to enhance quality by improving value.

5.6 DESIGN DEVELOPMENT STAGES

Design and construction documents for each project are developed through the four review stages discussed above in Section 5.3. Staging of the design process encourages a systematic approach to plans preparation. Completion milestones are set at specific levels of development to incorporate quality assessment procedures and to conduct reviews by involved technical units and outside agencies.

The Project Work Plan gives the expected level of completion for each design stage together with the schedule and budget for accomplishing the design stage. The requirements for each stage should be based upon the guidelines presented below (and summarized as a checklist in Appendix B); however, the specific requirements may vary from these guidelines depending upon the scope, complexity, and type of project. Deviations from the guidelines may be recommended

by the technical managers and approved by the project manager

It should not be construed that all elements of a development stage should be completed simultaneously. To the contrary, many elements feed into other elements and must be completed before those that are dependent upon them. **The relationship between elements for a project is shown in the Project Work Plan.** This Section only gives those elements which must reach a certain level of completeness for a development stage to be considered ready for review.

5.6.1 Stage I Documents

It is extremely important to establish early in the Design Phase the controlling features of the project. An informal review (Stage I) and discussion of the project will be held early in preparation of documents to be submitted for Stage II Review. The meeting will take place as soon as the roadway designer has established the initial roadway alignment, the initial typical roadway sections, and a tentative plans layout for the project and has reviewed and summarized the environmental mitigation measures committed to during the conceptual design phase. See Section 5.8 for review procedures.

Required:

- ◆ Preliminary mapping showing the plot of existing topographic features.

Purpose:

- ◆ To provide the basis for preparing the initial roadway plan and profile sheets.

for incorporating in the Project Work Plan (PWP).

Required:

- ◆ Initial typical roadway sections.
- ◆ Initial roadway plan and profile sheets.
- ◆ Tentative plans layout.

Purpose:

- ◆ To compare the basic project configuration with that set forth in the Project Scoping Phase studies and reports.
- ◆ To provide early identification of potential problem areas not identified in the Project Scoping Phase.
- ◆ To coordinate the plans layout among all involved disciplines.
- ◆ To review the quantity estimates and assumptions underlying the Scoping Phase cost estimate.

Required:

- ◆ A summary of mitigation measures committed to in the environmental study process and a preliminary indication as to whether each measure would be addressed by specification or by plan detail.

Purpose:

To ensure that mitigation measures are provided for in the contract documents.

5.6.2 Stage II Documents

The Stage II document development should convey the basic design concept and features of the project in accordance with the Scoping Phase documents and the It is intended that the project plans will be sufficiently developed at this stage that right-of-way requirements can be established. **Changes in the plans after the Stage II review which require modifications to the right-of-way requirements will require the concurrence of the project manager.**

All plans circulated for review must be marked "Preliminary" and "Stage II Review". The project manager will advise the design units of the number of sets of plans to be submitted for review. (Often, on in-house designs, the project manager will assemble the drawings and have the prints made.) See Section 5.8 for review procedures and document distribution requirements.

Initial design plans and documents are to be developed to the following levels of completion:

5.6.2.1 Surveys and Mapping (Stage II Review)

Required:

- ◆ Bound field books (or bound printout data if total station surveys are used) containing original survey notes on horizontal and vertical control, topography, cross-sections, utilities, drainage, right of way, and other information regarding existing features and conditions in the project area.

Project Work Plan. Work prepared by design consultants must also comply with the provisions of the contract.

- ◆ Mapping showing the plot of existing topographic features (plotted from survey notes or produced from aerial photography).

Purpose:

- ◆ To provide the basis for developing designs, plan sheets, profiles, and cross sections.
- ◆ To document and delineate existing features and conditions in relation to the proposed project.

5.6.2.2 Typical Roadway Sections (Stage II Review)

Required:

- ◆ Initial development of typical sections and roadway cross sections for the main roadway, detours, crossroads, ramps, frontage roads, streets, entrances, parking areas, etc.

Purpose:

- ◆ To reconfirm and finalize the basic configuration of the typical sections for mainline, crossroads, ramps, frontage roads, streets, etc., as set forth in Scoping Phase studies and reports.
- ◆ To allow development of the roadway design for early identification of initial construction limits, right-of-way requirements, and earthwork requirements.

5.6.2.3 Roadway Geometry (Stage II Review)

Required:

- ◆ Calculated and checked horizontal and vertical alignment of the mainline, ramps, crossroads, frontage
- ◆ To establish final geometry early to prevent costly design changes during later stages of development.
- ◆ To determine right-of-way requirements and to expedite completion of right-of-way plans and acquisition.
- ◆ To locate soil and bridge foundation borings.
- ◆ To determine utility conflicts early for initiation of relocation plans and agreements.

Required:

- ◆ Size and location of existing major drainage structures. Initial size and location of new drainage structures, channel relocations or crossings, and storm sewers that would affect the design of the roadway horizontal and vertical alignment.

Purpose:

- ◆ To verify that vertical roadway alignments are appropriate for culvert size, location, and minimum cover.
- ◆ To verify that vertical roadway alignments at stream or channel crossings will satisfy flood level criteria.

roads, streets, parking areas, detours, etc.

Purpose:

- ◆ To verify that the geometry is being developed in accordance with the project design criteria.
- ◆ To determine right-of-way and easement requirements for channel and culvert locations.
- ◆ To verify that vertical roadway alignments will accommodate design of closed drainage systems.

Required:

- ◆ Type, size, and location of existing utilities based on as-built plans and available information.
- ◆ Transmittal of plans to utility companies for verification of type, size, and location of facilities, identification of conflicts, and prior rights information.

Purpose:

- ◆ To determine which utilities can remain in place and which will require relocating and whether changes in roadway alignment should be considered.
- ◆ To begin coordination with utility companies for planning relocations.
- ◆ To determine prior rights, responsibilities, and associated costs for utility relocations.

Required:

- ◆ Initial construction limits.

Purpose:

- ◆ To identify the impact of construction on existing and proposed right-of-way and to determine the need for temporary construction easements.

5.6.2.4 Initial Drainage Plan and Report (Stage II Review)

- ◆ Drainage map showing topographic features and drainage areas.
- ◆ Hydrology for project area including peak runoff rates from each drainage area.
- ◆ Proposed concepts for disposal of storm water.
- ◆ Design criteria, procedures, methodology, and assumptions for analysis and design.
- ◆ Proposed concepts for disposal of storm water during construction.
- ◆ Recommended size and location of cross drainage structures and channels that affect the roadway location.
- ◆ Proposed concepts for on-site roadway drainage collection, retention, and outfall locations.

Purpose:

To document the methodology and results of the hydrologic analysis and the rationale used in developing the roadway drainage system.

- ◆ To define the type, size, and location of cross drainage

Required:

- ◆ Assessment of existing and future conditions affecting drainage areas, flow patterns, and flood levels.
- ◆ Estimate of future development and its effect on flows and flood levels.

structures and channels and to determine flood level elevations.

- ◆ To determine the initial type, size, and location of the on-site roadway drainage system and to determine outfall location(s).

5.6.2.5 Environmental Permits and Mitigation Measures (Stage II Review)*Required:*

- ◆ Draft applications for environmental permits such as health, water quality, etc.
- ◆ Any significant changes in engineering data supporting previous environmental decisions or applications.

Purpose:

- ◆ To permit timely processing of environmental permits.

Required:

- ◆ Summary of required environmental mitigation measures and a preliminary disposition of them.

Purpose:

- ◆ To ensure that environmental mitigation measures are incorporated in the project construction documents.

5.6.2.6 Initial Intersection and Interchange Layouts (Stage II Review)

Required:

- ◆ Initial development of intersection plans including basic geometry and channelization.

5.6.2.7 Initial Construction Staging and Traffic Control Concept (Stage II Review)

Required:

- ◆ Initial development of construction staging and traffic control.

Purpose:

- ◆ To verify design approach and evaluate constructability.

5.6.2.8 Traffic Analysis Report (Stage II Review)

Required:

- ◆ Traffic data for the highway interchange or intersection including existing and projected traffic volumes; K,D,and T factors; and accident records.
- ◆ Traffic signal needs studies, capacity, and level of service analysis.
- ◆ Evaluation of existing signs and signals and proposed concept for re-use or replacement.

- ◆ Initial development of interchange plans based on Conceptual Phase studies and reports.

Purpose:

- ◆ To establish the basic configuration of the intersections and interchanges per project criteria and projected traffic.
- ◆ Proposed new sign and signal installations.
- ◆ Proposed method of signal timing and phase control.
- ◆ Proposed signal display and mounting configuration.
- ◆ Initial drawings of signing, including affected adjacent sections, signal system locations, and other traffic controls.

Purpose:

- ◆ To provide information and recommendations for traffic control systems, number of traffic lanes and lane arrangements, lengths of weaving sections, queue lengths at intersections, cycle durations, and levels of service on proposed roadways.
- ◆ To ensure that proposed traffic control is compatible with the geometric design and other features, with the ADOT *Guide Signing and Traffic Signal Policies*, and with the *Manual on Uniform Traffic Control Devices* (MUTCD).

5.6.2.9 Geotechnical Report, Pavement Design Summary, and Initial Materials Design Memorandum (Stage II Review)

Required:

- ◆ Reports prepared in the following sequence, with each
- ◆ Geotechnical Report (first document) will describe methods for foundation design, groundwater or pH and resistivity conditions requiring design considerations, soil shrinkage/swell characteristics, slope stability, soil support values for pavement design, potential imported borrow sites and availability for structural section materials, location and depths of topsoil, and design alternatives; design values for active, at rest, and passive soil pressures, and allowable design loads or pressures.
- ◆ Pavement Design Summary (second document) will present the pavement design alternatives.
- ◆ Initial Materials Design Memorandum (third document) will present the recommended pavement design and recommended special considerations for project development (plans, contracts, and specifications). This document must be strategically prepared for review along with the Geotechnical Report and Pavement Design Summary, such that the development process (plans, etc.) is not affected.

Purpose:

- ◆ To obtain data on subsurface conditions and formulate recommendations for structure

leading progressively to the next, culminating with the Initial Material Design Memorandum. Contents of the reports are to be prepared in accordance with the ADOT *Materials Preliminary Engineering and Design Manual*.

foundation type and depth, roadway pavement design, earthwork factors and slopes, borrow material, and aggregate sources, and for the preparation of earthwork cross sections, quantities, and cost estimates.

5.6.2.10 Bridge Foundation Design Report (Stage II Review)

Required:

- ◆ Discussion of site conditions, previous structures and foundation investigations, and proposed structure(s).
- ◆ Discussion of site investigations including regional/site geology, test borings, and laboratory testing.
- ◆ Recommended foundation alternatives such as drilled shafts, spread footing, and steel H-piles, giving the advantages and disadvantages for each type.
- ◆ Analysis of the effects of scour, aggradation and/or degradation.
- ◆ Foundation recommendations including type, depth, allowable loads or bearing pressures, anticipated settlements, and the effects of scour.

Purpose:

- ◆ To establish the basis for bridge foundation design.

5.6.2.11 Structure Selection Reports (Stage II Review)*Required:*

- ◆ Bridge geometrics including roadway and bridge cross sections, alignment and grade, location, minimum vertical and horizontal clearances, and provisions for future expansion.
- ◆ Bridge superstructure alternatives including cast-in-place or precast concrete, steel girders, deck, pedestrian rails, and traffic barriers.
- ◆ Architectural treatments.
- ◆ Construction procedures including construction phasing, traffic detours, and falsework.
- ◆ Construction cost comparisons.
- ◆ Recommended alternative based on above comparisons.
- ◆ Supporting data including calculations and plans for various alternatives with structure analysis and design calculations completed only to the extent necessary to evaluate variables for each alternative for the purpose of cost comparison.

Purpose:

- ◆ To document the evaluation used in determining the recommended bridge type.

- ◆ Drainage considerations including hydrology and hydraulics for channel, stream or river and identification of bank protection needs.

- ◆ Scour and degradation values for alternative foundations.

- ◆ Bridge substructure alternatives including piers, abutments (deep versus stub or shallow), and foundations.

- ◆ Recommended foundation type based on Bridge Foundation Design Report.

- ◆ To present recommendations for proceeding with design.

5.6.2.12 Preliminary Right-of-Way Requirements (Stage II Review)

Required:

- ◆ Determination of the preliminary new right-of-way requirements. The requirements can be approximations of the needed right-of-way with final definition provided at the Stage III Review. Approximate requirements should generally be greater than the final requirements.
- ◆ Drawings showing the anticipated new right-of-way with sufficient definition to identify all property ownerships affected. Larger requirements should generally be set where needs are uncertain.

Purpose:

- ◆ To initiate the preparation of preliminary right-of-way plans and title reports for acquiring properties.
- ◆ To determine right-of-way requirements, type of acquisitions anticipated, and estimated acquisition costs.
- ◆ To allow initiation of acquisition activities on parcels that are anticipated to have difficult relocation problems.
- ◆ To provide lead-time for long relocation procedures or difficult acquisitions if required.

Required:

- ◆ Plan showing preliminary right-of-way requirements including

existing right-of-way, proposed right-of-way, and type of acquisition anticipated such as permanent, easement, temporary construction easement, etc. (On urban freeway projects, the right-of-way may have been acquired prior to design and the designer will verify that sufficient right-of-way has been acquired.

Purpose:

- ◆ To initiate preparation of right-of-way title reports and plans, and right-of-way acquisition.

5.6.2.13 Cross Sections (Stage II Review)

Required:

- ◆ Cross sections of the project at even stations and at breaks in terrain.

Purpose:

- ◆ To support earthwork quantities and drainage profiles.
- ◆ To verify adequacy of right-of-way requirements.

5.6.2.14 Quantities and Cost Estimates (Stage II Review)

Required:

- ◆ An initial quantity and cost estimate on ADOT forms based on ADOT bid items and bid item descriptions.

Purpose:

- ◆ To determine if the cost of the project is within the allocated budget and, if not, to identify

options to maintain the project within budget.

5.6.3 Stage III Documents

The Stage III document development will substantiate that the design is progressing in accordance with the project criteria, existing site conditions, traffic requirements, etc., and that adequate liaison and coordination is being provided between the various technical sections. Comments received from previous reviews are to be resolved and incorporated into the Stage III documents where appropriate. Special details are to be fully developed and included in the plans.

The final right-of-way plans are based on the right-of-way requirements contained in the Stage III plans. **Any requests for right-of-way changes after the Stage III Review must be submitted through the project manager and approved by the Deputy State Engineer for Planning and Engineering.** The Project Team will evaluate the benefits and costs of the requested change to the project according to the requirements of Chapter 7.

A field review will be performed as a part of the Stage III review. (See Section 5.8.4)

See Section 5.8 for review procedures and requirements.

All plans circulated for review must be marked "Preliminary" and "Stage III Review".

Stage III documents are to be developed to the following levels of completion:

5.6.3.1 Typical Roadway Sections (Stage III Review)

Required:

- ◆ Completed typical sections and roadway cross sections, for the mainline, crossroads, streets, frontage roads, ramps, parking areas, etc.

Purpose:

- ◆ To complete the refinement of the typical roadway sections for the project.
- ◆ To completely define all the roadway and parking area sections, including the final pavement design for each section.

5.6.3.2 Plan and Profile Drawings (Stage III Review)

Required:

- ◆ Plan and profile drawings that depict all design features of the mainline, crossroads, parking areas, streets, detours, frontage roads, and ramps, including additions and revisions resulting from the Stage II Review.

Purpose:

- ◆ To complete the refinement of the design on the plan and profile drawings prior to proceeding with final details and construction notes.
- ◆ To develop plan and profile drawings to a point where "design-fit" problems can be readily detected during the preliminary design field review.

5.6.3.3 Final Drainage Report and Plans (Stage III Review)

- ◆ A completed drainage report that includes the final hydraulic design data for drainage structures and systems, and additions and revisions resulting from the Stage II review.
- ◆ Complete location plans, pipe profiles, and initial summaries for all drainage structures including culverts, channels, and storm sewers. Design and water surface elevation information for all culverts.
- ◆ Scour, aggradation and degradation calculations for foundations of major structures.
- ◆ Bank protection requirements for major structures.

Purpose:

- ◆ To finalize the selected drainage system including an analysis of changes to existing flow patterns; design of channels, culverts, and other drainage structures; and location and design of storm sewer systems for on-site and off-site drainage.
- ◆ To have plans, profiles, and hydraulic data available for review in the field.

5.6.3.4 Environmental Permits and Mitigation Measures (Stage III Review)

Required:

- ◆ Completed applications for environmental permits such as health, navigable stream, water quality, etc.

Required:

- ◆ Any significant changes in engineering data supporting previous environmental decisions or permit applications.

Purpose:

- ◆ To permit timely processing of environmental permits.

Required:

- ◆ Final summary of required environmental mitigation measures and their final disposition.

Purpose:

- ◆ To verify that all required environmental mitigation measures have been provided for in the project contract documents.

5.6.3.5 Interchange and Intersection Layouts (Stage III Review)

Required:

- ◆ Intersection plans including traffic channelization and special sections as required to depict construction of the intersection.
- ◆ Interchange plans developed to include data required for construction.

Purpose:

- ◆ To complete the refinement of the intersection and interchange design prior to preparing final details and construction notes.

- ◆ To develop the intersection and interchange plans to a point where "design-fit" problems can be readily detected during the

5.6.3.6 Major Structure Plans (Stage III Review)

Required:

- ◆ Plans for bridges and retaining walls including, as a minimum, plan and elevation views of all major superstructure and substructure elements, general notes, and foundation data sheets. Special provisions to allow alternative retaining wall designs to be submitted by the contractor.

Purpose:

- ◆ To present the analysis, design, and preliminary plans for the bridges and retaining walls recommended in the Structure Selection Reports.

5.6.3.7 Proposed Construction Staging and Traffic Control Plans (Stage III Review)

Required:

- ◆ Plan layout and proposed sequence of construction for maintaining traffic through the construction area.

Purpose:

- ◆ To develop traffic control plans in sufficient detail to determine the method of maintaining traffic during construction.
- ◆ To determine final construction staging.

preliminary design field review.

