

Maricopa County Department of Transportation

PROJECT

Development MANUAL



May 2016

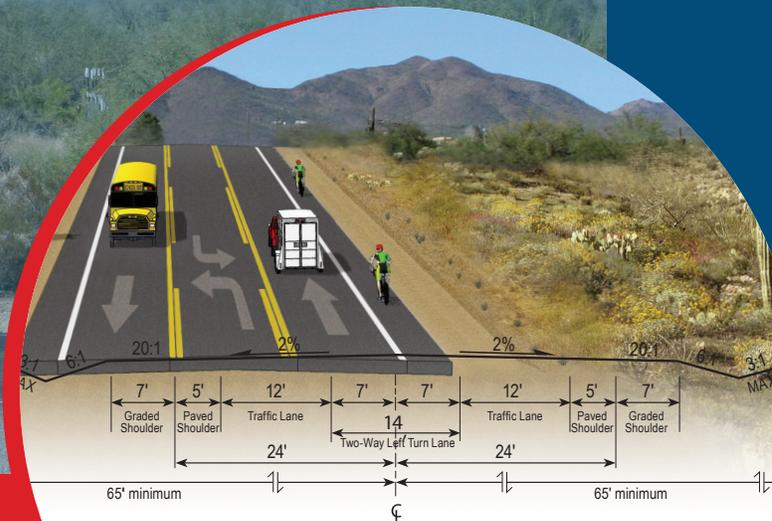




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SUMMARY OF CHANGES FOR THE PROJECT DEVELOPMENT MANUAL

The manual has been modified to combine all volumes in to one document. Below is a summary of revisions made for the Project Development Manual.

Revisions – Sections:

- Section 1 New Introduction section is provided.
- Section 2 Renamed Volume I to be Section 2.
- Section 3 New Planning section has be added.
- Section 4 Renamed Volume III to be Section 4.
- Section 5 Renamed Volume IV to be Section 5.
- Section 6 Renamed Volume V to be Section 6.
- Section 7 Remaned Volume II to be Section 7.

Revisions – Figures:

All figures were renamed to coincide with the section numbers.

Revisions – Tables:

All tables were renumbered to coincide with the section numbers.

Revisions – Appendices:

All appendices were renumbered to coincide with the section numbers.



1 INTRODUCTION

All projects must follow the published Transportation Improvement Program (TIP) project delivery process. The Project Development Manual (PDM) is developed to streamline the delivery of all TIP projects and make them consistent. The PDM details all aspects of project development from inception to completion.

The Maricopa County Department of Transportation (MCDOT) has a core purpose to provide connections that improve people's lives. The TIP program contains a variety of project types which, when completed, will directly align with MCDOT's purpose.

The PDM stipulates the documentation requirements and encourages transparency and accountability. The goal of this organizational support is to enable the Project Manager (PM) to achieve his/her goal of successful Project Management and to enable the Project Team to achieve its goal of successful Project Development and delivery. This goal aligns with the other goals of the MCDOT Project Development process. The process will help deliver projects efficiently by utilizing teamwork and accountability.

The PDM will guide the user through the development of pertinent documents and plans. This manual is not intended to explain the engineering design process or specific design requirements, nor is it an exhaustive listing of all potentially pertinent project data, information, or criteria. This manual is intended to be used as a guideline for the development of required documentation. As all engineering projects are unique, each project will require that the professional(s) developing the requisite document exercise professional judgment when determining what items must be included. For additional information regarding the engineering design process or specific design requirements, refer to the MCDOT Roadway Design Manual (RDM) and all other MCDOT design manuals located on MCDOT's website. For additional drainage design requirements, refer to the Flood Control District of Maricopa County manuals located in the Flood Control District website. For additional Federal requirements refer to the Federal-Aid Manual.

1-1 Overview

MCDOT projects are identified through multiple resources. Resources may include, but are not limited to the following: warrant studies, safety studies, traffic studies, planning studies, maintenance inspections/needs. These studies are performed routinely as a normal process of business.

Every five years MCDOT updates the Transportation System Plan (TSP). The TSP performs both a capacity based (impacted by population growth) and an operational needs analysis (maintenance, intersection, safety). This network review identifies short-, mid-, and long-range roadway improvements for further consideration and programming. Typically, short-range improvement needs proceed to Tier 1 project rating, while mid- and long-range improvement needs advance to planning level studies resulting in recommendations for future considerations. Once a need is identified potential projects are entered into the Project Rating System (PRS) to determine project priority. Based upon the results of the needs analysis and the PRS results, recommendations are made for inclusion into the TSP. Project inclusion for the TIP is based



upon the previously mentioned recommendations as well as any newly identified maintenance, warrant studies, and operational or safety needs.

The TIP project delivery process stipulates that all requests for initiation of a new project must be endorsed by a MCDOT division manager or a member of top management (i.e., Transportation Director or Board of Supervisors) and submitted in writing to the Project Review Committee (PRC). Once submitted, each request will be placed on the PRC agenda for the next available meeting. The person submitting the request will then present the project to the PRC for review. If approved by the PRC, the project will proceed to the scoping process. MCDOT utilizes the scoping process to achieve better engineered solutions, optimized prioritization, appropriate programming of projects, and ultimately, higher percentage delivery rates and program stability due to fewer unknowns. The scoping process will only begin if the project is approved by the PRC. After the Scoping Phase is complete the project is again analyzed in the Project Rating System (PRS). Selected projects will then advance to Final Design and construction after receiving approval from the PRC.

The following figure illustrates the complete TIP Project Development Process:

Figure 1-1 - TIP Project Development Process

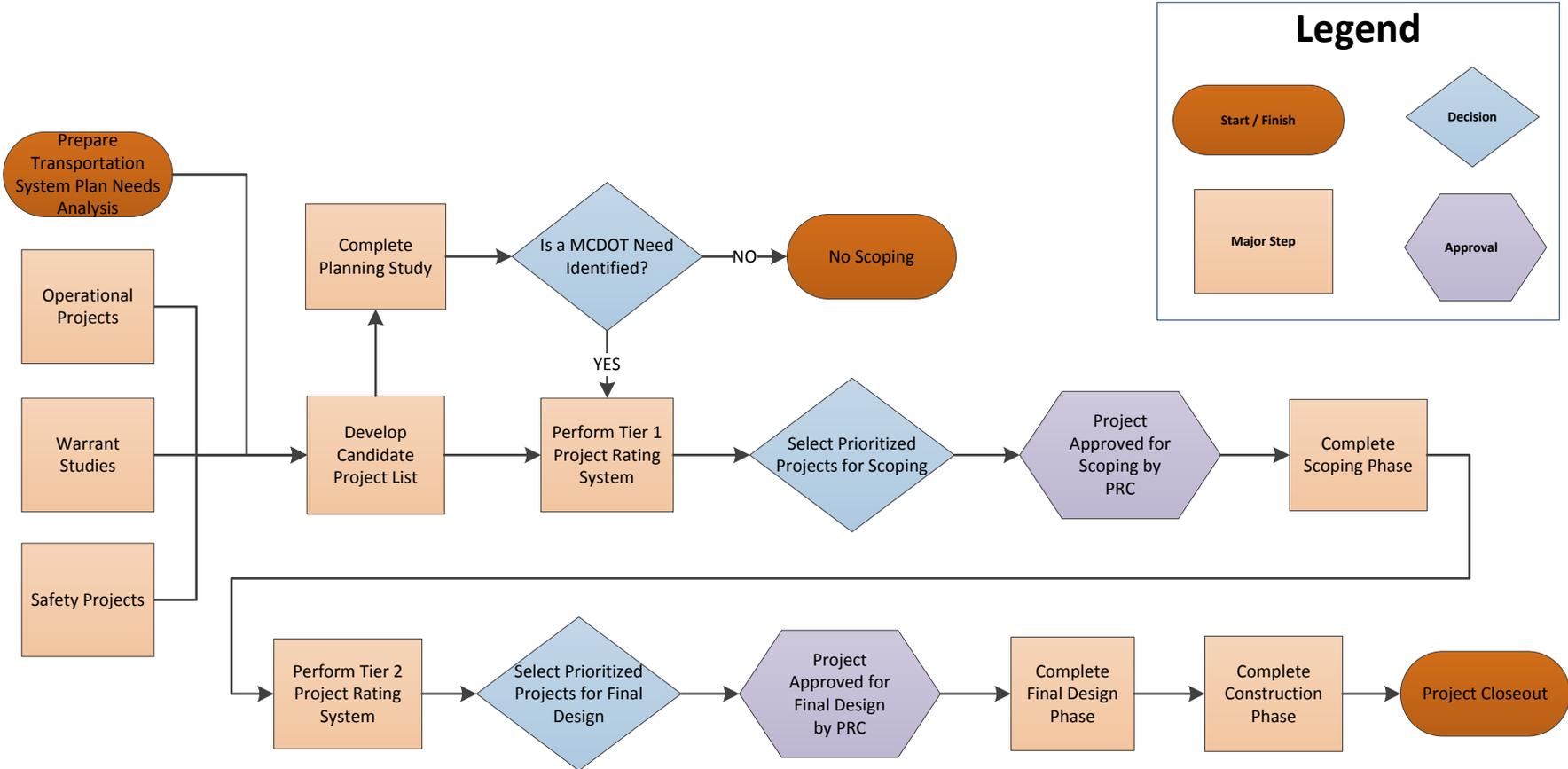


Table 1.1 is a list of abbreviations found within the PDM.

Table 1-1 – List of Abbreviations

Abbreviation	Definition
AASHTO	American Association of State Highway and Transportation Officials
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADT	Average Daily Traffic
APE	Area of Potential Effect
ASCE	American Society of Civil Engineers
AZPDES	Arizona Pollutant Discharge Elimination System
CE	Categorical Exclusion
CLOMR	Conditional Letter of Map Revision
CMAR	Construction Management at Risk
CVS	Certified Value Specialist
D	Directional Distribution Factor
DTM	Digital Terrain Model
EA	Environmental Assessment
ED	Environmental Determination
EID	Environmental Identification Document
EIM	Environmental Identification Memorandum
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
GIS	Geographic Information System
HSM	Highway Safety Manual
IGA	Intergovernmental Agreement
ITS	Intelligent Transportation System
JOC	Job Order Contract
K	Design Hour Traffic Factor
LOS	Level of Service
MCDOT	Maricopa County Department of Transportation
MP	Mile Post
MSAT	Mobile Source Air Toxins
MUTCD	Manual on Uniform Traffic Control Devices
NEPA	National Environmental Policy Act



Abbreviation	Definition
NHI	National Highway Institute
PDM	Project Development Manual
PISA	Preliminary Initial Site Assessment
PLZ	Potential Wildlife Linkage Zone
PM	Project Manager
PMO	Project Management Office
PRC	Project Review Committee
PRS	Project Rating System
PS&E	Plans, Specifications and Estimate
PWP	Project Work Plan
QA	Quality Assurance
QC	Quality Control
QL	Quality Level
RFP	Request for Proposal
R/W	Right of Way
RDM	Roadway Design Manual
SAC	Stakeholder Advisory Committee
SAVE	Society of American Value Engineers
SDR	Scoping and Design Report
SOC	Summary of Comments
SOW	Scope of Work
SWPPP	Stormwater Pollution Prevention Plan
T	Truck Factor
TAC	Technical Advisory Committee
TCE	Temporary Construction Easement
TIP	Transportation Improvement Program
TM	Technical Memoranda/Technical Memorandum
TSM	Transportation Systems Management Division
TSP	Transportation System Plan
USGS	United States Geological Survey
VE	Value Engineering
WBS	Work Breakdown Structure
WUS	Waters of the United States



1-1.1 CHANGES TO THE MANUAL

The original Microsoft Office Word document of this manual is maintained by the Transportation Systems Management Division. Recommendations for corrections, revisions, or additions to this manual should be submitted to the Transportation Systems Management Division. Prior to the start of each fiscal year, the Transportation Systems Management Division Manager will review the recommendations for possible inclusion in the next update of the manual.

Additional information and requests for additions and updates to the PDM should be forwarded to:

Transportation Systems Management Division Manager

Maricopa County Department of Transportation

2901 W. Durango Street

Phoenix, AZ 85009

(602) 506-8600

2 ADMINISTRATION

This section provides definitions and roles to clarify the terms used in the PDM and identifies the responsibilities of all parties involved in project development. This section has also been assembled to provide the PM and the Project Team with all the administrative tools necessary to carry out a project.

2-1 Definitions and Roles

2-1.1 DEFINITIONS

2-1.1.1 Project

A project is a process with clearly defined start and end time, a prescribed task list, management structure, and a budget. A project is undertaken to accomplish a well-defined goal or objective.

2-1.1.2 Project Management

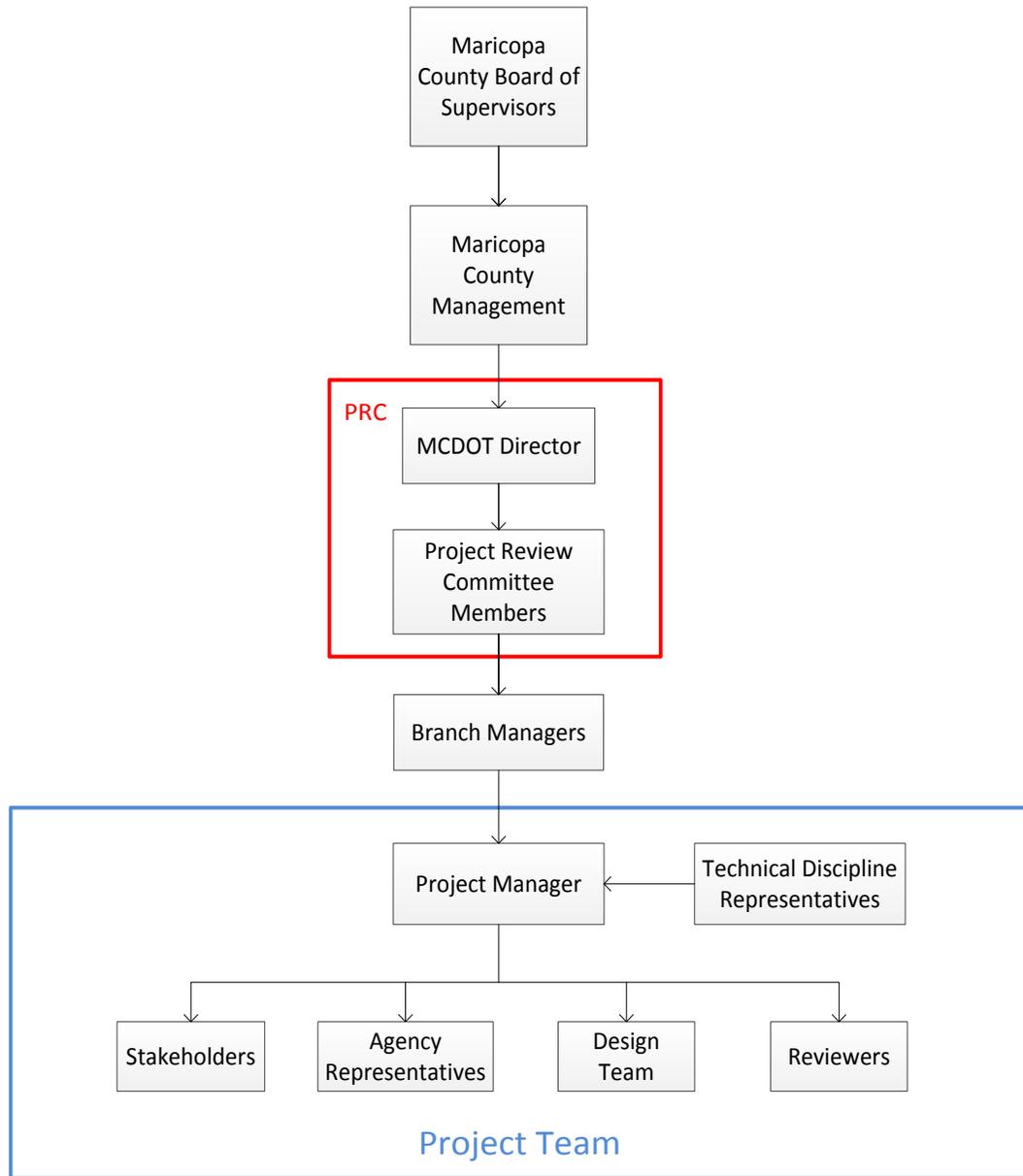
Project Management encompasses all of the processes, techniques and tools associated with initiation, planning, executing, controlling and closing a project. It involves directing the activities associated with a project while controlling limited resources in an efficient and effective manner while ensuring that the end goal is successfully achieved.

Successful project management requires establishing processes for organizational planning and communication, availability of techniques and tools that support management processes, and a culture that values cooperation, teamwork and planning.

2-1.2 ROLES AND RESPONSIBILITIES

Figure 2-1 provides the team structure of the MCDOT Project Development process.

Figure 2-1 – Team Structure



2-1.2.1 Project Manager

The PM is the individual who leads the project and the project team within the approved scope, schedule and budget. The PM is primarily responsible for project planning, the quality of the project's deliverables and the successful completion of the project. The PM is assigned early to initiate planning and start-up processes. Although it is uncommon, it is possible for a different PM to be responsible for each major project process.

The PM requires general knowledge of basic management principles, practices, concepts, techniques, tools and skills, including the ability to work well with people, take responsibility to lead a group and make decisions.

Other PM responsibilities include, but are not limited to:

- Approving documentation requirements;
- Identifying and acquiring resources through the Division Managers and MCDOT Leadership Team;
- Ensuring staff proficiency and productivity;
- Leading the project team, promoting teamwork and being result oriented;
- Establishing and maintaining quality in a project;
- Developing project success criteria and constraints;
- Ensuring project documents are filed;
- Developing a detailed Project Work Plan, tailoring and defining scope of work(SOW), schedule, and budget to reflect the project's needs;
- Ensuring that all members of the team are in agreement with the Project Work Plan and requirements;
- Ensuring that management, the public, affected state organizations and consultants understand and follow the designated plan and processes;
- Finalizing the project scope, schedule and budget;
- Identifying project deliverables;
- Managing resources assigned to the project and assigning work packages;
- Ensuring project QA/QC (Quality Assurance/Quality Control) plan is implemented;
- Conducting monthly progress meetings;
- Regularly reviewing the project status, comparing budget to actual values and presenting them to the PRC;
- Regularly updating the status of TIP projects in the TIP Project Status Tracking tool;
- Ensuring that the Project Scope Schedule and Budget are updated and submitted for approval, as needed;
- Ensuring a timely response to issues that affect projects success;
- Participating in major reviews and performing the QA reviews;
- Participating in communicating all changes to the stakeholders;
- Updating project risks and establishing prevention and mitigation procedures, as required;
- Obtaining public and management approval of the final deliverables;

- Closing out the project;
- Coordinating Requests for Information (RFI) during construction; and
- Conducting Lessons Learned sessions.

2-1.2.2 Stakeholder

A stakeholder is defined as a person or organization that is actively involved in the project or whose interest may be positively or negatively affected by the execution or completion of the project. A stakeholder may also exert influence over the project and its deliverables. The identification and input of stakeholders helps to define, clarify, change, and contribute to the planning and the success of the project.

Stakeholders include, but are not limited to:

- The Public, defined as the person, persons or organization using the product, service, or result of the project;
- Federal and State Agencies;
- Utility Companies; and
- Local agencies who are interested in the success of the project.

The Public is to be considered an important stakeholder. Without input from the public community, projects are likely to fail. Having project goals based on public input increases the likelihood of success for a given project.

The main responsibility of a Stakeholder is to provide information about the project. Other Stakeholder responsibilities include, but are not limited to:

- Attending Stakeholder Meetings;
- Identifying relevant issues and potential solutions; and
- Contacting the PM and Communication Team for project information.

2-1.2.3 Design Lead

The Design Lead is the one who leads the design of the project and the Design Team. The Design Lead is primarily responsible for developing and submitting project deliverables associated with design. The Design Lead works closely with the PM to make sure the project is progressing smoothly and issues are resolved and decisions are made in a timely manner. The Design Lead works with the technical support staff from each discipline.

The main responsibility of the Design Lead is to lead the Design Team in meeting project goals. Additional Design Lead responsibilities include, but are not limited to:

- Assisting the PM in implementing project policies and procedures;
- Assembling the Design Team;
- Maintaining Design Team proficiency and productivity;
- Leading the Design Team, promoting teamwork and being result oriented;
- Delivering quality in a project;
- Keeping the PM informed of all issues;
- Providing the PM with monthly progress reports; and

- Adhering to the project Scope, Schedule and Budget.

2-1.2.4 Division Manager

A Division Manager is the Manager of a Maricopa County Department division. The Division Manager's main responsibility is to ensure the project goals are met and to provide final approval. The Division Manager provides direction on project conflicts.

2-1.2.5 Transportation Systems Management Division Manager

The Transportation Systems Management (TSM) Division Manager works with the Project Management Branch Manager to select the PM and assists in the staffing effort. TSM Division Manager's responsibilities also include, but are not limited to:

- Monitoring project methodologies/practices;
- Reviewing and approving project management procedures;
- Communicating the project purpose and values to the executive management;
- Directing changes to the organization's project management culture;
- Providing oversight and direction to projects lacking satisfactory performance;
- Supervising organizational project management maturity;
- Preparing the organization for strong project management;
- Monitoring that Lessons Learned sessions are taking place; and
- Approving project methodology changes and PDM updates.

2-1.2.6 Branch Manager

The Branch Manager is the Manager of a branch of a Division. The Branch Manager's main responsibility is to coordinate the assignment of a Technical Discipline Representative at the startup of a project. Additional Branch Manager responsibilities include, but are not limited to:

- Serving as a liaison between the Division Manager and the Technical Discipline Representative;
- Making sure that the Technical Discipline Representatives are providing input required for the project;
- Participating in major reviews; and
- Assisting the PM in implementing project procedures.

2-1.2.7 Project Management Branch Manager

The Project Management Branch Manager selects the PM to be assigned to a project at startup. The Project Management Branch Manager's responsibilities also include, but are not limited to:

- Managing the PM team;
- Monitoring project progress and status;
- Overseeing project management procedures are followed;
- Communicating the project purpose and values to the assigned PM;
- Implementing changes to the organization's project management culture;
- Providing oversight and direction to projects lacking satisfactory performance;

- Supervising the use of the PDM on TIP projects; and
- Coordinating with TSM Division Manager on project methodology changes and PDM updates.

2-1.2.8 Project Team

The Project Team is responsible for producing the project deliverables, assisting the PM in the planning effort and making commitments to complete the project within the established project scope, schedule, and budget. The success of a project is dependent on the Project Team contributing to the PWP and accepting responsibility for the completion of assignments. The other stakeholders should interact with the Project Team to ensure that requirements are correctly implemented.

The Project Team includes groups or individuals including but not limited to:

- Project Manager;
- Stakeholders;
- Agency Representatives;
- Technical Discipline Representatives;
- Design Team (MCDOT staff or Consultant); and
- Reviewers.

Other responsibilities of the Project Team include but are not limited to:

- Implementing deliverables within budgeted cost, scope and schedule;
- Identifying possible solutions to project problems within the established project scope, schedule and budget;
- Providing detailed justification for when the scope, schedule and budget must be changed;
- Notifying PM when project budget for their deliverables will be exceeded or not used;
- Assisting in giving updated status and reports along with recommendations;
- Supporting project planning and tracking activities;
- Providing general estimates for developing deliverables;
- Assisting in development of Technical Memoranda, reports and documents;
- Developing approach and associated estimates and schedules;
- Assisting in the implementation of a QA/QC plan;
- Identifying productivity tools for the project;
- Coordinating balance in work duties and performance;
- Submitting status reports to the PM;
- Conducting work using management processes;
- Reviewing QA results and correcting any deviations;
- Assisting in development of project deliverables;
- Identifying risks;
- Participating in change reviews; and
- Participating in Lessons Learned seminars.

The Design Team consists of Designers from various disciplines that are responsible for collaborating in developing solutions for the project. MCDOT staff or a selected Consultant may be used on a project by project basis. The Design Team is led by the Design Lead. The Design Team compiles the project deliverables associated with design.

Other responsibilities of the Design Team include but are not limited to:

- Developing Technical Memoranda, reports and documents;
- Developing approach and associated estimates and schedules;
- Using productivity tools identified for the project;
- Submitting status reports to the Design Lead;
- Performing QC on own work;
- Developing Technical Memoranda;
- Reviewing QA results and correcting any deviations; and
- Developing project design deliverables.

Additionally the Project Team (Reviewers) is responsible for QA. QA ensures that the required project management processes and design standards are followed. The QA team will conduct audits to verify the quality of the work on the project, followed by feedback to the design team which will include suggestions or discrepancies found.

2-1.2.9 Consultant

A Consultant is a resource which MCDOT has the ability to use as a part of the complete design team for a project. The responsibilities of a Consultant match that of the Design Team and may also include:

- Fulfilling tasks identified in project specific SOW;
- Coordinating with MCDOT Technical Discipline Representatives; and
- Preparing and documenting of project status meetings.

2-1.2.10 Technical Discipline Representative

The Technical Discipline Representative is the person assigned to the Project by the Branch Manager. Technical Discipline Representatives make the project team complete. The main responsibility of Technical Discipline Representatives is to provide information to the Project Team about the project aspects that fall under the disciplines expertise. When a project is completed with in-house staff of the Technical Discipline Representatives then this role may also be identified as the Discipline Representative.

Additional responsibilities of the Technical Discipline Representatives include, but are not limited to:

- Attending Progress Meetings;
- Developing Technical Memoranda;
- Serving as the main contact person for the discipline; and
- Keeping the Branch Manager and the PM informed of the projects progress.

Specific Technical Discipline Representatives may also be called a Coordinator, such as Environmental Coordinator, Utility Coordinator, R/W Coordinator, Communication Coordinator, and Federal Aid Coordinator.

2-1.2.11 Reviewer

The reviewer is a discipline expert assigned to review project deliverables. A Reviewer can be a Technical Discipline Representative.

The reviewers are responsible for ensuring that MCDOT policies and design standards are followed by all organizations. The reviewers are responsible for reviewing proposed projects, contracts, and other project commitments. Project review can be conducted by either an internal team specified by the PM or an external team.

Additional responsibilities of the Reviewer include, but are not limited to:

- Reviewing design deliverables;
- Reviewing deviations from standards and policies;
- Providing consistent and non-conflicting review comments among MCDOT reviewers through internal communication;
- Providing review comments that reflect the level of the design submittals;
- Reviewing the goals and objectives for the project;
- Designing a checklist of areas to be examined and measured;
- Giving feedback to the PM and MCDOT Leadership Team concerning findings;
- Documenting findings for the project;
- Reviewing and verifying that MCDOT QC processes are followed;
- Communicating violations of the standards;
- Reviewing processes that are used for estimating and planning;
- Verifying that MCDOT and project policies are followed;
- Verifying deliverables for conformance to policy and procedures;
- Evaluating if polices are implemented successfully; and
- Verifying that deliverables meet specifications.

2-1.2.12 MCDOT Leadership Team

The MCDOT Leadership Team is responsible for making high-level project decisions including establishing the need for projects and conducting reviews and assessments. They are responsible for aligning the strategic plans, establishing project goals and ensuring the project is consistent with plans. Other MCDOT Leadership Team responsibilities include but are not limited to:

- Prioritizing needs and including them in the organization strategic plan; and
- Reviewing/Approving commitments to external entities.

2-1.2.13 Project Review Committee

The PRC is responsible for project initiations and approvals. **Figure 2-1** provides the visual relationship of the team structure. Responsibilities include but are not limited to:

- Ensuring that sufficient resources are available to conduct projects;

- Ensuring that funding is available to the project; and
- Regularly participating in decision making meetings.
- Monitoring changes to the Project scope, schedule and budget; and
- Reviewing and approving changes in contract commitments.

The voting team members of the PRC include:

- MCDOT Director;
- Real Estate Division Manager;
- Engineering Division Manager;
- Transportation Systems Management Division Manager;
- Permit, Construction, and Inspection Division Manager;
- Maintenance Division Manager; and
- Capital Improvement Program (CIP) Manager.

The non-voting team members of the PRC include:

- Board of Supervisors Liaison;
- Infrastructure Technology Center (ITC) Division Manager;
- Ombudsman;
- Communications Manager;
- Administrative Services Division Manager; and
- Finance Division Manager.

The PRC team charter is defined in **Table 2-1**:

Table 2-1 – PRC Team Charter

Element	Definition	Focus
Purpose (core question) and deliverables	Reason the project team exists	To determine if any new TIP initiative requests should be recommended for authorization. To establish project priority and programming for scoped projects. To approve project scope, schedule and budget change requests.
Organizational requirements, boundaries and constraints	Set boundaries, constraints and requirements	To follow project development procedures and abide by the escalation process to evaluate changes to the project development procedures.
Expectations	Set expectations	Decisions should be made in the best interest of MCDOT and Maricopa County residents. Effective team work, no silos, true commitment, skillful professionalism. No hidden agendas. Be on time. Listen effectively. Be fair and honest. Act decisively on issues presented. Be present at each meeting or send a qualified substitute. Actively work to ensure annual business metrics are met.



Element	Definition	Focus
History and business case	Brief history of the situation leading to the forming of the project team. Business case addresses organizational relevance and urgency [financial, growth/re-alignment, service and culture]	This team was formed as a process improvement to ensure that MCDOT meets the performance measure goal for project delivery. All projects will go through a formal Scoping Phase to obtain a detailed Scoping document (including Scoping plans), including scope, time estimation or schedule and an accurate cost estimate (budget) before it goes back to the PRC. Scoping leads to better engineering solutions, prioritizing and programming which leads to a higher % delivery rate and program stability, because there are fewer unknowns. Once the project is Scoped, this committee is better able to prioritize, program and budget based on more accurate and detailed information. The process improvement allows for an agency collaborative decision to move projects from Scoping into design and construction, with the Director’s knowledge and approval. The final design phase allows for the refinement of the scoped design and to obtain the project clearances necessary to prepare for the solicitation of bids and ultimately construction.
Authority and accountability	Identifies what decisions the team can make and to who they are accountable	Authorized to recommend requests for approval by the Director. Authorized to recommend priority, sizing and program timing of scoped projects for approval by the Director. Authorized to approve project scope and budget adjustment requests. Authorized to recommend project scope changes and budget adjustments. Accountable to the Director.
Team and roles	Names	<p>Chair: Director</p> <p>Role: Receive written requests, obtain clarifications, schedule to next meeting, distribute meeting agendas and written requests in advance, assign PM, facilitate meeting discussions, document decisions and actions, circulate and track status of written request, prepare minutes and distribute. Initiate project to the assigned PM.</p> <p>Team Members: Refer to previous section for PRC members.</p> <p>Roles: Receive agendas and written requests from facilitator, be prepared to discuss and support MCDOT’s best interest at next scheduled meeting, seek understanding and clarification, and be prepared to vote</p>

Element	Definition	Focus
		if necessary.
Approach	General approach or methods to be used to achieve purpose.	Formal monthly 1-hour meeting. Meeting agenda is prepared and distributed one week in advance of the meeting. Meeting minutes are prepared and distributed within 3-days of the meeting. Decisions are made by majority vote, if a consensus cannot be reached. Minimum decision quorum is 4 voting members.

2-1.3 BOARD OF SUPERVISORS

The Maricopa County Board of Supervisors approves the annual TIP budget and agreements between MCDOT and other entities. In addition, responsibilities include the approval of bid solicitations and contracts.

2-2 Administration

The administrative element of the Project Development process consists of several templates, forms and check lists. The following sections are provided to describe their purpose, scope, and how and when to use them.

2-2.1 PRC REQUEST FORM

The PRC Request Form is an electronic form to be completed by the PM after the PWP is completed for both the Scoping and Final Design phases of a project. The PRC Request Form is located on MCDOT’s SharePoint site. Information documented in the PWP will become the source of information to complete the PRC Request form. The purpose of this form is to provide information to the PRC in a clear and detailed manner to enable a decision to be made.

2-2.2 MEETING TEMPLATES

The Project Manager or the Design Lead will use these templates for each project meeting which is to be held on a regular basis with the Project Team. The Progress Meeting Agenda, Notes and Sign-In Sheet templates located in **Appendix 2-A** shall be used to document progress meetings and set a minimum standard of information expectation. More information may be added as necessary.

Major elements required:

- Make the project schedule milestones evident, status of clearances and the status of critical issues needing upper management guidance;

- Meeting notes are distributed to project team members. The team members are to make branch and divisional managers aware of the issues and to document team member participation, or the lack thereof; and
- Critical issues needing upper management guidance will not be lost and the status of major clearances which can delay bid advertising will be covered in every mandatory minimum, monthly project progress meeting.

Steps to Complete:

The steps to complete for the Project Manager/Design Lead include:

- Fill out project information;
- Mark “N/A” or remove if a discipline is not applicable appropriate;
- Coordinate with Project Team members to get their input;
- Record notes during the meeting and get attendance information;
- Distribute completed Agenda, Notes and Sign-In Sheet to the Project Team; and
- Retain copy in project file.

The steps to complete for the Project Team include:

- Review Agenda, Notes and Sign-In Sheet for accuracy;
- Provide any corrections or updates;
- Work on Action Items assigned; and
- Report the status of the Action Items.

2-2.3 PROJECT FILING

The purpose of project filing is to track project related information through the project development process and to file documents which will be archived at the conclusion of the project. All TIP projects shall file project related documentation electronically using a standard file structure within MCDOT’s SharePoint Project Site and network drive site. The network drive site (Y Drive) will be used for all CADD files. At the conclusion of the project, files that are located within the Project Site in SharePoint will be public record and archived. **If a public records request is received for a project only sealed and final documents are to be provided. Documents and plans which are still under development are not to be provided to a records request.**

Documents that are defined as public record include, but are not limited to:

- Meeting agendas and minutes;
- Comment resolution minutes;
- Signed IGA documents;
- Email correspondence;
- Signed and sealed project submittal documents;
- Contracts and change orders;
- Construction documentation; and
- Construction as-built plans.

The PM is responsible to ensure all final documents are accounted for and filed in the appropriate location in the Project Site on SharePoint. During construction the Construction Manager is responsible to ensure all construction related documents are accounted for and filed in the appropriate location in the Project Site on SharePoint. Technical Discipline Representatives are responsible for the working files which are used to ultimately create the final documentation. The working files will be filed using a standard file structure that is located within the discipline's SharePoint site.

Project file names are to include the project number; ADOT TRACS number (if necessary); Project Name; description of file; and date (YYMMDD).

Upon conclusion of each project development phase, the documentation located in the Project Site on SharePoint will proceed to follow MCDOT's archiving process.

2-2.4 DESIGN EXCEPTIONS

All design elements which do not meet minimum MCDOT design standards require a design exception. Refer to the MCDOT Roadway Design Manual for the required steps to obtain design exceptions. All design exceptions are required prior to the submittal of the 60% Stage and shall be distributed to all reviewers. The PM is responsible for filing approved design exceptions forms into the project file on SharePoint.

2-2.5 SUMMARY OF COMMENTS

The Summary of Comment (SOC) template located in **Appendix 2-B** is to be used by those choosing or assigned to review project deliverables including but not limited to; document, reports, plans, specifications and estimates. All fields must be filled in with the discipline, item identifying information, Reviewer's name, and the comment. Comments will be collected and compiled into a consolidated SOC Form compiled by the PM or the Design Lead. The initial disposition will be coded as A (will comply), B (consultant/designer to evaluate), C (MCDOT team to evaluate) or D (design team recommends no further action), along with the action required, by the appropriate Designer and will be submitted to the PM for Review. The PM will be responsible to send the consolidated SOC back to the Reviewer before the Comment Resolution meeting is held.

Following a resolution, each comment marked B or C shall be changed to either A or D with remarks providing adequate information concerning the evaluation. In the Final SOC, each comment must have a written explanation describing the action to be taken. In addition, the SOC form also records the initials of the Designer addressing the comment.

The SOC Form should accompany each subsequent submittal for review. This should shorten review time and help clarify the reason behind the final disposition. Reviewers should be able to go directly to the comments and read/verify what action has been taken by looking at the revised project submittal.

Review comments should be completed by each functional area and should reflect the level of design and stage of the submittal. Only one set of review comments should be submitted by each functional area. If more than one reviewer reviews a document the comments should be consolidated and only one set of comments should be submitted by the functional area.

Steps to Complete:

The first step for the Project Manager/Design Lead to complete is:

- Provide SOC form with each project submittal.

The next steps to complete for the Reviewer include:

- Fill out information at top of form;
- Enter each comment separately;
- For each comment:
 - List item number and description;
 - Enter your comment with a reason/justification;
- Forward SOC form and any marked up submittal material, as appropriate, to the PM by the due date; and
- Attend comment resolution meeting.

Comments contain two elements – the “what” that needs to be changed and the “why” it needs to be changed. Be specific change “Maricpa County” to “Maricopa County”: Reason Misspelled. Use words like “Delete”, “Add”, and “Change”.

The reason for each change should be brief yet specific, “Misspelled”, “Quantity wrong”, “Incorrect specification”.

Personal preferences are not appropriate review comments.

The next steps for the PM to complete include:

- Collect forms from reviewers;
- Consolidate comments, resolving and clarifying any comments not understood or between conflicting MCDOT functional areas;
- Review each comment with the designer;
- Schedule a review comment resolution meeting and return the initial disposition of comments to the reviewers a minimum of two days prior to comment resolution meetings;
- Chair comment resolution meeting;
- Work to resolve conflicts with functional areas;
- If necessary, follow Project Issue Escalation process;
- Report final resolution to Project Team. If code “B” is entered, complete evaluation and report result to Project Team;
- Ensure comments are incorporated into document being reviewed; and
- Make sure all comments at the end of the process are A or D.

The next steps for the Designer to complete include:

- Review each comment with PM;
- Complete initial disposition column with appropriate disposition action code;
- Attend comment resolution meeting;
- Review each comment with Project Team and Reviewers;
- Agree on correct disposition;

- If code “C” is entered, complete evaluation and report result to Project Team;
- Complete form with final disposition and justification; and
- Address comments such that at the end of the review process all comments are A or D.

NOTE: Each comment must have a disposition action code.

2-2.6 PROJECT ISSUE ESCALATION

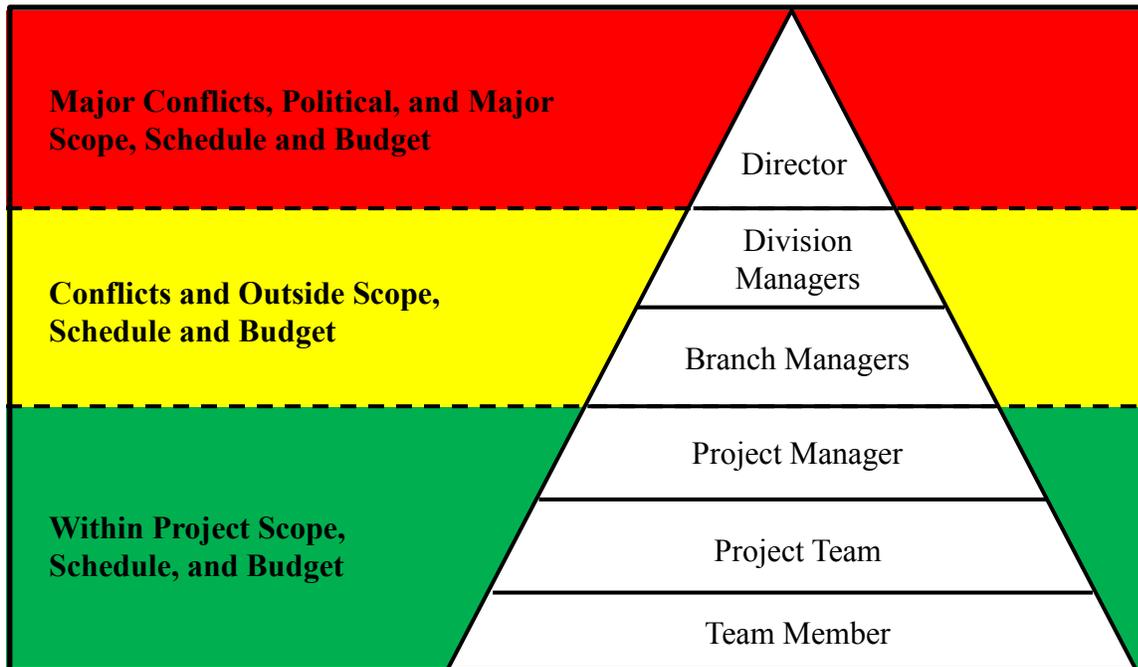
A Project Team member should follow these guidelines when there is an issue that the Project Team cannot resolve themselves and if not resolved quickly will impact the project scope, schedule or budget. The Project Team should make every effort to resolve issues within the team. The team should not delay unnecessarily to elevate an issue that could be resolved with higher level assistance and avoid impacting the project scope, schedule or budget.

If an issue cannot be resolved within the Project Team then the PM will escalate the issue to the Project Management Branch Manager and the Branch Manager of the discipline related to the issue. The Division Manager(s) would be informed of the issue and may need to provide guidance on the resolution. If a resolution is determined with the Division Manager(s) approval the PM will communicate the information back to the Project Team.

If an issue cannot be resolved at the Division Manager level then the Division Manager(s) will present the issue to the Director for a resolution and potentially present to the PRC for a final resolution.

Figure 2-2 is provided to show the issue escalation process steps:

Figure 2-2 – Issue Escalation Process



2-2.7 PROJECT SCOPING APPROVAL

The project Scoping Phase in itself is a complete process and has a defined end. The Scoping Phase needs to finish before the Final Design Phase can start. The Scoping Approval signifies that the Scoping efforts are complete and approved. This requires approval from the Division Managers and the Director.

The form located in **Appendix 2-C** will be used by the Project Manager when the final scoping documents are complete on a project.

The approval is needed from the MCDOT Director, after recommendation from the following Division Managers:

- Real Estate Division Manager;
- Engineering Division Manager;
- Transportation Systems Management Division Manager;
- Permit, Construction, and Inspection Division Manager; and
- Maintenance Division Manager.

After receiving approval on the Scoping Phase and confirmation has been made that the project is justified to continue to final design, the PM will notify the TSM Division Manager and the Planning Branch Manager that the project is ready to be prioritized as part of the Project Rating System.

2-2.8 PROJECT CHANGE APPROVAL GUIDELINES

The final deliverables for the Scoping Phase defines the project scope, duration of final design and construction and costs which is then used to develop the PWP and PRC request for final design and construction. The scope, schedule and budget that are presented to the PRC for approval is defined as the baseline for both the scoping or final design and construction phase.

The PM is responsible for managing requests for a change in the SOW and the project team is not to proceed with a scope change unless directed by the PM. The PM will request approval from the PRC for scope changes.

The PRC is responsible for change management processes including identifying changes to the project and ensuring that they are carefully managed. The PRC will review all scope, schedule and budget change requests for all TIP projects. The PRC request can be submitted for an individual project when the changes meet the threshold requirements. On a quarterly basis a PRC request will be submitted for consent approval that may include multiple projects that have minor scope, schedule, budget changes that do not meet the threshold requirements. As compared to the baseline of a project the threshold for a project change that requires PRC approval as an individual request includes but is not limited to:

- Scope:
 - Change in project termini, right-of-way width, drainage/retention footprint and/or functional class or type (rural to urban);
 - Additional through lanes required;

- Right-of-way requirement changes after right-of-way requirements are established and acquisition has begun;
- IGA or other agreement cancelled or substantially changed;
- Pavement structure change after 30% plans; and
- Change in type of structure (e.g. replacing dip crossing with culvert or bridge).
- Budget and Schedule:
 - Budgeted line item extending or shifting out of current fiscal year or scheduled year;
 - Contract cost change greater than \$50,000 or 10%, whichever is less; and
 - Total project cost change greater than \$100,000 or 10%, whichever is less.
- Other:
 - Environmental mitigation requirements that could have budget and schedule impact;
 - Right-of-way cost per acre increase that impacts the budget;
 - Addition of a larger drainage structure of the same type that impacts the budget; and
 - Engineering changes which provide value to the project and that impacts the budget.

2-2.9 SEALED PS&E COMPLIANCE

Final Design completion is dependent on the completion of the design plans, specification and estimates. Once all comments are addressed in the 100% documents the designer submits the Sealed construction documents. It is the responsibility of the PM to make sure that the plans are checked for compliance with the 100% comments disposition. The Project Team members shall assist the PM in this task and provide their input where needed.

2-2.10 PROJECT APPROVAL FOR BID

Final Design is a complete process and has a defined end. Final Design needs to complete before construction can start. The Project Approval for Bid signifies that the Final Design efforts are complete and approved and the results of Final Design are recommended for construction and bidding process or JOC fee negotiation can start. This requires approval from the Division Managers and the Director.

The form found in **Appendix 2-D** will be used by the PM to obtain the approval from the following:

- Director;
- Real Estate Division Manager;
- Engineering Division Manager;
- Transportation Systems Management Division Manager;

- Permit, Construction, and Inspection Division Manager; and
- Maintenance Division Manager.

The signed form will be filed for records and the PM will continue into the advertisement and bidding process or if a JOC delivery method is used then the PM will hold the construction hand-off meeting.

The PM is responsible for preparing the documents necessary to be included in an advertisement package. The following information is to be provided to the MCDOT Office of Procurement Services staff to prepare the advertisement package:

- Bidding schedule;
- Environmental memorandum;
- Informational material (cross sections, geotechnical reports, location maps, etc.);
- List of principal items (major items listed on bidding schedule);
- Signed and sealed special provisions;
- Signed and sealed plan sheets;
- Signed and sealed engineers estimate;
- Board of Supervisors bid authorization approval;
- Project bidding range;
- Project number(s) (ADOT, FHWA, if applicable);
- DBE goal (if necessary); and
- Date of the bid advertisement.

If the project is to be constructed using federal funding then the advertisement package is to be included in an obligation package that will be submitted to ADOT. The PM is to work with the Federal Aid Coordinator to prepare the obligation package.

2-2.11 PHASE AND PROJECT CLOSE-OUT

A close-out process is performed once the project objectives have been met, or if the Project Sponsor determines that the project should be concluded or cancelled. The Project Close-Out Checklist for Scoping and Final Design should be completed by the PM with sections marked “N/A” as appropriate. Scoping Project Close-Out Checklist is located in **Appendix 2-E** and the Final Design Project Close-Out Checklist is located in **Appendix 2-F**. The PM is to coordinate with the construction manager to verify the status of project close-out when the project is in the Construction Phase. The construction manager will initiate the project close-out process. The PM is to verify with the construction manager the status of items including, but not limited to:

- Lessons learned meeting;
- All IGA partner(s) have been billed;
- Record documents archived;
- IGA partner(s) payments have been received;
- All Contracts closed;
- Federal-Aid close-out;
- Condemnation status; and
- Annexation status.

It is important to monitor both the administrative and contract closure of the project, both of which are part of the project close-out. It is imperative that communication between these two sides of close-out takes place continuously throughout this final stage.

2-2.12 PROJECT COMPLETION

The PM should close-out the project phase once all goals, objectives, and deliverables have been met. The close-out phase of a project is very important for documenting the completion of the project and to prevent the project from moving beyond its original scope and budget, as defined in the PWP. The Construction Manager is responsible for the construction phase close-out.

In order for the project to be considered complete, completed deliverables and documents considered as a record must be transferred to OnBase for archive. A thorough documentation of the project, including lessons learned information should be completed by the PM, Construction Manager and the Project Team and all contracts and work assignments closed with the certificate of performance on file. The Construction manager is to notify the Financial Service staff of project completion.

2-2.13 PROJECT CANCELLATION

If it is determined that the project should be cancelled or otherwise concluded prior to construction completion, the PM should determine a logical and effective work stoppage date and immediately notify all project team members, stakeholders and participants. In coordination with the MCDOT Office of Procurement Services, all consultants and contractors should be officially notified of the cancellation in accordance with their respective contract requirements. Copies of all stop work letters should be placed in the project file. Also any outstanding commitments such as condemnations or annexations that have not been completed need to be noted and communicated to appropriate staff for tracking.

The PM should determine the total cost involved in halting all project activities. Those costs should be shared with the project team and Project Sponsor. The latest versions of all relevant project documentation should be placed in the project file. A thorough documentation of the project, including lessons learned information should be completed by the PM and the Project Team.

2-2.14 LESSONS LEARNED

A “lessons learned” session should be held after substantial completion occurs during construction and at the Project close-out to informally measure the performance of the Project Team. The PM is to initiate contact with the construction manager regarding the status of the lessons learned session. The construction manager is responsible to hold this session and invite the members of the Project Team and Stakeholders. Lessons learned sessions are a valuable closure mechanism for Project Team members, regardless of the project’s success. Some typical topics to discuss in such a session include:

- Did the delivered project meet the specified requirements and goals of the project;
- Was the customer satisfied with the end product;
- Were cost budgets met;
- Was the schedule met;

- Were risks identified and mitigated;
- Did the project management methodology work;
- What could have been done to improve the process;
- What bottlenecks or hurdles were experienced that impacted the project;
- What procedures should be implemented in future projects;
- What can be done in future projects to facilitate success; and
- What changes would assist in speeding up future projects while increasing communication?

The lessons learned session provides a forum for the attendees to express their satisfaction or dissatisfaction with the management, progress and conclusion of the project. Such a session provides official closure to a project. It also provides for team member recognition and offers an opportunity to discuss ways to improve future processes and procedures. The PM should document the lessons learned session and send the results to the affected Branch Managers.

3 PLANNING

3-1 Introduction

The Transportation Systems Planning Branch (Planning Branch) identifies roadway improvements to meet the needs of County residents now and into the future. Through methods such as the Transportation System Plan (TSP), State of the System Report (SOS) and Project Rating System (PRS), and other short-, mid- and long-range planning studies, the Planning Branch prioritizes and recommends projects for programming based upon need and available funding.

In an effort to ensure MCDOT is evaluating the roadway network with regional connectivity in mind the Planning Branch strives to bring together stakeholders from cities and towns, Maricopa Association of Governments (MAG), Arizona Department of Transportation (ADOT), utility companies, Indian Communities, and other entities for coordination of short-, mid-, and long-range plans.

This chapter is not intended to explain the entire planning process or project requirements, nor is it an exhaustive listing of all potentially pertinent project data, information, or criteria. All planning projects are unique; each project will require the use of professional judgment in developing the SOW.

3-2 Planning Reports

The Systems Planning Branch generates reports that are cyclical in nature. These reports assist in identifying needs for the roadway network and result in recommendations for the next step in roadway development. Sections 3-2.1 through 3-2.3 describe typical reports (not all typical reports are included).

3-2.1 TRANSPORTATION SYSTEM PLAN (5 YEAR CYCLE):

The MCDOT TSP identifies short-, mid-, and long-range roadway improvements and is updated on a five-year cycle. This process is completed by performing both a capacity based (impacted by population growth) and an operational needs analysis (maintenance, intersection, and safety). Once a need is identified potential projects are entered into the PRS to determine project priority. Typically, short-range improvement needs proceed to Tier 1 project rating, while mid- and long-range improvement needs advance to planning level studies resulting in recommendations for future considerations. Based upon the results of the needs analysis and the PRS results, recommendations are made for inclusion into the TSP. Project inclusion for the TIP is based upon the previously mentioned recommendations as well as any newly identified maintenance, warrant studies, and operational or safety needs.

3-2.2 STATE OF THE SYSTEM REPORT (ANNUAL CYCLE):

The SOS Report is a compilation of the physical inventory and the status of MCDOT's transportation system infrastructure. The transportation system includes roads, bridges, bicycle facilities, traffic signals, and other facilities. The SOS Report documents the performance and condition of the Major Routes and Streets Plan (MSRP) described in Section 3-2.3.

3-2.3 MAJOR STREETS & ROUTES PLAN (2-3 YEAR CYCLE):

The MSRP is a street classification map designating functional classifications for arterial and collector County roadways. Functional classifications are determined by utilizing national classification criteria, MCDOT Service Volume thresholds, and regionally accepted growth rates.

3-3 Planning Studies

Planning studies are typically the first glimpse at a potential project. As such, there are varying levels of planning evaluations and studies. Planning Studies are a high level evaluation of the corridor and provide exhibits that typically do not exceed a 15% design level. The following list of study types may not include all types of planning studies.

- ***Candidate Assessment Reports:*** Candidate Assessment Reports (CARs) are used to evaluate a specific improvement (canal crossing, roadway improvement, low volume road analysis, etc.), typically less than one mile in length.
- ***Corridor Improvement Study:*** A Corridor Improvement Study (CIS) evaluates the need for improvements in the case where a roadway either exists entirely or exists with gaps in connectivity and the study corridor is greater than one mile in length. Recommendations may include short-, mid-, and long-range needs.
- ***Feasibility Study:*** A Feasibility Study (FS) evaluates a potential corridor in circumstances when there is limited, gapped, or non-existing right-of-way. Results of this type of study can include an identified roadway alignment allowing MCDOT and other jurisdictional agencies the ability to preserve right-of-way for the future roadway.
- ***Small Area Transportation Study:*** A Small Area Transportation Study (SATS) is used to study an existing or potential network of roadways servicing a designated area, usually in a rural community. This allows for MCDOT and other jurisdictional agencies to plan appropriately for the future roadway network.
- ***Regional Transportation Study (RTS):*** A Regional Transportation Study (RTS) focuses on regional connections between multiple communities, jurisdictional agencies, and unincorporated Maricopa County. The purpose of this study is to ensure preservation of future right-of-way in the face of development. This study may include multiple partners.

3-3.1 STUDY ELEMENTS

Planning studies typically include the following elements:

- Existing and future conditions;
- Environmental overview;
- Drainage overview;
- Development and evaluation of candidate alignments;
- Detailed preferred alignment;
- Public outreach;
- Phasing plan (when appropriate); and
- Planning level project costs.

3-3.2 STUDY OBJECTIVES

The primary objectives of a planning study are to:

- Evaluate and determine need;
- Clearly define and assess the study area for strategic issues identification;
- Develop and evaluate candidate alternatives or alignments within the study area;
- Recommend a preferred alternative or alignment;
- Subsequently define characteristics of the preferred alignment in greater detail; and
- Identify and include opportunities for project partnerships.

Planning Studies combined with the results of the PRS score (explained in Section 1) set the tone for the next step in project development determining the necessity for a potential project to move to the scoping phase.

3-4 Project Rating System

Project Rating Systems are used by city, county, regional, and state transportation departments to prioritize identified roadway improvements. The MCDOT PRS has been used since 1998; the original PRS has been updated a few times keeping the process in line with current needs and goals. The PRS is designed to assist in determining a true need to move forward with a proposed project. Utilizing target scores, both in individual categories and overall scoring, MCDOT is able to evaluate a project based upon five categories. The PRS categories are as follows:

- **Traffic Volumes and Congestion:** Average Daily Traffic (ADT) is compared to roadway level of service expectation to define the volume-to-standard (V/S) ratio for both existing and future conditions.
- **Safety:** The crash rate is calculated using the latest three years of crash data on County roadways as provided by ADOT. The number of crashes is then averaged based upon number of County owned roadway miles.
- **Cost per Future Vehicles Mile of Travel:** The estimated project cost, length of roadway to be improved, and number of users anticipated to benefit from the improvement are combined to determine an estimated cost per vehicle miles of travel.
- **Land Use:** The roadway type and category of adjacent land use is defined by the adopted TSP and MSRP.
- **Regional Travel:** The role the project plays in supporting regional travel is determined based on the percent of all trips on the roadway segment more than 10 miles long.

The PRS is used multiple times through the project development process. The following describes each tier of the PRS.

- **Tier 1 - Initial Conception of Project:** When a project is identified through any means (TSP, warrant study, citizen report, etc.), planning level information is gathered and entered into the PRS. The resulting score will assist in determining the need to move to the next step in project development; next steps may include a planning level study, traffic study, safety study, or scoping and design report.
- **Tier 2 - Completion of Initial Report:** Once a report is completed, as identified in Tier 1, the information from that report is fed into the PRS for a secondary scoring. This score will assist in determining the need to move toward design and construction.

- ***Tier 3 - Revised Information:*** If at any point after the Tier 2 process, project information changes (project limits, cost, PRS factors) the updated information may be processed through the PRS to revise the score.

Note: All data collected for each PRS element must be obtained through the Systems Planning Branch. This will ensure accuracy in rating projects by providing data that is comparable.

3-5 Project Programming

The planning process is an integral part of the project programming process. Through the process of the TSP, MCDOT can establish the need for projects in time frames of 5, 10, and 20 years. This allows comparison and prioritization based upon need and anticipated funding.

4 SCOPING

4-1 Project Scoping

It is MCDOT's intent that the scoping phase activities produce a well-defined engineering approach to solving a transportation issue with a reasonable life-cycle cost considering the impacts to the environment, the community, and the County as a whole. The project scoping phase includes all activities necessary to advance a project from its conception as a solution to a transportation need through its acceptance into the TIP.

Refer to Figure 1-1 in Section 1 for the complete TIP Project Development Process.

4-1.1 PROJECT SCOPING GOALS

Project scoping is the first step in the engineering analysis and design. Project scoping sets up the project for the final design phase and the goals of scoping are to:

- Clearly identify purpose and need of the project;
- Establish risks and solutions and preliminary project footprint;
- Identify estimated project costs; and
- Estimate project schedule.

Therefore, the objectives of the project scoping are to develop and deliver the following:

- Scoping Plans;
- Scoping Document;
- Utility Conflicts and Pot-holes;
- Right-of-Way (R/W) limits;
- Environmental Documentation;
- Technical Memoranda (as necessary);
- Identify Potential Need for Intergovernmental Agreements (IGAs) or other agreements;
- Constructability Review and Preliminary Construction Phasing; and
- Value Engineering (VE) recommendation.

Table 4-1 shows typical deliverables and necessary project information throughout the Scoping Phase development. The Project Work Plan (PWP) for Scoping prepared by the PM and discipline representative for the project will identify all project specific requirements and submittals. Refer to Section 7, Project Management, for more details on the PWP requirements.



Table 4-1– Scoping Development

DISCIPLINE	SCOPING PHASE		
	Candidate Alternatives Stage (15%)	Draft Scoping Stage (25%)	Final Scoping Stage (30%)
Design	<ul style="list-style-type: none"> ▪ Design Criteria ▪ Candidate Alternatives Plans ▪ Design Documentation ▪ TM: Draft Alternatives Analysis 	<ul style="list-style-type: none"> ▪ TM: Final Alternatives Analysis ▪ Draft SDR ▪ Recommended Alternative Plans ▪ Design Documentation 	<ul style="list-style-type: none"> ▪ Final Scoping Plans ▪ Final Scoping Document (Sealed) ▪ Design Documentation
Land Survey	<ul style="list-style-type: none"> ▪ Topographic Mapping and Monuments (as needed) ▪ Establish coordinate system per RDM ▪ Land Survey Centerline 	<ul style="list-style-type: none"> ▪ Supplemental Mapping and Monuments (as needed) 	<ul style="list-style-type: none"> ▪ Final Proposed Roadway Features ▪ Final Land Surveyed Monument Centerline
Traffic	<ul style="list-style-type: none"> ▪ TM: Draft Traffic Analysis 	<ul style="list-style-type: none"> ▪ TM: Final Traffic Analysis 	<ul style="list-style-type: none"> ▪ TM: Sealed Traffic Analysis
Environmental	<ul style="list-style-type: none"> ▪ Preliminary Environmental Analysis 	<ul style="list-style-type: none"> ▪ Preliminary Environmental Analysis ▪ Environmental clearance for Geotechnical, Utilities or Traffic (if required) 	<ul style="list-style-type: none"> ▪ TM: Final Environmental Documentation
Drainage	<ul style="list-style-type: none"> ▪ Preliminary Drainage Analysis 	<ul style="list-style-type: none"> ▪ TM: Draft Drainage Report 	<ul style="list-style-type: none"> ▪ TM: Sealed Drainage Report
Structures		<ul style="list-style-type: none"> ▪ TM: Draft Structures Report 	<ul style="list-style-type: none"> ▪ TM: Sealed Structures Report
Utilities	<ul style="list-style-type: none"> ▪ Utility Identification ▪ Preliminary Utility Conflicts 	<ul style="list-style-type: none"> ▪ Utility Conflicts Determination ▪ TM: Draft Utility Report 	<ul style="list-style-type: none"> ▪ Utility Conflicts Determination ▪ Pot-holes List ▪ Prior Rights Determination ▪ TM: Final Utility Report



DISCIPLINE	SCOPING PHASE		
	Candidate Alternatives Stage (15%)	Draft Scoping Stage (25%)	Final Scoping Stage (30%)
Geotechnical		<ul style="list-style-type: none"> TM: Draft Geotechnical and Pavement Design Report 	<ul style="list-style-type: none"> TM: Sealed Geotechnical and Pavement Design Report
Public and Stakeholder Involvement		<ul style="list-style-type: none"> Initial Public Stakeholder Involvement 	<ul style="list-style-type: none"> Final Public and Stakeholder Involvement
Right-of-Way	<ul style="list-style-type: none"> Preliminary R/W Width 	<ul style="list-style-type: none"> Draft R/W Requirements TM: Draft R/W Report 	<ul style="list-style-type: none"> R/W Requirements Preliminary R/W Limits TM: Final R/W Report
Other		<ul style="list-style-type: none"> Project Implementation and Master Schedule Preliminary Constructability Review 	<ul style="list-style-type: none"> Identified needs for IGAs or other agreement Constructability Review Value Engineering (if required) Preliminary Construction Phasing Project Implementation and Master Schedule

The scoping document and the scoping plan, upon completion, will enter into the MCDOT PRS. The PRS contains the following evaluation criteria:

- Traffic Volumes and Congestion
- Safety
- Cost Per Future Vehicles Miles of Travel
- Land Use
- Regional Travel

Successfully meeting the goals for scoping and design plans helps MCDOT continue to develop the TIP and also ensures an efficient project delivery throughout the subsequent phases.

4-2 Project Scoping Document

The first priority for any project, prior to being approved for scoping by the PRC, is to determine the appropriate type of analysis, design and environmental evaluation. The PWP defines the SOW for each project and will be developed by the PM and the discipline representatives.

4-2.1 PROJECT DELIVERY METHOD

It is important to understand that the project delivery method may alter the course of Scoping. The PM and discipline representatives will discuss the project delivery method when developing the PWP for the Scoping Phase. On all projects, Scoping will proceed to the Draft Scoping stage. Once the Recommended Alternative is selected by the project team, the Construction Branch Manager in consultation with the PM and the project team will confirm the construction delivery method. Some of the construction delivery methods that may be considered include:

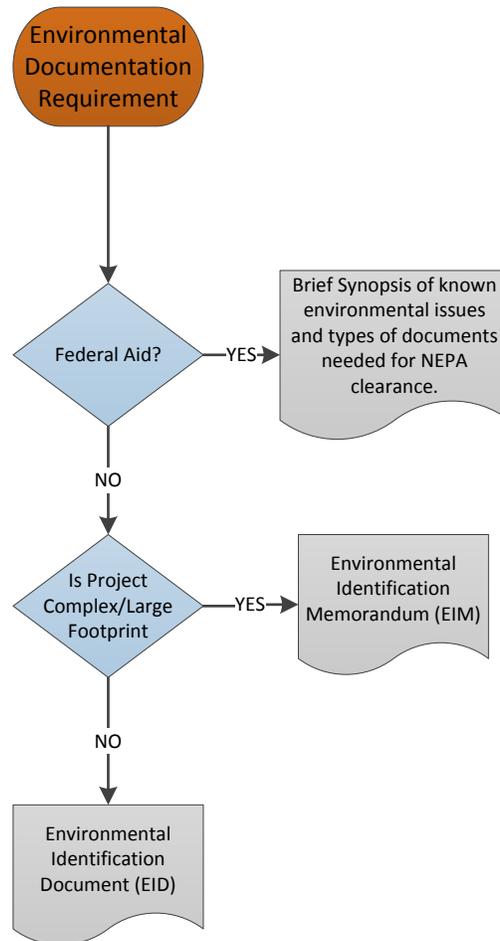
- In-house Construction;
- Design-Bid-Build;
- Design-Build;
- Construction Manager at Risk (CMAR); and
- Job Order Contracting (JOC).

Based on the construction delivery method, the subsequent Scoping and Final Design may need some adjustment. These adjustments shall be made considering the objectives of the project.

4-2.2 ENVIRONMENTAL DOCUMENT LEVEL DETERMINATION

The level of environmental documentation must be determined by the environmental team in consultation with the PM when developing the PWP for the Scoping Phase. The flowchart in **Figure 4-1** will assist in determining the necessary environmental documentation needed during the Scoping phase.

Figure 4-1 – Environmental Scoping Documentation Determination Flowchart



4-2.3 SCOPING AND DESIGN REPORT

The Scoping and Design Report (SDR) is intended to meet the goals identified in the Project Scoping Goals Section.

The project’s scope, proposed schedule, and budget will be established with the SDR. Additionally, the project study area, existing and known future project features, existing and future traffic, environmental data (including mitigation), R/W requirements, and existing utilities (including prior rights status) shall be identified and summarized within the SDR.

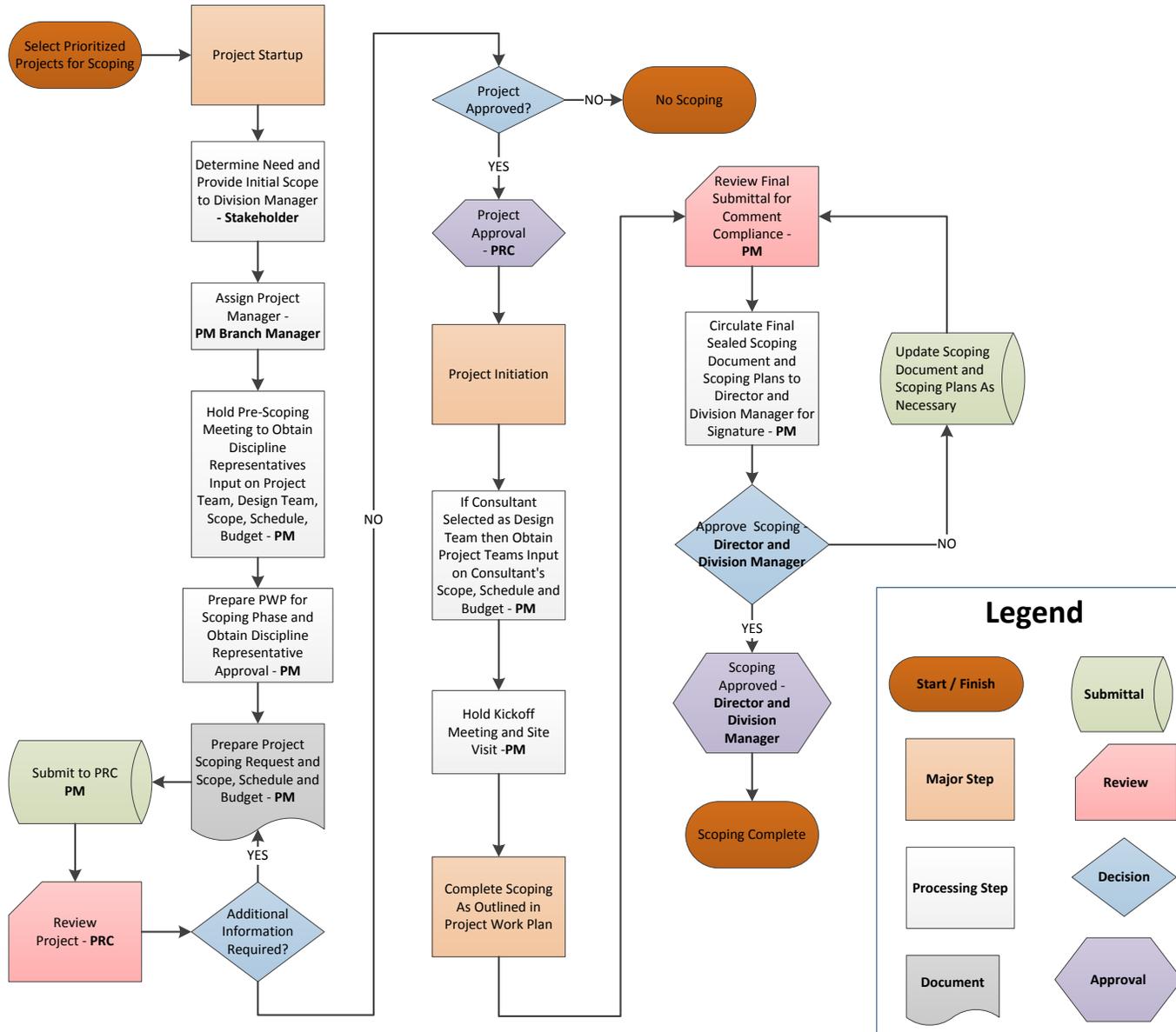
The purpose of the SDR is to identify a systematic plan for the project solution. In order for the solution to be holistic, it must address all potential issues of that particular solution. Potential issues include not only scope, schedule, and initial budget, but also R/W identification, utility relocation identification, and environmental requirements. These critical path items are risk factors that threaten project delivery. The identification of risk factors and their ripple effects is essential for appropriate and timely decision making.

The SDR will provide sufficient information so that MCDOT can appropriately program the project in the TIP. Ultimately, when the project is approved for final design and construction the SDR will be the basis to finalize R/W requirements, complete the environmental clearance and mitigation identification measures, and request utility providers to begin designing relocation plans. Because of their lengthy lead time, it is imperative that appropriate process schedules be developed for each of the three processes (environmental, R/W, and utilities) that could potentially delay the project.

The development process for a SDR is shown in **Figure 4-2**.

Upon receiving the final scoping documents and plans, the PM is to review and determine that all MCDOT scoping goals are met. The PM will then complete the Project Scoping Approval Form and obtain signatures from the Director and Division Managers. MCDOT Planning will then be notified by the PM that the project has completed the Scoping Phase and is ready to be analyzed in the PRS.

Figure 4-2 – Scoping Process Flowchart



4-2.4 SDR REQUIRED INFORMATION

While the project type, cost, funding, complexity, and other factors will determine the contents of the scoping document, it is the responsibility of each PM and the discipline representatives to determine which elements of the scoping process are applicable based upon the understanding of the specific project. Based on the project characteristics and the level of plan development the Technical Memorandum needs and Environmental evaluation will vary and will be documented in the PWP.

The SDR process and document will help identify and document mitigation for the critical path items noted previously (environmental, utility relocation, and R/W acquisition) in advance of final design and construction. Active and in-depth participation by all MCDOT team members in the scoping phase is essential to optimize the document and address project issues and concerns. Discipline representatives are responsible to provide data and information to the design lead for inclusion into the SDR.

It is expected that engineering design and evaluation will be required to define the project elements sufficiently to meet the previously stated goals.

Table 4-2 provides a list of required information and information that may be warranted by the project characteristics.

Table 4-2 – Summary of Required Information

Item	Required	Warranted by Project Type
Cover Sheet	✓	
Project Fact Sheet	✓	
Executive Summary		✓
Table of Contents	✓	
Abbreviations		✓
Project Overview	✓	
Project Features	✓	
Traffic Analysis	✓	
Existing Roadway Features Analysis	✓	
Environmental Analysis	✓	
Drainage Analysis		✓
Utilities Analysis	✓	
Structures Evaluation		✓



Geotechnical and Pavement Design Analysis		✓
Alternatives Analysis		✓
Design Features of the Recommended Alternative		✓
Design Exceptions		✓
Public and Stakeholder Involvement	✓	
Implementation Plan		✓
VE Recommendation	✓	
Other Considerations		✓
Cost Estimate	✓	
Funding	✓	
Involvement Matrix		✓
Partners and Agreements	✓	
Project Schedule	✓	
Appendices	✓	
Scoping Plans	✓	
Candidate Alternatives Plans		✓
Recommended Alternative Plans		✓
Right-of-Way Acquisition Schedule		✓
Summaries of Comments and Responses	✓	

If a project identifies new R/W and or temporary construction easements, it is understood that some minor changes are possible. However the majority of R/W must be adequately identified to estimate cost and schedule implications in final design. MCDOT has developed a scoping document to address these concerns to a high level of probability and therefore reduce risk. During the scoping phase, the PM and R/W staff will jointly develop the schedule to acquire the properties identified at the scoping level.

In addition, MCDOT is implementing a VE program on a project by project basis to optimize design before Final Design Plans are produced, thus reducing changes in design during the Final Design level. Refer to Section 5 for details on the VE Program.

If Technical Memoranda are determined to be needed by the PM and discipline representatives then refer to Chapter 4-3 for requirements. The Technical Memoranda content will be used to prepare the appropriate sections of the SDR.

A project schedule shall be developed to show the relationships between the various tasks and submittals to complete the SDR. The PM is to monitor the schedule and adjust as necessary.

The following sections identify and describe the items generally required in any SDR; however, depending upon project type or complexity, certain elements may not be required. Conversely, additional unique elements not detailed below may be required for some projects. The PM will consult with the discipline representatives to determine which elements are required for each project. The PM is to prepare a detailed PWP for the Scoping Phase that clearly defines the expectations and required information to complete the SDR.

4-2.4.1 Cover Sheet

The cover sheet will be the top sheet of all SDRs, and shall include the following information:

- Project name;
- Report title;
- MCDOT Project number (Federal, ADOT, and MAG project numbers as necessary);
- Contract number;
- Maricopa County seal;
- Name of the consultant firm (if any) that produced the report;
- Month and year of the report's completion; and
- If the report is in a draft form, show "DRAFT" on the cover sheet.

In addition to the information noted above, the cover sheet page will also bear the seal, signature, date signed, and expiration date of the Professional Engineer registered in the State of Arizona under whose direction the report was prepared.

4-2.4.2 Project Fact Sheet

The purpose of the Project Fact Sheet is to provide a high level succinct technical synopsis of the project that can be distributed to management, project team, and/or consultants. The Project Fact Sheet should consist of a brief one page summary in tabular format, with the minimum text required for clarification. The Project fact sheet is a stand-alone document of "Just the facts," and may include the following information:

- Project name;
- Project number;
- Project location and jurisdiction;
- Project begin and end termini and project length;
- Project purpose and need;
- Project description;
- Posted speed;
- Key design and other criteria as obtained from the RDM (design year, design speed, design vehicle, road classification, terrain type, and existing and future number of lanes);
- Existing and future Average Daily Traffic (ADT);
- Total R/W and temporary construction easement requirements;
- Estimated number of affected parcels;
- Known environmental, utility, drainage, and structures issues;



- Earthwork excavation, embankment, and estimated waste or borrow quantities;
- Major features and benefits of the project (such as safety improvements, traffic operations, improved access, improved drainage characteristics, or any other items pertinent to each particular project);
- Lane miles added;
- Project costs (construction, design, R/W, utilities, and administration) and lifecycle costs including operation and maintenance;
- Value Engineering Recommendation;
- Anticipated funding and funding sources;
- Project construction delivery method;
- Desired construction year;
- Anticipated design and construction duration;
- Partners and agreements (IGA or other agreements);
- Month and year of report completion; and
- PM and his/her contact information.

4-2.4.3 *Executive Summary*

The PWP will identify if a project requires an Executive Summary or not. If required, the Executive Summary must be written with decision-makers in mind, as it is often the most influential part of the report. The Executive Summary provides a readable, accurate, condensed description of the conclusions and recommendations that evolved from the scoping process. The Executive Summary only contains information essential to understanding the purpose, objectives, and recommendations of the report—it is NOT an abbreviated version of the full report. The Executive Summary usually should not exceed 10 pages in length.

An Executive Summary is designed to stand on its own—it should not refer by number to figures, tables, or references contained elsewhere in the full report. Only figures essential to the Executive Summary are to be included. All uncommon symbols, abbreviations, and acronyms must be explained within the Executive Summary.

As a guide, the following sections are to be included in the Executive Summary; other sections may be added as necessary for clarity.

1. Project Need – Describe the current functionality of the facility under consideration, identifying any deficiencies or anticipated deficiencies that prompted MCDOT to identify a project need at this location.
2. Project Purpose – Clearly define the study area; mention any previous studies used or referenced; and describe the existing roadway features in relation to the proposed improvements. Clearly address the needs identified in the Project Purpose and Need section.
3. Evaluation of Alternatives – Describe the study process and state the evaluation criteria used for the various alternatives (including the ‘No-Build’ alternative). Detail the advantages and disadvantages of the various alternatives.
4. Recommended Alternative – Describe the Recommended Alternative including its advantages and disadvantages. Note the key characteristics of the Recommended Alternative such as utility and R/W requirements, and cost. Include the amount of Lane Miles added to the Transportation Network. Any agency or partners must be in agreement with accepting the Recommended Alternative before the scoping phase is finalized.

5. Environmental Considerations – Describe any environmental concerns or impacts caused by implementation of the Recommended Alternative, as well as the appropriate mitigation measures, studies, and permitting required in conjunction with implementation of the Recommended Alternative.
6. Estimated Cost – Identify the total estimated project delivery cost. Costs should be broken down in the approved MCDOT format and identify appropriate construction, design, construction administration, R/W, utility relocation, and administration costs.
7. Lifecycle Cost – Identify the lifecycle costs based on maintenance and replacement costs. Maintenance costs should be based on standard costs available from MCDOT Roadway Maintenance Division. Replacement costs should be developed based on the initial costs. State the lifecycle length and associated costs for features that have different lifecycles, such as a structure that has a 50-year lifespan versus a roadway that has a 20-year lifespan.
8. Implementation Plan – Describe any assumptions and recommendations for construction of the project. Note any adjacent or concurrent projects in the subject corridor, as well as potential phasing recommendations and funding sources.
9. Concurrent Technical Documents – List any concurrent technical documents developed in conjunction with the SDR that provide additional support or clarification to statements made in the Executive Summary or the SDR.
10. Partners and Agreements – Identify any partners and agreements (IGA or other agreements) that have been undertaken or are potentially required for this project. All agreements are to be identified within the SDR phase of the project and completed within a timeframe prescribed by intergovernmental relations.
11. VE Recommendation – Identify whether the VE process is recommended and describe the basis of the recommendation.