5.6.3.8 Traffic Signal Plans (Stage III Review)

Required:

- ◆ Completion of signal design.
- ◆ Plans showing intersection geometrics, pavement striping, location of signals, pole summary, conductor schedule, and general notes.

Purpose:

- ◆ To verify that signal design conforms to ADOT specifications, standard drawings, and symbols.
- ◆ To coordinate traffic signal plans with intersection designs.

5.6.3.9 Signing and Pavement Marking Plans (Stage III Review)*Required:*

- ◆ Plans showing roadway geometry, lane lines, edge striping, lane widths, gore striping, channelization striping, stop bars, delineators, markings and arrows, word markings, crosswalks, median transition striping, transition limits, and preliminary quantities.
- ◆ Plans showing the location of guide signs, warning signs, regulatory signs on the main roadway, ramps and crossroads, sign symbols, code numbers, legend size, panel size, post size, foundation details, sign structures, sign illumination, existing signs and the disposition, sign summary, and quantities.

Purpose:

- ◆ To verify that signing and pavement markings are adequate for the project and conform to the *Manual on Uniform Traffic Control Devices*.

5.6.3.10 Lighting Plans (Stage III Review)*Required:*

- ◆ Separate roadway plans sheet showing the layout of continuous roadway lighting, interchange lighting, intersection lighting and lighting for parking areas.

Purpose:

- ◆ To verify that the design conforms with the required levels of lighting.
- ◆ To verify that the location of the intersection lighting standards have been coordinated with traffic signal and sign locations.
- ◆ To verify that crossroad lighting at interchanges and at intersections meets AASHTO minimum levels.
- ◆ To identify power source and agreements with utility company.

5.6.3.11 Utility Plans (Stage III Review)*Required:*

- ◆ Type, size, and location of existing utilities based upon input from utility companies and field measurements.
- ◆ Pothole information on utilities providing field measurements at critical locations.
- ◆ Proposed utility installations and/or relocations to be performed as part of the project construction.
- ◆ Prior rights documentation and confirmation.

- ◆ Transmittal of plans to utility companies for final verification of existing
- ◆ Written request asking utility companies to prepare relocation plans and schedule (costs will also be required if utility company has prior rights).

utility locations and conflicts.

- ◆ To reach agreement on landscaping philosophy and concept before preparing detailed irrigation and planting plans.

Purpose:

- ◆ To identify conflicts between existing utilities and roadway construction.
- ◆ To permit utility companies to prepare preliminary relocation plans and schedules with sufficient information to allow negotiation of utility adjustments and agreements.
- ◆ To begin preparation of agreements between ADOT and utility companies having prior rights.

5.6.3.13 Draft Special Provisions (Stage III Review)

Required:

Special provisions (draft copy) including ADOT *Stored Specifications* (Special Provisions) and any project requirements not adequately covered in ADOT's *Standard Specifications for Road and Bridge Construction* and *Stored Specifications*. Utility specifications for utility work made a part of the project.

Purpose:

To verify that the special provisions address special items and that the plans and specifications are compatible.

5.6.3.12 Landscape Plans (Stage III Review)

Required:

- ◆ Proposed plant list and grading plans showing landscaping concept (landscape areas outlined including a description of proposed planting).
- ◆ Proposed sources of water and power, and location of controls.

5.6.3.14 Cross Sections (Stage III Review)

Required:

- ◆ Cross sections of the project at even stations and at breaks in terrain.

Purpose:

- ◆ To verify that the landscaping is being developed in accordance with policy and that it will be in concert with the roadway setting.

Purpose:

- ◆ To support earthwork quantities and drainage profiles.
- ◆ To verify adequacy of right-of-way requirements.

5.6.3.15 Quantity and Cost Estimate (Stage III Review)*Required:*

- ◆ A quantity and cost estimate, using ADOT approved construction items.

Purpose:

- ◆ To verify that the project is within budget and to provide a basis for reducing the project if required to meet the budget.
- ◆ To determine that all construction items identified on the preliminary plans have been included in the estimate and that items are described in accordance with ADOT standards.
- ◆ To verify that construction items and units of measurements are compatible with the specifications.
- ◆ To verify unit prices used in the estimate.

5.6.3.16 Final Materials Design Memorandum (Stage III Review)*Required:*

- ◆ Final Materials Design Memorandum prior to completion of the Stage III plans.

Purpose:

- ◆ To verify that all conditions of the project are covered by the materials reports.
- ◆ To confirm the pavement section, pavement material, final typical section, earthwork cross-sections, and

- ◆ Final earthwork quantities and calculations.

shrink-swell factors used in the preliminary design.

5.6.3.17 Preliminary Construction Schedule (Stage III Review)*Required:*

- ◆ A bar chart showing a proposed construction schedule for the project.

Purpose:

- ◆ To verify the appropriateness of the proposed construction phasing.
- ◆ To identify any time constraints which would affect the cost estimate.
- ◆ To support the construction time permitted in the project special provisions.
- ◆ To verify that the project will meet the project completion objectives.

5.6.3.18 Final R/W Requirements (Stage III Review)*Required:*

- ◆ Drawings showing the completed requirements for right-of-way, permanent easements and temporary easements.

Purpose:

- ◆ To permit preparation of final right-of-way plans and acquisition documents.

5.6.4 Final R/W Plans

The final right-of-way plans are completed following the Stage III Review and comment resolution so that right-of-way acquisition can be completed and right-of-way clearances can be given before advertisement for construction bids. Acquisition of right-of-way is often a critical element in the project schedule and it is necessary that the acquisition begins as early as possible.

Required:

- ◆ Final right-of-way plans and legal descriptions.
- ◆ Title reports for each parcel.
- ◆ Acquisition documents.
- ◆ Transportation Board documents.

Purpose:

- ◆ To complete right-of-way documentation in accordance with ADOT procedures and standards.
- ◆ To verify that right-of-way plans and documents have been coordinated with other disciplines and that right of way will be available for construction, operation and maintenance of the project.
- ◆ To permit the acquisition of all new right-of-way required for the project.

5.6.5 Stage IV Documents

The Stage IV documents will include all construction details and notes. The plans and documents must be thoroughly reviewed and checked. Comments received from the previous reviews are to be resolved and incorporated into the Stage IV documents where appropriate. The review for this submittal will determine the adequacy of the plans, special provisions, and estimated officers as bidding documents.

All plans circulated for review must be marked "Preliminary" and "Stage IV Review"

Required:

◆ The Final Design is a complete set of construction documents

- List of Standard Drawings;
- Design Sheet and Index;
- Summary Sheets;
- Special Detail Drawings;
- Typical Roadway Sections;
- Roadway Plan and Profile Sheets;
- Parking Area Plans and Details;
- Drainage Plans and Details;
- Intersection and Interchange Plans and Details;
- Major Structure (Bridges and Retaining Walls) Plans and Details;
- Traffic Signal Plans and Details;
- Traffic Control Plans, Details, Sequence of Construction, Quantity List, and Duration of Use for Temporary Traffic Control Devices;
- Traffic Signing Plans;
- Pavement Marking Plans including a summary of the various pavement marking materials;
- Lighting Plans and Details;
- Landscape Plans and Details;
- Utility Relocation Plans and Details (to be constructed with project);
- Stormwater Pollution Prevention Control Plan;
- Other Special Drawings and Details not covered by the above;
- Roadway Cross Sections;
- Summary of Final Earthwork Quantities;
- Quantities and Combined Cost Estimate;
- Special Provisions refined to cover all aspects of the project construction;
- Construction Schedule;
- Environmental Permits;

typically including the following:

- Face Sheet;
- Summary of Environmental Mitigation Measures and Disposition;
- DBE Participation Goals (requested by the project manager and received from the ADOT Affirmative Action Office) incorporated into the project specifications;
- Bidding schedule listing all bid items including the bid item number, description, unit of measurement, and estimated quantity;
- Final design calculations.
- Design reports not previously furnished

Purpose:

- ◆ To develop the construction plans and documents to a stage where all necessary information is shown in adequate detail to permit bidding, staking and construction of the facility.

5.6.6 Final Plans, Specifications, and Estimates (100% Complete)

The Final Plans, Specifications, and Estimates will consist of finished construction plans, special provisions, combined estimate, and bidding schedule ready for bid advertising. The comments from the Stage IV review are to be resolved and incorporated into the plans and documents where appropriate.

Required:

- ◆ Plans and documents 100 percent complete and thoroughly checked and reviewed.

- ◆ Original plans and documents sealed and signed as stipulated by the Arizona Board of Technical Registration. If overlay plan sheets are used during design, composite mylar
- ◆ One sealed and signed reproducible set of special provisions complete and ready for bidding, including the contract time for project construction.
- ◆ The bidding schedule complete and ready for bidding along with the final combined estimate.
- ◆ Design computations completed, indexed and checked. Verified and checked computer programs and output data.
- ◆ Original field survey data and survey computations indexed and titled.
- ◆ Copies of all agreements, clearance letters and approved environmental permits.
- ◆ Reproducible set of earthwork cross sections by station showing the plotted roadway template superimposed on the plotted natural terrain with quantities and overall summaries.
- ◆ Consultants should return any documents or other materials provided for use on the project.

Purpose:

² "On-call" consultants are considered to be extensions of the staffs of the groups or sections which oversee their work. Therefore, submittals from on-call consultants will be through the section or group technical leader.

sheets are to be provided and sealed as originals. Seals and signatures are to be in black ink.

To complete the development of the plans and documents for final processing and preparation of the "Advertisement for Bids" document.

5.7 QUANTITIES AND COST ESTIMATES

Bid item quantities are estimated at the Initial, Preliminary and Final Design stages. Quantity take-offs are prepared by each technical unit for their own work and reflect the current level of development of the plans.

The estimating staff of Contracts and Specifications Section will provide the unit prices to be applied to the estimated quantities for computing the Quantity Cost Estimate. Appropriate estimating contingency factors will be applied to the Quantity Cost Estimate to account for those items which cannot be reasonably quantified at the development stage. The estimating contingency factors will be determined by each technical unit and should decrease as the level of development of the plans increases.

5.8 DESIGN REVIEW

5.8.1 General

Design and construction documents are distributed for formal technical review (see Section

5.2.2) and/or coordination at the completion of each of the four design stages. Documents prepared by ADOT sections will be distributed for comments and coordination. (Each section's Quality Plan provides for technical reviews of its work to be done by section staff.) Documents prepared by engineering consultants² will be distributed for technical review as well as for coordination. (See Appendix A for review document distribution requirements.)

Informal review and/or coordination of design and construction documents will occur on an continuing basis throughout the design development process.

At the design phase kickoff meeting, the Project Team will review scheduled dates for informal and formal review and coordination of the design development. The informal reviews will generally take place at the regular project team meetings. The comment resolution and coordination meeting for the formal review will generally occur within three weeks following the design stage submittals.

ADOT sections and engineering consultants will submit documents for review to the project manager in conformance with the requirements of Section 5.6. Upon receipt of the submittal, the project manager will determine that the documents satisfactorily reflect the expected stage of development. Inadequate documents will be returned to the originator requesting additional work or information. The project manager has the authority to waive, in writing, any of the requirements of Section 5.6.

The project manager is responsible for having the design review and/or coordination packages assembled and distributed to the various parties along with a cover letter, instructions, and supportive information. (Submittals to railroad and utility companies are coordinated with Utility and Railroad Engineering Section).

5.8.2 Design Review Distribution

The project manager will distribute interim design and construction documents at each stage of project design development as follows:

5.8.2.1 Stage I Review

Documents are distributed to the Roadway Group technical manager and to the Project Team for informal technical review and coordination.

5.8.2.2 Stage II Review

Documents are distributed for coordination and for general review and comment on the Stage II progress:

- ◆ To utility companies for verifying location of facilities, determining conflicts, and initiating prior rights research.
- ◆ To railroad companies to initiate coordination.
- ◆ To ADOT sections participating in the design for information and coordination.

- ◆ To ADOT District office for general and constructability review and comments.
- ◆ To FHWA for review and comments on federal-aid projects not covered by Certification Acceptance. This distribution is helpful to ensure that FHWA
- ◆ To the appropriate ADOT section for technical and constructability review of documents prepared by engineering consultants.
- ◆ To the project manager for consolidation and recording of comments.

5.8.2.3 Stage III Review

Documents are distributed for coordination, for review to ensure that all comments from the Stage II review were resolved or incorporated, and for technical and constructability review and comments on the Stage III progress:

- ◆ To utility companies for planning relocation work and to initiate preparation of agreements where prior rights exist.
- ◆ To railroad companies for comments and to initiate preparation of agreements.
- ◆ To ADOT sections participating in the design for information and coordination.
- ◆ To ADOT District office for general and constructability review and comments.
- ◆ To FHWA for review and comments on federal-aid projects not covered by Certification Acceptance.

is in concurrence with the design approach early in the project development process.

- ◆ To other agencies or entities as appropriate based upon the involvement or interest (Forest Service, municipalities, etc.)
- ◆ To other agencies or entities as appropriate based upon their involvement or interest.
- ◆ To the appropriate ADOT section for technical and constructability review of documents prepared by engineering consultants.
- ◆ To the project manager for consolidation and recording of comments.

Note: A field review is conducted following completion of Preliminary Design. See Section 5.8.4.

5.8.2.4 Stage IV Review

Documents are distributed for coordination, for review to ensure that all comments from the Stage III review were resolved or incorporated, and for final review and comment on the construction documents:

- ◆ To utility companies for verification of relocation plans, agreements, and schedules.
- ◆ To railroad companies for comment and to finalize agreements.
- ◆ To ADOT sections participating in the design, for information and coordination.
- ◆ To appropriate ADOT District office for review and comments.
- ◆ To FHWA for review and comments on federal-aid projects not covered by Certification Acceptance.
- ◆ To other agencies or entities as appropriate based upon their involvement or interest.
- ◆ To the appropriate ADOT section for technical and constructability review of documents prepared by engineering consultants.
- ◆ To the project manager for consolidation and recording of comments.

Note: Re-submittal(s) of the Stage IV Documents may be required before proceeding to the next stage. The extent of redistribution of the documents as noted above will be at the Technical reviews follow procedures developed by the ADOT

discretion of the project manager depending upon the rework involved and the need for associated review and comments.

5.8.2.5 Final Plans, Specifications, and Estimates

Documents are distributed for information and for confirmation that previous review comments have been resolved.

Note: Prior to distribution, the project manager reviews the Final documents to verify that all comments from the Stage IV review were resolved or incorporated.

- ◆ To railroad and utility companies.
- ◆ To ADOT District office and involved ADOT units for information.
- ◆ To other agencies as appropriate based upon their involvement or interest.

5.8.3 Review Procedures

All project development documents will be reviewed by ADOT staff whether prepared by staff or by consultants.

Reviewing and checking documents are separate but closely aligned responsibilities (See Section 5.2). Checking procedures, developed by the ADOT sections or consultants, are incorporated in the Project Quality Plan for independently verifying the accuracy and completeness of each discipline's work. Checking is the responsibility of the entity performing the work.

sections and incorporated in the Project Quality Plan for

assessing the overall design concept presented in the project documents. Technical and constructability reviews are the responsibility of the ADOT sections as well as a consultant performing the work.

Approximately 10 working days before each design review submittal, the project manager will conduct an on-site Pre-submittal Quality review of each consultant's work. At this review, the project manager will:

- A. Compare the proposed submittal against a checklist of required elements identified in the discussions of submittals elsewhere in this Manual;
- B. Review how comments from the previous submittals were addressed by the consultant;
- C. Review the results of the consultant's quality process and confirm in writing that the process has been followed or note minor deviations.

If the proposed submittal is significantly lacking in required content or if the Project Quality Plan has not been followed, the project manager will give written notice to the consultant. This notice will define the steps to be taken to bring the proposed submittal into conformance with the submittal requirements or the approved Project Quality Plan. The notice will also include a schedule for completing these steps such that the project will not be delayed.

The Pre-submittal Quality review of work being performed by ADOT staff will be conducted at a Project Team meeting using a

checklist of required elements discussed elsewhere in this Manual. If a technical unit's proposed submittal is significantly lacking in required content or if the Project Quality Plan has not been followed, and if the responsible technical leader cannot give reasonable assurances that the noted deficiencies will be corrected by the review submittal date, the project manager should meet with the technical leader and the appropriate technical manager to define the steps to be taken to bring the proposed submittal into compliance.

Project development documents are submitted to the project manager for processing at the completion of each stage of design development as described herein. The project manager also reviews the documents for adherence to the objectives of the project as defined by the project scope. Documents out of scope are returned to the maker for justification and modification, as appropriate.

The project manager monitors the assembly of the documents for review together with supporting data (e.g., project scope and pertinent correspondence to ADOT reviewers of consultant work) and instructions for review, including comment forms and due date. The project manager arranges for distribution of the review documents to the appropriate parties.

Each reviewer conducts a thorough review (not a design check) of the documents for conformance to ADOT standards and criteria, ADOT policy, the project scope, design guidelines, coordination with other disciplines, constructability, responsiveness

to previous review comments, and good engineering practice. The detail and nature of the review Reviews by the District office should be made by the resident engineer assigned to the project. Documents are to be reviewed primarily for constructability, construction staging, traffic control, and future operation and maintenance. The resident engineer should coordinate with the district maintenance engineer to assure that the operations and maintenance issues are addressed.

Review comments are numbered and recorded on the forms provided with the review package. The reviewer circles the areas in question on the review document with red and marks each with a comment number corresponding to the comment number on the review form. The comments must be concise yet descriptive enough to ensure that the designer will clearly understand the intent of the reviewer. Supporting documentation or illustrations may be supplied to clarify the comments. Using the comment forms allows for ease of reproduction, filing, and future reference.

Upon completion of the review, each reviewer signs the comment forms and returns them to the project manager by the due date.

Comments submitted at later date may not be accepted at the discretion of the Project Team. The project manager consolidates the review comments for transmittal to the project technical leaders. Conflicting comments or errors are resolved by the project manager prior to transmittal of the review documents to the technical leaders.

will depend upon the type of document and its stage of development.

Review comments that would result in changes to the project scope, that would significantly increase the project cost, or that would delay the project advertisement date must be submitted through the project manager with appropriate justification when the reviewer believes such changes are beneficial to the project.