4-2.4.4 Table of Contents

The report will include, on a separate sheet(s), a table of contents detailing all the headings and sub-headings of the report. The table of contents will also include a list of all figures, a list of all tables, and a list of all appendices.

4-2.4.5 Abbreviations

If required by the PWP, all abbreviations used in the report must be summarized for easy reference in a list. This list does not eliminate the requirement to write out an abbreviation or acronym the first time it occurs in the text of the report. Additionally, any acronyms used in the Executive Summary must be written out again in the main body of the report, as the main body of the report is independent of the Executive Summary.

4-2.4.6 Project Overview

4-2.4.6.1 PRC Request

Each SDR must include—the date of when the project was approved by the PRC for advancement to the scoping process. It is the responsibility of the PM to acquire a copy of the approved PRC Request Form for inclusion in the project file.

4-2.4.6.2 Background

Briefly describe the project history, including the following:



- Project sponsors, partners, and proponents;
- Type of project – roadway, safety, bridge, drainage, traffic, maintenance, etc.;
- Project funding sources and programming status;
- Any actions or commitments that have taken place to date regarding the proposed project;
- Previous studies or other efforts that identified the project purpose or objectives; and
- Description of the community and demographics, as well as specific regional or political characteristics of particular importance.

4-2.4.6.3 Project Need

Succinctly describe why the project is being undertaken at this time.

Identify the underlying transportation deficiencies that require correction. While there may be several associated deficiencies identified within the project study area, it is important for the project team to agree on the primary deficiency or deficiencies that create the need for the project. The purpose and need statements are supported by data that indicates, but is not limited to, a safety issue, reduced mobility, limited capacity for the transportation demand, lack of reliability, gaps in or between transportation systems, or limited life of the facility.

4-2.4.6.4 Description of the Project

Describe the complete SOW for the project and recommended alternative, including the following information:

- Project length;
- Roadway classification;
- Project termini, identified by station and nearby landmarks;
- Total pavement width, lane widths, median width, shoulder widths, number of lanes, and number of lane miles;
- Intersection improvements including new or modified traffic control and number and type of turning lanes.
- New R/W needs, including the amount required and type of ownership (i.e., residential, commercial, State, or other jurisdiction);
- Roadway improvements, including curb and gutter, sidewalks, median improvements, and/or intersection improvements;
- Safety improvements including sight distance improvements, hazard removal or protection, and guardrail or barrier installations;
- Proposed drainage improvements such as roadside ditches, installation of driveway culverts, installation or improvement of cross-culverts, scour protection, bank protection, and channel relocation or restoration; and
- Utility and/or railroad impacts and potential conflicts created by the proposed improvements.

4-2.4.6.5 Project Study Area

Describe the limits of the project study area with respect to major streets, highways, or other prominent features. Develop a project location map to show the study limits and major

topographic features, including a north arrow, a scale, and a Maricopa County vicinity map showing the project location in relation to major cross-streets or other identifiable landmarks. The scale will depend on the size of the project. The vicinity map can be inset within the project location map.

4-2.4.6.6 Project Purpose

Clearly identify solutions to correct the problems and needs identified in the Project Need section.

4-2.4.6.7 Project Scoping Schedule

Generally describe the history of the development of the SDR, including major items of work and key milestones such as project kickoff, project completion, stakeholder meetings, and public meetings.

4-2.4.6.8 Plans and Studies

Provide a summary of the principle plans, studies, reports, and other documents obtained and reviewed for the project. The document title, date, and source should be included for each item. A summary of any programmed roadway or other pertinent infrastructure improvements in the project vicinity should also be included.

4-2.4.7 Project Features

Describe the existing and known future project features, including the following information, as well as any other pertinent information identified during the study process. This information can be presented in text form or supplemented with figures, such as those based upon Maricopa County Geographic Information System (GIS) data.

4-2.4.7.1 Jurisdictional Responsibilities

- Discuss existing jurisdictional responsibilities, and
- Develop a map showing existing jurisdictional boundaries.

4-2.4.7.2 Land Ownership and Right-of-Way Information

- Land ownership
- Existing R/W information (including maximum and minimum R/W width and the type of R/W (deed or easement)
- A map showing existing parcel information

4-2.4.7.3 Land Uses and Zoning

- Existing zoning and land uses;
- Future zoning and land uses; and
- Develop a map showing existing and proposed zoning.

4-2.4.7.4 Design Criteria

Each element of the design criteria must refer to the pertinent section in the RDM and/or other reference manual(s). Identify applicable design criteria associated with the Recommended

Alternative. Include the source of the design criteria when appropriate. Design criteria may include the following:

- Design year;
- Design speed;
- Design vehicle;
- Existing and Design year ADT;
- Type of terrain;
- Roadway classification
- Standard typical section; and
- Number of travel lanes.

Provide similar level of detailed design criteria for other applicable disciplines. Include the design criteria and provide a reference.

Should any design exceptions be required, they should follow the procedures as identified in the RDM.

4-2.4.7.5 Roadway Features

- Existing roadway features including horizontal and vertical alignments, grades, surrounding topography and terrain, and adjacent vegetation;
- Existing roadway cross section including overall pavement width, lane widths, shoulder widths, existence and location of curb and gutter, and the roadway typical section;
- Functional classification of the roadway;
- Existing design speed of the roadway, if available;
- Posted regulatory and advisory speed limits and existing accesses; and
- Existing roadside features to be considered for clear zone requirements.

4-2.4.7.6 Drainage Characteristics

- Drainage characteristics (such as watersheds or waterways adjacent to the project area), agencies or authorities responsible for drainage, and the type, number, and brief description of the existing drainage structures.

4-2.4.7.7 Utilities and Railroads

- Major utilities and railroads

4-2.4.7.8 Pavement and Roadway Conditions

- Pavement and roadway conditions (Road Management System information)

4-2.4.7.9 Previous Projects

- A listing of all previous projects, documents, as-built drawings, and/or improvements constructed within the project study area.



4-2.4.8 Traffic Analysis

- Describe the findings of the traffic analysis in this section, including the following topics, as well as any other pertinent information identified during the study process:

4-2.4.8.1 Traffic Volumes

Project team shall coordinate with MCDOT Planning and Traffic staff to obtain traffic data and resources for traffic data. Develop pertinent daily and peak hour roadway segment and intersection movement traffic volumes for the existing year, the construction year and the design year. Document available pertinent traffic count data, travel demand model data, adjustment factors, assumed growth rates, future anticipated major traffic generators, and data sources referenced. Where appropriate, identify the Design Hour Traffic Factor (K, in percent), the Directional Distribution Factor (D, in percent), and the Truck Factor (T, in percent).

4-2.4.8.2 Crash Analysis

Include all data sources referenced, a summary of the crash history, the time period for which the crash data is applicable (five most recent years of data on record), identifiable trends in the data, anomalies with the data, calculated crash rates, and a comparison to state crash rates where appropriate. Identify if crash data indicates safety concerns to be addressed.

4-2.4.8.3 Capacity and LOS Analysis

Describe data sources referenced, the level of detail associated with the capacity analysis, modeling software utilized, additional analyses required as the project progresses, assumed capacity values, the minimum acceptable LOS for the existing year, the construction year, and the design year, and the calculated existing and anticipated future LOS for the baseline condition.

4-2.4.8.4 Existing Access Condition and Traffic operations

Identify existing accesses to controlled access facilities, major intersections, minor intersections, and private commercial or residential accesses from the subject roadway. Applicable access control and minimum access point spacing requirements also should be indicated. Identify existing traffic operations at the intersections.

4-2.4.8.5 Existing Intelligent Transportation System

Identify all existing Intelligent Transportation Systems (ITS) components. Describe the details of the existing ITS and if the system is connected with other jurisdiction(s) ITS Networks. Describe the existing communication between ITS and the MCDOT Traffic Management Center.

4-2.4.8.6 Traffic Analysis Recommendations

Discuss mitigation measures for reducing the crash rate, reducing crash severity, improving access, and providing for future multimodal needs. Also, discuss future anticipated major traffic generators and recommendations for accommodating future traffic. Identify recommended traffic improvements which may include turn lanes, signage, access managements, traffic control devises, etc.

Clearly identify the existing roadway capacity and LOS, as well as the capacity and LOS requirements to meet projected future travel demand for the construction year and the design



year. This section should use a combination of tables, graphics, and descriptive text to best convey the required information.

4-2.4.9 Existing Roadway Features Analysis

Describe the existing roadway with regard to critical dimensions and criteria. These items should then be evaluated against the design criteria to determine where deficiencies exist. If the design criteria does not provide criteria for evaluating a particular item, RDM criteria shall be used. The following list may be included in the Existing Roadway Features Analysis section.

- **Design Speed:** Identify the minimum design speed for the roadway based on the terrain and facility type previously identified. The criteria for all of the following items are based on a determination of the design speed.
- **Lane and Shoulder Widths:** Compare the existing lane and shoulder widths to the design criteria minimum widths, noting any deficiencies.
- **Horizontal Alignment:** Compare the existing horizontal alignment to the design criteria minimums for deflections, curve lengths and degree of curvatures, noting any deficiencies.
- **Vertical Alignment:** Compare the existing vertical alignment to the design criteria minimums for grades, grade breaks and curve lengths, noting any deficiencies.
- **Stopping Sight Distance:** Examine the existing stopping sight distance as compared to the design criteria minimums for all horizontal and vertical curvature within the project study area. Note any areas of deficient sight distance.
- **Intersection Sight Distance:** Examine the intersection sight distance as compared to the design criteria minimums for intersections within the project study area. Note any areas of deficient sight distance.
- **Cross-Slope:** Identify and compare the cross-slopes to the maximum and minimum allowable cross-slopes specified in the design criteria. Note any cross-slopes that exceed the maximum or minimum.
- **Horizontal Clearance:** Include an analysis of the clear zone and an evaluation of lateral offsets to obstructions and recovery widths within the project area, noting any deficiencies.
- **Vertical Clearance:** If the existing roadway passes under a bridge, sign, or other structure or obstacle, the existing vertical clearance must be evaluated and compared to the design criteria minimum clearance. Deficiencies shall be noted.

4-2.4.9.1 Bridge Structures Geometry

Existing bridge clear width (curb-to-curb) and rail type. Note any geometry deficiencies, if any. Bridge geometry restriction/deficiency examples include bridge load restrictions/load posting, historic scour/erosion/overtopping issues, horizontal/vertical clearance limitations, speed restrictions, bridge approach settlement, site distance, poor approach geometry, nearby intersection geometry in the bridge vicinity and any other limiting bridge geometry features/problem areas.

4-2.4.9.2 Other Considerations

Identify and evaluate any other road or roadside features not identified above, but affecting safety and/or drivability, as compared to the design criteria. Note any existing deficiencies.

4-2.4.9.3 Summary of Deficient Items

Summarize the deficient or substandard items requiring variances or design exceptions.

4-2.4.10 *Environmental Analysis*

Information provided in this section is dependent on the funding source of the project (design or construction funding) or the type of document being provided during scoping. The type of environmental document prepared for a project depends on, the type of Environmental Clearance required (National Environmental Policy Act (NEPA) Environmental Clearance or Non-Federal Environmental Clearance). If Federal funding is in place or may be in place in the future, a NEPA Environmental Clearance (Categorical Exclusion (CE), Environmental Assessment (EA) or Environmental Impact Statement (EIS), as determined by the lead Federal agency and communicated by ADOT) is warranted. If the project is not subjected to a Federal funding, but is programmed by MCDOT, a Non-Federal Environmental Clearance is required.

For projects with federal funding, this section will provide a brief synopsis of the known environmental issues, as well as indicating what type of relevant documentation would be needed to secure a NEPA Clearance. Rather than provide a technical memorandum, the Environmental Program Branch would focus on NEPA Clearance shortly after providing the synopsis for this section.

For projects that would require an Environmental Identification Document (EID) as the technical memorandum, this section would only reference the appendix that the EID is housed in. Due to the relative small size of the documentation, reference to the EID within this section would be adequate. In addition to the reference to the EID, this section may reference potentially known issues that could affect project delivery as well.

For projects that would require an Environmental Identification Memorandum (EIM) as the technical memorandum, this section would provide an overview or synopsis of the EIM. The Environmental Identification Conclusions section within the EIM will be presented in this section of the scoping report as the overview or synopsis. In addition to the overview or synopsis of the EIM, this section may reference potentially known issues that could affect project delivery as well. The EIM would also be located as an attachment or appendix to the scoping report.

Sample documentation of the three environmental deliverables can be obtained from the MCDOT Environmental Program Branch.

Any ground breaking activity by geotechnical, drainage, utilities, traffic or another discipline will be reviewed by environmental staff prior to starting the work, and a discipline specific clearance would be issued; not a clearance for the entire project.

4-2.4.11 *Drainage Analysis*

Conduct a thorough review of the existing drainage patterns and facilities to identify areas of concern and propose solutions to those concerns.

Describe the following items, as well as any additional pertinent items identified during the study process.

4-2.4.11.1 Existing Drainage Conditions

Describe the existing drainage conditions and patterns throughout the project area. Identify all data sources referenced.



4-2.4.11.2 Flood Zone Classification

Identify existing flood zones and their classification in the vicinity of the project site. Include a map of the project area clearly showing the flood zones and their classification. Provide a description of the flood zones and identify the impact on the project, improvement limitations, mitigation measures, and application processing through local floodplain administrator and the Federal Emergency Management Agency (FEMA). Identify any data sources referenced.

4-2.4.11.3 Design Criteria and Design Storm

Identify drainage design criteria and the applicable design storm, usually per roadway classification. Identify all data sources referenced.

4-2.4.11.4 Design Flows

Identify onsite and offsite drainage areas and quantify the corresponding peak flows for the design storms. Identify all data sources referenced.

4-2.4.11.5 Proposed Drainage Concept

Present a proposed drainage concept based on the applicable design criteria. The plan should, to the extent possible, preserve or improve the pre-development drainage pattern, avoid adverse impact to adjacent properties, and mitigate unavoidable impacts. All assumptions and limitations associated with the management plan must be identified and addressed.

4-2.4.11.6 Adjacent Impacts

Describe all upstream and downstream impacts caused by the proposed drainage improvements, as well as any appropriate mitigation measures.

4-2.4.11.7 Drainage Inlets and Storm Drains

For roadways with curbs and gutters, identify location and sizes of drainage inlets and storm drains. The system should accommodate allowable spread criteria. State both actual and allowable spread.

4-2.4.11.8 Culvert and Channel Design

Describe the proposed culvert and channel improvements with regard to the pavement drainage, off-site drainage, and roadside ditch configuration.

4-2.4.11.9 Stormwater Storage Requirements

Identify stormwater storage requirements for retention, detention, or first flush applications. Size basins and identify outlets, dewatering means, and maximum allowable time.

4-2.4.11.10 Scour Analysis

Identify locations that are subject to scour and erosion and propose protection measures. Provide supporting documentation and calculations.

4-2.4.12 Utilities Analysis

Describe the existing and proposed utilities (including railroads) within the study area. This section should also identify the following information.



4-2.4.12.1 Facility Ownership

For any facility within the study area, the utility type and ownership should be identified. The data sources should be listed as well.

4-2.4.12.2 Facility Details

- Types of utilities present;
- Owner's contact information for each utility;
- Any proposed utilities; and
- Status of the proposed utilities with respect to potential conflicts.

Utility types typically include electric, telephone, cable or fiber optics, natural gas, water, sewer, storm drainage, and irrigation. Utilities shall be designated. The PM in consultation with the utilities section may grant an exception to this requirement.

The Utilities Analysis section should also identify future development plans for the area with respect to potential utility facilities required as the area develops.

Include a map or other exhibit showing the project area and the identified utilities.

4-2.4.12.3 Prior Rights

Summarize identification of prior rights and/or documentation verification as applicable to the submittal stage. The identification for prior rights shall take place prior to the scoping plans submittal. Complete prior rights documentation shall be submitted no later than the final scoping submittal.

4-2.4.12.4 Utility Conflicts

Include a complete conflicts and resolutions list describing the current status of the utilities.

4-2.4.12.5 Pot Holes

Provide a table listing Pot holes including the following information:

- Utility provider name;
- Utility provider contact information;
- Utility conflict type (e.g., conflict with culvert, excavation, etc.);
- Utility type (e.g., electric, gas, water and gas, etc.); and
- Approximate pot-hole northing, easting, station, and offset.

Pot holes shall be identified and provided prior to the Scoping Plans submittal. Additional pot holes may be required in Final Design at the 60% stage, as necessary.

4-2.4.12.6 Utility Relocation

Describe utility relocation concepts and discuss the timing of the relocations as to whether before or during construction. If during construction, discuss if the work will be done by the MCDOT's contractor or by utility company's contractor. In the Final Design Phase utility relocation plans shall be provided prior to the 60% stage submittal and approved for conformance with the project design at the 95% stage submittal. Provide the estimated utility relocation construction schedule for the relocation(s) prior to the Scoping Plans submittal.



Provide a utility relocation cost estimate to relocate utilities in conflict. Provide a list of who is responsible for payment of relocation work prior to the Scoping Plans submittal. If betterments are requested by a utility company, include a cost estimate for the work to be included in the project prior to the 60% stage submittal.

4-2.4.12.7 Utility Coordination

Summarize the meetings and/or correspondence with each utility company. Describe mitigation measures evaluated and the actions taken to arrive at the selected mitigation measure. Provide a list of transmittals when plans were sent to the utilities.

4-2.4.12.8 Utility Service Connections

Describe any anticipated utility service connections required for the project. Specify the responsible party for connection/extension charges and monthly billings. Provide contact information for the utility responsible for providing the new service.

4-2.4.12.9 Utility Agreements

Identify the need for a utility agreement to accommodate relocations, adjustments, removals, abandonments and/or betterments as identified and provided in coordination with the utility provider. List elements of agreement and responsibilities for costs incurred.

4-2.4.13 Structures Evaluation

Identify existing structures within the project area and provide a complete review of their status with respect to needed maintenance, sufficiency rating, expected lifespan, and future needs. Also, identify new structure needs and provide a thorough review of applicable alternatives to identify and provide a recommended type and configuration for any proposed structures. The following items should be documented in this section.

4-2.4.13.1 Bridge Structures

General bridge description including number of spans, overall bridge length and width, type description (deck, superstructure and substructure), condition of the bridge, bridge clear width (curb to curb) and rail type. Include descriptions of any bridge restrictions/deficiencies, if any. Restriction/deficiency examples include load restrictions, scour/erosion issues, channel and channel feature deficiencies, bridge condition deficiencies, horizontal/vertical clearance limitations, speed restrictions, site distance issues, foundation settlement, bridge approach settlement and any other limiting bridge features or problem areas related to the bridge structure.

Include existing bridge maintenance needs and future viability. If applicable, discuss bridge replacement or rehabilitation needs.

If there is no existing bridge, state such.

4-2.4.13.2 Structure Geometry

Describe the horizontal and vertical alignment and the preferred cross section featuring the structure (such as approach roadway, number of travel lanes, barrier type, sidewalk size and location, and median type for bridges).

4-2.4.13.3 Structure Selection and Configuration

Detail the various alternatives considered, the various construction methods or materials available, the recommended configuration, and the advantages of the recommended configuration. If a TM for structures is part of the scoping project then contents from the TM is to be included in the SDR. The contents in this section are to include the structural recommendations which include the detailed cost analysis of the structures work.

4-2.4.14 *Geotechnical and Pavement Design Analysis*

Document any geotechnical investigations completed in support of the project, including those performed for bridge or structure construction and pavement design. Also, provide appropriate pavement design recommendations for the project. The Geotechnical and Pavement Design Analysis should address the following items, as well as any additional items identified during the project.

4-2.4.14.1 Geotechnical Analysis

Describe the geotechnical investigations performed and the existing soil and pavement characteristics identified from those investigations. All pertinent geotechnical investigations should be completed with this SDR and prior to submission of the Scoping Plans.

4-2.4.14.2 Existing Pavement

Describe the existing pavement condition and composition and the history of the pavement (including previous replacement and preservation activities). Describe all observations of the pavement's existing condition and its future viability. Include a description of the pavement substructure and pavement types. Identify the location of the proposed pavement structural sections.

4-2.4.14.3 Pavement Design

Describe any recommendations concerning the pavement structural section such as aggregate base depth, pavement type, pavement course thickness, surface course requirements, and any special additives or placement methods required.

4-2.4.14.4 Foundation Recommendations

Identify the appropriate foundation types and construction methods for any structures that may be constructed, such as bridge and wall foundations.

4-2.4.14.5 Earthwork

Identify the appropriate earthwork factors including shrink, swell, and ground compaction. The shrink and swell factors shall not consist of wide ranges.

4-2.4.15 *Alternatives Analysis*

Provide a succinct description of the alternatives development process, including identification of conceptual alternatives, selection and development of candidate alternatives, and selection and development of the Recommended Alternative. Identify the major characteristics of each conceptual alternative and Candidate Alternative and provide supporting documentation of the decision process used to select the Candidate Alternatives and the Recommended Alternative.

The Alternatives Analysis section should contain the following items, as well as any additional items identified during the project:

4-2.4.15.1 Alternatives Development Summary

Define the process by which the conceptual alternatives, Candidate Alternatives, and Recommended Alternative were developed, evaluated, and advanced. A simple graphic may be used to illustrate the process.

4-2.4.15.2 Conceptual Alternatives

Describe the development of all conceptual alternatives. List the major characteristics of the conceptual alternatives including possible fatal flaws, environmental impacts, R/W impacts, and cost impacts.

4-2.4.15.3 Candidate Alternatives

Describe the process through which the conceptual alternatives were evaluated to identify the conceptual alternatives selected to advance as Candidate Alternatives.

4-2.4.15.4 Evaluation of Alternatives

The Evaluation criteria should be developed by the project team and approved by the PM. Identify how the evaluation criteria were developed. List the date of the meeting when consensus was reached on the evaluation criteria.

Describe each Candidate Alternative including the advantages and disadvantages of each with respect to the evaluation criteria such as present and future land use, R/W, environmental impacts, cultural resources, archeological impacts, cost, constructability, safety, drainage (including floodplains), earthwork, utilities, structures, socioeconomic considerations, and any required design exceptions. A template of the evaluation criteria is included in **Appendix 4-A**.

At the kick-off meeting, the project team will discuss and optimize the evaluation template. During development of the alternatives, the project team will further tailor and confirm the evaluation template.

Develop a quantitative Evaluation Matrix based on the template evaluation criteria to compare and evaluate the Candidate Alternatives, discussing the Evaluation Matrix criteria with the project team for consensus. Additionally, develop a Summary of the Evaluation Matrix to qualitatively compare the results of the Evaluation Matrix. Provide a description of each evaluated category, identifying the aspects of each alternative that influenced the rating in each category.

Comparative evaluation is inherently subjective; however, it can be augmented with objective support when clear, factual numerical criteria are available. Standard formulas for scoring or rating are not advocated. The project team will evaluate the alternatives and determine the recommended alternative. The PM will submit the recommended alternative and other alternatives including evaluation discussions to the Division Manager for approval. At the Division Manager's discretion, the recommended alternative may be discussed further during a MCDOT Leadership Team Meeting to receive approval. The scoping design will proceed after approval of the recommended alternative is received.

For a comprehensive safety comparison, the AASHTO Highway Safety Manual provides a method for comparing safety of candidate alternatives through quantitative measures. Safety performance has been subjective in the past and for an objective comparison, Part C Predictive Method that produces predicted crash rates is to be used for candidate alternatives when assessing their comparative safety performance. The detailed results must be listed and backup documentation added to the appendices.

4-2.4.15.5 Recommended Alternative

Identify the Recommended Alternative selected and provide a description of its major characteristics in this sub-section. Also, describe the reasoning behind the selection of the Recommended Alternative.

4-2.4.16 Design Features of the Recommended Alternative

Identify the features, characteristics, and advantages of the Recommended Alternative.

4-2.4.16.1 Advantages of the Recommended Alternative

Summarize the advantages of the Recommended Alternative with regard to the following, if applicable:

- Horizontal alignment;
- Vertical alignment;
- Safety;
- Sight distance (stopping, intersection and passing);
- Intersection improvements;
- Private access improvements;
- Drainage improvements;
- Traffic design and operations improvements; and
- Environmental mitigation.

4-2.4.16.2 Earthwork

Describe the earthwork impacts for the Recommended Alternative including the following information:

- Total estimated volume of, borrow, or waste; and
- Estimate the total earthwork cost. A statement regarding whether or not the earthwork is balanced and the quantity of borrow or waste that will be generated. If the earthwork is not balanced, explain the rationale used to identify the earthwork.

4-2.4.16.3 Traffic Control and Constructability

Describe the constructability and potential traffic control issues that may be expected to be encountered with the Recommended Alternative. Describe the requirements for construction sequencing, if needed.

4-2.4.16.3.1 Constructability

Identify any special or abnormal features of the Recommended Alternative that could potentially impact the ability of traffic to utilize the corridor during construction. For example, if the



Recommended Alternative is roughly aligned (horizontally) with the existing roadway but has significant vertical variation, this will create additional difficulties in maintaining traffic on the existing roadway. Identify scheduling/sequencing criteria, requirements, or constraints that will impact construction. Identify constraints that would cause a partial or full road closure.

4-2.4.16.3.2 Detours

Identify any areas where detours may be required due to construction activities and proposed detour routes.

4-2.4.16.3.3 Construction Sequencing Plans

Some projects may require the development of construction sequencing plans. The PM, after consultation with the project team, will determine the necessity and assignment of the sequencing plans. Determine the need for Construction sequencing plans in this section.

4-2.4.16.4 Access Condition and Traffic Operations

Discuss all intersections and access to the subject roadway that are impacted by construction of the Recommended Alternative. The following information should be provided at a minimum. Describe traffic operations at the intersection(s). Describe the access location(s) and spacing.

4-2.4.16.4.1 Intersection Improvements

Provide details regarding improvements to be made at all impacted intersections such as signalization, sight triangle requirements, realignment to reduce skew angle, changes in grade, and the extent of pavement if the intersecting roadway is unpaved. Describe traffic operations at the intersection(s).

4-2.4.16.4.2 Impacts

Describe impacts to neighboring properties due to the changes imposed at the intersection.

4-2.4.16.4.3 Intelligent Transportation System

Provide details regarding a new or modifies ITS. Describe the components and any connections with other jurisdictions network. Describe the communication path between the project ITS and the MCDOT Traffic Management Center.

4-2.4.16.5 Typical Section

Typical sections accommodate and define requirements for the various conditions that may occur in the project area. Typical sections must comply with standards defined in the RDM. Describe the proposed typical section in detail. If the proposed typical section differs from the standard typical section in the RDM, provide a detailed explanation as to why the exceptions are needed, who approved the exceptions, and a graphical representation of the selected typical section.

4-2.4.16.6 Horizontal and Vertical Alignments

Describe the proposed horizontal and vertical alignments including the number of curves, minimum and maximum radii, tangent lengths, and the beginning and ending stations of the alignment.



4-2.4.16.7 Right-of-Way

Describe the proposed R/W, including the maximum and minimum R/W width throughout the corridor. Identify the quantity (in acres or square feet) of R/W to be acquired and provide a table listing the parcel number, parcel size, type of owner, amount of parcel to be acquired, and post-acquisition status with regard to whether the remainder of the parcel conforms to zoning standards. If only a partial take of a parcel is required, note any impacts to the landowner and business operations. Identify the proportion of R/W that will be acquired from various types of properties (such as State Land, private residential, private commercial, municipalities, or jurisdictional entities). Identify any Right of Entry needs.

4-2.4.16.8 Utility

Summarize the impacts that the Recommended Alternative will have on utilities.

4-2.4.16.9 Drainage

Summarize the impacts that the Recommended Alternative will have on drainage.

4-2.4.16.10 Environmental

Summarize the impacts that the Recommended Alternative will have on environmental elements.

4-2.4.17 *Design Exceptions*

Identify all design exceptions required for the Recommended Alternative. If applicable, include copies of all approved design exceptions in the appendix section of the SDR.

4-2.4.18 *Public and Stakeholder Involvement*

Describe the public involvement process, including stakeholder and other public meetings. Identify the TAC and SAC, define their functions and list their members, and summarize the TAC and SAC meetings that occurred during the project. Additionally, describe any public open house or other public meetings held. Provide a detailed description of the outreach methods used for public involvement and summarize all comments and discussions that occurred during the public involvement phase.

4-2.4.19 *Implementation Plan*

Identify the recommended project implementation and phasing plan. For example, it may be advantageous to separate a large project into several smaller construction projects due to funding sources, traffic control, or constructability concerns. Conversely, it may be advantageous from a schedule or cost standpoint to combine several smaller projects into one larger construction project, thereby eliminating multiple bid advertisements and awards or mobilization and demobilization costs. Additionally, provide an involvement matrix listing all parties and their involvement with the project. A sample involvement matrix is provided in **Appendix 4-B**.

4-2.4.20 *VE Recommendations*

Identify if the VE Process is recommended and describe the basis of the recommendation. Refer to Section 5, Value Engineering, for guidelines to select a project to complete the VE process.



4-2.4.21 Other Considerations

Address any other general elements of the project's overall development process that does not fall within one of the prior sections. This section may generally include the following:

- Critical outside agency involvement for the elements of the proposed scope of improvements requiring coordination with public and private groups, agencies, and others affected by the project including the impact on each group and anticipated clearance requirements;
- Seasonal considerations for design and construction (surveys, data collections, geotechnical testing, constructability, agricultural fields and crop considerations, canal dry ups, wildlife habitats, etc.);
- Description of any special detailed construction materials or design/construction processes recommended that are not adequately explained in the *Project Scope and Recommended Improvements*;
- Responsible design parties for each discipline (MCDOT, design consultant, or others) will be identified whenever possible;
- Decision determining the construction contract delivery method such as design-bid-build, design-build, CMAR, or JOC;
- Other elements pertinent to development of the project; and
- Additionally, describe any alternative SOW that was reviewed and/or considered for the project along with an explanation why the work was rejected or discontinued from further consideration.

4-2.4.22 Cost Estimate

Include a summary cost estimate based on MCDOT's project cost estimation total. This estimate typically identifies construction costs, design costs, construction management costs, R/W and temporary construction easement costs, utility relocation costs, environmental mitigation costs and administration costs.

The cost estimate in each stage shall begin with identification of known MCDOT items. The known bid item list may be constructed using MCDOT's master bid item list or if known the bid item list for a specific JOC contract. Include assumptions for quantities and unit cost basis used for the cost estimate.

During scoping some unidentified items are expected and as the project progresses, the magnitude of the unidentified items will decrease. Construction contingency costs are applied to the cost estimate for all stages of development.

The percentage applied to estimate the construction management cost will vary depending if the project is known to have a federal funding source. The PM and design team are to provide input obtaining the cost estimate for in-house costs.

4-2.4.22.1 Maintenance Costs

Identify the maintenance costs for the design life of the Recommended Alternative. Standard maintenance costs can be obtained from MCDOT Maintenance Division.

4-2.4.22.2 Construction and R/W Costs

Identify the total construction costs for the Recommended Alternative. Identify the individual unit costs for R/W and the total cost of R/W acquisitions and temporary construction easements for the Recommended Alternative. Identify the method and source used for identifying R/W costs.

4-2.4.23 Funding

Provide in detail the funding needed for the project and include any partner's contributions and/or federal funding.

4-2.4.24 Partners and Agreements

Identify any partners and agreements (IGA or other agreements) that have been enacted and/or could be required for this project as determined by intergovernmental relations. Intergovernmental Relations staff shall be involved with identification of partners and agreements.

All standards and requirements identified in the agreement(s) shall be adhered to in the study and design. Funding sources and agreed-upon responsibilities must be identified.

4-2.4.25 Project Schedule

The project schedule can include specific dates if known and if project funding source is known. For projects that do not have a funding source identifies the project schedule is to include durations. A project schedule is to be included with each SDR, and should address each of the following critical elements:

4-2.4.25.1 Final Design Schedule

Provide a schedule for the final design phase of the project including all major milestones, design steps, submittals, and reviews anticipated to finalize the project.

4-2.4.25.2 Environmental Clearance and Mitigation Schedule

Provide an environmental clearance and mitigation schedule including all major milestones and steps in the permitting, clearance and mitigation processes.

4-2.4.25.3 Utility Relocation Schedule

Provide a preliminary utility relocation schedule that identifies all major milestones including utility conflict identification, pot-hole collection, coordination with utility providers, prior or jurisdictional rights determination, and final utility relocation plan design.

4-2.4.25.4 R/W Acquisition Schedule

Provide a R/W acquisition schedule that includes all major milestones, coordination with R/W staff, final R/W determination, final R/W strip map production, acquisition negotiations, and possible condemnation proceedings.

4-2.4.25.5 Construction Schedule

Provide a preliminary schedule for the construction phase of the project including bid material preparation, project advertisement, bid review, contract award, contractor coordination, and all major construction milestones.

4-2.4.26 *Involvement Matrix*

Include an involvement matrix that lists each involved party and/or discipline along with the type of involvement each will have with the project. The purpose of the involvement matrix is to document the individuals participating in the scoping project. Refer to **Appendix 4-B** for an involvement matrix template.

4-2.4.27 *Appendices*

The appendices should be reserved for supporting or other material that supplements the contents of the SDR. The following items may be organized in the SDR appendices, along with any other pertinent materials identified during the project:

- Candidate Alternatives Plans;
- Cost estimates for the Candidate Alternatives;
- Recommended Alternative Plans;
- Cost Estimate for the Recommended Alternative;
- Scoping Plans (final submittal only);
- Detailed cost estimate to accompany the Scoping Plans;
- Copies of any approved design exceptions requested (if applicable);
- Summaries of comments and associated responses from all official document reviews;
- Environmental documents (if applicable);
- Progress, Design and Coordination Meetings Notes and Sign-In Sheets; and
- Technical Memoranda (if applicable).

4-3 Technical Memoranda

The purpose of the Technical Memoranda is to complete more in depth analysis for specific project elements. Additionally, this allows individual specialty reports to be submitted throughout the process, which allows opportunities for reviewers to review each technical specialty in depth before the next segment is completed.

Prior to the PRC approval, the PM and project discipline representatives will determine which Technical Memoranda may be needed. The list of Technical Memoranda required will be identified in the PWP for the scoping phase and will be communicated to the project team at the first project meeting. The actual content of the Technical Memoranda is discussed separately; however, the following lists the Technical Memoranda that may be developed during the SDR process:

- Technical Memorandum – Traffic Analysis
- Technical Memorandum – Environmental Documentation
- Technical Memorandum – Drainage Report
- Technical Memorandum – Structures Report
- Technical Memorandum – Geotechnical and Pavement Design Report
- Technical Memorandum – Alternatives Analysis
- Technical Memorandum – Utilities Report
- Technical Memorandum – Right-of-way Requirements

The contents of the Technical Memoranda will be used to prepare the appropriate section of the SDR. The Technical Memoranda may be included as an appendix to the SDR.

4-3.1 COMMON FRONT END SECTIONS OF THE TECHNICAL MEMORANDA

The following are common sections which appear at the beginning of all Technical Memoranda.

4-3.1.1 Cover Sheet

The cover page will be the first page of the report. As the TM prepared by and/or for MCDOT are public documents, the title page must have a professional look and convey pertinent project information.

The cover sheet shall include the following information:

- Project name;
- Report title;
- Project number;
- Contract number;
- Maricopa County seal;
- Name of the consultant firm (if any) that produced the report;
- Month and year of the report's completion; and
- If the report is in a draft form, show "DRAFT" on the cover sheet.

The cover page will also bear, when required, the seal, signature, date signed, and expiration date of the Professional Engineer registered in the State of Arizona under whose direction the report was prepared.

4-3.1.2 Table of Contents

The report will include, on a separate sheet(s), a table of contents detailing all the headings and sub-headings of the report. The table of contents will also include a list of all figures, a list of all tables, and a list of all appendices.

4-3.1.3 Introduction

Provide an introduction, background, and purpose of the project. State the history of the project.

4-3.1.3.1 Project Background

Include complete information about the surrounding area and the reasons and need for this project. Identify the owner's intent and the stakeholders located within the project area.

Briefly describe the project history, including the following:

- Project sponsors, partners, and proponents; and
- Type of project – roadway, safety, bridge, traffic, drainage or maintenance.

4-3.1.3.2 Project Location and Description

Describe the limits of the project study area with respect to major streets, highways, or other prominent features. Develop a project location map to show the study limits and major topographic features, including a north arrow, a scale, and an inset Maricopa County vicinity map showing the project location in relation to major cross-streets or other identifiable landmarks. The scale will depend on the size of the project.

4-3.2 TECHNICAL MEMORANDUM – TRAFFIC ANALYSIS

This TM will document the findings from the analysis of existing and future traffic conditions and provide recommendations on improvements to accommodate existing and future traffic demands for the project.

The Traffic Analysis TM will typically be prepared early in the project scoping process to provide analysis for use in the evaluation of candidate alternatives. Depending on the outcome of the candidate alternatives analysis, additional or more detailed traffic analysis may be needed to be conducted later in the scoping process if the candidate alternatives being considered indicate a substantial traffic impact.

The following sections should be included in most traffic technical memorandums: Sections or other traffic concerns are listed after the basic sections as optional and may be required by the project manager on a project by project basis.

4-3.2.1 *Cover Sheet*

4-3.2.2 *Table of Contents*

4-3.2.3 *Introduction/Project Background*

Briefly discuss how the project originated and reason for the project.

4-3.2.4 *Project Location and Description*

Describe what the project is and location/limits.

4-3.2.5 *Existing Features/Surrounding Area*

Briefly describe the existing features and area including the roadway, roadside and surrounding area that is part of the project study area. This should include whether urban or rural, residential or industrial/commercial existing and roadway classification. This section should also include discussion of the type of traffic common to the area (vehicle, heavy trucks). Discuss jurisdictional control within the project limits.

4-3.2.6 *Traffic Analysis*

Analyze existing and future traffic conditions. This section should include the following information, as well as any other pertinent information identified during the study process:

4-3.2.6.1 Existing and Future Roadways

Identify existing and planned future transportation network conditions, such as existing and future roadway classification, roadway and intersection geometry, number of lanes, speed limits, and traffic control devices. Identify existing and planned future access points. Discuss major intersections, minor intersections, and private commercial or residential accesses to from the subject roadway. Include discussion of private developments or improvement projects by cities and towns that may increase or decrease trips and what would be the impact on the ADT.

4-3.2.6.2 Traffic Volumes

Project team shall coordinate with MCDOT Planning and Traffic staff to obtain traffic data and resources for the traffic data. Discuss existing as well as planned construction year and horizon year peak hour and daily ADT volumes. Provide figures that clearly show AM and PM peak

hours as well as daily ADT's for each. Document available pertinent traffic count data (MCDOT, MAG, etc.), adjustment factors, assumed growth rates, future anticipated major traffic generators, and data sources referenced. Where appropriate, identify the Design Hour Traffic Factor (K, in percent), the Directional Distribution Factor (D, in percent), and the Truck Factor (T, in percent). Some projects may require intersection turning movement counts, if required, provide figures that also clearly show AM and PM turning movement counts for the identified intersections.