The technical leaders are required to respond to each review comment in the space provided on the form. Each subsequent submittal for review is then accompanied by a copy of the previous review comment forms indicating the disposition of each comment noted. This allows the reviewer to quickly examine the progress made by the designer on past reviews. Typically, the same reviewer(s) should be assigned to each subsequent review submittal to maintain continuity in communications.

5.8.4 Field Review (Stage III Review)

Following completion of the Stage III documents, a field review of the project site is arranged for and conducted by the project manager. Attendees at the field review include:

- Project manager
- Project Team technical leaders (and technical managers on complex projects), including consultants
- ADOT reviewers
- District representatives
- Representatives from involved federal, state, and local agencies

- Representatives from railroad companies (when involved)

The field review occurs after reviewers have examined the Stage III documents and recorded their comments and returned them to the project manager thus assuring that participants are knowledgeable of the project scope and the contents of the documents. Generally, a review comment resolution meeting is held in conjunction with the field review.

The field review verifies topographic information, adjacent property development and the appropriateness and completeness of the design relative to existing conditions. Field review comments are recorded by the project manager for incorporation in the consolidated comment sets.

As a part of the field review and evaluation of the preliminary design documents, the district personnel review the plans for constructability, construction staging, traffic control, suitability of materials and design for the geographic region, and future operation and maintenance.

5.9 PRE-AWARD STAGE

The Pre-Award stage encompasses the project activities from the completion of plans, specifications and estimates through award of a construction contract. The primary objective of this stage is to assure that the conditions precedent to construction award have been satisfied. The Pre-Award stage completes the Design Phase and Pre-Construction Activities of the Project Development Process.

- Utility companies (when involved)

Most of the activities in this stage involve only the project manager and the bid management staff of Contracts and Specifications Section (C&S) with C&S acting in support of the project manager.

Following the completion of plans, specifications and estimates, (PS&E) the project manager forwards to C&S the original PS&E documents for processing together with copies of project agreements (railroad, Inter-Governmental Agreements, local agencies), clearance letters (utilities, right of way, and environmental), and materials memos and requests advertising the project for bid. C&S bid management staff review the PS&E package, concur in the estimate, and acknowledge receipt of the agreements, clearances and materials memos and request verification of funds for construction.

The bid management staff transmit the full PS&E and clearance package to FHWA with a request for approval to advertise for federal-aid projects not under Certification Acceptance. Copies of the approval requests are forwarded to the project manager.

For federal-aid projects under Certification Acceptance Procedures, the project manager and the C&S manager together approve the PS&E and clearance package.

When all approvals have been received, the project is ready for bid.

C&S finalizes, assembles, and arranges for printing of bidding documents (bid books, plans, cross sections) and prepares the bid advertisement and arranges It may be necessary to issue bid document addenda to prospective bidders. The issuance of addenda by the C&S manager requires the concurrence of the project manager. Input from the technical units required for addenda will be coordinated through the project manager.

for its publication. C&S sells the bidding documents and earthwork cross sections to prospective bidders.

5.9.1 PS&E Approval (Federal-Aid Projects Not Covered by Certification Acceptance)

Certain ADOT projects involving federal aid are covered by the Certification Acceptance Procedures adopted by ADOT and the Federal Highway Administration. These procedures and the criteria for covered projects are discussed in Section 2.4.2 of this Manual.

For federal-aid projects not covered by Certification Acceptance, The request to FHWA for authorization to advertise is accompanied by a copy of:

- Plans with the face sheet signed by the project manager
- Special Provisions
- Bid Schedule
- Clearance Letters
- Agreements (joint project, railroad, utility, etc.)
- Agency Approvals (Forest Service, BIA, etc.)

FHWA issues a Letter of Approval and Authorization Form PR-1240 which establishes the authorization date.

5.9.2 PS&E Approval (Federal-Aid Projects under Certification Acceptance)

Certain ADOT projects involving federal aid are covered by the Certification Acceptance Procedures adopted by ADOT and the Federal Highway Administration. These procedures and the criteria for covered projects are discussed in Section 2.4.2 of this document.

On projects covered by Certification Acceptance Procedures, the signature of the

project manager on the face sheet of the plans is approval to advertise the project for bid.

Copies of the PS&E and clearance package will be furnished by C&S to the FHWA upon request.

5.9.3 Project Clearance

Table 5.1 presents a summary of the documentation required for substantiating clearance and approval to advertise a project for bid.

Prior to advertising for bid, each project must have on file with Contract And Specifications Section a copy (or certification) of the following:

- Right-of-way Clearance
- Utilities Clearance
- Utility Agreements
- Environmental Clearance
- Railroad Agreements
- Joint Project Agreements
- Agency Approvals
- FHWA approval (federal-aid projects)
- Verification of funds available
- Affirmative Action Office assigned DBE goals.

5.10 PROJECT APPROVAL

A project is considered approved and ready for advertisement upon completion of the following, sequential activities:

- Sealing and signing of plans, special provisions, and estimate by a professional engineer or other appropriate registrant as stipulated by the Arizona Board of Technical Registration.

- Receipt of project clearance letters and executed agreements.
- Verification of funds available.
- Approval to advertise project from the Manager of Contracts and Specification Section and the concurrence of the project manager.
- Signature of the project manager on the face sheet of the plans.

opening bids. Depending upon the project, other pertinent information may be included in the advertisement.

5.11 BID ADVERTISEMENT

Upon approval, the project is advertised in accordance with state law by Contracts and Specifications Section. The manager of C&S determines the appropriate bidding period in consultation with the project manager. A time period of thirty calendar days is normally allotted. A longer period may be required on complex projects and a shorter period permitted on minor projects such as seal coats, overlays, and other similar types of projects.

5.11.1 Advertisement

Contracts and Specifications Section (C&S) prepares the bid advertisement and distributes it to contractors and to newspapers for publishing. The advertisement contains a description and location of the proposed work, the person(s) to contact for plans and information, instructions for submitting bids to ADOT, the closing date and time for submitting bids, and the scheduled date and time for

Table 5.1
SUMMARY OF DOCUMENTATION FOR PROJECT CLEARANCE/APPROVAL

Document	Purpose
Environmental Clearance Memorandum by Environmental Planning Section	Certifies that the environmental process and documentation is complete and has been approved by responsible agencies. If the project utilizes Federal funds, a separate similar letter is sent to the FHWA.
FHWA letters accepting scoping documents and Controlling Design Criteria Report	Provides documentation of FHWA involvement and agreement with the design development process. These letters are required to assure eligibility for Federal funding.
FHWA letters approving the Initial and Final Materials Memoranda	Required documentation approving the Initial and Final Materials Memoranda and pavement sections for continuing design development of federally funded projects.
FHWA letter approving the Bridge Structure Selection Report	Approves the structure type, size, and location for detailed design, and is required documentation for each major structure.
FHWA letter approving a Design Exception Request	This letter is required when Federal funds are to be used to construct elements of a project which do not conform with AASHTO design criteria.
FHWA letter authorizing Change of Access	Approves the Change of Access Report which is required to change any controlled access right-of-way whether or not the project is Federally funded.
FHWA Letter of Approval and Authorization, Form PR-1240	Encumbers Federal funds to be used by ADOT for specific purposes. Such Federal authorization and encumbrerment is required to start preliminary engineering work; incidental right-of-way (R/W) expenses, plans, and appraisals; preliminary engineering for utility companies with prior rights; R/W acquisition and relocation; relocation of utilities having prior rights; and advertise for bid (highway construction). Each of the activities requires a separate Form PR-1240 encumbrerment provided by the FHWA in response to a specific request made by the responsible ADOT group or section.
Joint Project Agreement prepared by Joint Projects	Defines work to be done and payments to be made under the agreement between the state and cities, counties, Indian tribes, and

Administration Branch of Engineering Consultant Section	private entities on joint projects. Also may be used in an agreement between ADOT and Federal agencies other than FHWA.
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Table 5.1 Continued

Document	Purpose
Utility Agreement prepared by Utilities and Railroad Engineering Section (U&RR)	Defines work to be done and payments to be made to relocate utilities or to eliminate conflicts between ADOT construction and utility companies having prior rights.
Railroad Agreement prepared by U&RR	Describes agreement between ADOT and the railroad company for use of and construction upon railroad right-of-way.
Arizona Corporation Commission Opinion and Order	Authorizes work on railroad grade crossings and is required for both new and existing crossings.
Letter for each utility company itemizing conflicts and clearance dates	Assures that existing and planned utilities are considered and that utility conflicts are eliminated as required for construction of the project.
Utility Clearance Letter for U&RR	Certifies that all utility companies and railroad companies known to be operating in the area have been contracted and certifies that utility conflicts have been or will be resolved prior to or during project construction. If the project utilizes federal funds, a separate, similar letter is sent to FHWA.
U.S. Army Corps of Engineers 404 Permit	Provides authorization required to construct highway projects over waters, wetlands, and intermittent streams of the United States.
Right-of-Way Clearance Letter from Right-of-Way Group	Certifies that right-of-way is cleared for construction or gives date clearance is expected. Conditional clearance is not considered if impaired access impedes construction. Clearance means land is acquired by fee (or easement in the case of Bureau of Indian Affairs or state or federal public lands) and relocation is complete. If the project utilizes federal funds, a separate, similar letter is sent to FHWA.
Approval to Advertise by Contracts and Specifications Section	Certifies that the project has acceptable plans, specifications, and estimate; that funds are available; and that FHWA has approved the project for advertising.

Note: For projects covered by Certification Acceptance Procedures, not all FHWA clearances and approvals listed here are required. See Section 2.4.2 and the Certification Acceptance Procedures Manual.

5.11.2 Addenda

Errors, omissions, or ambiguities discovered during the bidding period are reviewed by C&S and discussed with the project manager to determine the need for issuing an addendum. Addenda are prepared by C&S under the direction of the project manager. C&S prepares and mails the addendum. Addenda are approved by the project manager.

5.12 PRE-BID CONFERENCE

On projects with significant special requirements, the project manager, in consultation with Contracts & Specification Section, the District Engineer, and the Construction Group Manager should give consideration to holding a pre-bid conference to review the project considerations with prospective bidders.

The pre-bid conference may be chaired by either the project manager or the Manager of Contracts and Specifications Section. The project manager, the Manager of Contracts and Specifications Section and the District Engineer/Resident Engineer should jointly develop the agenda for the conference. Design issues should be presented by the project designers. The resident engineer should discuss any special requirements for construction and contract administration. Special bidding requirements or procedures should be addressed by the Manager of Contracts and Specifications Section.

The date, time, and location of the pre-bid conference should be included in the bid advertisement. Normally, these are established by C&S during the

preparation of the advertisement.

Generally, the pre-bid conference is held in reasonable proximity to the project site. It is usually appropriate to conduct project site visits in conjunction with the conference. The resident engineer is responsible for the logistical preparations associated with the conference.

5.13 SITE VISITS

Section 102.07 of the ADOT Construction Specifications states that the prospective bidder is expected to carefully examine the site of the proposed work and the contract documents before submitting a bid. This section also states the "The submission of a bid shall be considered *prima facie* evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered..."

Site visits are conducted by the resident engineer. Prior to the arrival of prospective bidders to view the proposed work, the resident engineer should have become familiar with the plans and specifications for the project. The project field personnel should have located and properly marked all sources for borrow and aggregates when the sources are furnished by the Department.

If the resident engineer for the Construction Phase did not represent the district during the Design Phase and Pre-Construction Activities, the project manager should assist the resident engineer in becoming familiar with the contract documents and in understanding any special requirements of the project.

In showing prospective bidders over proposed work, it is the responsibility of the resident engineer to supply each contractor with all available information concerning aggregate sources and haul roads (when furnished by the Department), right-of-way access limitations, water and power sources, and any other information concerning the work which might enable the contractors to make a more accurate estimate of the cost of doing the work.

The resident engineer should make every effort to furnish the same information to all contractors. Verbal information that cannot be verified in the contract documents should be avoided.

When a project is to be constructed through rough terrain, provisions should be made for transporting prospective bidders over the work.

5.14 AWARD OF CONSTRUCTION CONTRACT

Contracts and Specifications Section receives bids from contractors, verifies receipt of bids within the authorized time limit, and reviews bids for completeness and accuracy to determine the lowest responsible and qualified bidder. A recommendation for award of the contract is then made by Contracts and Specifications Section to the ADOT Director for Highways Division (the State Engineer).

The State Engineer, in consultation with the ADOT Director, makes a recommendation to the State Transportation Board for award of the Contract. The Board reserves the right to table or reject the recommendation.

When a contract is to be awarded, the State Transportation board makes the award in an open public meeting. When a contract is not to be awarded, the Board determines in the open public meeting what future action is to be taken.

Section 103 of the ADOT *Standard Specifications for Road and Bridge Construction* sets forth in detail the policies and requirements of the Department for consideration of proposals, award of contracts, return of proposals to bidders, cancellation of awards, bonding of successful bidders, and execution of contracts.

From time-to-time, the amount bid by the lowest responsible bidder may vary from ADOT's estimate (the Engineer's Estimate) by 15 percent or more. In such cases, the project manager will work with Contracts and Specifications Section and the project design team to document for the Transportation Board the apparent reasons that the contractor's bid was higher or lower than the Engineer's Estimate.

The day-to-day administration of the construction contract award and execution process is the responsibility of the Contracts and Specifications Section. The project manager should monitor this effort and stand ready to provide any assistance necessary to complete the process.

For those projects in which other agencies are participating, the Joint Project Agreement (JPA) with each agency may require their concurrence before award of the construction contract. Communication with these agencies regarding the contract award will be by Contracts and Specifications Section. The project manager should be

informed of such communication and should be prepared to assist Award of the construction contract concludes the Design Phase and Pre-Construction Activities.

in responding to issues arising from the JPA.

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6. CONSTRUCTION PHASE AND MAINTENANCE PHASE

6.1 GENERAL

The Construction and Maintenance Phases of the Project Development Process include the construction of the project and the post-construction evaluation and monitoring of the project. The Construction Phase concludes with acceptance of the constructed project by ADOT. The Maintenance Phases continues through the one-year maintenance period evaluation. The conclusion of the Maintenance Phase ends the Project Development Process.

The Construction Phase differs significantly from the Conceptual and Design Phases in that the major effort on the project is performed by a contractor working under the terms of the construction contract to build the facility described by the project plans and specifications.

The specificity of the Construction Phase work product, as governed by the project plans and specifications, requires that the major effort of the Department staff be that of contract administration. Construction contract administration procedures are presented in the current edition of ADOT's *Construction Manual* and are addressed in this Manual only to the extent necessary to establish Project Team roles and responsibilities during the Construction Phase.

The Maintenance Phase is also significantly different from the others in that ideally there

should be no significant activity. The major effort of the Department staff is monitoring the operation of the project and identifying areas where adjustments may be warranted and communicating these to the design and construction staff.

6.2 INITIATION OF CONSTRUCTION PHASE

Construction Phase activities commence with the determination of the low bidder and award of a construction contract by the Transportation Board. Upon award of the construction contract, the primary project activity becomes the administration and enforcement of the construction contract and the monitoring of construction progress. Day-to-day responsibility for this activity belongs to the resident engineer under the supervision of the District Engineer (See Section 6.3.2) with technical support by the manager of the Construction Group. The project manager continues to be responsible for overall project coordination and for the project scope, schedule and budget--subject to the provisions of the construction contract.

6.3 AUTHORITIES AND RESPONSIBILITIES

6.3.1 Authority of the Engineer

The ADOT Standard Specifications assigns to the State Engineer, acting through designated representatives, legal responsibility for the construction project with the authority to make changes and alterations to the project.

6.3.2 Resident Engineer

The ADOT Standard Specifications provide that the resident engineer (RE), acting for the State Engineer, is the authorized agent for the state on the project. The RE has the responsibility and authority for administering the construction contract. The RE is supervised by the district engineer; technical support is provided by the construction specialists of the Construction Group.

The resident engineer is expected to administer the contract with fairness and firmness and to make certain that the people of Arizona receive a full measure of value for the funds expended and to see that the contractor is paid in full for all contract items which are satisfactorily completed in accordance with the contract.

The resident engineer has the authority to reject defective material and to suspend any work that is being improperly performed.

The resident engineer has the responsibility and authority to interpret the intent of the plans and specifications in the event there are questions raised by the contractor. To properly carry out this responsibility, the resident engineer must be familiar with the project objectives, important design

considerations and any joint agreements made. Where the RE has not followed the project throughout its development, consultation with the design members of the Project Team is necessary to clarify the intent of the plans and specifications.

Within the monetary limitations established by the Department, the resident engineer has the authority to negotiate and approve supplemental agreements to the construction contract (see Section 6.4.8, Contract Modifications) excepting those involving design issues or which affect the project scope or any project milestones.

The ADOT Standard Specifications address the administration of the project construction contract and the role the resident engineer in the technical aspects of contract administration, i.e., as a technical leader as defined in Section 2.2.4 of this Manual. As such, the resident engineer has the responsibility to keep the project manager informed of issues involving the project scope, schedule, and budget. The resident engineer should confer with the project manager prior to the beginning of the Construction Phase to coordinate communication during construction.

As a technical leader, the RE has responsibility for the project activity assigned to the technical unit. During the Construction Phase, the project activity assigned to the District is the administration of the construction contract. Thus the RE is responsible to the Project Team for the construction of the project according to the scope specified in the construction documents, within the schedule defined in the construction

documents and within the budget established by Department policy. Deviations from the project scope, milestones, and budget defined by contract and ADOT policy are made only by a consensus of the Project Team.

6.3.3 District Engineer

As in the other phases of the Project Development Process, during the Construction Phase of the project, the District Engineer supervises the resident engineer and, in this regard, serves in the role of technical manager as defined in Section 2.2.2 of this manual.

Additionally, within the limits established by the Department, the District Engineer has approval authority for construction contract supplemental agreements. (See Section 6.4.8, Contract Modifications)

6.3.4 Project Manager

As defined in Section 2.2.3, the project manager is responsible for the project scope, schedule, and budget. This responsibility continues unabated throughout the Construction Phase.