4-3.2.6.3 Crash Analysis

Discuss crash history along the posted roadway and intersections. Include all data sources referenced, a summary of the crash history (including severity types), the time period for which the crash data is applicable (five most recent years of data on record), identifiable trends in the data, anomalies with the data, and a comparison to ADOT crash rates where appropriate. Discuss how the proposed project will provide potential countermeasures that may reduce the crash rate, as well as their anticipated effects on crash patterns, if requested to do so by the PM. Unless otherwise approved by the PM, crash analysis should be based on one or more of the methodologies provided in the most current version of the *Highway Safety Manual (HSM)*.

4-3.2.6.4 Capacity and LOS Analysis

Level of Service (LOS) is a qualitative measure of the traffic operation of an intersection or roadway segment. A LOS analysis should be done for all intersections and roadway segments within the project limits. Existing configurations as well as proposed configurations should be analyzed for the construction year and the horizon year as defined by project team. State the source of count data used for the analysis and intersection turning movement counts may need to be conducted if required and approved by the PM.

Refer to Chapter 2 of the RDM for capacity and LOS Analysis requirements.

Unless otherwise approved by the PM, the capacity analysis should be based on the methodologies and tables provided in the most current version of the *Highway Capacity Manual (HCM)* for unsignalized and signalized intersections. For signalized intersections, Synchro analysis can be used to determine the LOS.

4-3.2.6.5 Alternate Modes (optional, if required)

Where relevant, describe existing and anticipated future conditions for alternate modes of travel (e.g., pedestrian, bicycle, golf carts, transit, or equestrian). Document the data sources referenced, the level of detail associated with the analysis, and additional analyses required as the project progresses. If requested to do so by the PM, identify and provide the minimum acceptable LOS for each relevant mode of travel for the existing year, the construction year, and the design year, and calculate the existing and anticipated future LOS for the baseline (i.e., no-build) condition and for the recommended improved condition. Unless otherwise approved by the PM, alternate mode capacity and LOS calculations should be based on the methodologies and tables provided in the most current version of the *HCM*.

4-3.2.6.6 Sensitivity Analysis (optional, if required)

If requested to do so by the PM, conduct a sensitivity analysis that evaluates how the findings and recommendations associated with the traffic analysis would change under differing scenarios regarding the assumed future traffic volumes.

4-3.2.6.7 Conclusions

Summarize the pertinent findings from the traffic analysis. Discuss if future acceptable LOS can be achieved and any factors that may influence the LOS prior to construction or horizon year. Discuss if the analysis identified any need for signals, signal modifications or other traffic control device changes. Identify any issues that need to be considered as project development proceeds.

4-3.2.7 *Recommended Improvements*

Based on the findings of the analysis, identify recommended improvements needed to better promote safety and provide acceptable existing and future LOS. Indicate how these recommended improvements are anticipated to impact existing and anticipated future crash rates and LOS. Discuss mitigation measures needed to achieve the desired LOS as a result of the analysis. If the desired LOS cannot be achieved, discuss if any restricted type access may be required along the proposed corridor or any intersections.

Recommended improvements could pertain to traffic operations, roadway and intersection geometry (e.g., provide a right-turn lane or traffic calming island), traffic control devices (e.g., provide a roundabout or protected left-turn signal phasing), access management (e.g., provide a raised median or consolidate driveways), pavement markings (e.g., provide additional no-passing zones or increase left-turn storage), and signage (e.g., provide more or larger signs). Discuss project phasing with proposed construction dates and detail which improvements will be required in each phase. Discuss if the recommended improvements will impact other jurisdictions and what type of coordination will be required.

Identify if additional/future analysis or reports will be needed later in the project scoping process (or for future project phases) for any of the recommended improvements (e.g., a signal warrant study, parking study, or school crosswalk study).

4-3.2.8 *Appendices*

The appendices should be reserved for supporting or other material that supplements the contents of this TM. The following minimum items shall be organized in the TM appendices, along with any other pertinent materials identified during the project:

- Summary of the TM that will become part of the SDR section covering the traffic analysis. The contents are defined in SDR guidelines under the traffic analysis section;
- Traffic count data and/or other sources of existing and projected traffic volumes;
- Capacity analysis modeling output sheets, if applicable; and
- Crash data.

4-3.3 TECHNICAL MEMORANDUM – ENVIRONMENTAL DOCUMENTATION

The Environmental Technical Memorandum is prepared to aid in the scoping analysis and to act as a building block that feeds into the environmental clearance document. It is not intended to meet the needs of a NEPA or Non-Federal Environmental Clearance and is a planning-level document. The resources discussed in the document are similar to those discussed in a NEPA or Non-Federal clearance document, but at a planning level versus a project clearance level. The clearance document will provide greater detail regarding each resource topic and project-specific impacts and mitigation in order to clear the project.

If a NEPA clearance is required, actions done during scoping, such as public involvement and other environmental tasks, should follow the intent of the NEPA. In addition, the Environmental Program Branch will focus their efforts on obtaining a NEPA clearance, and therefore, a technical memorandum will not be produced. On all other non-NEPA projects, an environmental clearance will be completed after the Scoping Phase. The clearance document provided for non-NEPA projects is known as an Environmental Determination, and it would be produced during the design phase, once a project has been approved for final design and construction. Clearance is conditional on mitigation measures, implementation of those mitigation measures, and issued during the Design Phase (if the project is programmed and funded in the 10-year MCDOT Program).

Although there are two types of environmental technical memoranda (EID or EIM), each environmental document may have the following contents, at varying levels of detail based on the documentation requirements. Additional resource topics and information may be required depending on the project's complexity. The decision as to which level of environmental documentation is appropriate, as well as to the content within that document, would be determined between the Environmental Program Branch Manager and the PM, prior to the inception of the scoping project.

The following information may be included in the environmental technical memorandum (EID or EIM):

4-3.3.1 *Cover Sheet*

Refer to Section 4-3.1 for further guidance.

4-3.3.2 *Table of Contents*

Refer to Section 4-3.1 for further guidance.

4-3.3.3 *Abbreviations*

A list of abbreviations commonly used in environmental documentation should be included in the EIM, and located after the Table of Contents.

4-3.3.4 *Introduction*

Refer to Section 4-3.1 for further guidance.

4-3.3.5 *Project Background*

Refer to Section 4-3.1 for further guidance.

4-3.3.6 *Project Location and Description*

Refer to Section 4-3.1 for further guidance.

4-3.3.7 *Existing Features*

Briefly describe the existing features and status of the physical area including the roadway, roadside, and surrounding area that is part of the project study area. Include R/W information and roadway classification. Describe the project study area including Township, Range and Section, United States Geological Survey (USGS) maps, and Mile Post (MP) markers (if applicable).

4-3.3.8 *Need*

Include a discussion describing the need for the project. State the problem that will be addressed by the project. For example, “Traffic is projected to exceed the maximum capacity of the roadway”.

4-3.3.9 *Purpose*

Include a discussion of the purpose of the project. Answer the question: What does MCDOT hope to accomplish with this project? Explain how the project will address the stated need for the project. For example, “The purpose of this project is to accommodate future traffic needs along the roadway”.

4-3.3.10 *Socioeconomic Considerations*

Discuss the existing and planned development, local demographics, population, ownership and impacts. List any protected populations such as minority or low-income populations located within the project area. Discuss any displacements and any temporary or permanent access changes. Discuss any changes to the neighborhood continuity and/or community cohesion. Discuss Title VI/Environmental Justice. Identify farmlands within the project area and determine if they are considered prime and unique soils/farmlands, or farmland of statewide/local importance. Mitigation associated with the take of farmland is only associated with projects with a federal nexus, therefore indicate whether the project has a federal nexus, indicate that nexus and identify impacts. Also include land jurisdiction, ownership, and use (i.e., private/residential, public/transportation etc.). Each of these considerations should be broken up as separate sections under Socioeconomic Considerations. For EID’s, list the mitigation measures that may apply to the project, if impacts are known. Note all data resources referenced.

4-3.3.11 *Natural Environment*

4-3.3.11.1 Biological Resources

Describe the terrain, soil types, elevation range, type of native and invasive flora and fauna present (biological communities), habitats, presence of federally threatened and endangered species, and species/habitat of special concern in Arizona, Tribal sensitive species/habitat, and additional investigations that may be required as the project progresses. Also, identify wildlife crossings/Potential Wildlife Linkage Zones (PLZs) as defined in Arizona’s Wildlife Linkages Assessment, any protected native plants, invasive species/noxious weed information, and any impacts. Each of these topics should be broken up as separate sections under Biological

Resources. For EID's, list the mitigation measures that may apply to the project; if impacts are known. Note all data sources referenced.

Also identify any additional biological investigation(s)/survey(s) which will be needed in the next phases of the project.

4-3.3.11.2 Floodplains

Identify all floodplains adjacent to the project with respect to identified impacts. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.11.3 Water Quality

Identify existing drainage patterns, potential jurisdictional waters of the U.S. (WUS), and any potential wetlands. Document any known impacts to existing drainage patterns, potential jurisdictional WUS, and/or potential wetlands. Identify the need for nationwide or individual permits required under Section 404 of the Clean Water Act. Note if the Section 401 Water Quality Certification is conditioned in the nationwide permit or if a separate certification will be issued by the Arizona Department of Environmental Quality (ADEQ), the Environmental Protection Agency (EPA) or the Indian Tribes.

Identify whether an Arizona Pollutant Discharge Elimination System (AZPDES) permit (greater than one acre of disturbed land) and Stormwater Pollution Prevention Plans (SWPPP) will be needed. Determine if project will be within ¼ mile of an Impaired Water or Outstanding Arizona Water (OAW) and if so, advise the PM the need to complete an Impaired Water Action Plan in sufficient time to receive the permit prior to a project's Notice to Proceed. ADEQ has up to 30 calendar days to review a project's Notice of Intent and SWPPP (if required) and either grant or deny the AZPDES permit if discharging within an Impaired or OAW. Section 404/401 and Section 402 of the Clean Water Act should be broken up as separate sections under Water Quality.

For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.11.4 Visual Resources

Identify existing view sheds, and vistas; identify any designated scenic byways or corridors associated with the project area; identify if any land managing agencies have specific visual resource management objectives; identify any impacts caused by the improvements or change in the existing visual character as a result of the project. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.12 Physical Environment/Construction

4-3.3.12.1 Air Quality

Describe whether the project adds capacity or alters an existing alignment. Describe the status of the project area (attainment, non-attainment, maintenance) with regard to major monitored pollutants (ozone, carbon monoxide, sulfur dioxide and particulate matter) and all identified impacts associated with the improvements.

Describe whether the following are needed: air quality analysis with modeling, qualitative air quality evaluation, or non-attainment maintenance. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.12.2 Noise Impacts

Describe whether the project adds capacity as well as whether the project will substantially change the alignment. Identify the presence and location of sensitive noise receptors and existing and anticipated noise generators. List the noise activity category (A-D) present within the project area. Describe any impacts associated with the improvements. Describe whether noise modeling or comprehensive noise evaluation is needed. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.12.3 Hazardous Materials

Based on a database review and field reconnaissance, identify observed or suspected hazardous materials/facilities that may be an environmental concern for the project. Develop a Preliminary Initial Site Assessment (PISA), if needed, and discuss its findings. Identify additional investigations that may be required as the project progresses, such as a Phase I Environmental Site Assessment (ESA), Phase II ESA, or testing. Identify all impacts caused by the improvements. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.12.4 Construction-Related Impacts

Describe any construction-related impacts (traffic control measures, detours, etc.) that will occur as a result of the improvements. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.12.5 Utilities

Describe utilities present within the project area. Describe any utility involvement, the type of work proposed, who will be performing the work, and whether customers will be impacted by the work. If customers are impacted, describe the advance notification process. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.13 Cultural Resources

Describe the Area of Potential Effect (APE), identify previous cultural resource surveys in the area, determine if new surveys are needed and, if previously conducted, provide the report recommendations. Note all archaeological or historical sites, structures or buildings, cultural landscape, traditional cultural properties or Tribal designated sites. Describe all identified impacts of the project improvements. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.14 Section 4(f) and 6(f) Resources

Indicate if a federal nexus is present. Identify any Section 4(f) resources such as parks, recreation areas, wildlife refuges, historic properties (such as National Register eligible historic sites, historic bridges, historic roads, historic canals and archaeological resources) in the area and any impacts to these resources if a federal nexus exists. Also, identify any Section 6(f) resources,

which are public outdoor recreation areas and facilities funded through the Land and Water Conservation Fund Act regardless of a federal nexus or not. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.15 Public Involvement/Agency Coordination

Public involvement/Agency coordination may be limited to sending scoping letters to agencies and adjacent owners or may include public meetings, workshops, website, etc. The level of involvement and coordination will be determined by the MCDOT Communications Branch and the Environmental Program Branch or, if federal funding is being utilized for the project, by the lead Federal agency and the assigned NEPA planner, in coordination with MCDOT's Communication and Environmental Program Branches. Summarize the public involvement activities and results, if applicable. For EID's, list the mitigation measures that may apply to the project, if impacts are known. Note all data sources referenced.

4-3.3.16 Environmental Identification Conclusions

This section will provide a synopsis of the entire document and provide the highlights or determinations of each discipline discussed. This section within an EID will list the mitigation measures that may apply to the project if programmed for final design and construction; however, due to the relatively small size of the document (EID), no synopsis would be needed. An EIM will have this section which would also be utilized as the Environmental Analysis section of the scoping report. This section will be broken up into the main aspects of the document:

- Socioeconomic Considerations
- Natural Environment
- Physical Environment/Construction
- Cultural Resources
- Section 4(f) and 6(f) Resources
- Public Involvement/Agency Coordination

This section within an EIM would not include mitigation measures because mitigation measures are not listed in EIM documentation due to the complexity of the project. Mitigation measures would be listed in a separate clearance document known as an Environmental Determination, which would be produced once the project was approved for final design and construction. For federal aid projects, mitigation measures would be listed in the approved NEPA document.

4-3.3.17 Literature Cited

All data sources referenced in the document will be listed in this section. All documentation will include this section.

4-3.3.18 Appendices/Attachments

The appendices/attachments should be reserved for supporting or other material that supplements the contents of this environmental document. An EID will not typically have appendices or attachments unless warranted by special circumstances that add value to the report. However, depending on the complexity of the project, an EIM may have appendices or attachments.

4-3.4 TECHNICAL MEMORANDUM – DRAINAGE REPORT

A drainage report should be provided in support of each stage of plans submittal. Three levels of the drainage report, Preliminary, Draft, and Final, will be provided in the Scoping phase. A Final Drainage Report should be submitted in the Final stage. In preparation of the 60% submittal the drainage report should be evaluated to verify the drainage design. Modifications and re-sealing of the Final Drainage Report may be necessary in the 60% stage. **Table 4-3** shows the drainage report requirements at each stage.

Table 4-3 – Drainage Requirements

Required Report	Scoping Phase Stages		
	Candidate Alternatives (15%)	Draft Scoping (25%)	Final Scoping (30%)
Preliminary Scoping Drainage Analysis	✓		
Draft Scoping Drainage Report		✓	
Final Scoping Drainage Report (Sealed)			✓

The level of details will differ depending on the type of the drainage report. The Preliminary Drainage Analysis will address existing drainage conditions relevant to the current alignment of an existing roadway or proposed alignment or candidate alignments for a new roadway. The drainage report will identify contributing watersheds, any previous studies, existing flood zone data, existing waterways, and drainage structures. The analysis should detail the drainage challenges to be addressed, the magnitude of offsite flows, and apparent conflicts with known utilities and other structures. Based on potentially limited survey information and available data, the analysis should present a conceptual drainage plan that may need more details but is adequate for planning purposes and approximate cost evaluation. The report should identify major issues, pitfalls, and elements that may require permitting and other types of applications that affect the cost and schedule of the project. The analysis will help select the recommended improvements alternative.

Once the Preliminary Drainage Analysis is approved and the recommended alternative is selected, the Draft Drainage Report should be completed. The Draft Drainage Report should include all detailed calculations and documentation prepared for the recommended alternative, including design flows, drainage inlets, storm drains, culvert design, channel and ditch design, and scour analysis. The Draft Drainage Report should support, and be consistent with, the drainage structures and details provided in the Recommended Alternative Plans. Once comments have been received on the Draft Drainage Report, the Final Drainage Report should be

completed. The Final Drainage Report should support, and be consistent with, the drainage structures and details provided in the Scoping Plans.

The drainage reports mentioned will generally cover similar topics as mentioned below. Only the level of details will differ as discussed. Typical topics covered in a drainage report are discussed in the following sections.

The following sections are common to all Technical Memoranda, and their descriptions are listed above in Section 4-3.1, Common Front End Sections of the Technical Memoranda:

4-3.4.1 Cover Sheet

4-3.4.2 Table of Contents

4-3.4.3 Introduction

4-3.4.3.1 Project Background

4-3.4.3.2 Project Location and Description

In addition to the above sections, the following information may be included:

4-3.4.4 Existing Features

Briefly describe the existing features and status of the physical area including the roadway, roadside, and surrounding area that is part of the project study area. Include R/W information and roadway classification.

4-3.4.5 Drainage Design Criteria

Provide the drainage design criteria used to develop the project's elements. Typical design elements are provided in the following section. State the jurisdictional agency and reference their guidelines and recommendations. Detail the calculation methods and assumptions with justifications (if any). Identify all data sources referenced.

4-3.4.5.1 Design Storm

Identify applicable design storms for roadways, culverts, bridges and roadside design (usually per roadway classification).

4-3.4.5.2 Hydrology

Discuss the applicable method such as Rational Method, unit hydrograph method or routing method. For Rational Method provide the minimum Time of Concentration.

4-3.4.5.3 Pipe Sizes

Provide the minimum pipe size criteria for the roadways and driveways.

4-3.4.5.4 Fill Cover

Provide the minimum and maximum fill cover for pipes and box culverts.

4-3.4.5.5 Allowable Velocities

Provide the maximum and minimum allowable velocities for the culverts and channels.

4-3.4.5.6 Erosion Protection

State the erosion and scour protection requirements.

4-3.4.5.7 Channel Section

Provide the allowable side slopes (with consideration to clear zone) for channels.

4-3.4.5.8 Retention or Detention Basin

Provide the requirements for retention and/or detention basins.

4-3.4.5.9 Storm Drains

Provide the criteria requirements for storm drain systems design.

4-3.4.5.10 Bridges

Provide scour criteria for bridge foundation design. Provide recommendations for channel and bank improvements as needed for the channel in the vicinity of the bridge. Include recommendations for aprons, channel armoring, bridge deck drains, guide bank layout and geometry, abutment armoring, erosion protection, rundowns, ditches and any other drainage features needed for proper drainage function of the bridges and nearby bridge vicinities.

4-3.4.5.11 Design Exceptions

Identify and maintain a log of any potential need for design exceptions; obtain written approval from the PM.

4-3.4.6 Existing Drainage Conditions

Identify the project watershed with the aid of aerial photography, general topographic data (such as USGS maps), previous studies, and field visits. Identify natural and man-made waterways (rivers, washes, channels). Using aerial photography, previous studies, and as-built plans, identify existing drainage structures, such as bridges, culverts, and storm drains that may be impacted by the proposed improvements. Field-verify the identified drainage structures for size, material, and condition. Document findings with field photographs and notes. Describe the existing drainage patterns in the project watershed. Identify all data sources referenced.

4-3.4.7 Flood Zone Classification

Identify existing flood zones and their classification in the vicinity of the project site. Check the latest FEMA Flood Insurance Rate Maps (FIRM) for current effective flood zones. Check FEMA's website for flood zone revisions that may have taken place but are not yet reflected on the periodically published FIRM sets.

Check for any available flood zone data in the local community archives or electronic database.

Describe the area flood zones and include a figure of the project area clearly showing the relevant flood zones and their classifications.

Identify the impact on the project, applicable improvements regulations, required mitigation measures, and need for application processing through the local floodplain administrator and/or FEMA.

If flood zone establishment or revisions are required, consult with environmental for the status of the Endangered Species Act analysis. A declaration is required in flood zone applications.

Identify any data sources referenced.

4-3.4.8 Design Flows

Identify any estimated offsite flows from previous studies.

Confirm current applicable hydrologic design criteria including rainfall source and analytical methods. If different from previous studies, consult with PM for applicability of previous studies or the need for updated hydrology.

When applicable, estimate offsite peak flows for the design storm using the applicable analytical methods (i.e., HEC-1, Rational Method, or other methods).

Delineate onsite drainage areas per the proposed drainage concept and quantify the design peak flows using the applicable analytical method, usually the Rational Method.

Identify all data sources referenced.

4-3.4.9 Proposed Drainage Concept

Present a proposed drainage concept based on the applicable design criteria. The concept should, to the extent possible, preserve or improve the pre-development drainage pattern, avoid adverse impact to adjacent properties, and mitigate unavoidable impacts. Identify and address all assumptions and limitations associated with the proposed drainage concept.

Consult with the environmental professional on any existing jurisdictional waterways or structures, and tailor the proposed concept to minimize impact and accommodate applicable environmental regulations, such as maximum allowable impact for a particular environmental permit.

Ensure that proposed structures convey flows to the predevelopment discharge points. Stormwater runoff from one source should not be directed to another source without proper mitigation measures.

Identify water quality regulations and the need for corresponding mitigation measures, such as first flush storage basins or special types of drainage inlets that filter out regulated pollutants.

Tailor the proposed concept to avoid or minimize impacts to existing flood zones.

Collect data on existing and planned utilities, and tailor the proposed concept to minimize conflicts with these utilities, especially those that may require costly relocation.

4-3.4.10 Adjacent Impacts

Describe all upstream and downstream impacts caused by the proposed drainage improvements, as well as any appropriate mitigation measures.

4-3.4.11 Drainage Design

This section details the proposed drainage design.



4-3.4.11.1 Drainage Inlets and Storm Drains

For roadways with curb and gutter, document the location and sizes of drainage inlets and storm drains. Document inlets per maximum allowable street flows, collection structure locations, allowable flow spread criteria, and at other critical areas such as roadway intersections.

State allowable types of drainage inlets (catch basins, scuppers, etc.). If grated inlets are used, ensure documenting the appropriate grate type is selected, such as bicycle-safe grates. State the applicable clogging factors when sizing drainage inlets.

Drainage inlets are typically designed for smaller storms such as the 10-year storm. At on-grade inlets, ensure that bypass flows from larger storms discharge at the designated collection point; otherwise, size the structure to capture the maximum design storm, such as the 100-year storm. Document the design procedure.

Drainage inlet capacities at sump locations are typically evaluated at a water depth at least as high as the inlet opening height. Ensure that the elevation difference to the nearest grade break is not less than the water depth used in the inlet analysis; otherwise, the water will escape the inlet at the grade break. Document how design issues are addressed.

Document how the tail water conditions for the storm drains were determined.

In the hydraulic analysis of the storm drains, ensure the hydraulic grade line (HGL) at an inlet location is sufficiently below the lip of the gutter for the design storm (typically six inches for the 10-year flow). Provide discussion related to the HGL.

Provide the flow velocities and ensure that storm drain flow velocity is within acceptable limits.

4-3.4.11.2 Culvert and Channel Design

Describe the proposed culvert and channel improvements with regard to the pavement drainage, off-site drainage, and roadside ditch configuration.

4-3.4.11.3 Culverts

Culverts should ideally be located along the existing flow path, unless supplemental improvements are provided to convey the flow to the pre-development receiving waterway. Discuss the design procedure and any deviation from the existing flow paths.

Document the allowable culvert sizes and material. A minimum culvert height could be required to accommodate maintenance activities. If that is the case, document the locations. Provide the minimum cover requirements. Check if a portion of a culvert can be embedded in the ground to accommodate cover requirements.

Starting conditions at the downstream side of the culverts are critical for culvert hydraulic analysis. Provide evaluation of the applicable starting conditions. Ensure that the calculated water head at the face of the culvert meets the maximum water limit requirements, typically below the roadway structural section. Document water head details.

Culverts typically restrict flows in a waterway and raise the water depth. Ensure that the flow on the upstream side of the culvert does not escape an unintended low point away from the main flow path. Document culvert design impacts and mitigations.

Document the backwater impact from the water head at the upstream side of the culvert and ensure it is properly incorporated in any upstream conveyance element, such as a wash or a side ditch.

Provide the outlet velocities and ensure that they are within allowable limits. Document the need for and provide adequate scour protection measures at the culvert outlet.

Document that the culvert length, end treatment, and scour protection measures accommodate clear zone requirements.

4-3.4.11.4 Channels/Roadside Ditches

Required channel depth for flow conveyance should be below natural ground. Ditches on side slopes and alongside berms to contain flows are subject to additional design and compaction requirements and should not be utilized without approval from the PM. Document the roadside design approach.

Channel side slopes should accommodate clear zone requirements, typically no steeper than 6:1 within the clear zone. Detail the side slopes used in design. Document channel velocities and check against the need for appropriate channel lining for scour protection. The applied Manning's roughness coefficient should be documented and should correspond to the type of channel surface.

Consider downstream backwater for a downstream channel or culvert when establishing the water surface profile along the channel. Document and ensure that the water surface profile meets the design requirements (typically below the roadway structural section for the design storm).

State that any applicable lining material accommodates the applicable clear zone requirements.

4-3.4.11.5 Stormwater Storage Requirements

Detail stormwater storage requirements for retention, detention, or water quality/first flush applications.

The basins should be located within the R/W and outside the clear zone unless other accommodations are coordinated with the PM. Document the design decisions.

Detail and ensure the maximum water depth in the basins meets design requirements, typically no more than three feet.

Retention basins should be drained within a specified time, typically 36 hours, through surface percolation or dry wells, if necessary. Conduct a surface percolation test to identify applicable discharge rates. State the design parameters of the basin and provide related data.

Detention basin use should be in accordance with the Flood Control District of Maricopa County design criteria.

4-3.4.11.6 Scour Analysis

Evaluate and document whether drainage structures, such as drainage inlets, storm drains, culvert outlets, bridges, channels, and roadside ditches, require scour protection. The level of protection depends upon the comparison of flow velocity at the structure to the allowable velocity of the receiving element.

Lining type should accommodate the clear zone requirements. Riprap lining is a common application. Provide supporting documentation and calculations.

4-3.4.12 Conclusions

List the Drainage Report's conclusions.

4-3.4.13 References

List the Drainage Report's references.

4-3.4.14 Appendices

The appendices should be reserved for supporting or other material that supplements the contents of this Technical Memorandum. The following items may be organized in the Technical Memorandum appendices, along with any other pertinent materials identified during the project:

- Summary of the Technical Memorandum that will become part of the SDR section detailing the drainage analysis. The contents are defined in the SDR guidelines under the drainage analysis section;
- Figures;
- Flood zone data;
- Hydrologic documents and calculations (such as HEC-1 or Rational Method output);
- Drainage inlet calculations;
- Storm drain calculations;
- Cross culvert calculations;
- Driveway culvert calculations;
- Channels and roadside ditches;
- Scour analysis and scour protection data;
- Excerpts from previous studies;
- Relevant documents and permits;
- Reduced copies of improvement plans; and
- A drainage map that shows the peak discharge (Q) at points of concentration and clearly identifies the existing drainage system. Minimum scale shall be 1 inch equals 500 feet. Where drainage areas are large or otherwise inappropriate, other scales may be approved.

4-3.5 TECHNICAL MEMORANDUM – STRUCTURES REPORT

This Technical Memorandum will describe the existing structures located within the project limits, present an evaluation of viable alternatives for new structures and make the structural recommendations for final design. This will serve as the basis of structural alternative selection.

The following sections are to be included:

- 4-3.5.1** *Cover Sheet*
- 4-3.5.2** *Table of Contents*
- 4-3.5.3** *Introduction*
- 4-3.5.4** *Structure Background and Need for Improvements*
- 4-3.5.5** *Structure Location and Description*
- 4-3.5.6** *Existing Features*

Briefly describe the existing features and status of the physical area including the roadway, roadside and surrounding area that is part of the structure study area. Include R/W information and roadway classification.

4-3.5.7 *Structural Alternatives Considered*

A minimum of three structure alternatives shall be considered. The structure alternatives considered shall have approval of the MCDOT Bridge Group Manager early in the structure alternative process. Describe the structural alternatives considered.

4-3.5.8 *Evaluation of the Existing/proposed Structures(s)*

Indicate this Evaluation on the 30% Structure Design Plans – Items 4 - 3.5.8.1 through 4 - 3.5.8.14 shall be presented in the 30% Structure Design Plans.

4-3.5.8.1 Existing/Proposed Roadway Geometry and Condition

Provide the approach roadway geometry and show all constraints that may affect the serviceability and function of the Structure.

4-3.5.8.2 Existing/Proposed Structure Geometry

Describe the horizontal and vertical alignment and the preferred cross section featuring the structure (such as approach roadway, number of travel lanes, barrier type, sidewalk size and location, and median type for bridges).

4-3.5.8.3 Bridge Hydraulics

Indicate the latest hydraulic information on the 30% Structure Design Plans. Include channel and bank improvements as needed for the channel in the vicinity of the bridge. Include general layout and location of aprons, channel armoring, bridge deck drains, guide bank geometry, abutment armoring, erosion protection, rundowns, ditches and any other drainage features needed for proper drainage function of the bridges and nearby bridge vicinity as called for in the Drainage Report.

4-3.5.8.4 Existing Utilities

Indicate the latest utility information on the 30% Structure Design Plans.

4-3.5.8.5 Right of Way

Identify new R/W or construction and/or maintenance easement(s) (needed).

4-3.5.8.6 Design Specifications and Loadings

List the applicable specifications and design methodology to be used in this project.

4-3.5.8.7 Bridge Foundation

Include foundation types based on latest geotechnical information. Indicate existing and previous foundations, if any. Include a general layout and location of retaining walls, soil improvements, embankments and any other geotechnical features needed for proper function of the bridges and bridge approaches as called for in the Geotechnical and Pavement Design Report.

4-3.5.8.8 Environmental

Describe the environmental constraints that impact the structure.

4-3.5.8.9 Aesthetics

Present the appearance of the structure consistent with the project theme, if any.

4-3.5.8.10 Constructability

Describe the method of bridge construction and associated constraints. Indicate any phased construction as necessary.

4-3.5.8.11 Construction Access and Staging Area

Provide the locations of the project access area and possible location of the contractor's staging area.

4-3.5.8.12 Traffic Constraints and Traffic Control

Describe or indicate the traffic constraints and traffic control that will be required to construct the structure. There may be traffic control alternatives in which several may need to be considered and will affect the construction sequence and selection of the structure.

4-3.5.8.13 Temporary Structures

Indicate any temporary structures that are anticipated to construct the structure. This might include but is not limited to temporary retaining walls, temporary embankments, temporary lifting structures, etc.

4-3.5.8.14 Other

Indicate and/or describe any additional information or features that may affect or impact the bridge. This might include but is not limited to tunnels, mines, landfills, sinkholes, unstable slopes, etc.

4-3.5.9 Cost Estimate

Detail the costs of the various structure alternatives. Give a cost per square foot of deck area for each structure alternative.

4-3.5.10 Selection of the Recommended Alternative

Provide a detailed comparison between the alternatives and indicate the recommended alternative. A decision matrix shall be presented and the matrix shall be based on various project constraints/requirements.

4-3.5.11 Appendices

The appendices should be reserved for supporting or other material that supplements the contents of this Technical Memorandum. The following items may be organized in the Technical Memorandum appendices, along with any other pertinent materials identified during the project:

- Appendix A: Summary of the Technical Memorandum that will become part of the SDR section covering the structures. The contents are defined in the Project work plan for the scoping phase. The following shall be included in Appendix A as well as other information called for in this TM;
- Bridge Layouts and Typical Sections for Selected Alternative(s); and
- A brief discussion of considered structure alternative(s), final recommended structure alternative.
- Cost Estimates for Alternative(s).
- Appendix B: Existing Structural Documentation
- Appendix C: Supporting Documentation
- Appendix D: Supporting Documentation

4-3.6 TECHNICAL MEMORANDUM – GEOTECHNICAL AND PAVEMENT DESIGN REPORT

A geotechnical report should be provided for a MCDOT project, and the report may be prepared in three levels in the Scoping Stage: preliminary, draft, and final. The submittal of each report should be labeled to reflect the appropriate level. Once the report is reviewed and the comments are satisfactorily addressed by the designer, the report should be updated. This technical memorandum will provide the geotechnical analysis, pavement design, and structural foundation design. The geotechnical work should be completed during the scoping stage; however, some projects may require flexibility in performing borings after the Scoping Plans and at the onset of the Final Design Stage. The PM may grant an exception to accomplish this; thus, an updated geotechnical report can be provided at the 60% stage. Projects with the least complexity may require only one final geotechnical report. **Table 4-4** shows the Recommended Geotechnical Report Stages.

Table 4-4 – Geotechnical Requirements

Required Section	Candidate Alternatives Stage (15%)	Draft Scoping Stage (25%)	Final Scoping Stage (30%)
Preliminary Geotechnical and Pavement Design Report	✓		
Draft Geotechnical and Pavement Design Report			✓
Final Geotechnical and Pavement Design Report (Sealed)			✓

The level of detail will differ depending on the type of report. The Preliminary Geotechnical Report will include all of the geotechnical investigation elements such as pavement design, shrink/swell factors, ground compaction factor, expansive soils, borrow requirements, resistivity, and slope information. The findings of the preliminary report will be derived from prior reports, visual inspections, and sample collections in the field.

The Draft Geotechnical Report will include all of the elements described for the Preliminary Geotechnical Report. The borings and extensive test(s) as required by the project terrain will be carried out to prepare this report. Environmental clearance and a right-of-entry will be needed for the geotechnical field work. Details for structure foundations (bridge or wall) will be added at this stage. For some projects, at the discretion of the PM, the geotechnical report can be subdivided into the following four reports:

- Geotechnical Report;
- Pavement Design Report;
- Bridge Foundation Report; and
- Wall Foundation Report.

The Final Geotechnical Report will be completed, signed, and sealed by the design engineer at the completion of the scoping stage. The Final Geotechnical Report should be based on the Draft Geotechnical Report and updated to incorporate any changes that occurred after the approval of the Draft Geotechnical Report.

All of the reports will generally cover similar topics. Only the level of details will differ as discussed. Typical topics covered in a geotechnical report are discussed in the following sections.

The following sections are common to all Technical Memoranda, and their descriptions are listed above in Section 4-3.1, Common Front End Sections of the Technical Memoranda:

4-3.6.1 *Cover Sheet*

4-3.6.2 *Table of Contents*

4-3.6.3 *Introduction*

4-3.6.3.1 **Project Background**

4-3.6.3.2 **Project Location and Description**

In addition to the above sections, the following information may be included:

4-3.6.4 *Existing Features*

Briefly describe the existing features and status of the physical area including the roadway, roadside, and surrounding area that is part of the project study area. Include R/W information and roadway classification.

4-3.6.5 *Geotechnical and Pavement Design Analysis*

Document any geotechnical investigations and research completed in support of the project, including those performed for bridge or structure construction and pavement design. Also provide appropriate pavement design recommendations for the project. The Geotechnical and Pavement Design Analysis should address the following items, as well as any additional items identified during the project.

4-3.6.5.1 **Geological Features**

Describe the geological features in the project area. List the source and nature of deposits; depth, thickness, and composition of strata making up the subgrade soil profile; estimated location and quality of bedrock; location and variation in ground water table; and areas of potential problems such as springs, unstable slopes, and expansive, corrosive, or contaminated soils.

4-3.6.5.2 **Geotechnical Analysis**

Describe the geotechnical investigations performed, the sampling and testing methods used, and the existing soil and pavement characteristics identified from those investigations and tests. Provide boring location, equipment and procedure used, and the information obtained. Include treatment and recommendations for any constraints or potential problems.

4-3.6.5.3 Existing Pavement

Describe the existing pavement condition and composition and the history of the pavement (including previous replacement and preservation activities). Describe observations of the pavement's existing condition and its future viability. Describe the pavement substructure and pavement types.

4-3.6.5.4 Pavement Design

Describe any recommendations concerning the pavement structural section such as aggregate base depth, pavement type, pavement course thickness, surface course requirements, and any special additives or placement methods required. Provide graphics to illustrate different layers of the pavement sections. Identify the location of the proposed pavement structural sections.

4-3.6.5.5 Foundation Recommendations

Identify the appropriate foundation types and construction methods for any structures that may be constructed, such as bridge and wall foundations. Provide recommended foundation bearing pressures or capacities, foundation depths and geometrics, and design criteria for the resistance of lateral loads. Estimate foundation settlements. Provide earth pressures and requirements for the design of retaining walls and other retaining structures. Provide any other relevant design data.

4-3.6.5.6 Earthwork

Identify the appropriate earthwork factors including shrink, swell, and ground compaction. The shrink and swell factors shall not consist of wide ranges. Identify recommended cut and fill slopes. Describe borrow requirements and soil gradation.

4-3.6.6 Appendices

Provide supporting or other material that supplements the contents of this TM. The following items may be included:

- Summary of the Technical Memorandum will become part of the SDR section detailing the geotechnical analysis. The contents are defined in the SDR guidelines under the geotechnical analysis section;
- Map of test boring locations and coordinates, if surveyed; and
- Logs of test borings and a site plan.

4-3.7 TECHNICAL MEMORANDUM – ALTERNATIVES ANALYSIS

This technical memorandum provides the analysis of the alternatives from conceptual stage to the selection of the recommended alternative.

The following sections are common to all Technical Memoranda, and their descriptions are listed above in Section 4-3.1, Common Front End Sections of the Technical Memoranda:

4-3.7.1 *Cover Sheet*

4-3.7.2 *Table of Contents*

4-3.7.3 *Introduction*

4-3.7.3.1 *Project Background*

4-3.7.3.2 *Project Location and Description*

In addition to the above sections, the following information may be included:

4-3.7.4 *Existing Features*

Briefly describe the existing features and status of the physical area including the roadway, roadside, and surrounding area that is part of the project study area. Include R/W information and roadway classification.

4-3.7.5 *Existing Alignment*

Describe the existing roadway alignment(s) and provide existing centerline information. Evaluate the existing alignment based on AASHTO, MCDOT or any other applicable standards. Describe all deficiencies (geometric, drainage, structural, etc.) in detail (numerical variance from the standard) and other safety issues that must be addressed by the proposed improvements. Provide a map showing the existing roadway alignment(s). Provide additional maps if required to highlight deficient areas or issues.

4-3.7.6 *Design Criteria*

Provide the agreed-upon design criteria to be used for the proposed project. Candidate alternatives shall be developed without the use of design exceptions. In the event design exceptions are required an approval from MCDOT is required. List any approved design exceptions. State whether additional design exceptions are expected at a later date.

4-3.7.7 *Alternative Analysis*

Provide a succinct description of the alternatives development process. Identify the major characteristics of each conceptual alternative, candidate alternative and recommended alternative. The Alternatives Analysis section should contain the following items, as well as any additional items identified during the project.