The project manager monitors the construction activity for progress toward meeting schedule milestones established by the contract documents, for projected cost compared with the current budget, and for adherence to the approved scope.

If the resident engineer has not followed the project throughout its development, it is the responsibility of the project

manager to brief the resident engineer on the major project issues prior to start of construction.

The project manager has the responsibility for coordinating communication between the resident engineer and the other team members regarding design issues arising from the contractor's operations.

Although the project manager is not actively involved in the day-to-day activities of the Construction Phase, it is critical that the project manager be informed of activities and issues which would affect decisions regarding project scope, schedule and budget. Effective and frequent communication is required between the resident engineer and the project manager.

6.4 CONSTRUCTION ADMINISTRATION

6.4.1 Pre-Construction Conference

The resident engineer holds a conference following award of the contract but prior to start of construction. Generally, it is held in conjunction with the Initial Partnering Conference. The Preconstruction Conference is required to review with the contractor and others the requirements of the construction contract; to coordinate the activities of the contractor, any utility/railroad companies, and the State; to establish lines of communication; and to exchange formal submittals concerning the project. Attendees include the contractor, representatives of

the utility/railroad companies, any agencies participating in the project including the FHWA, the district engineer when The contractor is required to make several submittals at the preconstruction conference including:

- ◆ authorized signature list;
- ◆ lists of proposed subcontractors with a request for approval;
- ◆ list of proposed material sources and major suppliers;
- ◆ emergency phone numbers for key personnel;
- ◆ traffic control representatives;
- ◆ safety officer and safety plan;
- ◆ EEO officer and EEO policy;
- ◆ trainee schedule;
- ◆ Quality Control plan;
- ◆ environmental protection/erosion control plan;
- ◆ Phase I CPM construction schedule, where required;
- ◆ construction survey plan;
- ◆ shop drawing submittal schedule, etc.

The resident engineer forwards the request for approval of subcontractors to Field Reports Section for processing. Trainee schedules are forwarded to EEO office for review and determination of approved trainee programs. The Contractor's safety plan is forwarded to ADOT's OSHA Compliance Section for review and comment.

Materials supplier submittals are forwarded to the Regional Lab and /or Materials Section for review and approval.

Using the Contractor's schedule, the Resident Engineer develops an

appropriate, and the project manager.

ADOT staffing plan for administering the contract.

6.4.2 Initial Partnering Conference

ADOT encourages the foundation of a cohesive partnership with the contractor and its principal subcontractors. The partnership is to be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and completion within budget, on schedule, and in accordance with the project plans and specifications. The partnership is to be bilateral in makeup, and participation is to be totally voluntary. Any cost associated with effectuating the partnering will be agreed to by both parties and will be shared equally.

Prior to the preconstruction conference, the contractor's on-site project manager and ADOT's resident engineer will meet and plan a partnering development seminar/team building workshop. At this planning session, arrangements will be made to determine attendees at the workshop, agenda of the workshop, duration, and location. Persons required to be in attendance will be the resident engineer and key construction engineering staff; ADOT's project manager; the contractor's on-site project manager and key project supervision personnel of the prime and principal subcontractors. The project design engineers and key personnel from other governmental

agencies will also be invited to attend as appropriate. The contractors and ADOT will also be required to have It should be noted that the establishment of a partnership charter on a project does not change the legal relationship of the parties to the construction contract nor relieve either party from any of the terms of the contract.

The resident engineer contacts the contractor's project managers to coordinate the partnering conference. Partnering conferences are usually 4 to 16 hours long depending on the size and complexity of the project and on how familiar the respective staffs are with the partnering concept and procedures. The resident engineer also coordinates participation by the project manager, local government representatives, utility and railroad companies, FHWA, and citizens. The project manager coordinates the participation of the project designers in the partnering conference.

The logistics of the partnering conference are coordinated by the Construction Group including the arrangements for the facilitator and conference site.

The intent of the partnering conference is that all parties become acquainted, develop a team relationship, agree to a charter of joint objectives, identify potential constructability and administrative conflicts or concerns for resolution, and agree to work in a harmonious relationship.

The rapid and efficient resolution of project issues is an objective of the partnering

Regional/District and Corporate/State level managers on the project team.

process. An issue escalation procedure is defined at the partnering conference such that the decision-making hierarchy for all parties are identified. Time frames are established for each level to make a decision regarding an issue.

In establishing the issue resolution process at the partnering conference, provisions should be made for involvement of the Project Team on project scope, schedule and budget issues.

6.4.3 Start of Construction

As actual construction work begins, the district engineer initiates notification letters to local government officials. The resident engineer notifies the Field Reports Section in writing of the date the prime contractor starts work and when all subcontractors start work. Field Reports Section then advises the DBE, Trainee and labor compliance monitors.

The resident engineer initiates the NPDES NOI (Notice of Intent) for the District Engineer's signature in accordance with clean water federal regulations.

As the contractor moves onto the project site and begins work, care must be exercised to insure that environmental concerns and local regulations are complied with. The Stormwater Pollution Prevention Control Plan addresses erosion and pollution control measures for the contractor's clearing activities.

6.4.4 Right-of-Way Clearance and Utility Relocation

Normally, all improvements on the project right-of-way will have been removed before start of construction. Similarly, utility relocations being done by the utility companies should have been completed before construction. In some instances, this work may be identified in the project special provisions as being completed after the contractor begins operations. In such cases, the resident engineer should monitor this work and assist the contractor in coordinating the various activities.

6.4.5 Construction Progress Meetings

Weekly meeting are held to coordinate contractor, subcontractor, utility company, local government and ADOT activities. Meeting notes are kept, including action items, pending contract modifications and other issues, and upcoming items of work. From time-to-time, the project manager may attend these meeting to keep appraised of project status. The project manager and project designers attend to discuss specific design issues.

At the weekly meetings, the contractor submits an updated firm schedule for the coming two-week period.

6.4.6 Interpretation of Plans and Specifications

The resident engineer has the responsibility and authority to interpret the project plans and specifications. In most cases,

when questions are raised by the contractor, the general intent of the plans and specifications will be clear to the experienced resident engineer.

In some instances, the project objectives, project agreements, or specific design considerations may introduce unusual design elements into the plans and specifications. By participating on the Project Team throughout the development of the plans and specifications and by reviewing the plans for constructability, the resident engineer should have an understanding of the basis for any project-specific design considerations. In interpreting the plans and specifications to the contractor, the RE also has a responsibility to the Project Team to represent the design considerations and to consult with them when the design intent is unclear.

6.4.7 Post-Design Services

Post-design services are those design-related activities which are performed by the Project Team as a part of the construction contract administration. Such activities may include, among other things, the review and approval of shop drawings, field working drawings (such as erection drawings, falsework plans, etc.) and other contractor-supplied supplemental drawings and designs; the shop inspection of materials fabrication; the review of contractor-supplied designs; the response to requests for design clarification or modification; the review of contract modifications; and the review of contractor proposals.

As the primary contact with the contractor, the resident engineer has the responsibility of keeping the project manager and the other members of the Project Team informed as to the contractor's schedule for submitting items for review and or clarification.

Except where response times are provided in the contract documents, the resident engineer should consult with the reviewing members of the Project Team before committing to a response date for contractor requests.

Where the post-design services are provided by engineering consultants, the project manager must be advised sufficiently in advance so that a task order authorizing the review may be issued to the consultant.

In general, the project manager is the contact between the resident engineer and the rest of the Project Team. However, the

Team may elect to have direct communication between the resident engineer and the technical leaders responsible for shop drawing review and other similar scheduled post-design activities. However, the review of contractor proposals regarding design issues or other special requests of the design members of the Team should be through the project manager.

6.4.7.1 Shop Drawings

Shop drawings are prepared by the contractor's fabricator of structural elements for a project. Typically, steel bridges constitute the most important items for which shop drawings are prepared; however, drawings are also prepared for such metal structures as handrails, cattle guards, catch basins, irrigation standpipes, piling and sign structures.

The shop drawings indicate the materials to be used in the fabrication process, the dimensions and configurations of the structural elements to be assembled for the structure, and the procedures to be used in assembling the elements. The shop drawings reflect the fabricator's approach to assembling the structure. Fabricators are permitted to devise procedures for fabricating structures which are most economical for them (and ADOT) within the limitations of the plans and specifications.

Shop drawings are received by the resident engineer from the contractor, reviewed, and those requiring further review are sent to the appropriate design section.

Shop drawings are reviewed for conformity with the requirements of the plans and specifications by the resident engineer (for minor structures) or by the staff of the technical unit responsible for the work (for major structures).

Approval of shop drawings does not relieve the contractor of the responsibility under the contract for the successful completion of the work. Approval means only that the contractor may proceed with the fabrication of the material covered in the shop drawings.

6.4.7.2 *Field Working Drawings*

Falsework plans, stress sheets, erection plans, framework plans, cofferdam plans, and the designs and drawings for other major temporary support structures are prepared by the contractor's registered engineer for ADOT approval as required by the contract documents. Minor temporary support structures and falsework for culverts with clear spans of twelve feet or less are exempt from the ADOT approval process.

The field working drawings and supporting calculations define the support systems, sequencing and procedures proposed by the contractor for use in constructing the project's major structures. The final configuration of each structure is to be that required by the contract documents; however, contractors are permitted to construct and assemble the structures in a manner which is most economical for them (and ADOT) within the contract limitations.

Field working drawings and supporting calculations are received by the resident engineer and forwarded to the Bridge Group for review. The project manager should be advised of the submittal.

The review of the field working drawings is for conformity with the requirements of the plans and specifications. Approval of the field working drawings does not relieve the contractor of the responsibility under the contract for the successful completion of the work. Approval means only that the contractor may proceed with preparing the temporary support systems for the structures and with the erection of the structure.

6.4.7.3 *Fabrication (Shop) Inspection*

The on-site inspection of materials fabricated for the project is normally provided by the Bridge Group staff if the fabrication is done in Arizona. If the material is fabricated out of State, the shop inspection will be performed by a consulting engineering firm or testing laboratory convenient to the site. As soon as the material suppliers and fabrication location are identified by the Contractor (normally at the Pre-Construction Conference), the resident engineer should notify the project manager of the location and approximate schedule for fabrication.

The project manager will consult with the manager of the Bridge Group regarding the availability of ADOT staff for performing the shop inspection. If consultants are required, the Bridge Group will so notify Engineering

Consultant Services and prepare a scope of services for use in selecting a consultant and Approval of the shop fabrication does not relieve the contractor of the responsibility under the contract for the successful completion of the work. Approval means only that the contractor's fabricator has followed the shop drawings.

6.4.7.4 *Contractor-Supplied Designs*

In certain instances, the project contract documents will permit the contractor to construct or otherwise provide special structural elements which are not fully specified in the plans, standard drawings or specifications, such as large diameter pipe culverts, proprietary retaining walls, or other proprietary systems. In such cases, the contract documents may require the contractor to furnish the design calculations and working drawings for review and approval.

These documents are received by the resident engineer from the contractor and forwarded to the Bridge Group for review. Unless other arrangements have been made, the project manager should be advised of the documents having been submitted for review.

The drawings and calculations are reviewed for conformity with the requirements of the plans and specifications. Approval of the documents does not relieve the contractor of the responsibility under the contract for the successful completion of the work. Approval means only that the contractor may proceed with the preparation of the items covered by the review.

negotiating an inspection contract.

6.4.7.5 *Design Clarification*

From time-to-time, the contractor may express uncertainty as to the design features presented in the contract documents. In such cases, the contractor will request of the resident engineer a clarification of the design intent. The resident engineer has the authority and the responsibility to interpret the plans and specifications. However, on issues of design intent, the resident engineer should contact the project manager or (where time is a concern) the appropriate technical leader for assistance.

6.4.7.6 *Design Modification*

The impetus for modifications to the designs represented by the plans and specifications generally comes from changed conditions on the project or from value engineering or "partnered" suggestions from the contractor.

Generally, the need for a design modification will be identified in the field. The resident engineer should promptly contact the project manager who will be responsible for convening the Project Team and coordinating the development of the design modification.

Time is usually a critical element in preparing a project design modification and the Team must quickly respond to the occasion. However, as with less urgent activities, establishing an appropriately detailed work plan for the Team's efforts will permit the work to proceed in an orderly and efficient manner.

As with the original design, the project manager, with the consensus of the Project Team, is Design modifications arising from the contractor's suggestions should be carefully evaluated for benefits to the State. Drawings for design modifications prepared by the contractor should be reviewed in accordance with the procedures described in Section 6.4.7.4 and should be in compliance with the appropriate ADOT design procedures and criteria.

6.4.8 Contract Modifications

Sections 104.02 and 104.03 of the Standard Specifications establish the conditions under which alterations to the contract work may be made as a result of changes in the details of construction, increases or decreases in quantities of items of work, subsurface or latent physical conditions discovered during construction or due to unplanned work which was not originally contemplated.

Contract modifications are a part of the contract administration responsibilities assigned to the resident engineer. The project manager and the rest of the Project Team act in support of the resident engineer in developing and evaluating contract modifications.

6.4.8.1 Contract Modification Authority

The authority to sign contract modifications on behalf of ADOT has been delegated at various financial levels to resident engineers, district engineers and the manager of the Construction

empowered to implement the necessary design modifications within the limits discussed in Section 7.9 of this Manual. Group. The financial authorizations are unconstrained as long as the current project construction budget is not exceeded.

The project manager must concur on contract modifications which increase the contract to an amount greater than the current construction budget or which involve design modifications, scope changes, or milestone schedule changes.

The objective in requiring the concurrence of the project manager in contract modifications affecting scope, schedule, and budget increases but not in other contract modifications is to assure that the total Project Team remains involved in the broad issues of the project without affecting the authority and responsibility of the Team members administering the construction contract.

6.4.8.2 Construction Budget

The initial project construction budget is established administratively as one hundred and five percent (105%) of the awarded contract amount. The construction budget may be increased from time-to-time as necessary by the Administrative Services Division upon the request of the manager of the Construction Group. The request should have the concurrence of the project manager.

6.4.8.3 Construction Schedule

The construction contractor is responsible for establishing a schedule of work which will meet the construction time constraints provided in the contract documents. The Special Provisions establish the conditions under which a contractor may request and the State may grant an extension of contract time. This is a contract administration process and the concurrence of the project manager is not required.

In developing the contract documents, the Project Team may have determined that portions or all of the construction work must be substantially complete by certain dates to meet project commitments to others. These certain dates must be clearly identified in the contract documents as milestone dates which must be met. Milestone dates may not be modified without the written concurrence of the project manager. Before the project manager concurs in a milestone date modification, the proposed modification must be reviewed with those other entities to whom the original date commitments were made. If an agreement for the modification cannot be reached with the outside entity, the project manager must immediately escalate the issue to the Chief Deputy State Engineer for resolution.

6.4.8.4 Construction Scope

In this context, scope means the project limits and the major design elements required to meet the project objectives. The scope of the project to be constructed has been developed in the Scoping Phase and refined in the Design Phase; changes in scope during the Construction

Phase should not normally be necessary.

The Special Provisions establish the procedures by which work may be added to or deleted from the construction contract. Contract modifications for additions or deletions which change the scope as defined in the contract documents require the concurrence of the project manager. Contract modifications for additions or deletions due to field conditions do not require the concurrence of the project manager unless a design modification is involved.

It is difficult to establish definitive guidelines for determining if a change in the work constitutes a change in project scope. In general, the addition or deletion of designed elements such as a passing or turning lane would be a change in project scope. The extending or shortening of a pipe to meet field conditions would not be a scope change. When there is doubt as to whether a contract modification constitutes a scope change, the resident engineer should consult with the project manager and jointly make the determination.

6.4.9 Closeout Partnering Conference

The Close-out Partnering Conference is held to give the participants in the Initial Partnering Conference an opportunity to review the project and to critique the effectiveness of the Partnering Process.

The resident engineer is responsible for coordinating the Close-out Partnering Conference as described for the Initial

Partnering Conference in Section 6.4.2.

For an effective evaluation of the process, the attendees should be those that attended the Initial Partnering Conference. The viewpoint of the contractor's project staff is important in evaluating the process. At the end of construction, many of the contractor's key staff may have been reassigned to other projects and not be readily available to attend the conference. The resident engineer should work with the contractor's representative to schedule the Close-out Conference while the contractor's key staff are available. To provide the maximum information, the conference should not be held until all major elements of the construction are nearing completion.

In addition to a review and evaluation of the partnering commitments, the conference agenda should include an informal presentation by the contractor staff of any problems encountered in constructing the project as described in the contract documents. The contractor should also discuss with the design staff suggestions for design improvements.

6.4.10 Final Inspection

The Standard Specifications require the resident engineer to make an inspection of the project upon due notice from the contractor that the entire project is substantially complete. If all construction required by the contract documents is found completed to the resident engineers's satisfaction, the work will be accepted for ADOT by the resident

engineer and the contractor will be notified in writing of acceptance as of the date of the inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory or not complete, the Standard Specifications require the resident engineer to give the contractor written notice of the unsatisfactory or uncompleted work. The resident engineer will also give written notice to the contractor as to whether the work is substantially complete.

When the contractor has completed and corrected the work, the above process is repeated until the resident engineer gives written notice of substantial completion and final acceptance.

Attendees at the final inspection should include the District Engineer, the maintenance engineer, the resident engineer, the project manager, key design members of the Project Team, representatives of the Federal Highway Administration (if Federal funding is involved) and other funding agencies, and involved local, state and Federal agencies.

The project manager and design personnel should attend the final inspection firstly in support of the resident engineer by observing the completeness and acceptability of the constructed work and secondly as a design evaluation opportunity by comparing the completed work with the project objectives and design intent.

At least two weeks and preferably four weeks advance notice should be given to the attendees.

Final acceptance of the constructed project is the formal conclusion of the Construction Phase although certain activities will remain uncompleted at this time. The Standard Specifications provide for the evaluation and disposition of claims for additional compensation for work under conditions which the contractor believes may not be adequately covered in the contract documents. The claims process is a part of the construction contract administration and involves primarily the resident engineer, the District Engineer and the Construction Group.