4-3.7.8 *Alternatives Development Summary*

Define the process by which the conceptual alternatives, candidate alternatives, and recommended alternative were developed, evaluated, and advanced. Provide the dates when key decision were made. Describe the roles of various stakeholders and their input into the decisions. Any criteria that were fundamental in guiding the process must be mentioned.

A simple graphic may be used to illustrate the process.

4-3.7.9 *Conceptual Alternatives*

The alignments of the conceptual alternatives are engineered while the rest of the features are projected to give estimated impacts. It is not the intent to design the conceptual alternatives to an advanced level to obtain their impacts. The assessment and evaluation approach shall be the same for each conceptual alternative to provide comparative data.

For all projects provide at least three feasible conceptual alternatives. Consider as many conceptual alternatives as justified by the project scope and the project study area. A conceptual alternative outside the project area may be considered. This will provide a comprehensive picture of conceptual alternatives. All conceptual alternatives feasible or fatally flawed shall be discussed.

Describe the development of all conceptual alternatives. List the major characteristics of the conceptual alternatives including possible fatal flaws, environmental impacts, R/W impacts, and cost impacts. Provide maps to illustrate the conceptual alternatives. A map(s) may be provided to illustrate their unique characteristics.

4-3.7.10 *Candidate Alternatives*

Describe the process through which the feasible conceptual alternatives were evaluated to determine the conceptual alternatives selected to advance as candidate alternatives.

A no build alternative must be included at this stage as a candidate alternative. Candidate alternatives shall be engineered and designed to a 15% stage to compare their comparative impacts with each other and the no build alternative. The same assessment and evaluation approach shall be used for each to provide comparative data.

State any design exceptions required or considered for the candidate alternatives.

4-3.7.11 *Evaluation of Alternatives*

The evaluation criteria should be developed by the project team and approved by the PM. Identify how the evaluation criteria were developed. List the date of the meeting when consensus was reached on the evaluation criteria.

At the kick-off meeting, the project team will discuss and optimize the evaluation criteria. During development of the alternatives, the project team will further tailor and confirm the evaluation criteria.

Describe each candidate alternative including advantages and disadvantages with respect to the evaluation criteria such as present and future land use, R/W, environmental impacts, cultural resources, archeological impacts, cost, constructability, safety, drainage (including floodplains), earthwork, utilities, structures, socioeconomic considerations, and any required design exceptions. A template of the evaluation criteria is included in **Appendix 4-A**.

Develop a quantitative Evaluation Matrix based on the evaluation criteria to evaluate and compare the candidate alternatives. Additionally, develop a Summary of the Evaluation Matrix to qualitatively compare the results of the Evaluation Matrix. Provide a description of each evaluated category, identifying the aspects of each alternative that influenced the rating in each category.

Comparative evaluation is inherently subjective; however, it can be augmented with objective support when clear, factual numerical criteria are available. Standard formulas for scoring or rating are not advocated. The project team will evaluate the alternatives and determine the recommended alternative. The PM will submit the recommended alternative and other alternatives including evaluation discussions to the Division Manager for approval. At the Division Manager's discretion, the recommended alternative may be discussed further during a MCDOT Leadership Team Meeting to receive approval. The scoping design will proceed after approval of the recommended alternative is received.

For a comprehensive safety comparison, the AASHTO Highway Safety Manual provides a method for objectively comparing the safety of candidate alternatives through quantitative measures. The HSM's Part C Predictive Method can be used to produce predicted crash rates for candidate alternatives to assess their comparative safety performance. List the detailed results and include backup documentation in the appendices.

4-3.7.12 *Recommended Alternative*

Describe the recommended alternative as identified by the project team. Describe the reasoning behind the choice of the recommended alternative. Provide the details of the selection of the recommended alternative by the Project Team and if warranted the MCDOT Leadership Team.

4-3.7.13 *Appendices*

Provide supporting or other material that supplements the contents of this Technical Memorandum. The following items may be included:

- Summary of the Technical Memorandum will become part of the SDR section detailing the alternative analysis. The contents are defined in the SDR guidelines under the alternative analysis section;
- Evaluation Matrix;
- Candidate Alternative Plans;
- Cost Estimates of the Candidate Alternatives;
- Design Criteria; and
- Design Exceptions, if applicable.

4-3.8 TECHNICAL MEMORANDUM – RIGHT-OF-WAY REPORT

This Technical Memorandum describes the preliminary R/W requirements necessary for the proposed project improvements.

The following sections are common to all Technical Memoranda, and their descriptions are listed above in Section 4-3.1, Common Front End Sections of the Technical Memoranda:

4-3.8.1 *Cover Sheet*

4-3.8.2 *Title Page*

4-3.8.3 *Table of Contents*

4-3.8.4 *Introduction*

4-3.8.4.1 **Project Background**

4-3.8.4.2 **Project Location and Description**

In addition to the above sections, the following information may be included:

4-3.8.5 *Existing Features*

Briefly describe the existing features and status of the physical area including the roadway, roadside, and surrounding area that is part of the project study area. Include existing roadway classification.

4-3.8.5.1 **Existing Right-of-Way**

Identify existing R/W throughout the study area. Provide all relevant information such as maximum and minimum R/W widths and the type of R/W (deed or easement). Provide a map showing existing R/W, easements, and parcel boundaries with APN #. List and resolve any discrepancies between various sources (e.g., survey or County Assessor's maps) of R/W information. List all data sources.

4-3.8.6 *Right-of-Way*

Describe the R/W details to provide a clear picture of impacts, acquisition requirements, and timeline.

4-3.8.6.1 **New Right-of-Way Criteria**

Identify the design criteria to be met for any new R/W. The following items may be identified:

- Minimum R/W requirements;
- Increments for R/W acquisition dimensions;
- Minimum distance required from cut/fill line to R/W line;
- Stationing requirements for R/W breaks (e.g. only at even stations, etc.);
- Correct centerline for R/W dimensioning;
- Preferences for Drainage Easement or Slope Easement over new R/W;
- Maintenance requirements around culverts for new R/W; and
- R/W requirements to account for ponding areas.

4-3.8.6.2 Proposed Right-of-Way

Describe the proposed R/W, including the maximum and minimum R/W width throughout the corridor. Discuss methodology and assumptions used to identify and provide new R/W. Identify the quantity (in acres) of R/W and slope, drainage, and temporary construction easements to be acquired.

Provide a table listing the parcel number, parcel size, type of owner, distance of new R/W to existing structures, amount of parcel to be acquired, and post-acquisition status with regard to whether the remainder of the parcel conforms to zoning standards. If only a partial take of a parcel is required, note any impacts to the landowner and business operations. Identify the proportion of R/W that will be acquired from various types of properties (such as State Land, private residential, private commercial, municipalities, or jurisdictional entities).

Identify any right of entry needs. Discuss steps taken to minimize the R/W impacts. Identify ways R/W can be optimized and any potential concerns or issues that need to be considered in final design. Discuss potential relocations.

Address the R/W and easement requirements for the project including impacted owners and any special clearance requirements.

4-3.8.6.3 Right-of-Way Costs

Identify the individual unit costs for R/W and the total cost of R/W acquisitions and temporary construction easements for the Recommended Alternative. Identify the method and source used for identifying R/W costs.

4-3.8.7 *Right-of-Way Acquisitions and Schedule*

Provide an estimated schedule for R/W activities. Start assembling a R/W parcel schedule for the affected properties along the project. Identify critical path items that can impact project schedule. Discuss prioritizing parcels for utility relocations in final design.

4-3.8.8 *Appendices*

Provide supporting or other material that supplements the contents of this TM. The following items may be included:

- Summary of the Technical Memorandum will become part of the SDR section detailing the project's R/W requirements. The contents are defined in the SDR guidelines under the R/W section;
- Research Data; and
- Meeting Notes.



4-3.9 TECHNICAL MEMORANDUM – UTILITIES REPORT

This Technical Memorandum summarizes the existing and proposed utilities (including railroads) located within the project study area. A Utilities Report may be provided in support of the scoping phase development. The Report will document the utility coordination process during scoping. **Table 4-5** shows the Utilities Report requirements at each stage. Additional requirement details are provided in the following sections

Table 4-5 – Utilities Report Requirements

Required Section	Scoping Phase Stages		
	Candidate Alternatives (15%)	Draft Scoping (25%)	Final Scoping (30%)
Existing Utilities	✓	✓	✓
Utilities Contact Matrix	✓	✓	✓
Utility Coordination	✓	✓	✓
Prior Rights	Request/Confirm	✓	✓
Utility Conflicts	✓	✓	✓
Utility Relocation Cost Estimate		Initial	Cost Assigned
Pot-Holes			✓
Utility Conflicts and Resolutions Summary		✓	✓
Utility Right-of-Way Requirements		Request	✓
Future Utility Considerations		✓	✓
Utility Service Connections			✓

The following sections are common to all Technical Memoranda, and their descriptions are listed above in Section 4-3.1, Common Front End Sections of the Technical Memoranda:

4-3.9.1 *Cover Sheet*

4-3.9.2 *Title Page*

4-3.9.3 *Table of Contents*

4-3.9.4 *Introduction*

4-3.9.4.1 **Project Background**

4-3.9.4.2 **Project Location and Description**

In addition to the above sections, the following information may be included:

4-3.9.5 *Existing Utilities*

Provide a list and details of the existing utilities (including railroads) relevant to the project area.

4-3.9.5.1 **Facility Owners**

Provide a list of all facility owners within the project study area. Include a table that provides the name of each utility company, facility type, and contact information. List all data sources.

4-3.9.5.2 **Facilities**

Provide utility mapping Quality Level (QL) as defined by the American Society of Civil Engineers (ASCE) Subsurface Utility Engineering Guidelines, ASCE 38-02. Provide a summary of the existing facilities for each utility company and/or facility type including the size and/or frequency of a utility. Provide a map detailing the location of the facilities. Where applicable, provide pictures of existing facilities. List all data sources.

4-3.9.6 *Utility Right-of-Way Requirements*

Identify whether new R/W is required for utilities that exceeds what is required for road improvements. Include a map detailing the location(s) of the utility R/W needs.

4-3.9.6.1 **Prior Rights**

Summarize prior rights requests and/or documentation verification as applicable to the submittal stage. The request for prior rights shall take place prior to the Scoping Plans submittal. Complete prior rights documentation shall be submitted no later than the final scoping submittal.

4-3.9.6.2 **Future Utility Considerations**

Identify future development plans for the project area with respect to potential utility facilities required.

4-3.9.7 *Utility Conflicts*

Include a complete conflicts and resolutions list describing the current status of the utilities.

4-3.9.7.1 **Pot Holes**

Provide a table listing pot holes including the following information:



- Utility provider name;
- Utility provider contact information;
- Utility conflict type (e.g., conflict with culvert, excavation, etc.);
- Utility type (e.g., electric, gas, water and gas, etc.); and
- Approximate pot hole northing, easting, station, and offset.

Pot holes shall be identified and provided prior to the Scoping Plans submittal. Additional pot holes may be required in final design at the 60% stage, as necessary.

4-3.9.7.2 Utility Relocation Cost Estimate

Provide a utility relocation cost estimate to relocate utilities in conflict. Provide a list of who is responsible for payment of relocation work prior to the Scoping Plans submittal. If betterments are requested by a utility company, include a cost estimate for the work to be included in the project.

4-3.9.7.3 Utility Relocation

Describe utility relocation concepts, and discuss the timing of the relocations as to whether before or during construction. If during construction, discuss if the work will be done by the MCDOT's contractor or by utility company's contractor. In the final design phase utility relocation plans shall be provided prior to the 60% stage submittal and approved for conformance with the project design at the 95% stage submittal. Provide the estimated utility relocation construction schedule for the relocation(s) prior to the scoping plans submittal.

4-3.9.8 Utility Coordination

Summarize the meetings and/or correspondence with each utility company. Describe mitigation measures evaluated and the actions taken to arrive at the selected mitigation measure. Provide a list of transmittals when plans were sent to the utilities.

4-3.9.8.1 Utility Service Connections

Describe any anticipated utility service connections required for the project. Specify the responsible party for connection/extension charges and monthly billings. Provide contact information for the utility responsible for providing the new service.

4-3.9.8.2 Utility Agreements

Identify the need for a utility agreement to accommodate relocations, adjustments, removals, abandonments and/or betterments as identified and provided in coordination with the utility provider. List elements of agreement and responsibilities for costs incurred.

4-3.9.9 Appendices

Provide supporting or other material that supplements the contents of this Technical Memorandum. The following items may be included:

- Summary of the Technical Memorandum will become part of the SDR section detailing the utility overview. The contents are defined in the SDR guidelines under the utility section;
- Comments and Correspondence with Utilities;

- Conflicts and Resolutions Summary;
- Utility Coordination Meeting Notes; and
- Prior Rights Documentation.

4-4 Design Plans – Scoping Phase

Design and construction documents are developed through two phases:

- Scoping phase
- Final design phase

The scoping phase consists of the scoping document and design plans, which will be called Scoping Plans. The scoping phase, depending on the complexity of the project, consists of the development and review of Conceptual Alternatives followed by three plan set submittals: Candidate Alternatives Plans, Draft Scoping Plans, and Scoping Plans. The minimum submittal requirements for each submittal will be identified in the PWP for the Scoping phase. Specific requirements may vary from the following guidelines depending upon the scope, complexity, and type of project.

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.

All elements of a development phase are not completed simultaneously; many elements feed into other elements and must be completed before other elements that are dependent upon them. The relationship between elements for a project is reflected in the project schedule. These guidelines only indicate those elements that must reach a certain level of completeness for a development phase to be considered ready for review.

4-4.1 CANDIDATE ALTERNATIVES PLANS

The Candidate Alternatives Plans should convey the basic design concept of the Candidate Alternatives in accordance with the Alternatives Analysis Technical Memorandum.

Project plans will be developed at this 15% stage to a point where candidate alternatives can be compared and evaluated. The PWP will specify if roll plots or plan sheets are needed to represent the Candidate Alternatives.

All plans circulated for review must be marked “Candidate Alternatives Plans” and “Not for Construction.”

Components of the design plans may include the following:

4-4.1.1 Survey and Mapping

The purpose of surveying and mapping is to provide the basis for developing designs and plan sheets and profiles and to document and delineate existing features and conditions in relation to the candidate alternatives. A survey may not be necessary for every project and the decision to proceed without the completion of a survey will be made by the PM and discipline representatives.

4-4.1.2 Typical Roadway Sections

The purpose of the typical roadway sections is to:

- Reconfirm and provide the basic configuration for the mainline as required by the roadway classification; and

- Sufficiently develop the roadway design to allow early identification of initial construction limits, R/W requirements, and earthwork requirements.

4-4.1.3 Roadway Geometry

The roadway geometry sets horizontal and vertical alignments. The purpose of the roadway geometry is to:

- Verify that the geometry is being developed in accordance with the project design criteria;
- Establish geometry for review; and
- Identify R/W requirements.

4-4.1.4 Major Drainage Features

The purpose of the major drainage features is to:

- Verify that vertical roadway alignments are appropriate for drainage crossing requirements, location, and minimum cover for culverts; and
- Verify that vertical roadway alignments at stream or channel crossings will accommodate flood-level criteria.

4-4.1.5 Traffic Features

The purpose of identifying the traffic features is to:

- Identify the lane configuration and turn lane design; and
- Identify signal and access requirements.

4-4.1.6 Existing Utilities

The purpose of identifying the existing utilities is to:

- Identify and provide which utilities can remain in place;
- Identify and provide which utilities require relocating; and
- Identify and provide whether roadway alignment changes should be considered.

4-4.1.7 Construction Limits

The purpose of identifying the construction limits is to:

- Identify and provide the impact of construction on existing and proposed R/W;
- Identify and provide the need for temporary construction easements; and
- Identify and provide the footprint of the improvements for environmental impacts.

4-4.1.8 Right-of-Way Requirements

The purpose of the R/W requirements is to:

- Identify and provide the R/W required for the candidate alternatives.

4-4.2 DRAFT SCOPING PLANS

The Draft Scoping Plans are to be developed using Microstation and the MCDOT CADD Standards. The Draft Scoping Plans should convey the basic design concept and features of the Recommended Alternative in accordance with the project scoping document. The Draft Scoping plans build upon the items shown in the Candidate Alternatives Plans.

All plans circulated for review must be marked “Draft Scoping Plans” and “Not for Construction.”

Components of the draft scoping plans may include the following:

4-4.2.1 *Typical Roadway Sections*

The purpose of the typical roadway sections is to:

- Reconfirm and finalize the basic configuration for the mainline, crossroads, ramps, driveways, etc., as developed for the project scoping documents and other reports;
- Develop pavement structural sections based on the Pavement Design recommendations; and
- Develop roadway design sufficiently for early identification of initial construction limits, preliminary R/W requirements, and earthwork requirements.

4-4.2.2 *Roadway Geometry*

The roadway geometry sets horizontal and vertical alignments. The purpose of the roadway geometry is:

- To verify that the geometry is being developed in accordance with the project design criteria;
- To establish geometry for review;
- To identify and provide preliminary R/W requirements; and
- To locate soil and bridge foundation borings.

4-4.2.3 *Major Drainage Features*

The purpose of the major drainage features is to:

- Verify that vertical roadway alignments are appropriate for drainage crossing requirements, location, and minimum cover for culverts;
- Verify that vertical roadway alignments at stream or channel crossings will accommodate flood-level criteria;
- To provide R/W and easement requirements for channel and culvert locations; and
- To verify that vertical roadway alignments will accommodate design of closed drainage systems.

4-4.2.4 *Traffic Features*

The purpose of identifying the traffic features is to:

- Identify the signing and pavement marking requirements;
- Identify traffic signal requirements, signal pole layout and ITS requirements; and

- Identify access requirements.

4-4.2.5 Utilities

The purpose of identifying the existing utilities is to:

- Identify and provide which utilities can remain in place; and
- Identify and provide which utilities require relocating;

4-4.2.6 Construction Limits

The purpose of identifying the construction limits is to:

- Identify the impact of construction on existing and proposed R/W;
- Identify and provide the need for temporary construction easements; and
- Identify and provide the footprint of the improvements for environmental impacts.

4-4.2.7 Intersection Layouts

The purpose of the intersection layouts is to:

- Establish the basic configuration of the intersections in accordance with established project criteria and projected traffic;
- Development of intersection plans including basic geometry;
- Verification of turning movements using Autoturn;
- Determine stop bar location and turn lane length;
- Design of acceleration and deceleration lanes; and
- Verification of intersection sight distance.

4-4.2.8 Right-of-Way Requirements

The purpose of the preliminary R/W requirements is to:

- Identify and provide the R/W required for the proposed improvements; and
- Plans showing R/W requirements including existing R/W and proposed R/W.

4-4.2.9 Cross Sections

The purpose of the cross sections is to:

- Support earthwork quantities and drainage profiles; and
- Verify adequacy of R/W requirements.

4-4.3 SCOPING PLANS

The scoping plans should convey the basic design concept and features of the project in accordance with the project scoping documents. Scoping plans address the review comments and build upon the items shown in the Draft Scoping plans.

All plans circulated for review must be marked “Scoping Plans” and “Not for Construction.” The Scoping Plans are NOT sealed.

Project plans will be developed at this stage to a point where preliminary R/W requirements can be established so that the VE Process and or design optimization can be performed.

4-5 Project Submittal

4-5.1 SUBMITTAL PROCESS

All project documents to be reviewed must be submitted to the PM who will then distribute the documents to the project team along with a standard summary of comments form in Microsoft Excel format. The Summary of Comments Form is provided in the Appendix. Distributed materials will be marked prominently with the distribution date and the time and date that comments are due back to the PM. For projects that involve a consultant, the PM will be supplied with an electronic set on a CD containing all reports, plans, CADD files and backup documentation being submitted. The PM is responsible for ensuring the electronic submittal is filed in SharePoint and Y Drive in the appropriate folders.

For draft submittals, the PM will verify the content, list any necessary comments in the Summary of Comments (SOC) Form, and then forward the submittal documents to the appropriate reviewer. The reviewer will then list any comments in the Summary of Comments Form. When completed, the review will return the Summary of Comments Form to the PM. Once all comments have been received from the reviewers, the PM will forward the Summary of Comments Form to the design lead. When addressing comments, the designer will mark all addressed and completed comments in the Comments Addressed column in the Summary of Comments Form.

For final submittals, the design lead will submit the completed Summary of Comments Form along with all other applicable documents. The PM will review the documents and Summary of Comments Form to ensure all comments have been addressed.

4-5.2 REVIEW PROCESS

All review periods will be two weeks (10 business days) in length unless otherwise approved by the PM. The 10-business-day review period is a standard level of service that must be met. Request for an extension of the review period for extenuating circumstances can be granted by the PM on a case-by-case basis provided such extensions are justified and do not threaten the critical path of the schedule.

All review comments must be submitted electronically to the PM by the appropriate project team representative by the close of business on the final day of the review period. Comments will be compiled in a single Summary of Comments Form and an initial response will be assigned to each comment within one week (5 business days) of receiving the last review comments. The single Summary of Comments Form with the initial response will be sent back to the reviewers a minimum of two business days prior to the comment resolution meeting. The comment resolution meeting will be held within two weeks (10 business days) after receiving comments.

4-5.3 SCOPING PHASE COMPLETION

Scoping provides documentation that sets up the final design; however, there must be a clear demarcation between the two phases. The completion of the scoping phase depends on addressing all comments received during the scoping phase, thus all comments received shall be addressed, including the comments received on the final documents and plans. The PM will determine if any comments may be carried forward to the final design phase. The scoping



documents and plans will not be final until all comments have been addressed and incorporated in the final document and plans to the satisfaction of the PM.

Upon receiving the final scoping documents and plans, the PM is to determine that all MCDOT scoping goals are met. Then PM will complete the Project Scoping approval form and obtain signatures from the Director and Division Managers. MCDOT Planning will then be notified by the PM that the project has completed the scoping phase and is ready to be analyzed in the PRS.



5 VALUE ENGINEERING

5-1 Introduction

The purpose of Value Engineering (VE) is to add value and enhance the quality of a project, not simply to reduce costs. VE studies should question project elements that add cost or complexity to a project without improving its overall function.

Federal law (23 USC 106) states that VE analyses are required on certain National Highway System projects. In addition, the Federal Highway Administration (FHWA) may require VE analysis be performed on any other Federal-aid project the FHWA determines to be appropriate.

As stated in the Federal law, VE studies are undertaken to provide suggestions for reducing the total cost of the project and providing a project of better quality.

The Maricopa County Department of Transportation (MCDOT) recognizes VE Studies as effective tools for the continuous improvement of the quality and value of Transportation Improvement Program (TIP) projects. The concept of better quality is the basis of the MCDOT VE process.

MCDOT defines VE as a systematic process of review and analysis of a project following the completion of the Scoping Phase by a multidisciplinary team of persons not involved in the project. VE is conducted to provide recommendations for:

- Providing the needed functions safely, reliably, efficiently, and at the lowest overall cost;
- Improving the value and quality of the project; and
- Reducing the time to complete the project.

The successful application of the VE process can contribute measurable benefits to the quality of projects and to the effective delivery of the overall MCDOT Program. The VE process completed after the scoping phase is separate and different than Value Engineering performed during the construction phase. The construction Value Engineering details are located in the construction manual.

5-1.1 VALUE ENGINEERING

According to the Society of American Value Engineers (SAVE), the definition of Value Engineering Analysis is “a function-oriented, systematic, team approach to eliminate and prevent unnecessary cost.”

VE consists of those tasks performed by a VE Team in accordance with the guidelines provided in this section.

During the VE process, decisions and/or agreements from any discipline can be examined. The VE Team must consider that any resulting recommendations that negatively impact decisions and/or agreements could place the delivery schedule of the entire project at risk, thus supplemental steps may be required. Nevertheless, all valid recommendations should be included in the VE Report. The Project Review Committee (PRC) must determine what impact the VE

recommendation may have on the project schedule before deciding whether or not to approve the recommendation.

The simplest approach is to conduct VE as soon as sufficient information is available to perform an analysis. In the MCDOT Project Development process, the appropriate time to conduct VE is upon completion of the Scoping Phase. Once the VE Study is complete at the end of the Scoping Phase, no additional VE should be conducted.

VE may be referred to as a VE Study when the entire process is being noted or addressed. The actual analysis portion of the VE Study is referred as the VE Analysis. VE Analysis begins after Pre-Analysis activities are complete and ends before Post-Analysis activities begin.

5-1.2 VE GOALS

The goal of VE is to ensure the efficient use of funds (both capital and lifecycle costs) and to attain the best value while meeting project goals and performance attributes.

Common goals of VE include:

- Optimize the right-of-way (R/W) needs and minimize project footprint;
- Examine elements that minimize adverse effects to the existing system during construction;
- Look for opportunities to minimize impacts to the existing landscape during construction;
- Verify the effects and impacts due to construction;
- Verify the need and scope of the project;
- Consider options for flexibility to manage and maintain traffic during construction; and
- Consider the requirements related to schedule and budget.

Successful implementation of VE helps ensure efficient project delivery throughout subsequent design stages.

5-1.3 ACKNOWLEDGMENTS AND REFERENCE

The following are acknowledged and are references for further information regarding value engineering:

- National Highway Institute (NHI)
- Federal Highway Administration
- Arizona Department of Transportation (ADOT)
- Society of American Value Engineers



5-2VE Process

MCDOT utilizes the VE Process to achieve better engineered solutions. Project Managers (PMs) and Design Leads are requested to become familiar with this important process, and to consider it a powerful tool for consensus building, problem solving, and cost saving—not an inspection or a peer review. The objective of the VE Process is to enhance quality by improving value.

All MCDOT VE activities will be conducted in accordance with this document and its appendices. Activities of similar natures that may be performed by MCDOT employees or consultants, but which are not in accordance with these guides, shall not be referred to as “value engineering.” This will avoid confusion regarding the VE process and its implementation.

Following the completion of the Scoping Phase, and when requirements are met, a VE Study will be performed. The flowchart in **Figure 5-1** outlines the steps involved in the VE Process.

In general VE follows a systematic methodology consisting of three phases:

- Pre-Analysis;
- VE Analysis; and
- Post-Analysis.

The Pre-Analysis phase includes the following steps:

- Project Selection;
- VE Team Selection;
- VE Study Plan;
- VE Scope of Work;
- VE Contract;
- Study Duration;
- VE Meeting Setup; and
- Design Team Presentation.

These steps lead to the VE Analysis. The VE Analysis phase consists of six stages that lead to the formulation of the VE Report, which contains the final VE recommendations and design suggestions. The six stages are:

- Information Stage;
- Functional Analysis Stage;
- Creative Stage;
- Evaluation Stage;
- Development Stage; and
- Presentation Stage.

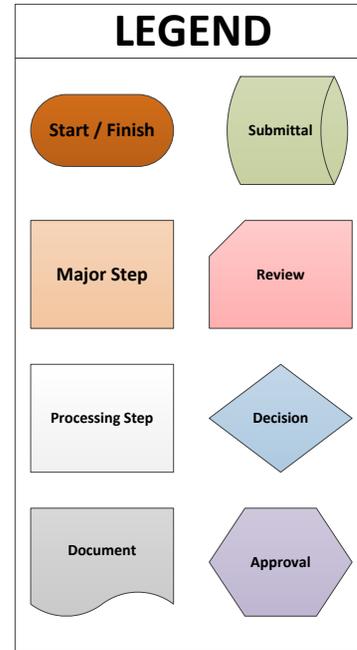
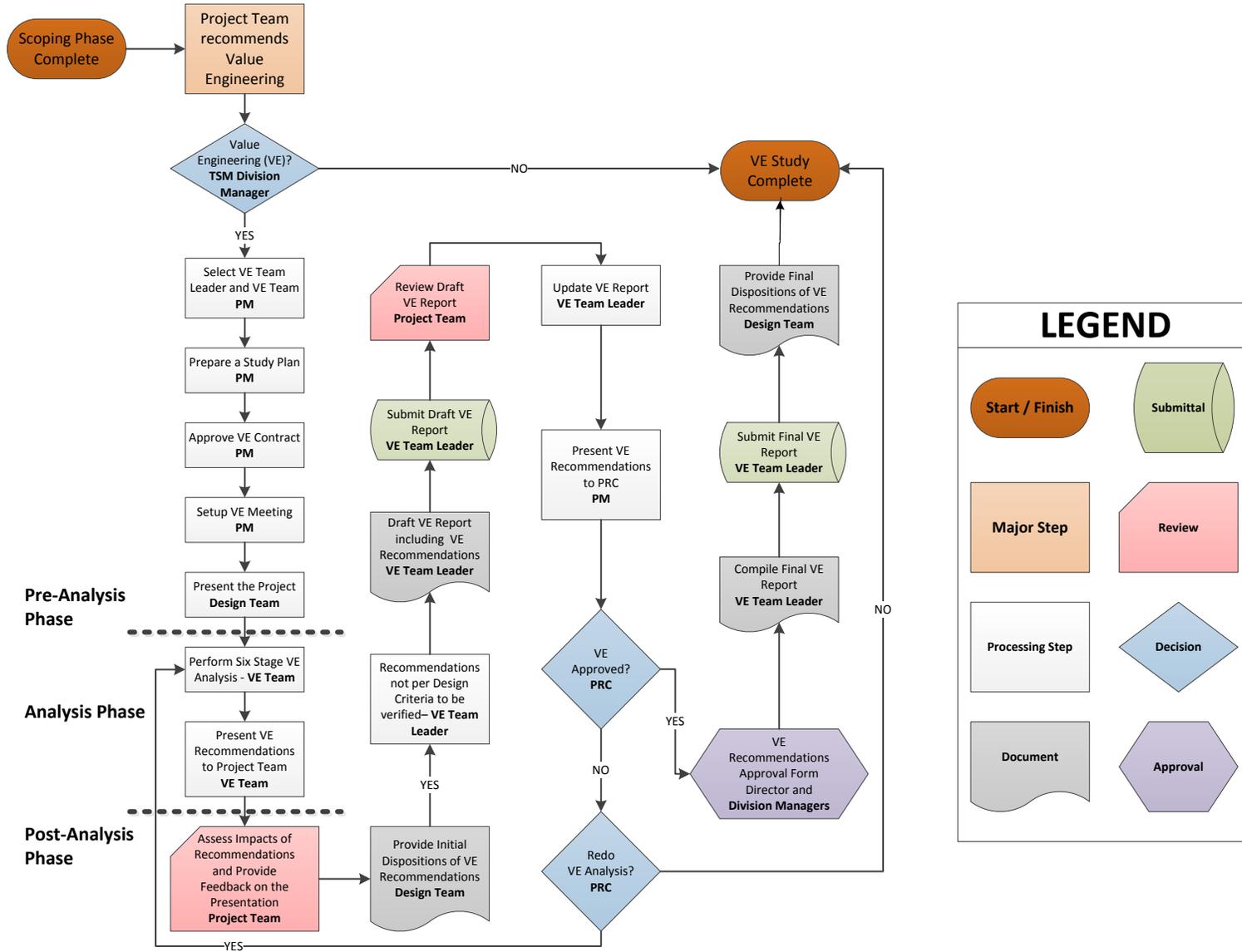
After the VE Team Presentation, the Post-Analysis phase begins. The Post-Analysis phase includes the following steps:

- Project Team Feedback;
- Initial Dispositions of the Recommendations;
- Design Exceptions Identification;



- Draft VE Report;
- Project Team Review;
- Project Manager Presentation;
- Approval of the VE Recommendations;
- Final VE Report;
- Final Dispositions of the Recommendations; and
- Implementation.

Figure 5-1 – Value Engineering Process Flowchart



5-2.1 PROJECT SELECTION

Projects with an estimated construction cost of \$5 million or more should be considered to include VE following the Scoping Phase. During the scoping phase the project team will evaluate the characteristics of the project to document a recommendation within the Scoping and Design Report. It is important for MCDOT and consultant designers to understand that projects are selected for VE on their own merits, irrespective of who is designing them. VE is not to be considered a design review or a peer review.

The Project Team, in coordination with the PM, will determine if the project requires a VE Study based on one or more of the following guidelines:

- Projects of a complex nature regardless of estimated cost.
- Alternative solutions that vary significantly in scope and cost are involved;
- Recommended Alternative is controversial;
- Significant R/W acquisition is needed;
- Capacity improvements widen an existing highway;
- Extensive or costly environmental or geotechnical requirements are required;
- Major traffic control requirements or multiple construction stages are involved; and
- Majority of the project budget is expended on one discipline; and
- Projects located on the National Highway System.

In addition to cost, complexity, and the above criteria thresholds, VE Studies may also be requested by other members of the PRC. The requesting manager will be kept informed of all phases of the VE Study.

When a PM is informed that his/her project is selected for VE, the PM will begin the steps necessary to initiate a VE Study. To assist the PM in the setup process, a VE Setup Checklist is provided in **Appendix 5-A**.

5-2.2 VE TEAM SELECTION

Proper composition of the VE Team is vital for a successful VE Analysis. The VE Team is a multidisciplinary group of experienced professionals chosen for their expertise and experience with similar projects. Important factors need to be considered in the formation of the VE Team. The VE Team must be independent of the project, multidisciplinary, and specifically suited for the project with considerable experience within their discipline.

The PM will select the VE Team Leader and the VE Team in consultation with the Project Management Branch Manager to ensure project-specific disciplines are represented. The PM is encouraged to evaluate all suggestions regarding disciplines or individuals to include.

A VE Team can be assembled in a number of ways. The VE Team can consist of MCDOT personnel, personnel from consultants or outside agencies, or some combination of these sources. After selection, appropriate materials, documents, and training will be provided by MCDOT to the VE Team members.

The Design Team shall cooperate fully with the VE Team, providing necessary background information for analysis. At the discretion of the PM, the Design Team may be requested to assign one of its representatives to the VE Team.

5-2.2.1 VE Team Leader

The VE Team Leader should be a seasoned VE practitioner experienced in transportation project delivery. The VE Team Leader should be trained and knowledgeable in VE techniques and able to serve as the coordinator and facilitator of the team. The VE Team Leader is recommended to be certified by SAVE as a Certified Value Specialist (CVS) or be an experienced project manager who is a registered engineer.

All contacts prior to and after the analysis will be between the PM and the VE Team Leader. Since VE Team members are mainly active during the VE Analysis phase, their focus should be on performing the VE Analysis.

The PM serves as a liaison between the Design Lead and the VE Team Leader. No formal relationship between the Design Lead and the VE Team Leader will be needed. The VE Team Leader will not contact the Design Lead directly unless approved by the PM.

5-2.2.2 VE Team Member

The PM with assistance from the VE Team leader will select the VE Team members; the VE Team Leader may assist in selecting the VE team members, if requested. The number of VE participants can vary; however, it is beneficial to have a sufficient number of members to ensure different viewpoints depending on the complexity of the project.

The VE process provides flexibility to best meet the objectives of each project being analyzed. These considerations must be carefully evaluated during the planning and coordinating activities for the VE Analyses. Generally, a team of five to eight persons with diverse backgrounds suited to the scope and complexity of the project and with experience on projects of similar nature will be selected for the VE team.

A VE Team should consist of a VE Team Leader and individuals from different discipline areas, such as design, construction, environmental, planning, maintenance, R/W, and other areas depending upon the type of project being reviewed. The VE Team will consist of persons not directly involved with the development of the project. Individuals from the public and other agencies that have experience with projects of similar nature may also be included on the VE Team when their inclusion is determined to be in the public interest.

Technical discipline experts can provide a host of benefits as key members of the VE Team. Use of technical discipline experts can also help round out a VE Team by providing experienced personnel from disciplines not included in the Design Team.

5-2.3 VE STUDY PLAN

After the PM and Project Team determines the need for a VE Study and the PM selects the VE Team, the PM will instruct and assist the VE Team Leader in preparing a VE Study Plan for the VE Team to follow during the study process. The VE Study Plan will contain information about the scope of the study, the logistics, and team preparation.

5-2.3.1 VE Analysis Packet

The VE Team Leader will distribute the VE Study Plan including the directions to the study location to each VE Team member no later than one week prior to the VE Analysis. The VE Team Leader will also arrange for pertinent documents to be made available to the team at least one week in advance of the beginning of the study.

The Design Team, under the supervision of the PM, will be responsible for the compilation of the VE Analysis Packet. Once compiled, the VE Team Leader, with the assistance of the PM, will distribute the VE Analysis Packet. The VE Team Leader will provide VE Analysis Packet materials to the VE Team members at least one week prior to the study. The VE Team Leader will work through the PM to obtain the VE Analysis packet documents from the Design Lead. Below is a general list of items that are provided:

- Project Synopsis including constraints and controlling decisions;
- Recommended Alternative Plans with quantities and estimates;
- Risk Management Plan;
- Project Design Criteria;
- Draft Scoping Document (with Technical Memoranda (TM));
- Cross sections;
- Candidate Alternative Plans (if closely competing alternatives and/or a controversial Recommended Alternative is involved);
- Project Background Data (plans, as-builts, and R/W Plans);
- Videotape and/or set of photographs, if available;
- Maps (vicinity, land use, contour, etc.) as needed;
- Aerial Mapping; and
- Any other exhibit or graphics that may be needed.

5-2.4 VE SCOPE OF WORK

The VE SOW will supplement information contained in the Project Specific Scope of Services and the General Conditions. For some projects, a more detailed VE section may be added to the scope.

5-2.5 VE CONTRACT

If it is determined that technical discipline experts outside of MCDOT are required to conduct a VE Analysis, the PM will manage the development and approval of the contracts with the outside technical discipline experts and MCDOT.

5-2.6 STUDY SCHEDULE

The time allotted to each Analysis will be determined in advance by the PM. The VE Study duration should be long enough for the VE Team to understand the project in depth, but not so lengthy that it distracts the VE Team from the VE goals. The length of time required for an Analysis varies and also depends on the complexity of the project. Generally, the VE Team can accomplish the VE Analysis in three to five days with the VE Team Leader assisting the PM through the implementation and approval of the VE recommendations.

5-2.7 DESIGN TEAM PRESENTATION

The intent of the Design Team Presentation is to communicate basic information regarding the project including Scoping efforts and known Final Design elements. The VE Team has to become familiar with the constraints and controlling criteria of the project; therefore, it is important for the Design Team to be concise and informative. The Design Team should convey all pertinent information concerning the project and allow time for a question and answer session

after the short presentation. Depending on the project’s complexity, one to two hours is usually sufficient for this process.

It is recommended that the presentation should be casual, allowing the VE Team to ask questions as they occur to them. The VE Analysis Packet should be available for quick reference. VE Team members can request additional documents used in the development of the project, if desired.

Ideas that have been thoroughly investigated and discarded with good cause by the Design Team should be shared with the VE Team, since the development and presentation of such ideas would have little value to the project.