The resident engineer may, from time-to-time, request support from the design members of the Project Team in evaluating a claim. Generally, the project manager will coordinate the design evaluation efforts unless, in the interest of efficiency, arrangements have been made for the resident engineer to communicate directly with one or more technical leaders.

6.5 CONSTRUCTION PHASE PROJECT WORK PLAN

A Project Work Plan (PWP) should be established for the Construction Phase to guide and coordinate the Project Team's construction related activities. In developing the PWP, the Team must recognize that many of their Construction Phase activities will be dependent upon the contractor's work plan; the Team must remain flexible and ready to modify the PWP as required to meet the needs of the contractor.

time -- final payment to the contractor, resolution of outstanding claims, etc.

6.4.11 Contractor Claims

The Project Team should have established the outline of the Construction Phase PWP during the latter stages of the Design Phase as the anticipated construction schedule becomes defined. At this time, several of the Construction Phase activities will be undefined -- particularly those of the design technical leaders and their staffs. However, the scopes and resources of several early activities can be defined at that time.

The PWP can be finalized following the Pre-Construction and Partnering Conferences based on the contractor's initial construction schedule and an anticipated list of review requirements.

Maintaining the PWP is essential to assuring that staff will be available to be responsive to contractor's needs. The resident engineer should monitor the contractor's progress in preparing items for review and communicate the expected review schedules to the rest of the Project Team so that their activities in the PWP can be kept current.

6.6 INITIATION OF MAINTENANCE PHASE

The Maintenance Phase commences with final acceptance of the constructed project from the contractor. At that time, the

District Engineer assumes responsibility for the maintenance and operation of the facility.

Only the first year of the maintenance and operation of the Section 2.3 of this Manual describes the District operations and maintenance personnel as representing the Customer (the taxpayers and highway users) on transportation projects. During the Scoping and Design Phases, the maintenance and operations staffs were consulted for their knowledge of the existing conditions in the project area and for their input on the anticipated operation and maintenance of the completed project.

The Maintenance Phase is an opportunity for the Project Team to close the communication loop with the Customer -- to review how the design solutions met the project objectives; to critique the effectiveness of design details; and to observe the performance of the constructed elements.

The Project Team continues intact throughout the Maintenance Phase of the project although there is normally very little activity for the Team except preparing the As-Built Drawings and reviewing the Project Evaluation Reports.

6.7 MAINTENANCE PHASE ACTIVITIES

6.7.1 As-Built Drawings

During the course of the construction activities, the resident engineer is responsible for recording any changes in the location or dimension of constructed elements from those shown in the contract documents. After acceptance of the

facility is included in the Project Development Process and is referred to as the Maintenance Phase.

contractor's work, the field record of construction changes is turned over to the Project Team for recording on the original contract documents. These "As-Built" documents will become the permanent record of the construction project and will be available for future reference.

Each technical section is responsible for preparing its own as-built documents. The project manager will coordinate these efforts and will monitor progress on the preparation of the as-built drawings.

6.7.2 Operation and Maintenance Support

During the Maintenance Phase, the Project Team is available to work with the district maintenance staff in addressing any design- or construction-related issues which impact the operation or maintenance of the facility.

The project manager will continue as the point of contact between the district maintenance staff and the Project Team. However, minor construction based issues should be addressed within the District itself. The project manager should be kept informed of such issues.

As the primary liaison between the operations and maintenance staff -- the Customer -- and the Project Team, the project manager has the responsibility for disseminating information from the Customer to the project technical leaders and for

coordinating any necessary responses. The technical leaders have the responsibility for discussing such information with the technical managers where technical standards or design approaches are of concern.

If concerns about the maintenance and operation of the project At the close of the one-year term for the Maintenance Phase, the project initiator and the district maintenance engineer will each complete a project evaluation form, critiquing the constructed project as a solution to the project objectives as stated in the project scoping documents. The maintenance engineer will also identify any maintenance or operation problems experienced during the one-year period. Copies of the completed forms will be forwarded to the manager of Special Programs Section for distribution and response, as appropriate.

The Project Evaluation completes the Maintenance Phase and the Project Development Process.

cannot be resolved by a consensus of the Project Team, the Issue Resolution Process of Section 7.7 should be followed.

6.8 PROJECT EVALUATION

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7. COMMUNICATION

7.1 GENERAL

For the project to be developed successfully, respectful communication is essential between the project manager, the technical managers, the team technical leaders, the technical staff, the Programming and Project Scheduling Section, the involved outside agencies, and the public.

The understanding of one's own and each other's roles, responsibilities, and authorities is the foundation for good communication.

Communication within the Project Team and with outside agencies can be formal or informal as described in the following sections. The basis for this communication are the Project Team Partnering Agreements developed from time-to-time as the project progresses through the various phases of the process.

Communication with the public, including the media, should generally be on a more formal level.

7.2 COMMUNICATION WITH THE MEDIA

7.2.1 General

Because of the diverse nature of ADOT's program and the associated public interest, contracts with the media are a common and valuable means for communicating the Department's work to the

public. These contacts may be either ADOT or media initiated. Contacts with the media initiated by Highway Division personnel or consultants require approval of the affected ADOT Group Manager, the District Engineer or the project manager and coordination with Community Relations Office prior to the contact. Contacts of Highway Division personnel and consultants by the media should be responded to by the person contacted if they have specific knowledge concerning the topic of the contact. If the person contacted is not knowledgeable about the topic, the media person should be referred to the Community Relations Office.

Consultants are considered employees in the context of this policy.

7.2.2 Contacts to the Media

Prior to contacting the media, the person planning the contact will obtain concurrence for the contact from the supervising group manager or District Engineer, or from the project manager if the contact is to be project related. The request for approval will include reasons for the contact, type of media to be contacted, materials or information to be provided, the method of contact and the expected outcome. The Group Manager or project manager may request approval of the contact from the Chief Deputy State Engineer. The proposed contact should also be reviewed with

ADOT's Community Relations Office before implementation.

7.2.3 Contacts from the Media

If a Highway Division employee is contacted by the media, the employee is expected to be responsive to the contactor. If the Highway Division employee is not thoroughly familiar with the subject matter of the contact, the employee should refer the call to the person who is familiar, if known; otherwise, the call should be referred to the Community Relations Office. If familiar with the subject matter, the employee should respond to those questions that the employee feels qualified to answer. If the media are seeking answers to questions for which the employee does not know the answer, the employee should indicate to the media personnel that an answer will be obtained and an early response provided. Employees must be particularly sensitive when responding for the Department to questions with legal or political implications.

The employee should report to the supervisory group manager or District Engineer and the Community Relations Office immediately following a media contact the essence of the contact and any sensitive issues discussed. If the contact pertained to a specific project(s), the appropriate project manager(s) should also be appraised of the discussion.

Project managers are most likely to have media contacts and should arrange to take the course on All public meetings and presentations, whether formal or informal in nature, should be carefully planned. The issues

"Meet the Media" offered through the Human Resource Development Program or other similar courses.

7.3 GENERAL PUBLIC COMMUNICATION

Most communication with the general public will be on specific projects through public information meetings, public hearings or meetings with individual property owners. Informational meetings with local governing bodies may be held from time-to-time.

An informal setting is preferred for most public information meetings. Formal presentations should be avoided in favor of one-on-one discussions of the project with individual citizens. In this way, the specific concerns of each attendee can be addressed and effective communication between the individuals and the ADOT representatives is enhanced.

Some situations require a formal setting; e.g., presentations to city councils or planning organizations. Where practical, formal presentations should be preceded by informal discussions with the members of the council or organization.

Generally, public meetings will occur during the Scoping Phase of the Project Development Process. City councils and planning organizations may require updates from time-to-time during the Design and Construction Phases of large corridor improvement programs.

which are most critical to the public audience should be determined and presentation materials addressing these issues

should be prepared to assist the ADOT representative in discussing the issues. The Environmental Planning Section is responsible for planning and conducting public meetings and hearings and for following up on comments from the public. ADOT's Community Relations Office and the public information staff of Statewide Project Management Section should be consulted in planning presentations to local governing bodies.

Presentations to or discussions with individual property owners impacted by the project would be coordinated with the Right-of-Way Group through their representative on the Project Team.

7.4 PROJECT TEAM COMMUNICATION

The Project Team comprises representatives (stakeholders) of the many sections which make up ADOT Highways Division and the involved outside agencies. Each stakeholder brings a unique set of objectives, perceptions, and concerns regarding the project. If the group is to effectively function as a team, these objectives, perceptions and concerns must be expressed by each individual and addressed by the team.

7.4.1 Project Planning

Project Partnering Conferences are scheduled by the project manager at the beginning of the project and at times of major change of emphasis in the project development process or at other times when there are significant changes in the team membership. Thus, generally, these

An important element of communication is provided by the Project Work Plan (PWP) described in Section 7.8. The PWP conveys to other members of the Project Team and to ADOT management each discipline's planned approach to project activities. Through the PWP, Project Team members are better able to coordinate activities--they know when data are to be delivered to them and when deliverables are expected of them. The Team members know how much time and effort is expected to be used on the various activities; technical managers know the staff resources expected of them by the project team. Through the PWP, ADOT management have data to plan the allocation of staff and capital resources among projects.

Monitoring the project progress and use of resources against the PWP, managers at all levels can anticipate problems in meeting their commitments and take informed and appropriate corrective action.

Other important forms of communication are the various reports derived from the Project Management Information System which are available on-line through the ADOT computer network and through Pre-Construction Project Management.

7.4.2 Project Partnering Conference

conferences will be held at the beginning of each of the major project development phases -- Scoping, Design, and Construction. The timing of the conferences will vary with the requirements of the particular project; however, they may appropriately be held in

conjunction with the initial field reconnaissance in the Project Scoping Phase and with the kick-off meeting of the Design Phase. For the Construction Phase, the Initial Partnering Conference (see Section 6.4.2) will generally provide an adequate forum.

For many projects, the partnering process will be minimal; often a recognition of responsibilities and coordination requirements as outlined in the Project Work Plan will be sufficient. However, projects with critical time constraints or projects with inter-discipline design issues may require the development of a formal Project Partnering Agreement.

On major projects with significant involvement of outside agencies, the partnering conferences at the outset of the Scoping and Design Phases should be coordinated through the Construction Group's Partnering Management Section. Outside facilitators may be required to assist in identifying stakeholder expectations and solutions.

7.4.3 Project Partnering Agreement

The Project Partnering Agreement documents the criteria for good faith among and between the various Project Team members -- project manager, technical leaders, and the involved outside agencies. It does not imply a legal responsibility between the signatories but rather signifies a recognition that all parties win when the involved organizations covenant for mutual good faith. The agreement is intended to establish inter-organizational working

relationships where trust and teamwork prevent disputes, foster cooperative bonds, and accomplish customer satisfaction and job satisfaction.

In developing the Project Partnering Agreement, the individual objectives form the basis for each stakeholder's mission statement which together lead to the project team's mission statement. In recognizing another's objectives, each stakeholder can commit to aiding them in achieving their objectives.

An important part of the Project Partnering Agreement is the identification of problem perceptions and the negotiation of solution commitments. Problem perceptions describe what other stakeholders view as a performance shortcoming commonly attributed to the technical discipline or category of the stakeholder. The problem perceptions are generally derived from one stakeholder's expectations of another. Solution commitments are derived from the team dialogue on each problem perception and are designed so that achieving the commitments eliminates the problem cause(s). Often, the problems perceptions fall into such topics as technical requirement conflicts, timeliness of responses to requests for decisions or information, lack of understanding of other's activities, and lack of communicating activities to others.

Identifying and discussing these potential problems will help to avoid them or reduce the severity of them throughout the project.

7.4.4 Informal Communication

Ongoing communication on an informal basis will provide much of the day-to-day information needed by the Project Team to manage and carry out the project tasks. Communication on a more formal basis is necessary at key milestones.

"Management by walking around" is encouraged. Much of the information needed by technical managers and project managers to carry out their responsibilities is best obtained informally. Particularly for technical managers, frequent, informal visits to the technical teams can give a sense as to the technical competency with which the project is being approached and the quality of the work being performed. Informal visits afford the technical leaders and their staff an opportunity to discuss technical or scope issues more comfortably than going to the manager for a more formal meeting.

In the same manner, by visiting the work site project managers can get a sense as to the progress being made on the project and can identify areas of concern.

7.5 PROJECT MILESTONE MEETINGS

Project Team meetings are required at five of the major project milestones:

- ◆ Scoping Phase kick-off meeting;
- ◆ Scoping Phase field review;
- ◆ Design Phase kick-off meeting;

- ◆ Stage II design review; and
- ◆ Construction Final Inspection.

Discussions of the objectives of these meetings may be found in the preceding sections of this document.

Although it is intended that the authorities and responsibilities of the project manager be vested in one individual throughout the life of the project, from time-to-time it will be necessary for the good of the Department to appoint a new project manager to an ongoing project. Following assignment to a project, the new project manager will meet with affected technical managers and team technical leaders to review the project status. If circumstances permit, the departing project manager should participate in the meeting.

7.6 PERIODIC MEETINGS

7.6.1 Between Project Manager and Team Technical Leaders

Each month, all project managers will discuss the status of the project with team leaders having active tasks. These meeting will generally be held following receipt of the monthly project reports.

7.6.2 Between Technical Manager and Team Technical Leaders

Technical managers will hold regular meetings with their staff who are serving as project technical leaders to discuss the status of active projects and to review projects entering the highway development process.

7.7 ISSUE RESOLUTION

An important aspect of communication is the ability of the Project Team to identify and resolve issues of conflicting opinions. Preferably, issues are resolved by a consensus of the Project Team. When issues can not be resolved by the Project Team, the project manager carries the issue throughout an escalation process until it is resolved. Through escalation, an issue is addressed at the technical manager level and then, if not resolved, it is raised to the Chief Deputy State Engineer.

The project manager is responsible for and is fully authorized to see that project issues are resolved in a timely manner.

7.7.2 Issue Types

Issues generally can be classified as Technical, Policy, or Project related.

Technical issues are conflicts between the technical requirements or opinions of the various technical disciplines which impact a project. An example might be a difference of opinion between traffic engineers and highway engineers regarding the layout of a highway intersection. Another might be a difference of opinion between the District representative and the bridge designer regarding the construction sequence for a bridge. (Technical issues such as quality of work or design procedures which do not affect project scope, schedule or budget

7.7.1 General

should be resolved within the technical unit under the direction of the technical manager.)

Project issues are issues which affect the project scope, schedule, or budget. Examples might be a request from the District during the Design Phase to add a passing lane to a pavement preservation project or the determination during design that a bridge is required to cross a drainage channel rather than the box culvert assumed in the Scoping Phase. Other issues might be a schedule change due to a delay caused by an outside agency or lack of progress by a technical unit due to insufficient resources available for an activity.

Policy issues most often are conflicts with ADOT policies. An example might be a request from a local government to provide special roadway lighting fixtures.

7.7.3 Issue Resolution Process

7.7.3.1 Initial Steps

Regardless of the type of issue, the initial steps to be taken when confronted with an issue are to identify the impacts of the issue on the project and to determine optional actions which can be taken to mitigate the impacts of the issue. On policy issues, after the Project Team has determined the impacts and optional actions, the project manager should seek the advice and opinions of the senior staff

in Statewide Project Management Section (SPMS) and, as necessary, the SPMS manager. On technical and project issues, the project manager should discuss the issue with the project manager. On project and technical issues, if the Project Team has reached consensus and the impacts to scope, schedule, or budget are within the project manager empowerment, the issue has been resolved and the issue resolution process is complete. If the Team has reached consensus but the project impacts are outside the project manager empowerment, the issue must be escalated to the Chief Deputy Engineer.

See Section 7.9.1 for project manager empowerment criteria.

7.7.3.2 Escalation to Technical Managers

◆ *Technical Issue* If the Project Team did not reach consensus on a technical issue, the project manager should meet with the conflicting technical leaders and their technical managers to reach a consensus and resolve the issue. If the technical managers are unable to reach consensus, the project manager should discuss the situation with the SPMS manager. If necessary, the SPMS manager may meet with the project manager and the conflicting technical managers to assist in striving for consensus. If the issue is not resolved at this level or if the project impacts of the resolution are beyond the project manager empowerment, the project manager must escalate the issue to the Chief Deputy State Engineer.

◆ *Project Issue* If the Project Team did not reach consensus on a project issue, the project manager should promptly discuss

the situation with the SPMS manager. If necessary, the SPMS manager may meet with the project manager and the involved technical managers and technical leaders to assist in striving for consensus. If the issue is not resolved at this level or if the project impacts of the resolution are beyond the project manager empowerment, the project manager must escalate the issue to the Chief Deputy State Engineer.

manager should seek a Project Team consensus as to a recommended course of action.

7.7.3.3 Escalation to the Chief Deputy State Engineer

If an issue remains unresolved after discussions at the technical manager level or if the project impacts are beyond the project manager empowerment, the project manager will prepare a memorandum outlining the issue, the source of the issue, the impacts upon the project, the options for mitigating the issue and any other pertinent information and a recommended course of action. If the issue involves additional funding, the project manager will meet with the Finance Committee and/or the Life Cycle Office (for MAG or PAG freeway projects) and determine the source of such additional funds. If another project is to be delayed or canceled to provide funds, the concurrence of the responsible District Engineer and other initiating agency must be obtained. The memorandum and funding sources are transmitted to the Chief Deputy State Engineer (CDSE) by the project manager.

The CDSE reviews the facts regarding the issue and either

resolves the issue or refers it to the Project Review Board (PRB) for consideration and resolution.

In certain cases, the Priority Planning Committee (PPC) must approve the action of the CDSE or the PRB. In these cases, the project work plan identifies the "who", "what", "when", and "how" of the development process for a project. It comprises the elements:

- ◆ *Scope* of the work tasks and activities to develop the project;
- ◆ *Schedule* and duration of the work tasks and activities;
- ◆ *Resource Budget* for work tasks and activities; and
- ◆ *Construction Budget* for the project.

The project work plan is a dynamic document, changing in content, focus and detail as a project progresses through the stages of project development. At the various stages, it reflects the best information available regarding the nature and extent of the project and the plan for its development.

Throughout all stages of project development, the PWP is the responsibility of the project manager. The project manager coordinates its development and update to reflect the current status and requirements of the project. However, the PWP is the product of the Project Team. It is simply a combination of each Team member's plan for fulfilling their project responsibilities.

7.8.1 Scoping Phase Project Work Plan

project manager will present the issue to the PPC for approval.

7.8 PROJECT WORK PLAN (PWP)

Following the assignment of a TRACS number to the candidate project and the assignment of the project manager by the Chief Deputy State Engineer, the project manager meets with the appropriate Pre-Design Section manager, the project initiator and others as necessary to establish the goals and objectives of the project. Using templates provided by Program and Project Scheduling Section (P²S²) and data from the Strategic Plan (Section 4.4), the scoping study technical leaders prepares a preliminary scope, schedule and resource budget for producing the project scoping documents. The project manager reviews these data and, upon concurring, forwards the proposed schedule and resource budget to P²S² for processing. Based on resource management criteria and decisions made by the Project Review Board, the project manager submits an initial schedule and resource budget to P²S². These documents together with the project scope form the initial project work plan.

Planning the preparation of a scoping document is necessarily an imprecise activity. As the scoping process unfolds, work tasks may be added or deleted to meet the study requirements. Some tasks may not be readily quantified until other tasks are completed. For example, the extent of environmental documentation may not be known until the initial investigations are completed. However, at any

time, the PWP should be based upon the best information available to the technical leaders and upon their professional judgement.

Thus, while it is expected that most scoping efforts will be completed within the original estimated time and budget, the discovery process inherent in such efforts may require the expenditure of more time and effort than originally estimated to resolve issues.

The project manager (with the consensus of the Project Team) is empowered to extend the scheduled completion date of a scoping study by three months but not beyond the cut-off date for programming consideration without the concurrence of the Chief Deputy State Engineer. Philosophically, an extended time period should be used only for accommodating significant changes in the project scope and every effort should be made to adhere to the scheduled completion date.

In scheduling the scoping completion date, the Project Team should assess the complexity of the project and include all reasonable activities, with contingency time and resources, appropriate for the project. In no case should the contingency exceed 20% of the overall time or resources.

The project manager will monitor the progress of the candidate project through the Scoping Phase and will work with the technical leaders to keep the PWP current.

The procedures for modifying time and budget for the activities are shown in Section 7.9.

Changes in time and resources which exceed the project manager's empowerment should be processed according to Section 7.7

The project manager should verify that time and resources have been programmed for the reviews of the scoping documents and for the

development of the design scope, schedule and budgets.

If at any time during the scoping process, it is determined that a higher level of scoping effort will be required to adequately define the project for programming consideration (e.g., a Design Concept Report rather than a Project Assessment), the project manager will promptly notify the Chief Deputy State Engineer. The project manager will work with the technical leaders to revise the PWP for the continuation of the project through the Scoping Phase.

7.8.2 Design Phase Project Work Plan

7.8.2 Design Phase Project Work Plan

The Design Phase project work plan is developed by the Project Team after a project has been accepted into the Five-Year Program. At that time, the Project Team will develop a "laundry list" of activities which may be required for the project. The technical leaders will each prepare a scope of work covering the efforts required of their discipline to take the project through the Design Phase.

From these scopes, the technical leaders will develop estimates of the time and resources required to accomplish each of the activities in their scope of work. The lists of activities with the estimated durations and resources are forwarded to Program and Project Scheduling Section (P²S²) for initial

processing. P²S² will work with the project manager and the technical leaders in integrating the schedules and resource requirements from the several technical units to form a tentative project schedule meeting the project objectives. The project manager will forward the final Design Phase PWP to P²S² for incorporation in the ADOT Program Master Schedule.

The project manager continues to be responsible for the design project work plan during the period between its inclusion in the Master Schedule and the start of design activities. Conditions may change during this time necessitating modifications to the scoping documents and/or the design PWP. The project manager will keep a log of the changes with the project work plan and update the Design Phase schedule as required.

If appreciable time has passed between finalizing the design project work plan and design start-up, a meeting between the project manager, team leaders and functional managers will provide an opportunity to refresh their understanding of the project requirements and to verify the appropriateness of the PWP for the current project conditions.

The project manager is empowered to extend the scheduled completion date of the Design Phase within the guidelines established from time-to-time by the Chief Deputy State Engineer. An extended time period should be used only for accommodating delays which are beyond the project team's ability to control; every effort should be made to adhere to the scheduled completion date. In establishing the scheduled completion date,

The technical leaders are responsible for consulting with their technical managers regarding the scopes, durations and resources for the proposed project work tasks.

the Project Team should assess the complexity of the project design and include in the PWP contingency time and resources appropriate for the project. In no case should the design PWP contingency exceed 10% of the overall time or resources. The project manager will monitor the progress of the project through the design stages and will work with the technical leaders to keep the PWP current. The procedures for modifying time and budget for the activities are discussed in Section 7.9

Changes in time and resources which exceed the project manager's empowerment should be processed according to Section 7.9

When all or a part of the design is being performed by a consultant, the project manager should verify that time and resources have been included in the PWP for the technical unit reviews of the consultant's work.

7.8.3 Construction Phase Project Work Plan

The Construction Phase project work plan is developed by the project manager, the proposed resident engineer, and the manager of ADOT construction activities. The development of the construction PWP should reflect the preliminary construction schedule included

with the Stage III design review submittal. For major projects where there is a possibility that the construction phase field engineering services will be performed by consultants, the It is recognized that the actual activities to be performed during the Construction Phase, including their schedule and resource requirements, are dependent upon the operations of the contractor. The initial Construction Phase PWP should be based upon the tentative construction schedule prepared during the Design Phase.

The PWP should include any anticipated major involvement of the design staff during the Construction Phase -- e.g., shop drawing review, partnering activities, etc.

The construction PWP should be reviewed and revised as appropriate after the construction contractor has submitted a preliminary project schedule. The review and updating process should be repeated if and as the contractor makes significant changes in the construction schedule. Of particular importance is keeping up-to-date the design team activity schedule.

7.8.4 Maintenance Phase Project Work Plan

Other than the preparation of the project As-Built Drawings, the activities of the Project Team during the Maintenance Phase normally are inconsequential and are reactive to requests from the maintenance staff. Unless there is a need for definite and major activities regarding design or construction issues, there will be no need for a Project Work Plan during the Maintenance Phase.

construction PWP should be completed at least five months prior to the scheduled construction advertisement date.

7.9 PROJECT CHANGES

Changes in scope, schedule, and budget are inherent in the development of a project. In each of the development phases - scoping, design and construction - more information is developed about the project permitting refinements to the initial project concepts. In many cases, such refinement has an insignificant effect upon the project scope, schedule, or budget. However, in some instances such refinements can greatly impact the project and the Project Team. Effective project communication requires a process for making project changes and assuring that others are advised of the nature and impacts of these changes.

The project change process is based upon Project Team consensus and empowerment. In an environment where there are no constraints as to time, money, or human resources, the Project Team could evaluate possible project changes solely on the needs of the project.

In a multiple-project environment, such as at ADOT, the overall pool of money and human resources is allocated among the projects on a priority basis. Increases in money or staff requirements for one must be balanced by reductions in other projects or from a contingency account. Thus in the multiple-project environment, changes in individual project requirements

for money and staff must be centrally coordinated.

ADOT balances the conflicting goals of independent project teams and central coordination by empowering, within limits, the project manager to make changes in a project scope, schedule, and budget with a consensus of the Project Team. The limits of the A project manager, with a consensus of the Project Team, is empowered to resolve many of the issues which might arise in the conceptual design phase or the design phase of a project.

Empowerment permits the project manager to implement project changes which do not affect the overall project objectives, change the advertisement date, or change the construction budget except as defined below. Project Team consensus on such changes is required. Without consensus, the Project Issue Resolution Process described in Section 7.7 must be followed.

◆ For *project scope*, the project manager is empowered to adjust the scope as required to meet the project objectives.

◆ For *project construction budgets*, the project manager is empowered to make cumulative changes up to the greater of \$100,000 or 10 percent of the original programmed construction cost.

◆ For *project Scoping Phase schedules*, the project manager is empowered to make changes of up to 90 days in the scheduled completion date of a Project Assessment or a Scoping Letter and up to 180 days for a Design Concept Report or a Corridor Study,

empowerment are set to give the Project Team flexibility without serious impacts to the overall program.

7.9.1 Project Manager Empowerment

but not beyond the cut-off date for programming consideration.

◆ For *project Design Phase schedules*, the project manager is empowered to make changes in the original programmed advertisement date of up to:

a) 90 days but not past the end of the fiscal year for projects programmed to be advertised in the current fiscal year;

b) 180 days but not beyond the end of the fiscal year for projects programmed to be advertised in the next two fiscal years; and,

c) any change but not beyond the end of the fiscal year for projects programmed to be advertised in the fourth and fifth years of the 5-Year Program.

◆ For *project Construction Phase schedules*, the project manager is authorized to concur in any contractor requested contract modifications changing milestone dates.

Issues which are outside the scope of project manager empowerment are to be addressed using the Project Issue Resolution Process described in Section 7.7.

7.10 PROJECT REPORTS

An important tool for communicating information about projects and the Five-Year Program is the series of reports available through the project. A number of standard reports have been developed by P²S² to provide the Project Teams, technical managers and Highways Division management with data to carry out their project and program responsibilities. Certain reports have also been developed to provide information to the public about the status of the ADOT Five-Year Program.

Certain of the reports are published by P²S² and distributed in hard-copy form. Other reports may be generated through Primavera by Team members and others on an as-needed basis. If hard-copies are required, the user may print them directly from Primavera. The various reports are described below.

7.10.1 Reports Distributed by Program and Project Scheduling Section

These reports are published by Program and Project Scheduling Section and distributed internally and externally to a list of recipients. These reports use information from Primavera and other databases; they are available only in hard-copy form.

7.10.1.1 36-Month Project Schedule is designed for use by the Highways Division management and the Project Team members. This hard-copy report is made available as a quick reference to project status. It

information system. The Primavera Scheduling software based information system is maintained by the Program and Project Scheduling Section (P²S²) and uses project information provided by the Project Teams.

shows all of the projects in the 36 month project schedule grouped by the bid advertise date. It shows project status, comments, bid advertisement date, total float, and such identification information as TRACS number, county, route etc.

7.10.1.2 90 Report - All Activities within a Project by Responsible Area is designed for use by the technical manager and the technical leaders. It shows all activities for a responsible area, grouped by project. It shows activity status with early dates, late dates, and total float. It also contains activity descriptions and project identification information such as TRACS number, county, route, milepost, etc.

7.10.1.3 24-Month Construction Schedule is prepared for use by contractors and suppliers. The report shows all of the projects in the 24-month project schedule grouped by the bid advertisement date. It shows project status with the scheduled advertisement date, total float, and status comments. It also contains the project description with such project identification data as TRACS number, county, route, milepost, etc.

7.10.1.4 Five-Year Bid Date Report is designed for use by project managers, the Highways Division management, the Construction Group, and the District Engineers. It contains

all the projects in the Five-Year Program organized by seven criteria as a quick cross-referenced guide to projects. The report shows project name, type of work, and bid advertisement date. The sorting criteria are project name, cps ID, Tracs number, bid date, project number, and district.

7.10.1.5 24-Month Project Schedule (Local Government Projects) is intended for use by the local government project managers and by local government agencies. It shows project status, comments, bid advertisement date, and identification information such as TRACS number, route, county, etc.

7.10.2 Standard Primavera Reports

The standard Primavera reports may be accessed by any authorized Primavera user. Generally, the reports will be displayed on the computer monitors; however, hard copies of the screen display may be printed by the user.

7.10.2.1 Listing of Activities Within a Project is designed primarily for use by the Project Teams. This standard report contains a listing of all activities within a project and shows project status, total float, bid advertisement date, and program cost.

7.10.2.2 Activity Predecessors and Successors by Project is designed primarily for use by the Project Team. It provides a listing of all incomplete activities within a project and their associated predecessors and successors. It shows the project status, total float, and activity description.

7.10.2.3 Critical Activities within a Project is designed for use by the Project Team. It provides a listing of activities within a project that have negative float. It shows the project status, total float, bid date, and program cost.

7.10.2.4 All Activities within a Section is primarily for use by technical managers. It contains a listing of all activities assigned to a technical unit grouped by project. It shows the project status, total float, bid date, and program cost.

7.10.2.5 Activity Predecessors and Successor for a Section is also primarily for use by the technical managers and technical leaders. It contains a listing of all incomplete activities assigned to a technical unit grouped by project together with their associated predecessors and successors. It shows the project status, total float, activity

description, TRACS number, and activity ID.

7.10.2.6 Critical Activities within a Section is designed for use by the technical managers and technical leaders. It contains a listing of all activities within a technical unit having a negative float grouped by project. It shows the project status, total float, activity description, TRACS number, activity ID, program cost, and bid date.

7.10.2.7 Project Listing by District is primarily for use by District Engineers in discussing the status of projects with the public and for project managers with district liaison responsibilities. It lists all projects within a district and **7.10.2.10 Project Technical Leader List** contains a listing of technical leaders grouped by project. It shows the technical area, district, county, project title, TRACS number and the type of work.

7.10.3 Non-Standard Primavera Reports

Authorized users of the Primavera system will be able to generate reports of their own design to meet their individual needs. The standard reports can be copied and modified to focus on specific activities or groups of activities for analysis.

In addition to the tabular reports listed in the above sections, the authorized user will be able to use Primavera and the Master Schedule data to generate graphic displays such as bar charts, time-scaled logic diagrams, pure logic diagrams, actual progress versus planned

shows project titles, bid date, total float, and project manager.

7.10.2.8 Project Listing by County is designed for use by District Engineers in discussing the status of projects with the public and for project managers with district liaison responsibilities. It lists all projects within a county and shows project titles, bid date, total float, and project manager.

7.10.2.9 Projects Behind (Ahead) of Schedule is designed for use by the management of Highways Division, Statewide Project Management Section, and Program and Project Management Section. It shows the project title, cps ID, Tracs number, bid date, total float, and the project manager.

and actual resources versus planned.

The staff of Program and Project Scheduling Section are available to assist the user in developing non-standard tabular reports and graphical displays.

7.11 REPORTING PROJECT PROGRESS

Each of the reports described in Section 7.10 is based upon information prepared and supplied by the Project Teams. The basic information as to scheduled activities, their durations, and required resources comes from the Project Work Plans prepared for each phase of every project. The status of these activities is reported each month by the responsible technical leader.

Program and Project Scheduling Section is responsible for establishing a schedule for updating the project data each

month -- the "data date". As of the data date each month, technical leaders have the responsibility to assess the status of each of their assigned activities and report the percentages of completeness and remaining durations for their activities.

The ADOT Master Schedule lists the activities which comprise each project. Generally, these activities are major efforts such as "Prepare Stage II Roadway Plans" or "Prepare Bridge & Retaining Wall Plans and Foundation Data". Each of these activities may be broken down into a series of work tasks which define in greater detail the activity. For the activities cited above, the work tasks may include:

Progress is to be a measurement of a actual work product completed. It is not a measurement of resources or time expended. Progress is independent of work hours used or calendar days spent. Quite simply, measuring progress is the determination of how many roadway cross sections have been developed or how many boring logs have been plotted.

For the monthly update, the technical leader should review the actual work accomplished versus the planned work effort. The percentage complete of a work task is, for example, the number of cross-sections produced divided by the total number of cross-sections required.

In updating the status of a project activity, it is necessary to identify the expected remaining duration of the activity. Calculating that a task or activity is 60% complete

- ◆ "Refine Typical Sections for Mainline"; and
- ◆ "Prepare Preliminary Cross-Sections"; or
- ◆ "Design Bridge Superstructure"; and
- ◆ "Plot Boring Logs".

Within Primavera, the component work task resources and durations can be "rolled up" or aggregated to define a project activity's resource requirement and duration for use in the Master Schedule.

It is at the work task level of detail that technical leaders will be preparing their work plans and managing their activities. Progress reporting should also be at this level.

does not mean that 40% of the time is remaining. The technical leaders should examine the original estimate of activity duration, compare it with the time and resources used to the present, and estimate the remaining duration.

Based upon the data provided by the technical leaders, the Program and Project Scheduling Section can use the Primavera software to update the ADOT Master Schedule and, through the reports described in Section 7.10, communicate project status to others.

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8. PROJECT DESIGN REFERENCES

The following documents are design references developed and published by ADOT and other agencies and adopted by ADOT for use in the design of highway projects. Included in this listing by agency are standards, specifications, manuals, guides, policies, procedures, and environmental regulations which may be applicable to various aspects of a project. It is the designer's responsibility to ascertain and apply the contents of these references as appropriate.

ADOT Engineering Records' publication numbers, where applicable, are in parentheses. The current editions of references should be used.

8.1 ADOT PUBLICATIONS

8.1.1 Standard Drawings

8.1.1.1 "Construction Standard Drawings" (31-001);

8.1.1.2 "Structures Section Standard Drawings" (31-002);

8.1.1.3 "Traffic Signals and Lighting Standard Drawings" (33-002);

8.1.1.4 "Signing and Marking Standard Drawings" (33-002);

8.1.1.5 "Standards for Right-of-Way Plans";

8.1.1.6 "Cadd Standards" (31-060).

8.1.2 Specifications

8.1.2.1 *Standard Specifications for Road and Bridge Construction* (31-066);

8.1.2.2 *Photogrammetry and Mapping Standard Specifications* (31-063);

8.1.2.3 *Aerial Mapping Specifications*

8.1.2.4 "Stored Specifications", revised to date, as held and issued by Contracts and Specifications Services.