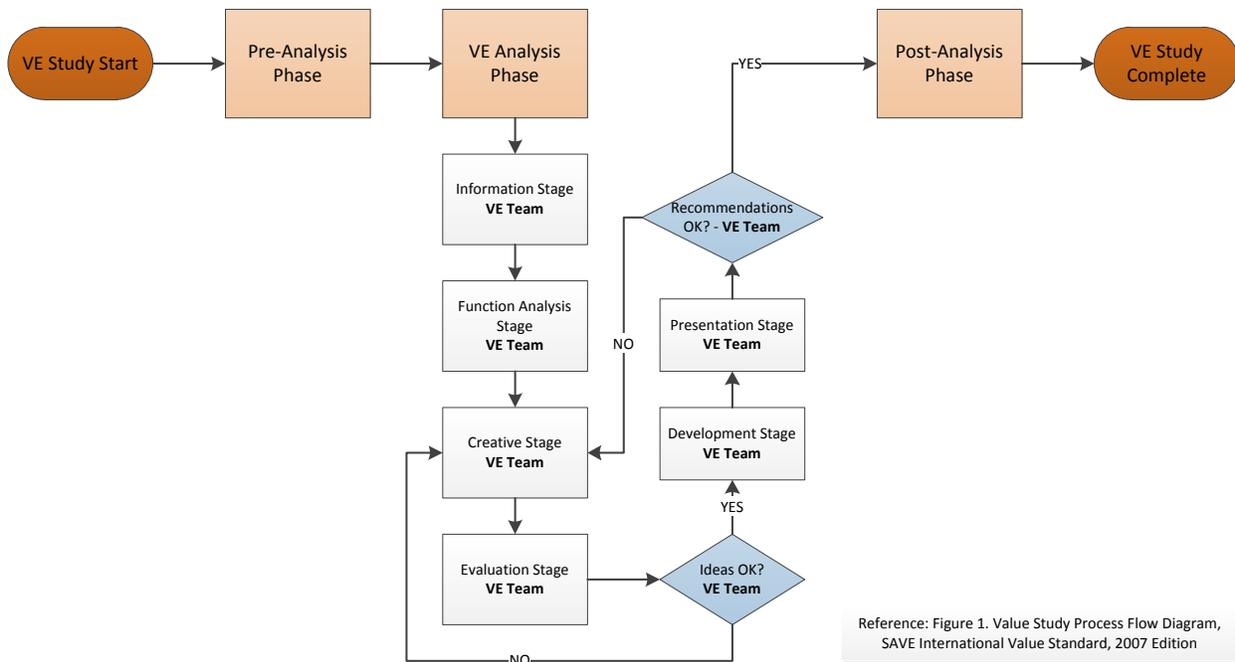
The PM is responsible for determining who will conduct the presentation and scheduling it accordingly.

The completion of the Design Team Presentation marks the conclusion of the Pre-Analysis phase.

5-2.8 VE ANALYSIS

VE Analyses shall follow the widely recognized systematic problem-solving examination process consisting of six stages. These stages set up the VE Analysis to be focused and streamlined. The flowchart in **Figure 5-2** shows the stages involved in the VE Analysis phase.

Figure 5-2 – VE Analysis Phase Flowchart



It is expected that the VE Team will document the study process and related information on an ongoing basis. Analyses shall conclude with a formal report outlining the VE Team’s recommendations for improving the project and reducing its overall cost. More information on this report can be found in Section 5-3.

5-2.8.1 *Information Stage*

The purpose of this stage is to comprehend the elements of the project and requirements or constraints that affected project design elements. The VE Study Plan and the VE Analysis Packet will contain project information necessary to perform the VE Analysis. If any additional information is needed, the VE Team can identify it to the VE Team Leader. The VE Team Leader will coordinate with the PM in acquiring the additional information. Some time may be spent reviewing available project documents at the start of the study; however, it is important for the VE Team members to review the VE Analysis Packet materials prior to the study and be prepared for a discussion after the Design Team Presentation.

One aspect of gathering information is visiting the project location. A field trip to the project location is desirable when needed. The most appropriate time for a field trip is after the Design Team Presentation and once the VE Team has reviewed the VE Study Plan and project documents.

In addition to the general project information, the VE Team needs to understand the project constraints. Constraints can fundamentally change the scope of the VE Analysis. The ideal situation for a VE Analysis is for the entire project to be open for analysis by the VE Team. Accordingly, it is assumed that each study is unconstrained unless otherwise stipulated. It is the PM's responsibility to obtain approval from the TSM Division Manager if any constraints exist. A description of the approved constraints should then be sent to the VE Team Leader, and the VE Team will be advised accordingly. Otherwise, the team will be constrained only by the applicable design criteria, good engineering judgment, and a consideration of lifecycle costs.

The completion of this stage will be indicated by the VE Team's understanding of the project, scope, and goals of the VE Analysis.

5-2.8.2 *Function Analysis Stage*

The purpose of this stage is to understand the function of each project element and what is the user expectation. The emphasis will be on the purpose and need of the project rather than how the project is designed to achieve that purpose or satisfy that need. Function definition and analysis is at the heart of VE. It is the primary activity that sets the VE process to be not just an improvement but a more in-depth analysis. This analysis provides alternative solutions that are equal to or better than the original design based on the needs of the project.

The VE Team will focus on validating that the project approach meets the objectives that drive the project. A complete and holistic understanding of the project is gained by focusing on what need the project fulfills rather than what the project elements are. To assist in this understanding, SAVE outlines the process for developing function definitions for projects or individual design elements. Function definitions consist of an active verb and measurable noun that fully describe the function of a given system. Examples of function definitions are "Provide Access" or "Increase Capacity." The VE Team should develop function definitions for the basic function and higher-order function for the project as a whole. As the VE Team progresses further into the analysis, function definitions should be developed for each VE recommendation that is investigated. This will help provide a more clear understanding of the true function of each VE recommendation.

The VE Team will identify cost and impact of the various elements of the project that provide a solution to a project need. This identification leads to distinguishing project elements that lack in value when compared to the project requirement that is fulfilled.

The completion of this stage is indicated by the VE Team's agreement on the purpose of the project elements and their value with regard to the solution versus the need they satisfy.

5-2.8.3 Creative Stage

The purpose of this stage is to generate ideas that solve project needs in different ways than those specified in the project design. The VE Team will systematically analyze various elements of the project to propose ideas for further exploration. Each idea will be explored for its potential to provide an equal or better solution. For each subsequent idea, the VE Team should note the implication to the project and other competing ideas. No ideas will be rejected during this stage unless the idea is outside the VE Analysis parameters set by project needs and constraints.

The completion of this stage is indicated by the generation of multiple ideas by the VE Team for each value-mismatched project design element that performs a function.

5-2.8.4 Evaluation Stage

The purpose of this stage is to narrow the number of ideas generated in the Creative Stage down to a shorter list of ideas with the maximum potential to increase the value of the project. The VE Team will make note of all the ideas, including those that are discarded. Based on the potential VE benefits and the size or complexity of the project, the top ideas will be selected to be explored further. The discussion at this stage should be focused on the value each idea provides or creates rather than the potential consequences of its implementation.

The completion of this stage is indicated by a short list of ideas the VE Team agrees to explore further.

5-2.8.5 Development Stage

The purpose of this stage is to optimize and develop the top ideas developed in the Evaluation Stage into design elements that fit into the project. The ideas will be converted into value alternatives that can replace a project design element without impacting the needed function or any related functions. The VE Team will develop and evaluate each value alternative for its integration into the project, its impact on other project elements, and its impact on other value alternatives.

The VE Team will carefully analyze the merits of each value alternative considering the project as a whole. Any negative factors associated with a value alternative will be noted. In certain cases an alternative may provide value in a certain location but may be less effective when the whole project is considered. Development Stage analysis will be sufficiently thorough to identify and resolve these concerns.

Documentation of the value alternatives should be comprehensive. It is important to note if certain value alternatives function better with certain other value alternatives. Similarly, it is important to note if certain value alternatives function better with certain original project elements.

The following information related to the VE Analysis recommendations shall be well documented throughout the study process:

- Original concept;
- Proposed changes;
- Discussion of benefits of the changes;
- Cost/benefit analysis;
- Initial and subsequent schedule impacts;
- Implementation considerations;
- Initial and subsequent changes to the scope;
- Follow-up actions;
- Lifecycle cost analysis;
- Impacts on other key attributes; and,
- Sketches and other communication aids.

The completion of this stage is indicated by the finalized development of recommendations that provide the most value to the project by the VE Team.

5-2.8.6 Presentation Stage

The purpose of this stage is to present the recommendations to the Project Team and to the project stakeholders. This presentation will be led by the VE Team Leader. The intent of the presentation is to communicate information regarding the VE Analysis, including all of the developed VE recommendations. The Design Team is ultimately responsible for implementing these recommendations into the Final Design Phase; therefore, it is important for the VE Team to be comprehensive and informative. The VE Team should convey all pertinent information concerning the VE recommendations.

Similar to the Design Team Presentation, it is recommended that the VE Team Presentation should be casual, allowing the Project Team to ask questions as they occur to them. After the presentation the VE Team Leader will be available for questions and to provide further information as needed.

The conclusion of the presentation completes this stage, which is the last stage of the VE Analysis phase. Following the Presentation Stage the Post-Analysis phase activities begin, which include review, implementation, and approval of the VE recommendations.

5-2.9 PROJECT TEAM FEEDBACK

The recommendations presented in the VE Team Presentation shall be forwarded by the VE Team Leader to the PM for review immediately upon the completion of the analysis. The PM will coordinate with the Project Team to gather their feedback, indicating acceptance or rejection of each recommendation. The PM will provide this feedback to the VE Team Leader within three business days.

The Project Team will develop their feedback based on notes taken and questions asked during the presentation, summarizing their initial thoughts on the VE recommendations. The Project Team will provide this feedback to the PM. The VE Assessment and Comment Form used for compiling and presenting the dispositions is provided in **Appendix 5-B**. The review and feedback shall be conducted on the basis of feasibility of implementation and total effect on the project's schedule. The PM will compile and review the feedback and then forward it to the VE Team Leader. The intent of this feedback is to guide the VE Team Leader in formulating the

Draft VE Report. If for some reason a recommendation is not feasible for implementation, the reason for removal from consideration will be documented in the VE Report.

5-2.10 INITIAL DISPOSITIONS OF THE RECOMMENDATIONS

Following the presentation of the VE recommendations, the Design Team will assemble the Initial Dispositions of the Recommendations of the Project Team. Should any Design Exceptions be required, the Design Team will indicate that in the initial dispositions. The initial dispositions will be provided to the PM to forward with the comments on the Draft VE Report to the VE Team Leader.

5-2.11 DESIGN EXCEPTIONS

Should any Design Exceptions be identified, the Project Team will be responsible for following the process as identified in the Roadway Design Manual after the completion of the VE process.

If the Design Exceptions are not acceptable to the Project Team, the VE Team Leader will update the Draft VE Report by eliminating the VE recommendations that required the Design Exceptions.

5-2.12 DRAFT VE REPORT

The VE Team Leader will start assembling the Draft VE Report following the conclusion of the VE Analysis phase. The VE Team Leader will incorporate all VE recommendations which were approved by the Project Team. Once completed, the VE Team Leader will submit the Draft VE Report to the PM. The PM will then distribute the Draft VE Report to the Project Team for formal review.

5-2.13 PROJECT TEAM REVIEW

Review of the VE Reports will be conducted by the Project Team. The PM will ensure the prompt review of VE recommendations the Project Team. Review and impact analysis of the VE recommendations should be a consensus-building effort between the Project Team and the Design Team, facilitated by the PM.

Once the Project Team has completed its review, all comments shall be provided to the PM who will compile them and provide them to the VE Team Leader. Once the comments have been received, the VE Team Leader will update the Draft VE Report based on the Project Team's comments.

5-2.14 PROJECT MANAGER PRESENTATION

The PM shall present the VE recommendations to the PRC for approval. The PM will be responsible for completing the PRC request form to be included on the agenda for the monthly PRC meeting.

The PM will present the Draft VE Report, which include the VE recommendation to the PRC for their review. The intent of the presentation is to communicate the VE recommendations, including their benefits and impacts to the PRC. The VE Team Leader and the Design Team will assist the PM by providing relevant information and documents for this presentation and by taking notes during the presentation. The PM should convey all pertinent information concerning the VE recommendations to the PRC.

5-2.15 APPROVAL OF DRAFT VE REPORT

The PRC will be responsible for the approval or disapproval or conditional approval of the draft VE report. The PM will document their decision using the PRC VE Approval Form, which is provided in **Appendix 5- C**.

If the VE recommendations are rejected, the PRC may require the VE Team to reconvene and propose new VE recommendations, or may direct the PM to complete the VE process with conditions to the VE study.

5-2.16 PREPARE NOTES/SUMMARY

Following the conclusion of the PM's presentation to the PRC, the PM will request that the PRC VE Approval form is signed and completed. The PM will ensure the actions and conditions from the PRC meeting is incorporated in the Final VE report.

5-2.17 FINAL VE REPORT

Following the approval of the VE recommendations by the PRC, the VE Team Leader will prepare the Final VE Report and will include the PRC decision. Once complete, the VE Team Leader will submit the Final VE Report to the PM. If no recommendations are approved, the PM is to direct the VE Team leader to prepare the Final VE Report to document the decisions made by the PRC.

5-2.18 FINAL DISPOSITIONS OF THE RECOMMENDATIONS

After the Final VE Report has been updated to incorporate the VE recommendations, the Project Team will provide the final disposition concerning the VE recommendations to the PM and the VE Team Leader. The final dispositions will summarize all decisions made regarding the VE recommendations throughout the process as well as any changes that were necessary for the VE recommendations to be properly integrated into the design.

5-2.19 IMPLEMENTATION

Once the Final VE Report and Final Dispositions of recommendations have been completed, approved, and filed, the implementation of the recommendations will occur when the project is approved to begin the final design phase. If design exceptions were identified in the recommendations then the approval shall be requested prior to submitting 60% documents.

In some cases, the implementation of approved VE recommendations occurs over a significant period of time through the development of the Final Design Phase. It is also possible that a change of conditions in the future may increase or decrease the acceptability and effectiveness of a VE recommendation. In these cases, it is the PM's responsibility to monitor the project development and ensure that the VE recommendations are able to be implemented. As in the preparation for the study, the PM will be the sole contact for this process. It is the PM's responsibility to keep the Project Team informed of any changes that may impact the implementation of the VE recommendations. The PM will alert the PRC of any significant events that may affect the project design and scope.

5-3VE Report

The VE Report will be prepared after the conclusion of the VE Analysis and will summarize the findings of the VE Team.

The initial report will be considered a Draft VE Report. The Draft VE Report will be submitted by the VE Team Leader to the PM. The PM and the Project Team will review the report and provide comments and recommendations. Once these comments and recommendations have been incorporated into the document, the updated report will be presented to the PRC. Only after PRC approval is the report finalized.

It is the responsibility of the VE Team Leader, with input from the rest of the VE Team, to prepare and submit both the Draft and Final versions of the VE Report.

5-3.1 COVER SHEET

The cover sheet will be the top sheet of the VE Report and shall include the following information:

- Project name;
- Report title;
- Project number;
- Contract number;
- Maricopa County seal;
- Month and year of the report's completion; and
- If the report is in a draft form, show "DRAFT" on the cover sheet.

5-3.2 TITLE PAGE

The title page will be the first page of the report. A VE Report prepared by and/or for MCDOT is a public document; therefore, the title page must have a professional look and convey pertinent project information.

The title page will include the same information contained on the cover sheet. Additionally, the name of the VE Team Leader and the other VE Team Members who presented in the study will be listed.

5-3.3 EXECUTIVE SUMMARY

The Executive Summary must be written with decision-makers in mind, as it is often the most influential part of the report. The Executive Summary provides a readable, accurate, condensed description of the VE Analysis, including the conclusions and recommendations that evolved from the process. The Executive Summary only contains information essential to understanding the purpose, objectives, and recommendations of the report. It is NOT an abbreviated version of the full report.

An Executive Summary is designed to stand on its own. It should not refer by number to figures, tables, or references contained elsewhere in the full report. Only figures essential to the Executive Summary are to be included in the Executive Summary.

As a guide, the following sections are to be included in the Executive Summary; other sections may be added as necessary for clarity.

1. Introduction/Project Description – Describe the project on which the analysis was conducted. Summarize the project’s purpose, need, and original project goals.
2. Purpose – Clearly define the purpose for the VE Analysis. List the reasons for undertaking the VE Analysis and the intended result of the analysis.
3. Conclusion – Briefly describe the conclusion of the analysis, which should include an overall summary of the suggested design changes (e.g., “modifications to roadway alignment” or “improvements to box culvert design”).
4. Recommendations Overview – Outline all individual VE recommendations presented in the VE Report. Include a brief description of each improvement and the potential cost savings or value incentives. The VE recommendations will be listed in the same order and will be titled the same as they are in the VE Analysis Recommendations section of the report.

5-3.4 INTRODUCTION

Introduce the VE Team and VE Team Leader, the PM, and any important stakeholders. Pertinent information related to the project or the VE Analysis that is not included in other sections should be included here.

5-3.5 PROJECT DESCRIPTION

Provide a description of the analyzed project. This section should not include any information about the VE Analysis. Information for this section can be obtained from the Draft Scoping Document.

5-3.5.1 Project Background

Provide a detailed description of the project history, including the following information at a minimum:

- Project purpose and need;
- Project goals;
- Major stakeholders, sponsors, and involved parties;
- Project schedule and progress; and
- Project funding and programming.

5-3.5.2 Description of the Project

Describe the SOW for the project, including the type of improvements (roadway, drainage, structural, etc.), major project features, additional R/W needs, timeline for project completion/construction, and a summary of any plans, reports, and/or other documents prepared for the project.

Describe the limits of the project study area with respect to major streets, highways, or other prominent features. Develop a project location map to show the study limits and major topographic features. Include a north arrow, a scale, and an inset Maricopa County vicinity map

showing the project location in relation to major cross-streets or other identifiable landmarks. The scale will depend on the size of the project.

5-3.5.3 Project Selection

Describe the steps followed to select the project for VE Analysis. Include a list of all major individuals who were involved in the selection process.

Describe the reason(s) this project was selected for VE Analysis. Reasons could include total project cost, size of the project, and complexity of the project

5-3.6 DESCRIPTION OF THE ANALYSIS

Describe the logistical details of the analysis, including the location where the analysis was held and the time and dates of the analysis. Include any important milestone dates, including the analysis' beginning and conclusion.

Describe the VE Analysis process including methodology followed and a description of any assumptions made.

5-3.7 PROJECT AND VE ANALYSIS GOALS

Provide a list of the goals and objectives of the VE Analysis that were established in the VE Study Plan prior to the beginning of the study. This section should include the goals of the original project and how the VE Analysis aimed to provide value-oriented solutions to those goals.

5-3.8 FUNCTION ANALYSIS

Describe the process of developing the function definitions for the project. Function definitions consist of an active verb and measurable noun that fully describe the function of a given system. Provide a basic function and higher-order function definition for the project.

5-3.9 SUMMARY OF RESULTS

Provide an overview of the ideas brainstormed during the creative stage and which ideas were moved to the Evaluation Stage. Explain the reasoning for moving an item forward to the Development Stage or removing from consideration.

Provide a sequential list of each VE recommendation. Each VE recommendation will be assigned a number matching those used in the rest of the document. The table should include the estimated savings or added cost for each VE recommendation.

5-3.10 COST ESTIMATE COMMENTS

Provide any necessary information related to the cost estimating procedures used in the analysis, including assumptions used. Include the level of detail of the cost estimates.

Describe the assumptions and methodology used during the cost/benefit analyses performed for each VE recommendation.

5-3.11 VE RECOMMENDATIONS

Describe in detail the VE recommendations prepared by the VE Team. The VE recommendations should be divided into sections as necessary depending on the size and scope

of the project. Each section will cover one discipline and contain all individual VE recommendations related to that discipline. Sample sections could include, but are not limited to:

- Roadway;
- Traffic Control;
- Construction Phasing;
- Environmental;
- Drainage Design;
- Structural;
- Utility Relocation;
- Pavement Design; or
- Right-of-Way.

Each discipline section shall contain a list of all related VE recommendations made by the VE Team. Each VE recommendation shall be assigned a number for future reference comprised of the VE recommendation's discipline and a number (e.g. "Roadway – 1"). Present the VE recommendations in sequential order within each discipline section.

Each VE recommendation shall be described separately including the following information at a minimum:

5-3.11.1 Title

Give each VE recommendation a brief title that summarizes the changes to the design (e.g. "Use PCCP instead of AC at intersection").

5-3.11.2 Function Definition

Provide a function definition for the VE recommendation. The function definition will consist of an action verb and a measurable noun describing the function improved by the VE recommendation.

5-3.11.3 Baseline Assumptions

Describe the original design that will be impacted by the VE recommendation. Include all details required to fully understand the significance of the recommended change.

5-3.11.4 Recommendation

Summarize the change being recommended by the VE Team. The change described should be specific to the discipline of the major section (Roadway, Structural, etc.) and contain information related to only one VE recommendation.

5-3.11.5 Benefits

List the benefits provided by the recommended change. The benefits listed in this section should be related to functional improvements, shortened construction time, design improvements, costs savings, etc. Do not include an itemized cost comparison in this section.

5-3.11.6 Risk Assessment/Challenges

List any additional risks or challenges associated with the proposed design change. Consider scope, schedule, and budget impacts.

It is important to provide all potential risks associated with the VE recommendation, as this will give the decision-makers a complete picture of the impacts, both positive and negative, of each VE recommendation.

5-3.11.7 Discussion/Justification

Provide an in-depth discussion of the proposed VE recommendation. Include as many details as necessary to clearly describe the VE recommendation's impact. Provide a justification for why this VE recommendation should be implemented.

5-3.11.8 Implementation Considerations

Discuss any special considerations related to the feasibility of implementing the proposed change. This section should focus on comparing the feasibility of the original concept to the recommended. List any additional investigation or reports required. If a VE recommendation is related to another VE recommendation, state the relationship. Detail the impacts of the VE recommendation on the project schedule.

5-3.11.9 Lifecycle Cost Impact

Provide a detailed outline of the changes in cost from the original scoping design to the recommended design. Include an itemized breakdown of cost for the original scoping design followed by an itemized estimated cost for the recommended change. Each cost item should include the related unit, quantity, unit cost, and total. Only costs related to the VE recommendation should be included. It is important to investigate and present all cost changes associated with the recommendation. These could include, but are not limited to, construction, additional design, R/W or easement requirements, future maintenance, etc.

5-3.11.10 Cost/Benefit Analysis

A cost/benefit analysis is an integral part of the VE Analysis. Discuss the impacts of the VE recommendation's cost versus its benefit to the overall project. Provide all information pertaining to the element's cost versus its benefit.

5-3.11.11 Sketch

One or more sketches will be included for each VE recommendation comparing the original scoping design to the recommended design. Clearly outline the changes due to the VE recommendation.

5-3.11.12 Design Suggestions

List any items identified by the VE Team that will need further investigation by the Design Team. These items differ from the VE recommendations in that they are not recommended changes to existing elements. Rather, design suggestions are entirely new design concepts that do not appear in the original plans. Design suggestions can also involve proposed changes to a project's cost estimate.

Compile and list the design suggestions by discipline (Roadway, Structural, etc.). Provide a brief description of each suggestion and a reason why the VE Team believes it should be investigated further. Reasons could include functionality improvements, reduced maintenance requirements, and reduced construction times, among others.

5-3.12 VE TEAM CONTACT LIST

In addition to clearly identifying the VE Team Leader and the VE Team title page, a VE Team contact list should be included within the document. The list will include the email, phone number, and business address of each member of the VE Team. This list will also include the PM.

5-3.13 APPENDICES

Other pertinent information not included in the body of the report should be included in the appendix. This could include, but is not limited to, project exhibits, plans revisions, a cost comparison sheet, and any special details required.

5-4 Roles and Responsibilities

5-4.1 PROJECT MANAGER

The PM plays a key role throughout the entire VE Study. The PM serves as the process' main facilitator and is responsible for organization and communication with all involved groups. It is important for the PM to be involved in every step of the VE Study process.

Some key responsibilities include:

- Providing clear leadership throughout the VE Study process;
- Understanding and believing in the benefits provided by a VE Study;
- Requesting the funds necessary to perform and support the study;
- Selecting the VE Team Leader and the VE Team;
- Organizing the VE Study;
- Providing coordination between all parties involved with the VE Study, including the Project Team, the Design Team, the VE Team, and the PRC;
- In conjunction with the Project Team, performing reviews of the results of the VE Analysis, including all VE recommendations and Draft and Final VE Reports;
- Ensuring that the VE Study schedule is followed;
- Confirming that VE Analyses are coordinated and performed effectively in order to meet the goals and objectives of the project; and
- Guide the implementation of the VE recommendations into the final design phase.

5-4.2 VE TEAM LEADER

The VE Team Leader is responsible for planning, leading, and facilitating the VE Analysis, as well as the overall execution of the VE Analysis. VE Team Leaders should have significant training and experience in VE prior to being selected as a VE Team Leader by the Project Manager (PM). He/she will serve as the main point of contact between the PM and the VE Team and will be responsible for developing and submitting the VE Report.

Because of the intensive and structured nature of the VE method, good teamwork and group dynamics are essential parts of a successful study. Plenty of opportunity exists for everyone to contribute during each phase, but the VE Team Leader may have to facilitate discussion to ensure everyone participates and the goals of the study are met. The VE Team Leader should have maximum cooperation in this regard from the VE Team.

Some key responsibilities include:

- Ensuring proper application of the VE methodology and following the VE Study Plan;
- Preparing the VE Study Plan and collecting the documents for the VE Analysis Packet;
- Assisting the PM in selecting the VE Team members;
- Guiding the VE Team through the activities needed to complete the Pre-Analysis, the VE Analysis, and the Post-Analysis phases of the VE Study;
- Delegating responsibilities to the members of the VE Team as appropriate;

- Keeping the VE Team focused and on topic;
- Keeping VE Team members involved in the discussion; and
- Preparing the Draft and Final VE Reports.

5-4.3 VE TEAM MEMBER

When members are selected to serve on a VE Team, they will spend several days working intensively and creatively with a group of peers. Regardless of the results of the particular study, members will develop a better understanding of other team members' perspectives and of the complexities of project design and development.

VE Analyses could require multiple consecutive days of work, depending on the size and complexity of a project. Selected VE Team members should make every effort to ensure they will be able to concentrate fully on the VE Analysis. This will not only enhance the experience, but will also help the project. Selected VE Team members who have a scheduling conflict should contact the VE Team Leader as soon as possible.

Selected members will receive a VE Study Plan in advance of the VE Analysis. The VE Study Plan contains background, scope, and logistical information about the study and may also include one or more attachments that provide a brief description of the study subject. Often these are excerpts from documents that will be available during the study. When reading these excerpts, selected members may want to note which documents they want to review more thoroughly during the Analysis phase. It is not intended for selected members to spend more than an hour or two preparing for the study.

Selected members are encouraged to bring appropriate resources with them to the Analysis. Because VE is an intensive, time-constrained procedure, it is recommended that selected members bring with them only those resources that they are very familiar with in order to save time.

Some key responsibilities include:

- Attending all meetings as required by the PM and the VE Team Leader, including the Design Team Presentation and all meetings related to the VE Analysis;
- Reviewing the contents of the VE Study Plan and the Value Analysis Packet to gain a better understanding of the subject project;
- Asking questions and taking notes at the Design Team Presentation in order to gain a better understanding of the subject project;
- Cooperating with the VE Team Leader and the other VE Team members during the VE Analysis;
- Fully participating in all stages of the VE Analysis, maintaining a good attitude, and being an active contributor of thoughts, ideas, and suggestions;
- Staying focused and on topic during discussions;
- Not being reluctant to offer a different opinion from the other members of the team and not agreeing to something just because everyone else does;
- Believing in the effectiveness of the Value Analysis methodology;

- Remembering that VE is not a peer/design review and is not about meeting a set number of recommendations or cost savings – rather, it is about working with the Project Team to improve the overall value of the project; and
- Provide assistance to the VE Team Leader in the development of the Draft and Final VE Reports, if requested.

5-4.4 DESIGN TEAM

Some key overall responsibilities of the Design Team include:

- Cooperating fully with the PM;
- Providing the PM with the documents required for the Value Analysis Packet;
- Communicating the key elements of the project to the VE Team at the Design Team Presentation; and
- Provide feedback and dispositions on the VE Reports and the VE recommendations.

5-4.5 PROJECT TEAM

The Project Team is responsible for reviewing the VE recommendations and VE Reports at various stages of the VE Process.

5-5 Training

From time to time, FHWA/NHI offers a 32-hour value analysis course. Potential VE Team members should avail themselves of this opportunity. The course includes 12 hours of lecture and class discussion, 20 hours of workshop time in a team environment, and 6-8 hours of home study and reading. The overall objective of this course is to familiarize the participants with the systematic VE approach to problem solving. The website for this training can be accessed at the following link:

<http://www.fhwa.dot.gov/ve/training.cfm>

6 FINAL DESIGN

6-1 Introduction

All MCDOT TIP projects which have completed the Scoping Phase continue into Tier 2 of the PRS. Selected projects will then continue on and the PM is to prepare a request to be placed on the next PRC agenda. The person submitting the request will then present the project to the PRC for review. If approved by the PRC, the project will proceed to the Final Design phase and will be programmed for Final Design and Construction.

Refer to Figure 1-1 in Section 1 for the complete TIP Project Development Process.

6-1.1 PROJECT FINAL DESIGN

The purpose of the Final Design Section is to provide guidelines for preparing Final Construction Documents for all MCDOT TIP projects. This section has been assembled to provide a standardized process, clarify the content requirements for final plans, and guide the development of all MCDOT TIP projects. This section is not intended to explain the Engineering design process or specific design requirements, nor is it an exhaustive listing of all potentially pertinent project data, information, or criteria. As all engineering projects are unique, each project will require that the professional(s) developing the requisite documents exercise professional judgment when determining what items must be included. For additional information regarding the engineering design process or specific design requirements, refer to the MCDOT Roadway Design Manual (RDM) and all other MCDOT design manuals. For additional Federal requirements refer to the Federal-Aid Manual.

6-1.2 FINAL DESIGN GOALS

Final Design is the second step in the engineering analysis and design. The project development processes is used to facilitate the timely and successful completion of the project through bid advertisement and construction. The Final Design goals include:

- Complete Plans, Specifications, and a Construction Cost Estimate to facilitate the construction of the project;
- Complete Utility relocations, if necessary, and obtain Utility Clearance;
- Complete R/W acquisition, if necessary, and obtain R/W Clearance;
- Identify and if necessary, execute Environmental mitigation measures, obtain Environmental permit(s) if necessary and secure Environmental Clearance;
- Identify required contract time and construction schedule;
- Complete Administration documents in preparation for Advertisement of the project. These documents may include as necessary, Intergovernmental Agreements, Federal Documentation, Board of Supervisors approvals, etc.; and
- Address all design components to eliminate construction change orders.

Therefore, the objectives of the Final Design phase are to develop and deliver the following:

- Sealed Plans, specifications, construction cost estimate and bid schedules;
- Utility Clearance memo;

- Environmental Clearance memo;
- R/W Clearance memo;
- Technical Memorandum (TM) update/addendum, as necessary; and
- Required Federal-Aid documents, as necessary.

The goals of Final Design align with the goals of the MCDOT Project Development process. The process will help deliver projects on time, since critical path items are identified within the project schedule. **Table 6-1** shows typical deliverables and project information required at the various project stages. The PWP for Final Design prepared by the PM and discipline representatives for the project, will identify all project specific requirements and submittals. Refer to Section 7, Project Management, for more details on the PWP and schedule requirements.

Table 6-1 – Final Design Development

DISCIPLINE	FINAL DESIGN PHASE			
	60%	95%	100%	Sealed PS&E
Design	<ul style="list-style-type: none"> ▪ 60% Plans ▪ Cost Estimate ▪ Special Provisions ▪ Bid Schedule ▪ Design Documentation 	<ul style="list-style-type: none"> ▪ 95% Plans ▪ Cost Estimate ▪ Special Provisions ▪ Bid Schedule ▪ Design Documentation 	<ul style="list-style-type: none"> ▪ 100% Plans ▪ Cost Estimate ▪ Special Provisions ▪ Bid Schedule 	<ul style="list-style-type: none"> ▪ Sealed Plans ▪ Special Provisions ▪ Construction Cost Estimate ▪ Bid Schedule
Technical Memorandum	<ul style="list-style-type: none"> ▪ Verify and update TM's as necessary 			
Environmental	<ul style="list-style-type: none"> ▪ Environmental Clearance Document 	<ul style="list-style-type: none"> ▪ Environmental Clearance Memo 		
Utilities	<ul style="list-style-type: none"> ▪ Relocation Design and Plans ▪ Utility Agreements 	<ul style="list-style-type: none"> ▪ Utility Relocations 		<ul style="list-style-type: none"> ▪ Utility Clearance Memo
Right-of-Way	<ul style="list-style-type: none"> ▪ Appraisals ▪ Negotiation & Offers ▪ Acquisitions 			<ul style="list-style-type: none"> ▪ R/W Clearance Memo
Other			<ul style="list-style-type: none"> ▪ Board of Supervisors Bid Solicitation Approval 	<ul style="list-style-type: none"> ▪ Federal Aid Documentation, as necessary ▪ Administrative Documentation

6-2 Design Submittals – Final Design Phase

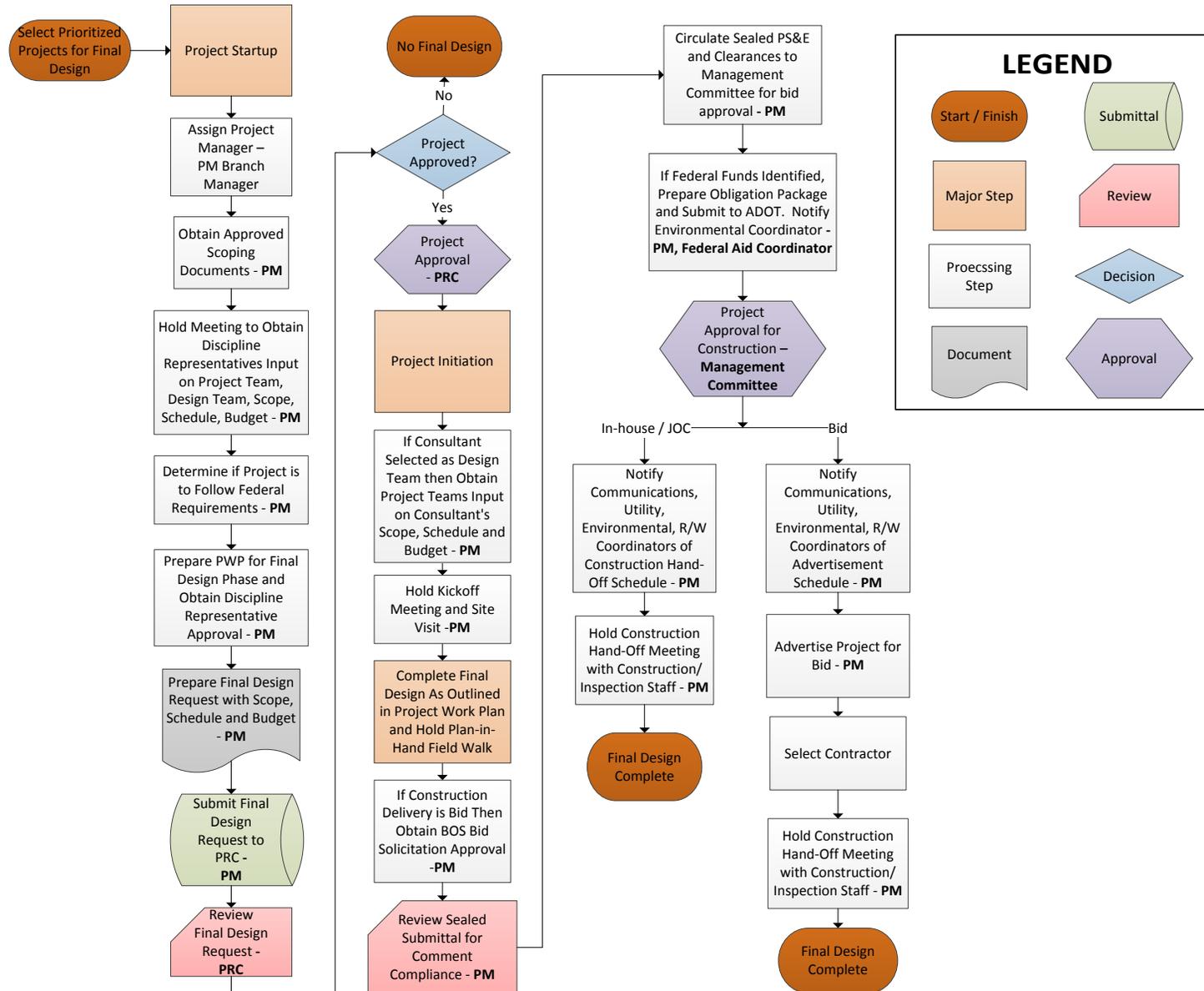
The Final Design phase consists of four major submittals: 60% Plans, 95% Plans, 100% Plans and Sealed Plans. Staging of the design process encourages a systematic approach to plans preparation. Completion milestones are set at specific levels of development to incorporate quality assessment procedures and to conduct reviews by involved technical units and outside agencies. Participation and coordination by all MCDOT disciplines is critical to the success of the project.

Typical requirements for each design plan stage are summarized in **Table 6-1** and specific project requirements are located in the PWP for Final Design. Requirements for each stage are based on the guidelines presented in the following sections and the PWP for Final Design. The PWP defines the SOW for each project and will be developed by the PM and the discipline representatives.

If federal-aid is associated with the project then the PM shall coordinate with MCDOT's Federal-Aid Coordinator and follow the requirements in the Federal-Aid Manual.

The development process for Final Design is shown in **Figure 6-1**.

Figure 6-1 – Final Design Process Flowchart



LEGEND

6-2.1 TECHNICAL MEMORANDA

The purpose of the TM is to segregate the project into discrete, easily definable segments that can be researched and developed in stages. The majority of the TM content is developed during the Scoping Phase of the project. TM's during the Final Design Phase are either updated versions or the final versions of the Scoping TM's as identified in the PWP.

The actual content of the TM is discussed separately in Section 4, Scoping. A TM may be updated, approved, and sealed before submitting the 60% documents and plans during the Final Design Phase. The PM and the discipline representatives will determine if a change in design and scope of the project warrants updates to previously completed TM. Significant changes on scope need approval from the PRC prior to making any revisions. Change(s) to the scope of the project after the 60% stage may significantly affect the environmental, right-of-way, and utility clearance schedules.

At the completion of Final Design all TM and any updated TM shall be filed in the project folder.

6-2.2 60% STAGE

The 60% Plans should convey the Final Design features of the project as guided by the project scoping document. Project plans will be developed at this stage to a point where all major design elements are complete. Changes in the scope after the 60% review that significantly modify the project's design require the concurrence of the PRC.

At the completion of the 60% Stage, the following goals are met:

- Finalize R/W requirements;
- Finalize roadway geometry;
- Finalize drainage design;
- Pot holes complete with results in project file;
- Finalize utility relocation needs; and
- Update/amend Scoping phase TM, as necessary.

Significant changes to the design and scope after the 60% Stage will have an effect on R/W, utility, and/or environmental clearance schedules and this will require PRC approval.