8.1.3 Manuals (Current Editions)

8.1.3.1 "Manual of Field Surveys" (31-059);

8.1.3.2 "Traffic control Manual for Highway Construction and Maintenance" (33-003);

8.1.3.3 "Right-of-Way Section", Volume V of ADOT Manual;

8.1.3.4 "Manual of Approved Signs" (31-019);

8.1.3.5 "Reinforced Concrete Box Culvert Manual" (31-019);

8.1.3.6 "Materials Preliminary Engineering and Design Manual" (31-017);

8.1.3.7 "Materials Testing Manual" (31-016);

8.1.3.8 "Materials Policy and Procedure Directive Manual" (31-011);

8.1.3.9 "Utilities Manual";
(Guide for Accommodating Utilities
8.1.3.10 "Bridge Design and
Detailing Manual" (31-069);

8.1.3.11 "Roadway Design
Guidelines Manual"

8.1.3.12 "ADOT Erosion and
Pollution Control Manual for
Highway Design and Construction"
(Draft)

8.1.3.13 "ADOT/USDA Forest
Service Highway Design Guidelines
Manual" (Draft)

8.1.3.14 "Highway Drainage
Design Manual: Hydrology"

8.1.4 Policies, Guides, and Procedures

8.1.4.1 "Drafting Guides for
Use in Office and Field";

8.1.4.2 "Signing Guidelines".
ADOT Traffic Design Services;

8.1.4.3 "Guidelines for Highway
Illumination". PGP-10A-1-2, ADOT
Traffic Operations Services;

8.1.4.4 "Traffic Engineering
Policies, Guides, and
Procedures";

8.1.4.5 "Traffic Impact
Analysis for Proposed
Development";

8.1.4.6 "Encroachments in
Highway Rights-of-Way". [Rule r-
7-3-712], April 14, 1981;

8.1.4.7 "Design Concept Report
Development Procedures". Highway
Development Group Policy and
Implementation Memorandum No. 89-
5, December 24, 1989;

8.1.4.8 "Retaining Wall
Policy". Highway Development

on Highway Right of Way)

Group Policy and Implementation
Memorandum No. 88-1;

8.1.4.9 "Establishment of New
Right-of-Way Requirements".
Highway Development Group Policy
and Implementation Memorandum 90-
9;

8.1.4.10 "Construction Manual"

8.1.4.11 "Landscape Design
Guidelines for Urban Highways"

8.2 AASHTO PUBLICATIONS

8.2.0.1 *A Policy on Geometric
Design of Highways and Streets*,
Current Edition ("Green Book");

8.2.0.2 *A Policy on Design of
Urban Highways and Arterial
Streets*, Current Edition ("Red
Book");

8.2.0.3 *Manual on Subsurface
Investigations*, Current Edition;

8.2.0.4 *Guide for Design of
Pavement Structures*, Current
Edition;

8.2.0.5 *Standard Specifications
for Highway Bridges*, Current
Edition and Current Interim
Specifications;

8.2.0.6 *Standard Specifications
for Structural Supports for
Highway Signs, Luminaires and
Traffic Signals*, Current Edition
and Interim Specifications;

8.2.0.7 *Roadside Design Guide*,
Current Edition;

8.2.0.8 *AASHTO Guide for
Transportation and Environmental
Design*, Current Edition;

8.2.0.9 *Manual for Maintenance Inspection of Bridges*, Current Edition.
8.2.0.10 *A Guide for Transportation Landscape and Environmental Design*, Current Edition.

8.2.0.11 *Highway Drainage Guidelines*, Current Edition.

Edition of 1983, with all issued Interims;

8.3.0.10 "Design of Urban Streets", 1980.

8.3 FHWA PUBLICATIONS

8.3.0.1 *Work Zone Traffic Control Standards and Guidelines*, Current Edition;

8.3.0.2 *Manual on Uniform Traffic Control Devices*, Current Edition (30-001);

8.3.0.3 "Hydraulic Design of Highway Encroachments of Flood Plains". FHPM - Volume 6, Chapter 7, Section 3, Subsection 2;

8.3.0.4 "Drainage of Highway Pavements. Hydraulic Engineering Circular No. 12;

8.3.0.5 "Hydraulic Design of Energy Dissipaters for Culverts and Channels". Hydraulic Engineering Circular No. 14;

8.3.0.6 "Scour at Bridges". Hydraulic Engineering Circular No. 18;

8.3.0.7 "Hydraulic Design of Highway Culverts". Hydraulic Design Series No. 5;

8.3.0.8 "Manual for Highway Storm Water Pumping Stations, Volumes 1 and 2".

8.3.0.9 "Design of Urban Highway Drainage, State of the Art";

8.4 OTHER SOURCE PUBLICATIONS**8.4.1 Arizona State Parks**

8.4.1.1 "Standards for Park Roads and Other Related Improvements".

8.4.2 Transportation Research Board (TRB)

8.4.2.1 *Highway Capacity Manual*. TRB Special Report 209, 1985;

8.4.2.2 "Tentative Design Procedure for Riprap-lined Channels". NCHRP Report 108;

8.4.2.3 "Intersection Channelization Design Guide". NCHRP Report 279.

8.4.3 U.S. Department of Labor**8.4.6 Central Arizona Coordinating Committee**

8.4.6.1 "Public Improvement Guide", November 1990 (31-068).

8.5 ENVIRONMENTAL REGULATIONS AND POLICIES**8.5.1 Federal**

8.5.1.1 "National Environmental Policy Act of 1969";

8.5.1.2 "Protection of Historical and Cultural Properties" 36 CFR 800;

8.5.1.3 "Environmental Impact and Related Procedures" 23 CFR 771;

8.4.3.1 "Davis-Bacon Act" 40 USC 2762;

8.4.3.2 "Copeland (Anti-Kickback) Act" 40 USC 276c;

8.4.3.3 "Walsh-Healey Public Contracts Act" 41 CFR Part 50-205;

8.4.3.4 "Construction Safety Act" 86 State. 96; 40 USC 333.

8.4.4 The Industrial Commission of Arizona

8.4.4.1 "Occupational Safety and Health Standards for the Construction Industry" ARS 230-410, April 1, 1981.

8.4.5 Soil Conservation Service

8.4.5.1 *Urban Hydrology for Small Watersheds* (TR55);

8.5.1.4 "Procedures for the Abatement of Highway Traffic Noise and Construction Noise" 23 CFR 772;

8.5.1.5 "Air Quality Guidelines" FHPM 7-7-9;

8.5.1.6 "Endangered Species Act of 1973" and supplements;

8.5.1.7 "Protection of Wetlands" Executive Order 11990;

8.5.1.8 "Floodplain Management" Executive Order 11988;

8.5.1.9 "National Historic Preservation Act of 1966";

8.5.1.10 "Department of Transportation Act", Section 4(f);

8.5.1.11 "Wild and Scenic Rivers Act of 1968"

8.5.1.12 "Clean Water Act of 1977", Section 404 33 CFR 320-330;

8.5.1.13 "Federal Farmlands Protection Policy Act of 1981";

8.5.1.14 "Guidance Material for the Preparation of Environmental Documents", FHWA Technical Advisory T6640.8;

8.5.1.15 "Safe Drinking Water Act", Section 1424(e), (Sole Source Aquifer Review);

8.5.1.16 "Determinations of Eligibility for Inclusion in the National Register of Historic Places" 36 CFR 60;

8.5.1.17 "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 PL 91-646;

8.5.1.18 "Arizona Desert Wilderness Act of 1990" PL 101-628;

8.5.2.2 "Arizona Historic Preservation Law";

8.5.2.3 "Arizona Water Quality Law", Section 401;

8.5.2.4 "ADOT Action Plan";

8.5.2.5 "Preservation of Arizona's Wetlands", Highways Division Policy and Implementation Memorandum 89-05;

8.5.2.6 "Noise Abatement Policy for State-Funded Projects"

8.5.2.7 Arizona Environmental Quality Act (EQA)";

8.5.2.8 "Hazardous Waste Management Act (HWMA)";

8.5.2.9 "Underground Storage Tank Act of 1986".

8.5.1.19 "Wilderness Act of 1964" PL 88-577;

8.5.1.20 "Resource Conservatory and Recovery Act (RCRA)";

8.5.1.21 "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)";

8.5.1.22 "Superfund Amendments and Reauthorization Act (SARA)";

8.5.1.23 "Integrated Resource Management", United States Forest Service, September, 1993;

8.5.1.24 "Clean Water Act" Section 402 (NPDES).

8.5.2 State

8.5.2.1 "Arizona Native Plant Law";

8.5.3 Local

Consult with local government agencies regarding local codes and ordinances relating to air quality, noise, dust abatement, light, etc.

8.6 HANDICAP ACCESS

8.6.0.1 "The Americans with Disabilities Act of 1990" (ADA).

8.6.0.2 "Americans with Disabilities Act Accessibility Guidelines" (ADAAG).

8.6.0.3 "Americans with Disabilities Act Handbook".

9. GLOSSARY 9.1

9. GLOSSARY

ADOT Arizona Department of Transportation: A Department of the Arizona State Government established by statute to provide an integrated and balanced State transportation system. Among other things, ADOT is responsible for providing a Statewide network of highways within Arizona which is, by statute, the State Highway System.

ADOT Director: Appointed by the Governor from a list of qualified candidates submitted by the Transportation Board. The Director supervises and administers the overall activities of ADOT, The Director coordinates the design, right-of-way and construction of controlled-access highways and is to exercise complete and exclusive operational control and jurisdiction over the use of State highways and routes.

ADOT Technical Organization: ADOT comprises divisions: Motor Vehicle, Transportation Planning, Highways, Aeronautics, and Administrative Services.

Certification Acceptance: A process authorized by Congress permitting the Federal Highway Administration to delegate certain administrative responsibilities for determining transportation solutions to the States.

Five-Year Highway Construction Program (Five-Year Program): The **Scoping Phase:** The initial phase of the Project Development Process beginning with the identification of a transportation improvement as a candidate project for the Five-Year Program. The Scoping Phase

ADOT Director is required by Statute to develop a Five-Year Highway Construction Program according the policies established by the Transportation Board. The Five-Year Program presents priority recommendations of the construction and development of transportation facilities. The Five-Year Program is updated annually.

State Action Plan: Documents which outline the processes utilized by ADOT in meeting its statutory responsibilities with regard to State-funded and Federal-Aid highway projects on the State System. The documents are *Action Plan for State-Funded Highway Projects on the State System*, dated July 8, 1983, 2nd edition and *Action Plan for Federal-Aid Highway Projects*, dated September 26, 1988.

ADOT Transportation Board: The Board establishes policies and relative weights to criteria for the development and modification of the Five-Year Highway Construction Program. It awards all construction contracts for transportation facilities, and monitors the status of such construction projects. The Board determines priority program planning with respect to transportation facilities. By statute, the Governor appoints the members of the Transportation Board.

concludes with the preparation of scoping documents and the planning of design activities for those projects accepted into the Program.

Customers: Those who will use or

pay for the products of the Project Development Process. Thus, the primary Customers of a highway project are the taxpayers and the highway users. Other Customers would include the construction contractor and suppliers. ADOT's District Operation and Maintenance functions generally represent the highway user during the development process.

Consultant: A person or firm who provides independent professional services to ADOT within the terms of a mutually agreed-to contract.

Design Phase: That part of the Project Development Process in which construction documents are developed based on the concepts prepared in the Scoping Phase. This Phase follows the Scoping Phase and ends with the award of a construction contract by the Transportation Board.

Construction Phase: That part of the Project Development Process in which the project is constructed. This Phase follows the Design Phase and ends with the State's acceptance of the project from the construction contractor.

Maintenance Phase: The final Phase of the Project Development Process covering the first year of operation and maintenance of the constructed and accepted project.

APPENDIX B

DOCUMENTS REQUIRED FOR DESIGN PHASE SUBMITTALS

DOCUMENTS REQUIRED FOR DESIGN PHASE SUBMITTALS

CONTRACT DOCUMENT ITEM	STAGE I REVIE W	STAGE II REVIE W	STAGE III REVIE W	STAGE IV REVIE W	FINAL PS&E
Face Sheet		P	F	F	F
List of Standard Drawings			P	F	S
Design Sheet & Index			P	F	S
Summary Sheets			P	F	S
Special Detail Drawings			P	F	S
Typical Roadway Sections	I	P	F	F	S
Roadway Plan & Profile Shs	P	F	F	F	S
Parking Area Plans & Dtls		P	F	F	S
Drainage Plans & Details		P	F	F	S
Intersection Plans & Dtl		I	P	F	S
Interchange Plans & Dtls		P	F	F	S
Major Struct Plans, Dtls		I	P	F	S
Traffic Signal Plns, Dtls		I	P	F	S
Traffic Control Plns, Dtls		I	P	F	S
Sequence of Construction		I	P	F	S
Traffic Control Duration & Quantities		I	P	F	S
Signing & Pavement Mrkg Plans & Quantities			P	F	S
Lighting Plans & Details			P	F	S
Landscape Plans & Details			P	F	S
Utility Reloc Plans, Dtls			P	F	S
Stormwater Pollution Pre- vention Control Plan			P	F	S
Special Drawings & Details			P	F	S
Roadway Cross Sections		P	F	F	F
Summary of Final Earthwork		P	F	F	F

Quantities					
CONSTRUCTION DOCUMENT ITEM CONTINUED	STAGE I REVIE W	STAGE II REVIE W	STAGE III REVIE W	STAGE IV REVIE W	FINAL PS&E
Quantities & Combined Cost Estimate		P	P	F	F
Special Provisions			P	F	S
Construction Schedule			P	F	S
DBE Participation Goals				P	F
Bidding Schedule			P	F	F
Final Design Calculations				F	S
Bound Survey Books	F	S			
Right-of-Way Requirements		P	F		
Drainage Report -Roadway		P	F	S	
Drainage Report -Structure		S			
Traffic Analysis Report		S			
Bridge Foundation Report		S			
Structure Selection Report		S			
Pavement Design Summary		S			
Geotechnical Report		S			
Environmental Permits		P	F		
Environmental Mitigation Measures	I	P	F		
Materials Design Memo		P	S		
Arizona State Plane Coordinates		S	F	F	S

LEGEND: I denotes initial concepts
P denotes preliminary, unchecked, excluding minor details
F denotes final, checked, all details and quantities

S denotes sealed in accordance with technical registration requirements

NOTE: The review stages roughly correspond to the following completion levels of the Design Phase: Stage I: 15%; Stage II: 30%; Stage III: 60%;, Stage IV: 95%; Final PS&E: 100%.

APPENDIX C
PROJECT TASK RESPONSIBILITY MATRIX

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C.2 DESIGN PHASE AND PRE-CONSTRUCTION ACTIVITIES TASK
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ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

C.1 PROJECT SCOPING PHASE TASK RESPONSIBILITIES

Note: The tasks shown in the Project Scoping Phase Responsibility Matrix are for the preparation of Project Assessments and Location/Design Concept Reports. The task responsibilities for preparation of Corridor Studies and General Plans are similar to those shown.

Potential Projects				Districts - Assemble lists of potential major and minor projects from COGS and District Operation & Maintenance. ADOT Systems Management - Assemble lists of potential projects in HES, Traffic, Bridge, Pavement, Park Roads, Roadside Improvement categories.
Objectives Meeting on Potential Major Projects	SPMS senior staff confer with District Engineers and project initiators	Pre-Design confers with District Engineers and project initiators		District Engineers - Participate in Objectives meeting Project Initiators - Participate in Objective meeting TPD - Receive objectives report from SPMS
Candidate Projects				Highways Division, TPD Management - Select major projects for scoping TPD - Selects proposed non-major projects for scoping; sets programming evaluation date for all projects being scoped
Resource Requirements and		Pre-Design Managers and		P ² S ² - Coordinates evaluation and prepares preliminary sched-

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

Activity Durations for scoping Candidate Project		SPMS senior staff		ule
Conceptual Design Strategic Plan (including use of On-Call and Project Consultants)		Pre-Design Managers and SPMS senior staff		P ² S ² - Coordinates strategic planning and prepares schedule
Project Manager		SPMS recommends PM		CDSE - Appoints Project Manager
Project TRACS Number	Verifies number assigned			Pre-Design Management - Assigns TRACS number to candidate projects
Project Objectives Meeting and Outside Agency Identification (Non-Major Projects)	Attends objectives meeting		Technical unit preparing scoping document organizes and conducts objectives meeting	District - Attends meeting Initiating Agency - Attends meeting
Project Team	Requests TM to assign;	Assign Technical Leaders to Team		

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

Project Scoping Phase Project Work Plan (PWP)	Coordinates preparation of PWP	Reviews TL estimates	Prepares scope Estimates activity durations and resources	P ² S ² - Processes schedule
Consultant Selection and Contracts (if required)			Primary technical unit provides Scope and schedule to ECS and assists in selection and negotiation	ECS - Administers consultant selection process
Design Team Kick-off Meeting	Organizes and conducts meeting		Participate	
Background Data, Accident Analysis and Controlling Design Criteria Analysis	Coordinates preparation of analysis	Monitors preliminary design exceptions	Prepare analyses and preliminary design exceptions	
Field Review	Attends and assures Team participation		Primary technical unit organizes and conducts field review	District, Traffic, Environmental Planning, Right-of-Way, Structures, Materials - Participate FHWA - Participate Outside Agencies - Participate

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

All-Agency Scoping Meeting	Organizes and conducts meeting		Participate in Partnering	ADOT Partnering Office - Provides facilitator on major projects Outside Agencies - Participate
Initial Project Assessment/Design Concept Report/Environmental Documentation	Monitors project objectives; monitors progress	Monitor technical preparation of studies and reports	Prepare studies and reports	
Initial PA/DCR/En Docs Review, and Consensus Meeting	Monitors review and coordinates comment resolution or scope consensus meeting	All involved review initial scoping documents and comment	Primary technical units circulate documents for review; respond to comments	Involved Outside Agencies review PA and comment
Determine if PA has Defined Project	Recommends DCR to CDSE if project not defined	Roadway Group Manager concurs in determination	Project Team determines	
Public Hearing	Monitors public hearing process, attends		Envir Planning organizes and conducts, Team attends	
Design	Monitors	Roadway Group	Requests	FHWA - Approves design