All plans circulated for review must be marked "60% Plans" and "Not for Construction." The 60% Plans are NOT sealed. The distribution requirements noted in the **Project Submittal** section apply to all projects. Project specific requirements shall be documented in the PWP for Final Design.

The following components of the design plans and associated documents, which may be new at this stage, are to be developed as follows.

6-2.2.1 60% Documents and Plans

The following is a list of typical documents and plans to be submitted at this stage:

- Private Agreements and IGAs (jurisdictional boundaries verified and updated as necessary);

- Utility coordination;
- Survey;
- Engineering calculations;
- General sheets (face, general notes, quantity summary, and geometric control sheets);
- Roadway sheets (typical sections, plan and profile, and driveway detail sheets);
- Drainage sheets;
- Special Provisions;
- Traffic sheets (signing, pavement marking, signal, and ITS sheets);
- Structure sheets;
- Intersection Detail Sheets;
- Earthwork report and sheets (cross sections and mass diagram sheets);
- Project cost estimate and Bid Schedule or Fee Schedule; and
- TM Updates/Amendments, as necessary.

6-2.2.2 Utilities

The purpose of identifying the utilities is to coordinate with utility companies for adjustments and relocations.

Deliverables:

- Transmittal of plans (hard copy and electronic) to utility companies for verification against the relocation plans developed;
- Prior rights documentation and confirmation; and
- Final conflicts and resolutions list.

6-2.2.3 Environmental

The type of Environmental Clearance documentation required (National Environmental Policy Act (NEPA) or Non-Federal) is dependent upon whether or not a Federal nexus is in place or may be in place in the future.

A NEPA Environmental Clearance document (Categorical Exclusion (CE), Environmental Assessment (EA) or Environmental Impact Statement (EIS), as determined by the lead Federal agency) is warranted when there is a federal nexus, such as federal funding. If a NEPA clearance is required, actions done during scoping, such as public involvement and other environmental tasks, should follow the intent of the NEPA.

If the project is not subjected to a Federal nexus, but is programmed by MCDOT for Final Design and construction, a Non-Federal Environmental Clearance document is required. For small projects without a Federal nexus, such as intersection improvement projects, the technical memorandum produced during the scoping phase may be utilized as the clearance document. For larger, more complex projects, the clearance document provided for non-NEPA projects is known as an Environmental Determination Report. The MCDOT Environmental Program Branch will determine the level of documentation needed for non-NEPA projects.

A Draft Environmental Clearance document (Non-Federal) will be completed by the 60% stage of the project. Final Environmental Clearance documentation will be completed between the 60% and 95% stage of the project. Clearance is conditional with the issuance of an Environmental Clearance memo and its mitigation measures. Implementation of those mitigation measures would constitute Environmental Compliance.

If federal aid is associated with the project then the requirements located in the Federal-Aid Manual should be followed.

Sample clearance documentation and clearance memoranda can be obtained from the MCDOT Environmental Program Branch.

6-2.2.4 Right-of-Way

The purpose of the final R/W requirements is to:

- Identify all parcels effected by the project;
- Provide the final required R/W footprint and final acquisition costs; and
- Finalize roadway R/W width, drainage easements, slope easements, and temporary construction easements.

Deliverables:

- Final parcel schedule listing the parcels affected including the total area, affected area, total take, partial take, severance pay, date of acquisition etc.; and
- Dimensions and offsets of roadway R/W width, drainage easements, slope easements, and temporary construction easements.

6-2.2.5 Special Provisions

Special provisions are to be written for project requirements not adequately covered in MAG specifications as modified by the MCDOT Supplement. Special Provisions shall include specific project information to provide clear expectations and direction to the contractor. The MCDOT Guidelines special provisions (GSP) are to be used as a framework for developing project special provisions.

Deliverables:

- Draft special provisions

6-2.2.6 Cost Estimate and Bidding Schedule or Fee Schedule

The purpose of the cost estimate is to verify project cost and budget:

- Provide quantity calculations for estimated earthwork and disturbed area; and
- Provide cost estimate and draft bid or fee schedule.

For projects anticipated to be constructed by a JOC contractor, a fee schedule is to be prepared instead of a bidding schedule the design lead is to coordination with the PM to verify all sections of the cost estimate are completed appropriately.

6-2.3 95% STAGE

The 95% Plans should further develop the details based on the 60% Plans. Project Plans shall be developed at this stage to a point where design details can be thoroughly checked and utility relocations can commence, as necessary.

All plans circulated for review must be marked “95% Plans” and “Not for Construction”. The 95% Plans are NOT sealed. The distribution requirements noted in the **Project Submittals** section apply to all projects. Project specific requirements shall be documented in the PWP for Final Design. At the 95% Stage all issues must be resolved. The following components of the design plans and associated documents are to be developed as follows:

6-2.3.1 95% Documents and Plans

The following is the list of documents and plans that may be updated from the previous stage and submitted at this stage:

- Utility coordination;
- Engineering calculations;
- General sheets (face, general notes, quantity summary, and geometric control sheets);
- Roadway sheets (typical sections, plan and profile, and driveway detail sheets);
- Drainage sheets;
- Special Provisions;
- Traffic sheets (signing, pavement marking, signal, and ITS sheets);
- Structure sheets;
- Intersection Detail Sheets;
- Earthwork report and sheets (cross sections and mass diagram sheets); and
- Project cost estimate and Bid Schedule or Fee Schedule.

6-2.3.2 Utilities

If utility relocations are necessary for the project then the relocation work may begin by the 95% Stage but only after environmental clearance has been issued and if necessary a right-of-entry or new R/W secured.

6-2.3.3 Environmental

The Environmental Program Branch is to submit the Environmental Clearance Memo to the PM. The memo will contain the projects mitigation measures that will be included with the project special provisions. The PM shall place the Environmental Clearance Memo into the project file.

If federal-aid is associated with the project then the requirements located in the Federal-Aid Manual should be followed.

6-2.3.4 Right-of-Way

During the 95% Stage any new R/W and/or TCE needs will be in process of being acquired. The R/W plans, appraisals are to be complete at this stage. Negotiations and relocations are to have begun.

The assumption is that no design changes that effects the R/W limits have been made in this stage.

6-2.3.5 Special Provisions

Modify project special provisions to address 60% Stage review comments.

6-2.3.6 Cost Estimate, and Bid Schedule or Fee Schedule

Modify cost estimate and bid/fee schedule to address 60% review comments.

6-2.3.7 Final Project Field Walk

The PM shall schedule a plan-in-hand field walk after the 95% stage submittal. The purpose of field walk is to:

- Review the Final Design and its impacts in the field; and
- Verify that the existing conditions will not impede the construction.

Deliverables:

A field walk with the project team. For projects to be constructed by JOC include the JOC contractor in the field visit walk through.

6-2.4 100% STAGE

The 100% Plans should further develop the details based on the 95% Plans and shall convey the complete design for the project. Project plans shall be developed at this stage where design is complete and ready to be verified by the project team.

All plans circulated for review must be marked “100% Plans” and “Not for Construction.” The 100% Plans are NOT sealed. The distribution requirements noted in the **Project Submittal** section apply to all projects. Project specific requirements shall be documented in the PWP for Final Design. The following components of the design plans and associated documents are to be developed as follows:

6-2.4.1 100% Documents and Plans

The following is the list of documents and plans that may be updated from the previous stage and submitted at this stage in addition to the items discussed above:

- Utility coordination;
- Engineering calculations;
- General sheets (face, general notes, quantity summary, and geometric control sheets);
- Roadway sheets (typical sections, plan and profile, and driveway detail sheets);
- Drainage sheets;

- Specifications and Special Provisions;
- Traffic sheets (signing, pavement marking, signal, and ITS sheets);
- Structure sheets;
- Intersection Detail Sheets;
- Earthwork report and sheets (cross sections and mass diagram sheets); and
- Project cost estimate and Bid Schedule or Fee Schedule.

6-2.4.2 Utilities

The purpose of the existing and proposed utility information provided in the plans is to:

- Coordinate with utility companies about the relocated utilities; and
- Finalize the relocation plan concepts with relocated utilities.

Deliverables:

- Type, size, and location of relocated utilities based on relocation plans obtained from utility companies; and
- Acquisition of relocated utility plans (hard copy and electronic) from utility companies for verification against the design plans developed.

6-2.4.3 Environmental

Archaeological Data Recovery and/or mitigation measures may need to be performed at this stage; however, oftentimes these tasks cannot be conducted until R/W has been obtained/secured.

6-2.4.4 Right-of-Way

Negotiations are complete, condemnations filed, and relocations are near completion at the 100% stage. The assumption is that no design changes that effects the R/W limits have been made in this stage.

6-2.4.5 Special Provisions

Modify project special provisions to address 95% review comments.

6-2.4.6 Quantities, Cost Estimate and Bid Schedule

Modify cost estimate and bid/fee schedule to address 95% review comments.

6-2.4.7 Sealed Stage

100% Documents will be reviewed and comments will be forwarded to the designer to address. The designer shall not change or update the design apart from addressing the comments received. Once the 100% Plans are updated with all comments addressed to the satisfaction of the PM, the design lead shall seal the plans, special provisions, and construction cost estimate and submit the Final Construction Documents.

If the project will be advertised for bid then the PM shall request bid solicitation approval from the Board of Supervisors. The PM will submit an agenda item request to the MCDOT contracts staff to be placed on the next available Board of Supervisors meeting.

Construction documents will be completed and ready for construction at this stage. No additional review is required as 100% documents with all comments addressed shall be sealed. All plans produced must be sealed and signed with the “Not for construction” label removed.

6-2.4.8 Utilities

The utility relocation should be complete and a Utility Clearance Memo shall be submitted to the PM. A conditional Utility Clearance may be submitted if approved by the Utility Branch Manager. The PM shall place the Utility Clearance Memo into the project file.

6-2.4.9 Right-of-Way

At the sealed stage the possession of all land rights are complete, cost-to cure payments have been made, relocations of property owners complete, and R/W is cleared for improvements. The R/W Clearance Memo shall be submitted to the PM. The PM shall place the R/W Clearance Memo into the project file.

6-2.4.10 Special Provisions

The special provisions document shall be sealed and signed.

6-2.4.11 Cost Estimate and Bid Schedule or Fee Schedule

The cost estimate and bid or fee schedules are final at this stage. The construction cost estimate is to be sealed and signed.

6-3 Project Submittal

6-3.1 SCHEDULE

The PM is to prepare a project schedule based on the information provided in the Scoping and Design Report and per Section 7, Project Management. The project schedule is to account for Federal-Aid milestones (as necessary) and any MCDOT TIP programming milestones. The project team shall be involved in the project schedule preparation. Before finalizing the schedule a Gantt chart is to be completed to ensure all tasks are properly connected. The critical path shall be included in the finalized schedule. After review and approval by the project team, the schedule shall be saved as the baseline for the project. The schedule is to be documented in the PWP for Final Design and distributed to the project team. The PM is responsible for maintaining and updating the schedule as necessary.

6-3.2 SUBMITTAL PROCESS

All project documents to be reviewed must be submitted to the PM who will then distribute the documents to each designated project team representative along with a standard summary of comments form in Microsoft Excel format. Distributed materials will be marked prominently with the distribution date and the time and date that comments are due back to the PM. If the design work was completed by a consultant then the PM will be supplied with an electronic set on a CD containing all reports, plans, CADD files, and backup documentation being submitted. The PM is responsible for ensuring the electronics submittal is filed on SharePoint and Y Drive in the appropriate folders.

For submittals, the PM will verify the content, list any necessary comments in the Summary of Comments form, and then forward the submittal documents to the appropriate reviewer, as detailed in the PWP. The reviewer will then list any comments in the Summary of Comments Form. When completed, the reviewer will return the Summary of Comments form to the PM. All MCDOT disciplines are responsible to review and participate during each draft submittal. Once all comments have been received from the reviewers, the PM will forward all Summary of Comments Forms to the design lead. When addressing comments, the design lead will mark all addressed and completed comments in the Comments Addressed column in the Summary of Comments Form.

The Summary of Comments Form is provided in the Appendix.

6-3.3 REVIEW PROCESS

All review periods will be two weeks (10 business days) in length unless otherwise approved by the PM and documented in the PWP. The 10-business-day review period is a standard level of service that must be met. Request for an extension of the review period for extenuating circumstances can be granted by the PM on a case-by-case basis provided such extensions are justified and do not threaten the critical path of the schedule.

All review comments must be submitted electronically to the PM by the appropriate project team representative by the close of business on the final day of the review period. A standard comment form must be used. Comments will be compiled in a single Summary of Comments Form and an initial response will be assigned to each comment within one week (5 business

days) of receiving the last review comments. The single Summary of Comments Form with the initial response will be sent back to the reviewers a minimum of two business days prior to the Comment Resolution Meeting. The comment resolution meeting will be held within two weeks (10 business days) after receiving comments.

6-3.4 FINAL DESIGN PHASE COMPLETION

Final design provides documentation that sets up the construction phase; however, there must be a clear demarcation between the two phases. The completion of the Final Design phase depends on addressing all comments received during the Final Design phase, thus all comments received shall be addressed.

Final design is incomplete without acquisition of Environmental Clearance, Utility Clearance, and R/W Clearance.

Upon receiving the Final Construction Documents, Design Reports package and project clearances, the PM is to determine that all MCDOT Final Design goals are met. Then the PM will complete the Project Approval for Bid form and obtain signatures from the Project Management Branch Manager, Director and Division Managers. The Plan Set Face sheet will need signatures from the PM and the MCDOT Director and will be completed at the same time as the Project Approval for Bid form.

6-3.4.1 *In-house or Job Order Contract*

If the project is to be constructed with In-house forces or a JOC contractor and the Project Approval for Bid has been signed, then the PM is to schedule a hand-off meeting with construction and inspection staff as well as notify the communications, utility, R/W and environmental coordinators, at least 60 days prior to the hand-off meeting. The communications, utility, R/W and environmental coordinators may be invited to the hand-off meeting as appropriate. After the hand-off meeting has occurred the Final Design phase is then complete.

6-3.4.2 *Bid Advertisement*

If the project is to be constructed through the bid process and the Project Approval for Bid has been signed, the PM is to coordinate with MCDOT Office of Procurement Services staff. Projects with Federal funding are to follow the Federal-Aid requirements for bid advertisement and evaluation as identified in the Federal Aid Manual. The PM is to notify the communications, utility, R/W, environmental, construction and federal-aid coordinators (as necessary) of the advertisement schedule at least 60 days prior to the anticipated bid date. The PM will manage pre-bid meeting needs, issuing addendum material, as necessary, during the advertisement process.

For projects that are advertised for bid the PM is responsible for coordinating with a multi-disciplined review committee to analyze the bids received so that the various perspectives within the contracting agency are represented and are provided with technical and managerial input. After the bid opening the PM receives the bid results from the Office of Procurement Services and then the bid analysis is performed by the multi-discipline review committee which may include the PM, design lead, construction manager, and if applicable participating partners on the project. The analysis of bids needs to be able to discover bidding irregularities,

collusion, and unbalanced bids. The lowest responsive bidder should not exceed the engineer's estimate by more than 10%. Justification is necessary when the lowest responsive bid exceeds the engineer's estimate by more than 10%. After the review committee has completed the bid analysis and is in agreement on the lowest responsive bidder, the PM coordinates with the Office of Procurement Services to obtain approval from the Director before contract award. The PM is responsible to place documentation of the bid analysis and approval in the project file.

Projects which include federal funding shall also comply with the competitive bidding requirements per ADOT LPA manual and FHWA guidelines (23 U.S.C 112 and 23 C.F.R 635.114), unless an exception applies. The engineer's estimate should reflect a fair and reasonable cost of the project in sufficient detail to provide an accurate estimate of the financial obligation to be incurred and comparison of the bid received. In order to promote competition and information regarding advertised projects, effort should be taken to outreach the contracting community. Addenda to the bid documents should be communicated with all prospective bidders, who have obtained copies of the bid documents.

After the bid opening and a contractor is successfully selected the PM is to schedule a hand-off meeting with the construction and inspection staff. The communications, utility, R/W and environmental coordinators may be invited to the hand-off meeting as appropriate. After a contractor is awarded the project by the Board of Supervisors and the hand-off meeting has occurred the Final Design phase is then complete.

7 PROJECT MANAGEMENT

7-1 Introduction

The TIP project delivery process stipulates that all requests for initiation of a new project must be endorsed by a MCDOT Division Manager or a member of top management (e.g., Transportation Director or Board of Supervisor) and submitted in writing to the PRC. If approved by the PRC, the project will proceed to the Scoping Process which will be followed by the Final Design Process. The Scoping Process and the subsequent Final Design Process will only begin if the project is approved by the PRC, for each phase.

7-1.1 PROJECT MANAGEMENT

The purpose of this Project Management section is to provide guidelines for leading the project through startup, scoping, final design, and into construction. This manual has been assembled to provide the PM with a standardized process, streamlined tools such as Project Work Plan (PWP), Work Breakdown Structure (WBS), template Scope of Services, template Schedules and Fee Template which will assist in the development of MCDOT TIP projects.

Project Managers are accountable to the public, Board of Supervisors, and for the success of the project. The Project Manager delivers a quality product that meets or exceeds the standards of MCDOT. In addition the Project Manager must communicate effectively to be successful. Some communication skills of particular importance include written, verbal, interpersonal exchanges, and listening.

7-2 Project Management Goals

Project Management is at the core of a successful project. A PM is empowered to lead the Project Team to the successful and timely finish of a project. MCDOT requires that all projects are finished within budget and on schedule without scope creep. To facilitate this, the PM has been provided with the tools to start a project on a solid foundation, identify the task needs, keep track of the activities and recognize scope or budget issues in time to coordinate with the Project Team to avoid such situations.

The Project Manager goals include:

- Ensure all project funds are used to benefit the residents of Maricopa County in the best possible manner;
- Ensure the project is completed on schedule, within defined scope, and on budget; and
- Protect the interests of the project owner which are the residents of Maricopa County and Maricopa County Department of Transportation.

Project Management encompasses all phases of a project from its startup to its completion. The PWP is a tool the MCDOT PM is to complete with the discipline representatives to identify the scope, schedule, budget, resources, risks and project need.

This process will help the MCDOT PM and Project Team to deliver projects on time, since critical path items are identified within the Project Schedule.

7-3 Startup and Programming

The MCDOT TSP identifies short-, mid-, and long-range roadway improvements and is updated on a five year cycle. This process is completed by performing both a capacity based (impacted by population growth) and an operational needs analysis (maintenance, intersection, safety). Typically, short-range improvements needs proceed to Tier 1 project rating, while mid- and long-range improvements needs advanced to planning level studies resulting in recommendations for future considerations. Once a need is identified potential projects are entered into the PRS to determine project priority. Based upon the results of the needs analysis and the PRS results, recommendations are made for inclusion into the TSP. Project inclusion for the TIP is based upon the previously mentioned recommendations as well as any newly identified maintenance, warrant studies, and operational or safety needs. The TIP project delivery process stipulates that all requests for initiation of a new project must be endorsed by a MCDOT Division Manager or a member of top management (e.g., Transportation Director or Board of Supervisor) and submitted in writing to the PRC. Once submitted, each request will be placed on the PRC agenda for the next available meeting. The PM submitting the request will then present the project to the PRC for review. If approved by the PRC, the project will proceed to the scoping process. After the Scoping Phase is complete the project is again analyzed in the PRS. Selected projects will then advance to the Final Design and Construction Phase after receiving a second approval from the PRC.

7-3.1 PROJECT STARTUP

The purpose of Project Startup is to recognize the need for a project and to determine when to place this need into the project development process for discussion and approval. The following are objectives of Project Startup:

- Determine if a project is needed to solve a problem or to achieve an objective related to organizational goal;
- Complete a PWP to identify the scope, schedule, budget, risks and Project Team; and
- Gain input and support from the management, leadership and resources (internal and external).

Project Startup defines the process of project inception to its approval by the PRC. The PM is responsible for assembling the PWP and necessary documentation for the presentation of the project to PRC. Once a request for a project is received, the focus should be on developing the project goals and objectives. These goals and objectives will lead to developing a solution which will drive the Scope, Schedule and Budget. Preliminary information about the project should be used to develop the Scope, Schedule and Budget of the project.

At Project Startup, the PM obtains the input from various Technical Discipline Representatives on the project. The PM may obtain input from potential designers outside MCDOT. A Pre-Scoping meeting can facilitate this information gathering. The goal of this input is to formulate the PWP including preliminary Scope, Schedule and Budget which will aid in the completion of the PRC request form. The PRC Request is to be submitted to the PRC for project approval for the initiation of Scoping Phase. The PRC reviews the request and may need additional information which must be provided by the PM.

7-3.1.1 Project Work Plan

The PWP is a critical element to the success of the project delivery process as it provides the foundation and expectations for each project. For the PWP to successfully provide value it must provide a high level of detail and input from each discipline participating in the project.

The PM is responsible for completing a PWP at the Scoping and Final Design phases of the project delivery process. The PWP will be completed with the participation from the Technical Discipline Representatives prior to preparing the PRC request form. The PM is responsible for filing the PWP on SharePoint and communicating the location to the Project Team. **Appendix 7-A** contains the Project Work Plan for Scoping Phase and **Appendix 7-B** contains the Project Work Plan for Final Design Phase. The following are components of the PWP.

7-3.1.1.1 Project Need and Justification

Provide a description of the project need to justify the purpose of the project. The project need is the description of the problem or issue that a solution is being requested. This addresses the question of “why” is the project necessary. Describe the project limits within this section.

7-3.1.1.2 Goals and Objectives

Provide the goals and objections that would satisfy the project need. This addresses the “what” the project is striving toward to address the problem or issue.

7-3.1.1.3 Known Risks

In this section identify if the project limits are within Maricopa County right-of-way. In table format identify and describe any known risks, the level of severity of the risk (low, medium, high), and mitigation measure(s) to address the risk.

7-3.1.1.4 Funding

Identify the potential funding source for the project and whether federal-aid or other sources may be used for the project. If federal funding is identified then federal requirements will need to be followed. The Federal-Aid manual will need to be referenced.

7-3.1.1.5 Project Team and Design Team

The specific members of the project and design team will be listed in this section. The Branch Managers for each discipline will assign a staff member to the project. If a consultant will be used as the design team then the names will be added after the project is approved by the PRC and the consultant is selected.

7-3.1.1.6 Stakeholders

The project stakeholders and possible need for an IGA will be identified in this section. The need for an IGA will be identified during the Scoping phase. In preparing the Final Design phase PWP, the need for an IGA is confirmed and noted.

7-3.1.1.7 Quality (QC)/Quality Assurance (QA) Staff

The MCDOT QC/QA staff will be identified in this section. The individuals reviewing and checking the submittals shall be different from the individual producing the deliverable for each discipline.

7-3.1.1.8 Problem Escalation and Change Management

The problem escalation process as described in Section 2 will be followed. This section of the PWP identifies the individuals associated with the escalation levels.

7-3.1.1.9 Scope of Work

The SOW section describes the project limits and specific tasks required to successfully complete the scoping or final design phase. The SOW described shall be detailed and include all disciplines associated with the project. The WBS tool may be used to aid in the development of the SOW. The critical path items will need to be identified as well as a clear expectation of the party responsible for the task. If a Consultant is planned to be used then the SOW will identify which tasks will be completed by MCDOT staff and which tasks will be completed by Consultant staff. The scope of services for a consultant will be based on the SOW established in the PWP. The Consultant SOW is to be prepared only if a PRC request is approved. Another important part of the SOW is to identify specific items and tasks that are out of the project's SOW.

The purpose of the specific and detailed nature of the SOW is to establish clear expectations and responsibilities to complete the project. This will also aid in identification of scope creep.

7-3.1.1.10 Matrix of Deliverables

The matrix of deliverables is closely linked to the SOW and specifies what deliverables will be part of the project, when they will be submitted, and to what level of completion. A general description of the levels of completion may include:

- Preliminary (P) has a low level of detail tied to the submittal;
- Draft (D) has a medium level of detail that is higher than the preliminary submittal;
- Final (F) has a high level of detail that is built upon the preliminary and draft submittals; and
- Sealed (S) is a final submittal that is signed and sealed by the appropriate technical registrant as defined by the Arizona Technical Registration Act.

7-3.1.1.11 Schedule

The schedule is based on the scope of work and the matrix of deliverables. The schedule will be created using MS Project and will be established from input from each discipline to create a reasonable and realistic timeline to complete each task. The milestones will be identified in this section and the complete MS Project schedule will be included as an appendix to the PWP.

7-3.1.1.12 Anticipated Construction Delivery

The anticipated construction delivery method will be identified in this section. The primary delivery methods are Design Bid Build and JOC with other delivery methods being CMAR, Design Build, and In-house.

7-3.1.1.13 Budget

The budget for the project will be established using input from each discipline. The budget will identify the costs for in-house labor, consultant fees, utility relocation and/or pothole fees, R/W costs, construction cost, and construction management costs. Any work performed by MCDOT staff will be accounted for within MCDOT labor category.

7-3.2 PROJECT INITIATION

Project Initiation selects a consultant, as needed, by Request for Proposal (RFP) or current on-call contracts and kicks off the project. Project Initiation is critical because it is essential for those who will ultimately produce the desired project deliverables (Design Team), those who will use those deliverables (Project Team) and those who have a stake in the project (Stakeholders) to reach agreement on the problem and its solution.

If a consultant is utilized then the consultant's scope, schedule, and budget for the project will be formulated from the scope, schedule and budget established in the PWP.

7-3.3 KICK-OFF MEETING

The Project Initiation process then proceeds with the first major project meeting, known as the Project Kick-Off Meeting. The Kick-Off meeting and the Site Visit familiarize the Project Team and the Design Team with the elements and requirements of the project.

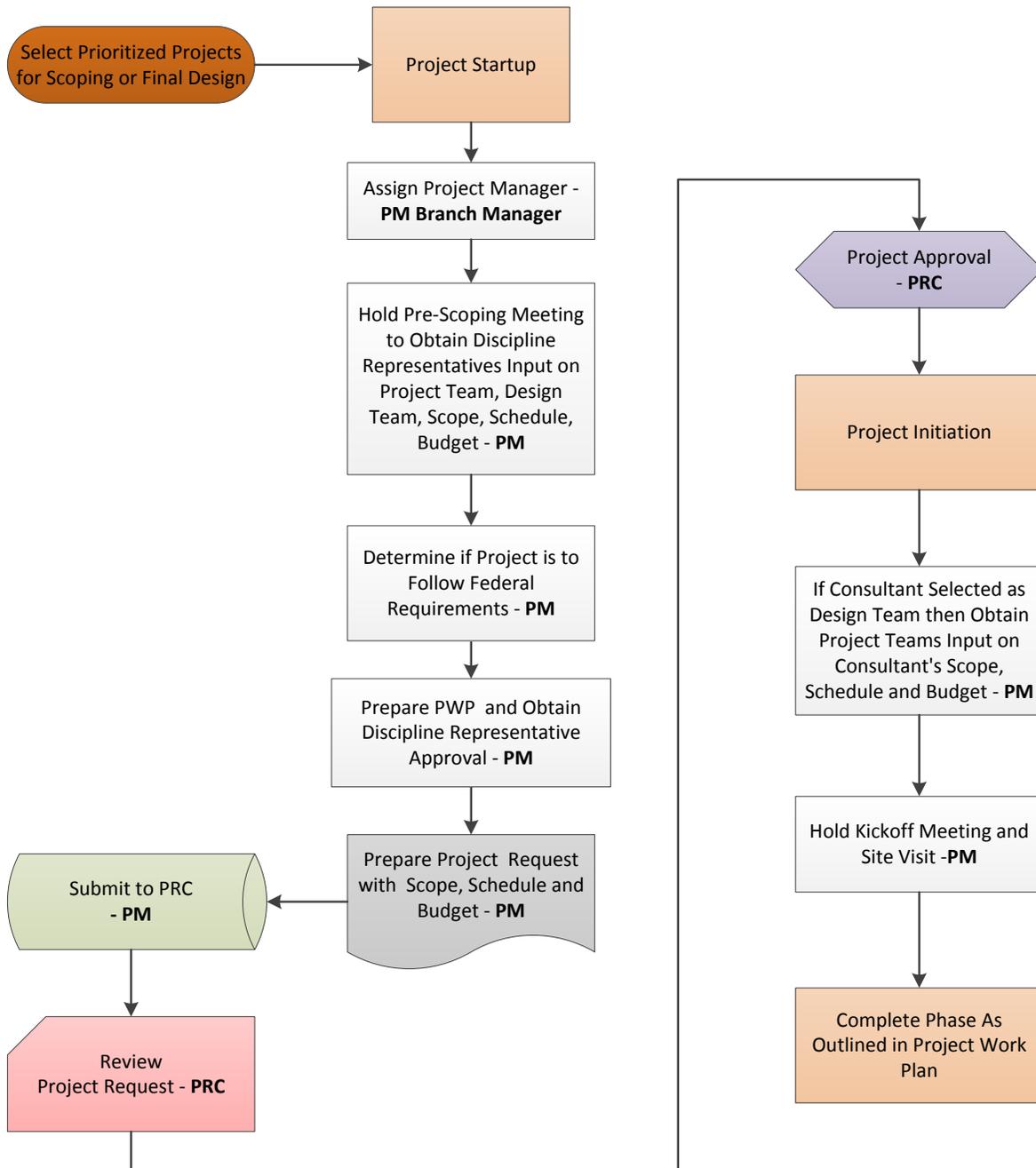
The Kick-Off meeting allows the PM to help communicate expectations, requirements and responsibilities. The Kick-Off meeting provides a forum to:

- Publicly state that the project is beginning;
- Review the goals, objectives and success factors of the project; and
- Establish commitments by all stakeholders.

The Kick-Off meeting is a gathering of the Project Team, Design Team, stakeholders and management. Stakeholders should attend the meeting to show support and to discuss the Project objectives and Scope, Schedule and Budget.

The following flowchart in **Figure 7-1** shows the project startup and initiation process.

Figure 7-1 – Project Startup and Initiation Flowchart



7-3.4 PROJECT PROGRAMMING

Projects are programmed in the MCDOT five year TIP based on their priority. The PRC is responsible for programming and funding a project. A project is programmed for funding only after a request is approved by the PRC.

7-4 Work Breakdown Structure

One of the most important parts of the project is the definition of project tasks and activities. For this purpose a WBS is created for project task needs. The activity sequence involves dividing the project into smaller, more manageable components or tasks, organizing them into major project phases and then sequencing them in their general order of completion. The goal is to use the WBS to aid in the development of the PWP.

The WBS is used as a tool to facilitate the development of a comprehensive Scope, Schedule and Budget for a project. WBS helps in development of Project Management deliverable (i.e. Scope, Schedule and Budget) and in itself is not a project deliverable.

The WBS reflects all activities such as Project Management, design, and implementation. The PM is responsible for selecting specific tasks associated with a project and verifying them with the Discipline Representative. As levels of the WBS become lower, the scope, complexity and cost of each subtask becomes smaller. The lowest level tasks are independent, manageable units that are planned, budgeted, scheduled and controlled individually.

A WBS template is provided in **Appendix 7-C** to streamline the process of identifying potential tasks needed for a typical project. The WBS contains all typical tasks required to complete a project including planning, design, production, submittals and reviews.

7-4.1 WBS ARRANGEMENT

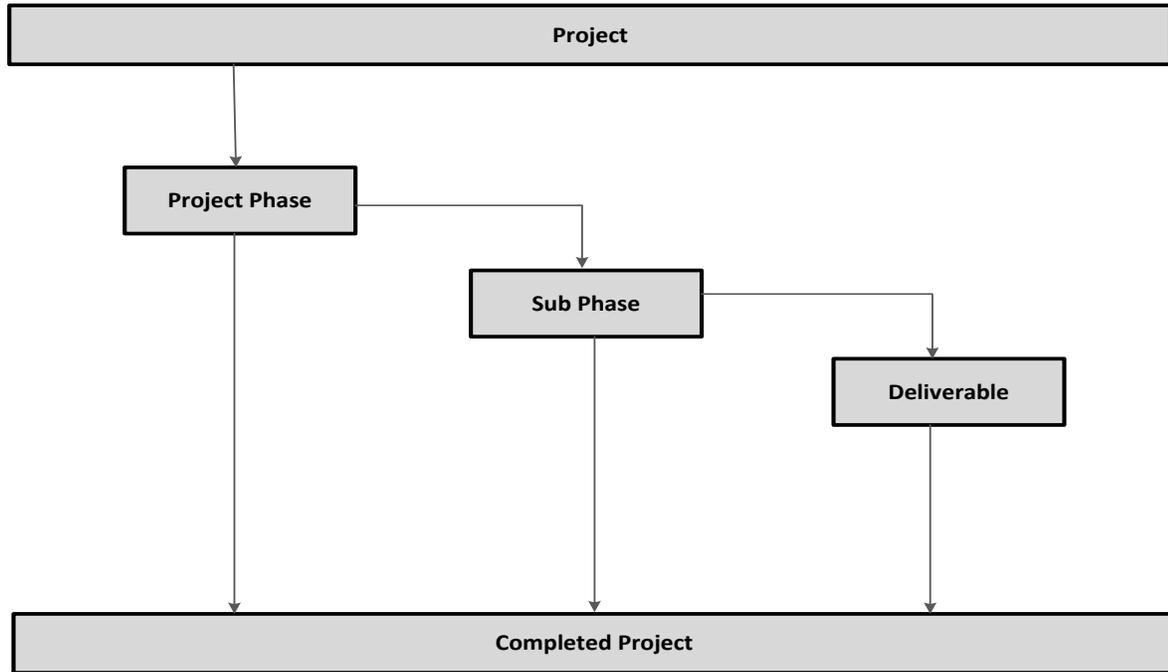
The WBS structure assigns an identifying notation to each task that will be carried through into the schedule. This unifying structure is developed to assist the PM and the Project Team in tracking and evaluating not only the project tasks but also to have the ability to compare similar tasks across projects and across proposals.

The tasks in the WBS are developed to cover the common tasks while the PWP details requirements for a particular task. The Schedule defines the duration and relationship of the different tasks.

A large project can consist of smaller projects; hence, the first level of the WBS is the Project number. A project is a collection of project phases, sub phases, and deliverables. The WBS denotes a hierarchy of task relationships.

The Project Breakdown Chart, as seen in Figure 7-2, shows how the various levels are needed to complete a project successfully. Projects are assisted by breaking down the activities in depth, to tasks which in turn help in scheduling and cost breakdown.

Figure 7-2 – Project Breakdown Chart



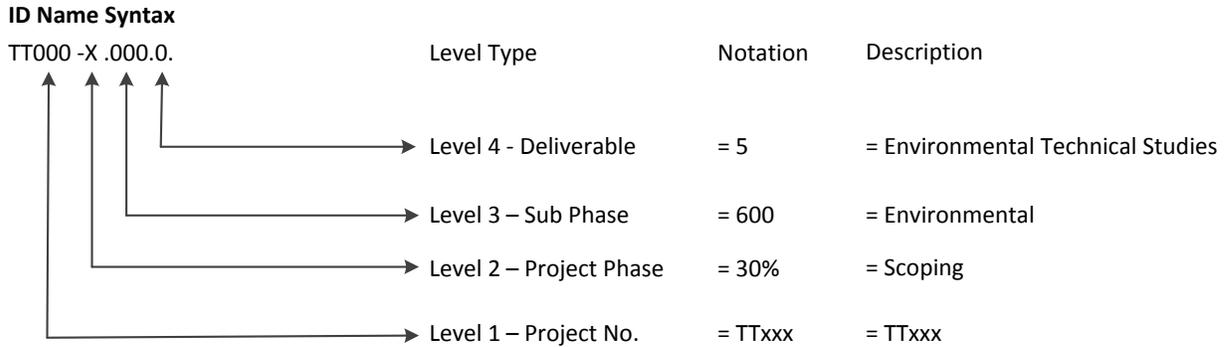
7-4.2 WBS TERMINOLOGY

The WBS tasks consist of up to 4 levels. A 4th level task will have a notation TT000-X.000.0. The first level denotes the Project Number (TT000). It allows the ability to merge or unmerge multiple projects into a single project or split a project in multiple projects. The second level defines the project Phase (X). This is divided in Scoping (30), 60%, 95%, 100%, and Sealed. The third level describes the Sub-Phase (000). This consists of major discipline or particular type phases such as Project Management, Environmental, Submittal, etc. that are represented by numbers (100, 600, 1200, etc.). The next level describes Deliverables and is by single digits (1, 2, 3, etc.).

The Terminology is depicted in **Figure 7-3**.

Figure 7-3 – WBS Terminology

WBS Terminology



7-4.3 WBS USE

Typically in a small project, there is a simple project development process. In large or complex project, there are often multiple project phases and sub phases, which are then grouped into a single project. In each case the WBS structure provides assistance in developing the Project scope, schedule and budget efficiently.

The WBS task name terminology is to be used in the schedule for a project. The PM, with the input from the Project Team, selects the required tasks for a particular project, and these will constitute the Scope tasks for the project. The PM will use the PWP to develop the Project Scope.

If a task is not applicable to a particular project, the name notation shall be skipped. The task notations cannot be changed and shall be consistent throughout the project.

The PM may determine if an additional task is required. The first step is to use the scope language under an existing task to describe what is needed.

7-5 Scope of Services - Template

The Scope of Services Template defines the tasks a consultant is responsible for completing. The requirements and responsibilities for each task are clearly defined to ensure completion of the task. The Scope of Services governs how a task will be accomplished, who is responsible and what will constitute its completion. A Scope of Services is needed for each project which uses the resources of a consultant.

A template Scope of Services based on the WBS is provided in **Appendix 7-D**. This scope of services describes each task in the WBS.

Note that the Project Specific sections are general and are for example purposes only. These sections are not intended to be a list of all required sections for a particular project. Each project will have its own particular sections as dictated by the PWP and as decided on by the Project Team with the approval of the Project Manager.

7-5.1 SCOPE OF SERVICES DEVELOPMENT

The complete project scope will consist of the PWP prepared by MCDOT and the Scope of Services which will be prepared by a consultant using the template Scope of Service. Scope of Services for a project will be developed using the template Scope of Services to have consistency across projects and consultants.

The information that is common to all design contracts is contained throughout this Project Development Manual. Note that not all of the tasks described are necessary on every project.

For each project, the Scope of Services shall contain any tasks which a consultant is responsible to complete. The sections in the PWP document will supersede sections in the Scope of Services.

7-5.1.1 Guideline for Conflicts

If conflicting criteria or procedures are presented in the scope of services or the references, the general order of precedence in resolving a conflict will be the following:

1. The Scope of Services – Project Work Plan;
2. The Scope of Services – Project Specific;
3. The Project Development Manual;
4. The MCDOT Roadway Design Manual;
5. MAG adopted Design Concept Guidelines for Roads of Regional Significance where applicable and reasonable;
6. Other MCDOT publications;
7. Flood Control District publications;
8. AASHTO publications; and
9. All other approved publications listed or used.

Confirm the resolution with the Project Manager. The Project Manager, in consultation with the affected parties, will make the final determination in the resolution of conflicts.