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

Exception Request		Manager approves design exception	design exception approval from Roadway Group Manager	exception request on Federal-Aid projects not under Certification Acceptance Procedures
Final PA/DCR/En Docs	Monitors project objectives; monitors progress	Monitor technical preparation of studies and reports	Prepare final studies and reports	
PA/DCR/Envir Docs Approval	Approves PA /DCR/Envir Docs	Roadway Group Manager/Envir Planning Manager approve		District and Initiating Agency approve PA/DCR/En Docs, schedule milestones and construction budget
Outside Agency Approvals and Commitments	Transmits documents; monitors approval process; obtains Project Agreements			FHWA - Approves documents on Federal-Aid projects not under Certification Acceptance Procedures Other Agencies - Concur in project, commit to funding or participation
Programming Data to TPD	Submits PA, schedule and budgets to TPD for evaluation			TPD and Project Rating Team - Evaluate projects TPD and PPC - Review ratings, select new projects and recommend tentative program.
5-Year Program	Monitors			Transportation Board - Review,

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

	process			hold hearings and adopt projects into 5-Year Program
Preliminary Design Phase Project Work Plan (PWP)	Coordinates preparation of PWP	Reviews TL estimates	Prepares scope, Estimates activity duration and resource requirements	P ² S ² - Processes schedule and resource requirements
Project Design Phase Schedule	Verifies Programmed Schedule			P ² S ² - Prepares program schedule, adjusts project schedules to balance resources
Schedule and Resource Allocation; ADOT and Consultant Assignments				CDSE/PRB - Confirms program schedules and resource allocations
Final Design Phase PWP	Coordinates final Design PWP		Prepare final Design PWP	P ² S ² - Processes final PWP schedule

END OF PROJECT SCOPING PHASE TASK RESPONSIBILITIES

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

C.2 DESIGN PHASE AND PRE-CONSTRUCTION ACTIVITIES TASK RESPONSIBILITIES

PM's Work Load Review and Assignment		SPMS reviews workload, recommends PM		CDSE - Confirms or appoints PM
Project Objectives and Current Conditions Review	Organizes and conducts review meeting			District - Attends meeting Initiating Agency - Attends meeting
Project Team Work Load Review and Assignment	Concurs in team nominees	Review work load and Assign new Technical Leaders if required		
PA/DCR/ Envir Doc Review	Organizes and leads review		Review PA/DCR/ Envir Doc	
PA/DCR/ Envir Doc Update as Required. (Return to Conc Des Phase if new reports required)	Coordinates update; Advise CDSE if new PA/DCR/Envir Doc required		Update PA/DCR/ Envir Doc	
Design PWP Revisions as required	Coordinates revisions and advises P ² S ² of			P ² S ² - Processes changes to Design PWP

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

	changes			
Early Start Field Investigations	Coordinates early start assignments		Obtain rights of entry and perform field investigations	
Design Consultants Selection and Contracts (if required)	Provides scope and schedule to ECS and assists in selection and negotiation		Assemble consultant scope from PWP; assist in selection and negotiation	ECS - Administers consultant selection process
Permits for Consultant Work in ADOT R/W	Initiates Request for Permits			District - Provides permits
Project Design Quality Plan	Coordinates preparation of Quality Plan		Adapt technical unit quality plan for project	
Draft Joint Project Agreements	Coordinates preparation			ECS - JPA Branch prepares draft agreement Participating Agencies - Review draft agreement
Design Team Kick-Off Meeting	Organizes and conducts meeting		Technical leaders participate	
All-Agency Design	Initiates meeting and		Participate	Partnering Office - Coordinates meeting

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

Partnering	participates			Outside Agencies - Participate
Field Review, if Required	PM determines need and organizes meeting		Participate	District - Participates Outside Agencies - Participate
Final Joint Project Agreement	Monitors JPA processing			ECS - JPA Branch coordinates JPA processing
Pre-Initial Design Stage	Coordinates Project Team and monitors project objectives and progress	Monitor technical preparation of studies, designs and reports	Prepare studies, designs and reports	
Pre-Initial Design Review (15%) and Comment Resolution	Coordinates review and comment resolution	Monitor adherence to Unit Quality Plan	Review material and resolve comments	
Value Analysis	Determine if Value Analysis is Appropriate			Value Engineer - Conduct value analysis
Initial Design Stage	Coordinates Project Team and monitors project objectives and progress	Monitor technical preparation of studies, designs, plans and reports	Prepare studies, designs, plans, reports, quantities and	

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

			cost estimates	
Construction Cost Estimate Comparison with Program	Compares cost estimate with programmed cost		Investigate cost reduction measures, if required	
Program Cost, Schedule Revisions	Advises P ² S ² of any recommended cost, schedule revisions			CDSE - Reviews, resolves PM cost, schedule recommendations PPC - Reviews, resolves programming changes
Initial Design Review (30%) and Comment Resolution	Coordinates review and comment resolution	Monitor adherence to Unit Quality Plan	Review material and resolve comments	
Preliminary Design Stage	Coordinates Project Team and monitors project objectives and progress	Monitor technical preparation of studies, designs, plans and reports	Prepare studies, designs, plans, reports, special provisions, quantities and cost estimates	
Final Right-of-Way Requirements	Coordinates development of R/W needs		Establish final R/W requirements	
Construction Cost Estimate	Compares cost estimate with		Investigate cost reduction	

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

Comparison with Program	programmed cost		measures, if required	
Program Cost, Schedule Revisions	Advises P ² S ² of any recommended cost, schedule revisions			CDSE - Reviews, resolves PM cost, schedule recommendations PPC - Reviews, resolves Program changes
Preliminary Design Review (60%) and Field Review	Coordinates review	Monitor adherence to Unit Quality Plan	Review material	
Comment Resolution	Coordinates comment resolution		Resolve comments	
Final Right-of-Way Documents	Coordinates preparation		R/W prepares documents	
Final Engineering Reports	Coordinates preparation		Finalize and seal reports	
Final Design Stage	Coordinates Project Team and monitors project objectives and progress	Monitor technical preparation of studies, designs, plans and reports	Prepare studies, design, plans, reports, specifications, quantities and cost estimates	

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

Final Design Review (95%) and Comment Resolution	Coordinates review and comment resolution	Monitor adherence to Unit Quality Plan	Review material and resolve comments	
Revisions to Joint Project Agreements	Monitors revisions and finalization			ECS - JPA Branch coordinates JPA revisions and final processing
Complete Plans and Specifications	Coordinates completion		Complete plans, specifications and estimates; sign and seal	
Construction Cost Estimate Comparison with Program	Compares cost estimate with programmed cost, locates additional funds, if required			CDSE - authorizes reprogramming of project if cost estimate over program limits
PS&E Package to C&S with Clearance Documents	Transmits all documents to C&S		C&S review package and verify completeness	
Construction Funds Availability	PM verifies funds available and obligated			
Approval to	Approves	C&S approves		Assistant State Engineer -

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

Advertise	project for advertisement	project for advertisement		Approves project for advertisement FHWA - Approves project for advertisement
Project Advertisement for Bids, Addenda	Coordinates addenda	C&S advertises project and issues addenda	Assist in preparing addenda	
Pre-Bid Conference	Determines need and coordinates conference. Coordinates responses to questions on bidding documents	District Engr attends and supports RE	C&S and District recommend pre-bid conference and attend. Respond to questions on bidding process and Standard Specifications	
Contractor Site Visits	Coordinates responses to questions on bidding documents	DE may attend, supports RE	Conducts sites visits	
Accept Bids	Coordinates analysis of bid prices		C&S conducts bid opening	
Award				Transportation Board - Awards

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

				contract
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END OF DESIGN PHASE AND PRE-CONSTRUCTION ACTIVITIES

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

C.3 CONSTRUCTION PHASE TASK RESPONSIBILITIES

Pre- Construction Conference	Attends meeting and coordinates responses to scope intent questions	District Engineer may attend, supports RE	RE coordinates conference and leads meeting; Project Team designer attend and respond to questions	
Partnering Conference	Attends meeting and participates	District Engineer may attend, supports RE	RE coordinates conference and leads meeting	
Weekly Meetings	Attends as schedule allows or when required for scope/design discussions	DE attends form time-to- time	Coordinates and conducts meeting, maintains records on discussions, action items, and pending issues	
Construction Administration	Monitors scope, budget and milestone schedule; coordinates	Supports RE in administering construction contract and maintains	Supervises inspection, quality assurance documentation	

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

	Team responses to questions on intent of plans and specifications	balance for Contract Administration in District	and acceptance of work; communicates with PM regarding status of work	
Post-Design Services	Coordinates and monitors Team review of shop drawings, specialty items, etc.		Receives material for review from contractor; forwards to Team with response date	
Contract Changes	Approves any contract changes which affect project scope, milestone schedule, or current construction budget; coordinates Team review of proposed design changes	Provides guidance or direction to RE on changes and approves all supplemental agreements	Advises PM of all contract changes involving scope, milestone schedule, or budget; approves changes within empowerment; develops technical analysis and negotiates cost of change	
Claims	Advises on	Second level	First level of	

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

	scope and design and determines need for action against consultants on design issues	of Escalation Process to resolve conflicts	Escalation Process to resolve conflicts;	
Final Inspection	Attends if schedule permits	Attends project walk-through and prepares final acceptance letter to contractor	RE coordinates final inspection; prepares punch list based on walk-through	District Maintenance Engineer - May attend final inspection of unusual projects
Partnering Closeout Conference	Attends to receive feedback on construction issues and recommendations for constructability improvements	DE attends to critique project successes and failures	Coordinates and leads meeting; prepares evaluation of project	

END OF CONSTRUCTION PHASE

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

C.4 OPERATION AND MAINTENANCE PHASE TASK RESPONSIBILITIES

Final Inspection of Construction Project	Assists Maint Engr in O&M review and in identifying remedial action		Maint Engr reviews constructed project for potential O&M issues	
Project General Operation and Maintenance Observations	Coordinates review of project O&M issues and responds to Maint Engr; assists Maint Engr in remedy if required		Maint Engr monitors constructed project for O&M issues	Special Programs Section - Receives O&M issues from District; general issues forwarded to Tech Manager; project issues forwarded to PM
Project First-Year O&M Review	Attends O&M review; responds to project O&M issues		Maint Engr organizes and conducts First-Year Review	Maint Foreman - Attends O&M review; discusses O&M history of project; Special Programs Section - Reviews general O&M issues
Partnering Session on General O&M Issues		District Engr, involved TM's participate	Maint Engr participates	Special Programs Section - Organizes and conducts session on general O&M issues

ACTIVITY	RESPONSIBILITY			
	PROJECT MANAGER	TECHNICAL MANAGER	TECHNICAL LEADER	OTHER

END OF OPERATION AND MAINTENANCE PHASE

APPENDIX D
PROJECT DEVELOPMENT PROCESS
FLOW CHARTS

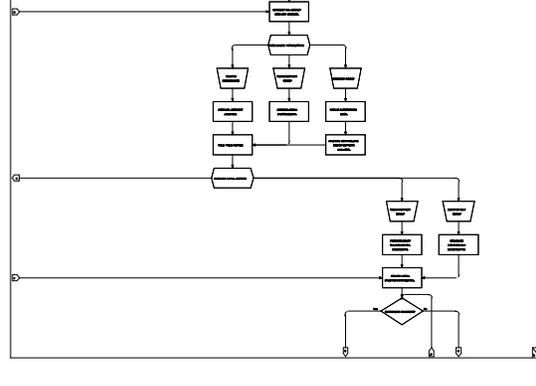
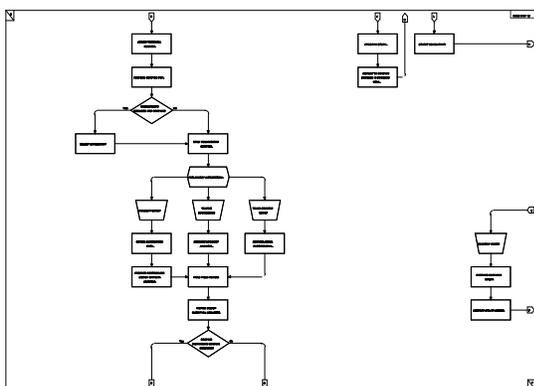
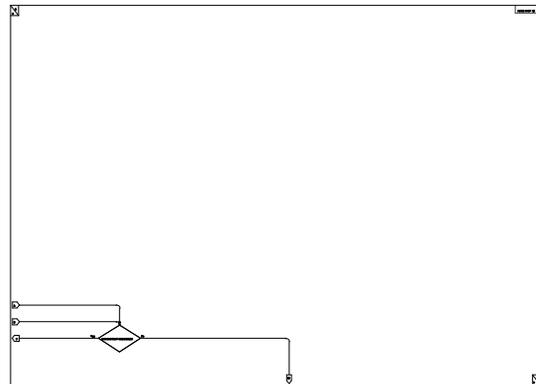
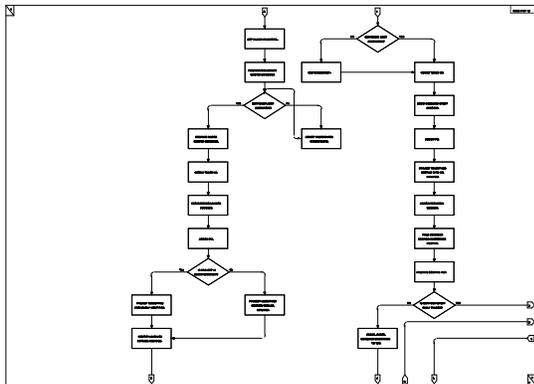
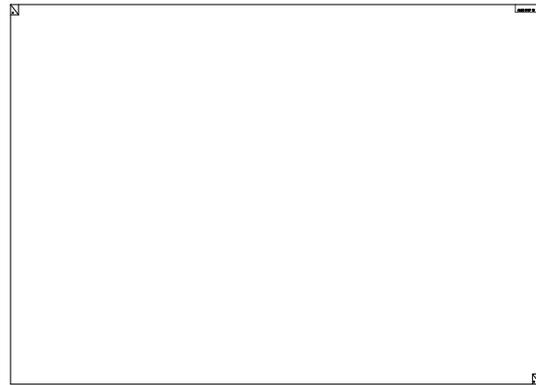
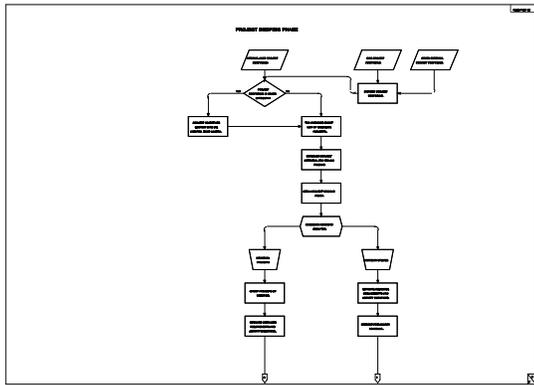
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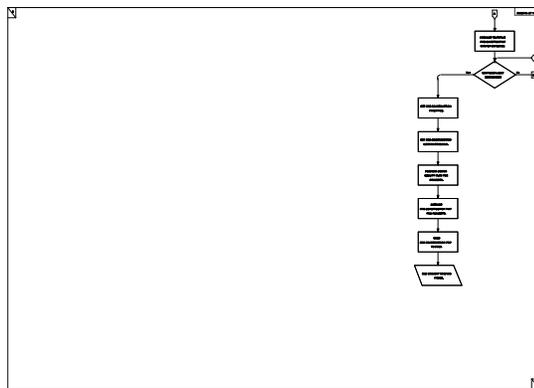
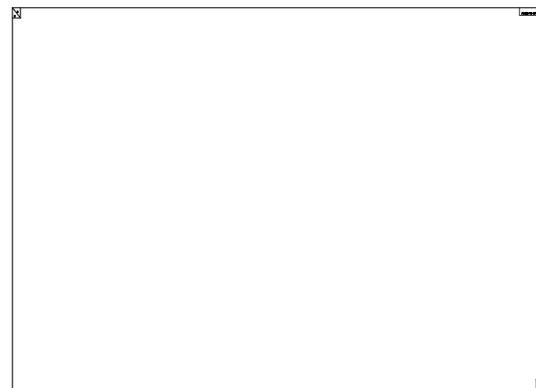
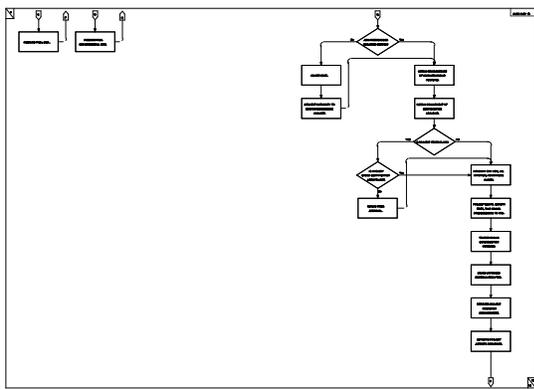
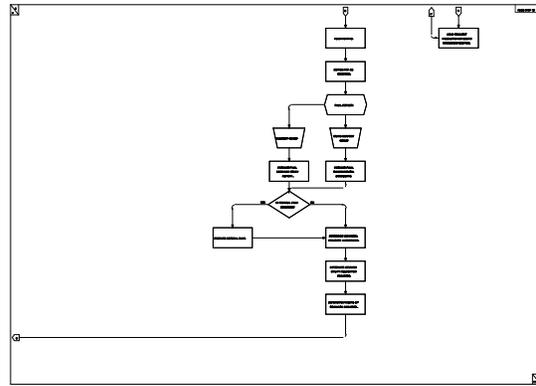
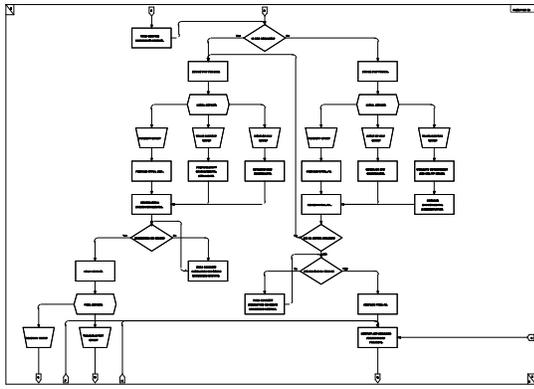
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D.1. PROJECT ISSUE RESOLUTION PROCESS

D.2. SCOPING PHASE





D.3. DESIGN PHASE AND PRE-CONSTRUCTION ACTIVITIES