7-6 Schedule - Templates

The Project Schedule is developed based on the list of tasks identified in the WBS and the Scope of Services. These tasks are given a realistic length of time, start/finish milestones and are arranged in sequential order to form the Project Schedule.

The Project Schedule provides a time phased representation of selected tasks, milestones, dependencies, resource requirements, task duration and deadlines. The Project Schedule consolidates all tasks into a logical and manageable flow. The Project Schedule should be detailed enough to show each WBS task to be performed, the party responsible for completing the task, the start and end date of each task, and the expected duration of the task. The ordering of tasks in the Project Schedule will follow the sequence of events required to complete the project and should be consistent with the Project Development Process flowcharts shown in Section 4 and Section 6. In addition, the Project Schedule will detail dependents and pre-requisites for each task. The critical path, or the longest path of events through the project, must also be identified.

This information is organized into a Gantt chart (or bar graph), a two-dimensional exhibit which shows each task and its timeframe for completion. Additionally, major milestones are shown on the Project Schedule as well as requirements for each milestone and tasks which are dependent on the milestone. There may be a need to extract particular discipline schedules out of the project Schedule and thus project schedule should be detailed and resource focused so that discipline specific schedule can be extracted.

7-6.1 TEMPLATE SCHEDULES

Template Schedules based on the WBS and template Scope of Services are provided in **Appendix 7-E**. These schedules detail each task in the WBS. The PM will use these template Schedules to develop a project's Schedule.

There are two template Schedules; Scoping and Final Design. The Scoping schedules details the Scoping project based on the Scoping process. The Final design schedule details the Final Design process.

Schedules for a project will be developed using the template Schedules to have consistency across projects and consultants. The PM will need to document assumptions and decisions made when developing the Project Schedule, including rationale for tasks included and/or modified. The PM will consult the Project Team to develop task durations.

During the life of the project, actual progress is frequently compared with the original schedule. This allows for evaluation of projects and allows the team to calculate schedule variances against the baseline.

7-6.2 PROJECT SCHEDULE DEVELOPMENT

The task durations and dependencies will need to reflect the actual project requirements. It is important to review project milestones and refine their list in the Project Schedule. The milestones have no duration. For example, deliverables are often represented as milestones, while the effort to produce the deliverable is referred to as a task. Milestones occur at the end of almost any work package in the WBS. Major project milestones should be included in the Project Schedule summary at the top of the Project Schedule.

Estimating task duration will allow the Project Team to set the baseline time expected to complete a task. Similarly, defining the task dependencies helps to resolve any scheduling and/or resource conflicts. Understanding the dependencies and relationships of the tasks assists in resolving difficult scheduling conflicts. It should be understood that some task dependencies are not pure. In other words, some parts of a task can be started prior to finishing the task that is shown as its predecessor. This fact should be considered in estimating task durations.

The critical path is the longest logical path through a project and should be identified in every schedule. It determines the earliest possible completion of the project. The critical path should be carefully managed, because, if the critical path tasks slips, the entire project is delayed. In order to manage the project, the PM determines the critical path and remains aware of its importance throughout the implementation of the project.

7-6.3 PROJECT DELIVERABLES APPROVAL MATRIX

The Project Deliverables Approval Matrix is an important element to the Project Delivery Process. Once the project documents are determined and agreed upon with the Project Team, the PM will assist in developing a comprehensive deliverable list for the project. This information is used in developing various project documents including the Schedule and this becomes part of the PWP.

The typical Deliverable Approval Matrix is shown in **Table 7-1**.

Table 7-1 – Deliverable Approval Matrix

Deliverable Name	Approved by
Project Scoping Request	PRC
Design Criteria	PM & Project Team
Conceptual Alternatives	PM & Project Team
Candidate Alternatives	PM & Project Team
Evaluation Criteria	PM & Project Team
Design Exceptions	Director & Division Managers
Recommended Alternative Selection	Project Team, PM, & Division Manager
Value Engineering Report	Director & Division Managers
Scoping Approval	Director & Division Managers
Project Final Design and Construction Request	PRC
Bid Approval	PM Branch Manager, Director & Division Managers
Recommended for Construction	PM & Director

7-6.4 MAJOR MILESTONES

A Project Schedule should always show major project milestones. It is important to provide a summary schedule consisting of these milestones to the decision makers (PRC, Project Team,

etc.). The template schedules are set with major milestones summary provided right up front. All project schedules are expected to be developed with the major milestones shown up front.

The major milestones for the Scoping of a typical project are shown in **Table 7-2**:

Table 7-2 – List of Typical Major Milestones for Scoping Phase

Major Milestones for Scoping Phase
Project Startup
Project Review Committee (PRC) Approval
Survey and Mapping Complete
Consultant Notice to Proceed (NTP) (as necessary)
Public and Stakeholder Involvement Complete
Design Criteria Approved
Right-of-Entry Permit
Conceptual Alternatives Approved
Technical Memoranda Submittal
Recommended Alternative Selected
Geotechnical Test Hole/Utility Pot Hole/Pot Hole Layout Submittal
Prior Rights Information Obtained
Geotechnical Test Hole/Utility Pot Hole/Pot Hole Environmental Clearance
Geotechnical Test Hole/Utility Pot Hole/Pothole Completed
Preliminary Right-of-Way Identified
Technical Memoranda Complete
Draft SDR and Scoping Plans Submittal
Final Scoping Document and Plans Submittal
Scoping Approval

The major milestones for the Final Design phase of a typical project are shown in **Table 7-3**:

Table 7-3 – List of Major Milestones for Final Design and Construction Phase

Major Milestones for Final Design Phase and Construction Phase
Final Design Startup
Project Review Committee (PRC) Approval
Consultant Notice to Proceed (NTP) (as necessary)
Technical Memoranda Updated (as necessary)
Design exceptions (as necessary)
60% Submittal and CLOMR submitted as necessary
Environmental Documentation
95% Submittal
Environmental Clearance
Utility Clearance
Right-of-Way Clearance
Plan in Hand Field Meeting
100% Submittal
CLOMR approved (as necessary)
IGA Signed
Sealed Submittal
Final Design Process Complete - Signatures Obtained
Advertise for Bids (as necessary)
Hand-off Meeting with Construction Staff
Construction Start
Construction Completion
Project Close-out

7-7 Budget

A Project Budget will be developed concurrently with the development of the Project Schedule. The Project Budget lists MCDOT costs required for the project. If consultants are assigned to a project then a fee proposal will be requested and the cost is included in the project budget.

7-7.1 FEE TEMPLATE

A consultant Fee Template based on the Scope of Services template and the scope in the PWP as provided in **Appendix 7-F**. The PM will remove/modify all tasks listed in the Fee Template as necessary to match the tasks selected in the Project Specific scope of services and PWP. Once this modification has been made, the PM should provide this Fee Template to Consultants to develop a project's fee estimate. The PM will coordinate with the discipline representative for review/comment on the consultant's fee proposal prior to approval. The PM will ensure the fee proposal is within the budgeted amount.

The fee for a project will be developed using the fee template, to have consistency across projects and consultants. The PM will need to document assumptions and decisions made when reviewing the fee proposal, including rationale for costs included and/or modified.

7-7.2 PROJECT BUDGET DEVELOPMENT

Development of Project Budgets requires coordination with the discipline representatives. Upon completion of the Budget based on multiple inputs, The PM should review the combined Budget for the project activities with the Project Team to determine if the work descriptions, schedule and associated budgets are complete and reasonable. If there are significant differences, the PM will determine the reasons and either redefines the work packages, schedule and budgets, or approves the appropriate project budget in consultation with the Project Team.

If a budget change is identified by a project team member and/or the PM, then the requested change will be communicated to the Project Management Branch Manager. The guidelines on when to present a scope, schedule, and budget change to the PRC as identified in Section 2 shall be followed. On a quarterly basis the Project Management Branch Manager, TSM Division Manager, and Capital Improvement Program (CIP) Manager will address and document changes to project budgets which do not require PRC approval. Only after approval will a project budget change.

7-8 Quality Control and Quality Assurance

The guidance and direction provided in the PDM are intended to ensure quality and that each project meets the defined goals. Each project team will be expected to perform tasks on that project and will be responsible for fulfilling their responsibilities accurately and efficiently. Quality Control (QC) and Quality Assurance (QA) guidelines are established to continue to improve the quality of our services to the community.

7-8.1 QUALITY CONTROL

QC is the independent checking of work and use of approvals to ensure a high level of confidence that each deliverable will meet expectations. Asking questions, training, and back-checking all work before it is reviewed by the PM is all part of QC. Each member of the project team needs to understand their role and expected duties and display the initiative to stay committed to providing a deliverable that is consistent and accurate. Consultants are required in their scope of services to conduct their own QA/QC review prior to each submittal. To be included with each submittal, the consultant shall complete and sign the consultant Quality Compliance form which is located in **Appendix 7-I**.

7-8.2 QUALITY ASSURANCE

After each submittal is distributed for review, the reviewers will use the checklists provided in **Appendix 7-E** and **Appendix 7-F** (Final Design Review) to perform QA. The checklists are not an exhaustive list of design element and it is the responsibility of the designers and reviewers to make reference to the appropriate design manuals. The checklist is a tool to use during review that addresses common errors and significant elements. It is the reviewer's responsibility to conduct a thorough and complete technical review that is appropriate for the submittal stage in review. The reviewer will return the checklists and summary of comments form to the Project Manager by the specified review date. The reviewer assigned to each project shall be different from the designer assigned to the project. The Project Manager completes a review of the submittal as well to ensure QC was performed on the project. In addition to the expectations identified in the PWP, design team members will use the checklists provided as a reference tool when working on projects. The PM will be responsible for enforcing the review timeline to assure that the quality reviews take place and all reviewers have provided comments. The PM is to ensure all components of the submittal found in the PWP are satisfactory prior to distributing the submittal.

7-9 Other Project Administration

7-9.1 CONSULTANT EVALUATION PROCESS

The Consultant Evaluation Program is a program administered by MCDOT as a means to monitor and evaluate the quality of work performed on all engineering consultant contracts, and to meet the federal requirement under Code of Federal Regulations 23 CFR 172.

A positive approach to the program assures that project schedule, cost, and quality of design and construction are attainable. This assures that potential problems that may impact other projects are identified and resolved in a timely manner.

All engineering consultant contracts shall include at least one interim evaluation, or be evaluated annually, based on the Notice to Proceed (NTP) anniversary date by the MCDOT PM, including other Technical groups in accordance with applicable contract provisions. The interim evaluation is to be completed at the mid-point of the contract length when the contract term for the project is less than two years. In addition to internal annual evaluations, a final consultant evaluation must be conducted at the end of all engineering consultant contracts. The Consultant Evaluation Form is located in **Appendix 7-J**.

7-9.1.1 Implementation Timeline

This evaluation program will be effective for all engineering consultant contracts with a Notice to Proceed date of July 1, 2015, or later.

7-9.1.2 Uses for Consultant Evaluation

Consultant Evaluations will be used for the following purposes:

1. To identify consultant performance strengths and weakness, as well as help identify, document and resolve performance issues as needed.
2. To be used as one factor or criterion in the selection process for subsequent contracts. Final evaluations for contracts executed after July 1, 2015 will be used as part of the selection process. Up to 5 points may be deducted from a consultant score during the selection process for final evaluation ratings of less than 3 (average performance) on performance factors of evaluation for projects a firm has completed for MCDOT over a three year time period.

Evaluation history to be used for selection will include evaluation scores encompassing the most current three-year period at any given time. The three-year evaluation history will be maintained for firm contracts executed after July 1, 2015. For example, a firm's evaluation history in FY 2018 would include scores from FY 2015 through FY 2018, in FY 2019; the evaluation history would include FY 2016 through 2019.

MCDOT will deduct points from the scores of submitted Statements of Qualifications (SOQ) for each firm based on performance rating as follows:

Performance Rating	Points Deducted
Performance Rating of 1 or 2 on 1-2 evaluation factors	-1
Performance Rating of 1 or 2 on 3-4 evaluation factors	-2
Performance Rating of 1 or 2 on 5-6 evaluation factors	-3
Performance Rating of 1 or 2 on 7-8 evaluation factors	-4
Performance Rating of 1 or 2 on 9 or more evaluation factors	-5

3. To be used as documentation to justify disqualification of a prime consultant from submitting Statement of Qualification (SOQ) proposal. In order for MCDOT to take action that could lead to consultant disqualification from submitting SOQs, the MCDOT PM or staff shall complete a Consultant Evaluation Form.
4. To be used as documentation to justify the declaration of a breach of contract for a consultant’s failure to fulfill terms of the contract or to address problems identified by MCDOT in the performance of the contract. In order for MCDOT to take action that could declare a breach of contract, the MCDOT PM or staff must complete a Consultant Evaluation Form.

Department Evaluations will be used for the following purposes:

1. To identify the Department’s performance strengths and weakness, as well as help identify, document and resolve performance issues as needed.
2. To identify process and procedure improvements the Department may address as appropriate.

7-9.1.3 Procedure

The MCDOT PM will initiate the completion of consultant evaluation forms for contracts annually on their NTP anniversary date.

Since evaluations will be used as a factor in the consultant selection process, it is important for MCDOT PMs, Resident Engineers or other applicable staff to complete evaluations in a timely manner.

Please adhere to the following general guidelines in completing the performance evaluation:

1. The Consultation Evaluation Form will be completed by the MCDOT PM and shall confer with other MCDOT Project Team members involved in the contract. The MCDOT PM shall complete the form within 21 calendar days after the NTP anniversary date and at the end of the contract.
2. When completed, the MCDOT PM shall discuss the evaluation with the consultant. If the consultant disagrees with the evaluation score, the consultant shall provide a written response which shall be attached to the evaluation. The consultant must also request a meeting with the MCDOT PM to try to resolve differences. The request for a meeting

must be made within 10 calendar days after receiving the evaluation rating. If the request is not made within 10 calendar days, the score shall be considered final.

3. The Department Evaluation Form shall be completed by the Consultant for review of MCDOT personnel and returned to the MCDOT Office of Procurement Services.
4. Both the completed Consultant Evaluation Form and the Department Evaluation Form shall be filed together in a separate process improvement file in the MCDOT Office of Procurement Services.

7-9.2 PROJECT STATUS UPDATES

In addition to placing project documents in the SharePoint Project Site, Project Managers are also responsible for entering project data, ongoing status, and monthly activities of the project into MCDOT's TIP Project Status Tracking Tool. The reports the Project Status Tracking Tool will generate are used by Branch Managers, Division Managers, and the Director to verify the current status of each MCDOT project.

TIP project information shall be entered into the TIP Project Status Tracking Tool as soon as they have been approved by the PRC and assigned a project number. The PM is responsible to ensure the project is added to the TIP Project Status Tracking Tool and all appropriate project information fields, schedule, project team members and budget data is identified and entered into this system. The PM shall update and maintain the project status and file the project status report in the project file on a monthly basis at a minimum. During the Construction Phase the Construction Manager is responsible to ensure the construction details, dates, activities and critical path issues are entered at a minimum on a monthly basis.

It is the Project Manager's responsibility to keep the information in the TIP Project Status Tracking Tool current and accurate by coordinating with the Technical Discipline Representatives.



APPENDICES

- Appendix 2-A – Meeting Templates
- Appendix 2-B – Summary of Comments Form
- Appendix 2-C – Project Scoping Approval Form
- Appendix 2-D – Project Approved for Bid Form
- Appendix 2-E – Scoping Close-Out Checklist
- Appendix 2-F – Final Design Close-Out Checklist
- Appendix 4-A – Evaluation Criteria Template
- Appendix 4-B – Sample Involvement Matrix
- Appendix 5-A – VE Setup Checklist
- Appendix 5-B – VE Assessment and Comment Form
- Appendix 5-C – PRC VE Approval Form
- Appendix 7-A – Project Work Plan for Scoping
- Appendix 7-B – Project Work Plan for Final Design
- Appendix 7-C – Work Breakdown Structure (WBS)
- Appendix 7-D – Scope – Template Scope of Services
- Appendix 7-E – Schedule – Template Schedules
- Appendix 7-F – Consultant Fee Template
- Appendix 7-G – Scoping Checklists
- Appendix 7-H – Final Design Checklists
- Appendix 7-I – Consultant Quality Compliance Form
- Appendix 7-J – Consultant Evaluation Form

APPENDIX 2-A

MEETING TEMPLATE



2901 W. Durango Street
Phoenix, AZ 85009
Phone: 602-506-8600
Fax: 602-506-4750
www.mcdot.maricopa.gov

Name of Project
Description of Project
Project no. TTxxx

Progress Meeting x Agenda

Date of Meeting: Month Day, 20yy – hh:mm a.m/p.m.

Meeting Location: Description of Meeting Location

From: Project Manager, MCDOT

Attendees: Please sign the sign-in sheet

1. Welcome | Introductions

2. Review Action Items

- Comments on last Meeting Notes
- Action Items Review:

No.	Action Item	Responsible	Due Date	Completed	Status/Comments
1	Completed action item	Project Manager	mm/dd/yy	mm/dd/yy	Update on status of action item
2	Outstanding action item	Project Manager	mm/dd/yy		Update on status of action item
3	In process action item	Project Manager	mm/dd/yy		Update on status of action item

3. Decisions

- ❖ Decision 1. *Update on implementation of decision.*
- ❖ Decision 2. *Update on implementation of decision.*

4. Schedule

- Critical Schedule items for the project
 - Item 1; *critical issue and deadline*
 - Item 2; *critical issue and deadline*
- Deliverable Dates

Milestone	Original Schedule	New Schedule	Actual Completion
Milestone #1	Month dd, 20yy	-	Month dd 20yy
Milestone #2	Month dd 20yy	-	
Milestone #3	Month dd 20yy	Month dd 20yy	
Milestone #4	Month dd 20yy	Month dd 20yy	
Milestone #5	Month dd 20yy	Month dd 20yy	

- Tasks Due next month
 - Task 1; *detail and anticipated date*
 - Task 2; *detail and anticipated date*

- Tasks Completed this month
 - Task 1; *detail and completion date*
 - Task 2; *detail and completion date*

5. Survey

- Agenda item:
 - Item details

6. Roadway

- Agenda item:
 - Item details

7. Drainage

- Agenda item:
 - Item details

8. Traffic

- Agenda item:
 - Item details

9. Environmental

- Agenda item:
 - Item details

10. Utilities

- Agenda item:
 - Item details

11. Structures

- Agenda item:
 - Item details

12. Geotechnical / Pavement Design

- Agenda item:
 - Item details

13. Public and Stakeholder Involvement

- Agenda item:
 - Item details

14. Right-of-Way

- Agenda item:
 - Item details

15. Summary | Miscellaneous Items

- Other items
- New Action Items

16. Adjourn | Next Meeting

- Month dd, 20yy – hh:mm a.m/p.m and location of the meeting.



2901 W. Durango Street
Phoenix, AZ 85009
Phone: 602-506-8600
Fax: 602-506-4750
www.mcdot.maricopa.gov

Name of Project
Description of Project 1
Project no. TTxxx
Progress Meeting x Notes

Distribution Date: Month Day, 20yy
Date of Meeting: Month Day, 20yy – hh:mm a.m/p.m.
Meeting Location: Description of Meeting Location
From: Project Manager, MCDOT

Attendees: See attached sign in sheet

The following meeting notes for the ‘Name of the project’ project are for your information, use, and distribution. Please contact ‘Project Manager’ at (602) 555-1234 if you have comments or questions. The team list/sign-in sheet is also included following the notes. If there is any missing information or additions to the notes, please let me know. Thank you to everyone who participated in the meeting.

ACTION ITEMS

No.	Action Item	Responsible	Due Date	Completed	Status/Comments
1	Completed action item	Project Manager	mm/dd/yy	mm/dd/yy	Update on status of action item
2	Outstanding action item	Project Manager	mm/dd/yy		Update on status of action item
3	In process action item	Project Manager	mm/dd/yy		Update on status of action item
4	New action item	Design Manager	mm/dd/yy		Action item from this meeting
5	New action item	Design Manager	mm/dd/yy		Action item from this meeting
6	New action item	Reviewer	mm/dd/yy		Action item from this meeting

DECISIONS

- ❖ Decision 1. *Update on implementation of decision.*
- ❖ Decision 2. *Update on implementation of decision.*

NOTES

1. Welcome | Introductions

Team members were welcomed to the monthly 'Name of the project' project progress meeting.

2. Review Action Items

Action items were reviewed – updates, changes, and additions are as noted above.

3. Review Decisions

Decisions were reviewed – updates on implementation are as noted above.

4. Schedule

Description of the project schedule and any critical path items. Make note of delinquent items or other items that may impact schedule.

The following is the anticipated schedule based on the available information:

Milestone	Original Schedule	New Schedule	Actual Completion
Milestone #1	Month dd, 20yy	-	Month dd 20yy
Milestone #2	Month dd 20yy	-	
Milestone #3	Month dd 20yy	Month dd 20yy	
Milestone #4	Month dd 20yy	Month dd 20yy	
Milestone #5	Month dd 20yy	Month dd 20yy	

- Tasks Due next month
 - Task 1; *detail and anticipated date*
 - Task 2; *detail and anticipated date*
 - Task 3; *detail and anticipated date*

- Tasks Completed this month
 - Task 1; *detail and completion date*
 - Task 2; *detail and completion date*
 - Task 3; *detail and completion date*

5. Survey

Describe meeting discussions as they relate to this agenda item. Be sure to note any action items, decisions, or other critical items that were identified during the discussion.

NOTE: the categories and headings contained in the notes and agenda should match, but those provided within these sample documents are provided for reference only. Items should be added or removed as necessary for each meeting.

6. Roadway

Provide description of pertinent discussion.

7. Drainage

Provide description of pertinent discussion.

8. Traffic

Provide description of pertinent discussion.

9. Environmental

Provide description of pertinent discussion.

10. Utilities

Provide description of pertinent discussion.

11. Structures

Provide description of pertinent discussion.

12. Geotechnical / Pavement Design

Provide description of pertinent discussion.

13. Public and Stakeholder Involvement

Provide description of pertinent discussion.

14. Right-of-Way

Provide description of pertinent discussion.

15. Summary | Miscellaneous Items

Identify any items not previously covered.

16. Next Meeting

The next meeting will be 'Progress Meeting x' on Month Day, 20yy at hh:mm a.m/p.m at 'Description of Meeting Location'.

APPENDIX 2-B

SUMMARY OF COMMENTS FORM

Summary of Comments Form

Project Number: Project Name

Submittal		Project Name	
Return Date		Project Number	
Reviewed By		Contract Number	
Agency		Consultant / Designer	
Discipline/Office		Project Manager	

A = WILL COMPLY, B = CONSULTANT / DESIGNER TO EVALUATE, C = MCDOT TEAM TO EVALUATE, D = DESIGN TEAM RECOMMENDS NO FURTHER ACTION

No	Discipline	Original No.	Item* / Dgn / Sht / Pg. #	Comment By	Comment	Disposition		Comment Addressed By	Response / Comment
						Initial	Final		
1		1							
2		2							
3		3							
4		4							
5		5							
6		6							
7		7							
8		8							
9		9							
10		10							
11		11							
12		12							
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27		27							
28		28							
29		29							
30		30							
31		31							

Summary of Comments Form

Project Number: Project Name

A = WILL COMPLY, B = CONSULTANT / DESIGNER TO EVALUATE, C = MCDOT TEAM TO EVALUATE, D = DESIGN TEAM RECOMMENDS NO FURTHER ACTION

No	Discipline	Original No.	Item* / Dgn / Sht / Pg. #	Comment By	Comment	Disposition		Comment Addressed By	Response / Comment
						Initial	Final		
32		32							
33		33							
34		34							
35		35							
36		36							
37		37							
38		38							
39		39							
40		40							
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70		70							

APPENDIX 2-C

PROJECT SCOPING APPROVAL FORM



PROJECT SCOPING APPROVAL FORM

(Insert or attach additional information if it helps clarify the request)

Project:	
Project Number:	
Project Manager:	Date:
Project Manager Signature:	
Project Management Branch Manager Signature:	

Recommended for Approval	
<i>With conditions (if any):</i>	
Engineering Division Manager:	
Signature:	Date:

Recommended for Approval	
<i>With conditions (if any):</i>	
Transportation Systems Management Division Manager:	
Signature:	Date:

Recommended for Approval	
<i>With conditions (if any):</i>	
Real Estate Division Manager:	
Signature:	Date:



**Maricopa County
Department of Transportation**

Recommended for Approval	
<i>With conditions (if any):</i>	
Maintenance Division Manager:	
Signature:	Date:

Recommended for Approval	
<i>With conditions (if any):</i>	
Permit, Construction and Inspection Division Manager:	
Signature:	Date:

Approved:	
<i>With conditions (if any):</i>	
Maricopa County Department of Transportation Director:	
Signature:	Date:

APPENDIX 2-D

PROJECT APPROVED FOR BID FORM



PROJECT APPROVED FOR BID FORM

(Insert or attach additional information if it helps clarify the request)

Project:	
Project Number:	
Project Manager:	Date:
Project Manager Signature:	
Project Management Branch Manager Signature:	

Utility Clearance Obtained:	
Environmental Clearance Obtained:	
Approved Design Exceptions:	
<i>Attach Utility Clearance Memo.</i>	
<i>Attach Environmental Clearance Memo to Project Specifications.</i>	
<i>Attached Design Exception Memo (if any).</i>	
<i>With conditions (if any):</i>	
Engineering Division Manager:	
Signature:	Date:

Right-of-Way Clearance Obtained:	
<i>Attach Right-of-Way Clearance Letter</i>	
<i>With conditions (if any):</i>	
Real Estate Division Manager:	
Signature:	Date:



**Maricopa County
Department of Transportation**

Transportation Systems Management	
<i>With conditions (if any):</i>	
Transportation Systems Management Division Manager:	
Signature:	Date:

Maintenance	
<i>With conditions (if any):</i>	
Maintenance Division Manager:	
Signature:	Date:

Permitting, Construction and Inspection	
<i>With conditions (if any):</i>	
Permitting, Construction and Inspection Division Manager:	
Signature:	Date:

Transportation Director:	
<i>With conditions (if any):</i>	
Maricopa County Department of Transportation Director:	
Signature:	Date:

APPENDIX 2-E

SCOPING CLOSE-OUT CHECKLIST



SCOPING CLOSE-OUT CHECKLIST

(Insert or attach additional information if it helps clarify the request)

Project Name:	
Project Number:	
Project Manager:	Date:
Project Manager Signature:	

Project Managers:	
<input type="checkbox"/>	Scope of work as identified in Project Work Plan has been successfully completed.
<input type="checkbox"/>	Recommended Alternative approved on _____ (date)
<input type="checkbox"/>	A detailed scope report of the approved Recommended Alternative has been prepared, a copy is on file and a copy is attached. The final scope report has been sealed and signed.
<input type="checkbox"/>	Closeout/Lessons learned meeting held on _____ (date). Lessons learned and remaining project issues discussed by Project Team.
The Following Lessons Were Learned:	

Survey:	
<input type="checkbox"/>	All Survey requirements have been properly identified
<input type="checkbox"/>	Survey records are in scoping project file
The Following Survey Issues Remain to be Resolved:	



Utility:	
<input type="checkbox"/>	All Utilities in project footprint have been identified.
<input type="checkbox"/>	Approved Recommended Alternative dry-up impact properly identified. There is/is not a potential schedule impact due to canal dry-up schedules.
<input type="checkbox"/>	Approved Recommended Alternative prior rights impact properly identified.
<input type="checkbox"/>	Railroad crossing requirements properly identified in Approved Recommended Alternative.
<input type="checkbox"/>	Utility Relocation cost estimate has been reviewed.
The Following Utility Issues Remain to be Resolved:	

Right-of-Way:	
<input type="checkbox"/>	All Right-of-Way parcels and temporary easements have been properly identified.
<input type="checkbox"/>	State, federal and Indian Community land has been identified.
<input type="checkbox"/>	Estimated Right-of-Way cost has been determined and reviewed.
<input type="checkbox"/>	Right-of-way impact on partners identified
The Following Right-of-Way Issues Remain to be Resolved:	



Environmental:

- | | |
|--------------------------|--|
| <input type="checkbox"/> | All Environmental issues have been identified and next steps have been documented. |
| <input type="checkbox"/> | Required Environmental permits identified. |
| <input type="checkbox"/> | Environmental Mitigation cost estimate has been reviewed. |

The Following Environmental Permit and Mitigation Actions Have Been Identified:

Financial Services:

- | | |
|--------------------------|---|
| <input type="checkbox"/> | Scoping study financial partners payments have been received. |
|--------------------------|---|

IGA:

- | | |
|--------------------------|---|
| <input type="checkbox"/> | Scoping financial partners have been billed for their portion of Scoping costs. |
| <input type="checkbox"/> | Potential IGA partner(s) have been identified. |
| <input type="checkbox"/> | IGA partner(s) interest has been determined. |

The Following IGA Issues Remain to be Resolved:



**Maricopa County
Department of Transportation**

Construction:

Construction estimate has been reviewed is complete.

Constructability has been reviewed.

Materials:

Pavement recommendation conforms to design requirements.

Procurement:

All consultant contracts are closed and certificate of completion on file.

All consultant final payments have been made.

Other Comments:

PM Branch Manager:

Date:

Signature:

APPENDIX 2-F

FINAL DESIGN CLOSE-OUT CHECKLIST



FINAL DESIGN CLOSE-OUT CHECKLIST

(Insert or attach additional information if it helps clarify the request)

Project Name:	
Project Number:	
Project Manager:	Date:
Project Manager Signature:	

Project Manager:	
<input type="checkbox"/>	Scope of work as identified in Project Work Plan has been successfully completed.
<input type="checkbox"/>	PS&E quality has been verified. Plan assembly (PS&E) has been reviewed.
<input type="checkbox"/>	Specifications are not in conflict with the plans. In those instances where plans need to contain specifications for clarification of the design, IGA, construction, phasing, etc., the Project Manager will verify the reference is identified with the specifications.
<input type="checkbox"/>	Plans have been checked by design team in the field within the previous 60 calendar days prior to issue for bid signatures and any resulting issues have been resolved. <i>Date of field review:</i>
<input type="checkbox"/>	Plan in hand field meeting held on _____ (date).
<input type="checkbox"/>	BOS Bid Solicitation approved on _____ (date).
<input type="checkbox"/>	Sealed PS&E approved on _____ (date).
<input type="checkbox"/>	Design to Construction hand-off meeting held on _____ (date).
<input type="checkbox"/>	Certification that the plans have been reviewed for constructability (reviewed by the Construction Manager who will be responsible for the oversight of the construction).
<input type="checkbox"/>	File management completed. Record documents have been archived and working files discarded.
<input type="checkbox"/>	Advertisement package has been checked for completeness and accuracy.
The Following Lessons Were Learned:	



Design:	
<input type="checkbox"/>	Design and construction references have been checked, are appropriate and specifically identified by date and/or edition number.
<input type="checkbox"/>	Issues raised and errors found in the review processes (Scoping, 60%, 95%, etc.) are reconciled and/or corrected in the final documents. Consensus has been reached. Comment resolution sheets have final dispositions.
<input type="checkbox"/>	Drainage report has been completed and reviewed.
<input type="checkbox"/>	Bridge selection report has been completed and reviewed.
<input type="checkbox"/>	Geotechnical Report and Pavement design has been reviewed and approved.
<input type="checkbox"/>	Cost estimate is current and accurate.

Survey:	
<input type="checkbox"/>	All Survey requirements have been properly identified.
<input type="checkbox"/>	The spatial datum (benchmark) has been identified, properly referenced and located in the field, and adjacent existing improvements are referenced to the same datum.
<input type="checkbox"/>	Survey records are in project file.
The Following Survey Issues Remain to be Resolved:	

Utility:	
<input type="checkbox"/>	Plans reflect all known utilities and their location
<input type="checkbox"/>	Pothole data is obtained and presented on plans as necessary.
<input type="checkbox"/>	Relocated utilities are accurately reflected on the plans.
<input type="checkbox"/>	All Utilities in project footprint have been cleared.
<input type="checkbox"/>	Utility Clearance Memo is in the project file on SharePoint.
The Following Utility Issues Remain to be Resolved:	



Right-of-Way:

- | | |
|--------------------------|---|
| <input type="checkbox"/> | All Right-of-Way parcels and temporary easements have been properly acquired. |
| <input type="checkbox"/> | Right-of-way Clearance Memo is in the project file on SharePoint. |

The Following Right-of-Way Issues Remain to be Resolved:

Environmental:

- | | |
|--------------------------|--|
| <input type="checkbox"/> | Design matches scope of work in the environmental clearance. |
| <input type="checkbox"/> | All Environmental issues have been identified and next steps have been documented. |
| <input type="checkbox"/> | Environmental Clearance Memo is in the project file on SharePoint. |

The Following Environmental Permit and Mitigation Actions Have Been Identified:

IGA:

- | | |
|--------------------------|---|
| <input type="checkbox"/> | Final design financial partners have been billed for their portion of design costs. |
| <input type="checkbox"/> | IGA with partner(s) have been completed, signed and is in project file. |

The Following IGA Issues Remain to be Resolved:

Communications:

- | | |
|--------------------------|--|
| <input type="checkbox"/> | Possible need for updated public notice or involvement has been evaluated. |
|--------------------------|--|



**Maricopa County
Department of Transportation**

Procurement:	
<input type="checkbox"/>	All consultant contracts are closed and certificate of completion on file.
<input type="checkbox"/>	All consultant final payments have been made.

Other Comments:

PM Branch Manager:	Date:
Signature:	

APPENDIX 4-A

EVALUATION CRITERIA TEMPLATE

(TTxxx)
Project Name
EVALUATION OF ALTERNATIVES MATRIX

EVALUATION CRITERIA	“NO-BUILD” ALTERNATIVE	ALTERNATIVE 1 ALTERNATIVE 1 BRIEF DESCRIPTION	ALTERNATIVE 2 ALTERNATIVE 2 BRIEF DESCRIPTION	ALTERNATIVE 3 ALTERNATIVE 3 BRIEF DESCRIPTION
Geometry Horizontal Alignment Vertical Alignment Design Exceptions	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect: Strong Disadvantage</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Safety	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect: Disadvantage</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Earthwork	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect: Neutral</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Use of Existing Road	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect: Advantage</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Constructability	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect: Strong Advantage</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Traffic Operations Level of Service Capacity	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Construction Traffic Control	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Environmental Impacts	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Drainage	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Utility Impacts	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>

Criteria Rating

- 1 - No positive impact/value
- 2 - Limited positive impact/value
- 3 - Minimal positive impact/value
- 4 - Positive impact/value
- 5 - Significant positive impact/value

(TTxxx)
Project Name
EVALUATION OF ALTERNATIVES MATRIX

EVALUATION CRITERIA	“NO-BUILD” ALTERNATIVE	ALTERNATIVE 1 ALTERNATIVE 1 BRIEF DESCRIPTION	ALTERNATIVE 2 ALTERNATIVE 2 BRIEF DESCRIPTION	ALTERNATIVE 3 ALTERNATIVE 3 BRIEF DESCRIPTION
Structure Improvements	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Geotechnical Impacts Geotechnical Pavement Design	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Access Management	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Right-of-Way	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Compatibility with Corridor	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Public Acceptance	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Land Use Impacts	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Impacts to Recreational Value	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Impacts to Character of Area	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>
Project Costs Design Construction Right-of-way Utility	Briefly, detail improvements or impacts related to the category. Provide numerical data if possible. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>	Briefly describe pertinent points. <i>Net Effect:</i>

Criteria Rating

- 1 - No positive impact/value
- 2 - Limited positive impact/value
- 3 - Minimal positive impact/value
- 4 - Positive impact/value
- 5 - Significant positive impact/value

APPENDIX 4-B

SAMPLE INVOLVEMENT MATRIX

APPENDIX 5-A

VE SETUP CHECKLIST



VE SETUP CHECKLIST

Project Name:	
Project Number:	
Project Manager:	Date:
Project Manager Signature:	

Project Description:

<input type="checkbox"/>	Obtain verification that a Value Engineering (VE) Study is needed from the Project Team and the Transportation Systems Management Division Manager
<input type="checkbox"/>	Obtain input on the VE Team and VE Team Leader selection from the Project Management Branch Manager
<input type="checkbox"/>	Select the VE Team Leader
<input type="checkbox"/>	Select the members of the VE Team with input from the VE Team Leader
<input type="checkbox"/>	Oversee the preparation of the Study Plan by the VE Team Leader
<input type="checkbox"/>	Oversee the preparation of the VE Analysis Packet by the Design Team
<input type="checkbox"/>	Approve additional scope items, if required
<input type="checkbox"/>	Approve additional VE contracts, if required
<input type="checkbox"/>	Determine the schedule of the VE Study; communicate to all involved groups
<input type="checkbox"/>	Secure a location for the VE Analysis
<input type="checkbox"/>	Determine who will conduct the Design Team Presentation and communicate this decision
<input type="checkbox"/>	Schedule the Design Team Presentation
<input type="checkbox"/>	Communicate the schedule (including the Design Team Presentation) to all groups involved in the VE Study
<input type="checkbox"/>	Attend the Design Team Presentation
<input type="checkbox"/>	Ensure that the VE Team has everything needed for the VE Analysis

APPENDIX 5-B

VE ASSESSMENT AND COMMENTS FORM

APPENDIX 5-C

PRC VE APPROVAL FORM



PRC VE APPROVAL FORM

(Insert or attach additional information if it helps clarify the request)

Project:	
Project Number:	
Project Manager:	Date:
Project Manager Signature:	

Recommended for Approval	
<i>With conditions (if any):</i>	
Engineering Division Manager:	
Signature:	Date:

Recommended for Approval	
<i>With conditions (if any):</i>	
Real Estate Division Manager:	
Signature:	Date:

Recommended for Approval	
<i>With conditions (if any):</i>	
Transportation Systems Management Division Manager:	
Signature:	Date:



**Maricopa County
Department of Transportation**

Recommended for Approval	
<i>With conditions (if any):</i>	
Maintenance Division Manager:	
Signature:	Date:

Recommended for Approval	
<i>With conditions (if any):</i>	
Permitting Construction and Inspection Division Manager:	
Signature:	Date:

Approved:	
<i>With conditions (if any):</i>	
Maricopa County Department of Transportation Director:	
Signature:	Date:

APPENDIX 7-A

Project Work Plan for Scoping



2901 W. Durango Street
Phoenix, AZ 85009
Phone: 602-506-8600
Fax: 602-506-4750
www.mcdot.maricopa.gov

Project Work Plan For Scoping Phase

Project Number: TTXXX
Project Name: (Title)
Date: XX/XX/20XX
Revision: 0

1. Project Need and Justification

(Provide a description of the project need)

2. Goals and Objectives

(Provide a description of the project goals and objective)

3. Known Risks

Is project within MCDOT Right-of-way? (Fully, Partially, No)

Risk	Level of Risk	Mitigation Measure

4. Funding

Is Federal-Aid identified for this project? (Yes, No) (Identify funding source)

5. Project Team and Design Team:

Design source: (In House, On Call, or Request for Proposal)

Consultant Name and contract number: (If known)

MCDOT Project Team	Name
Project Sponsor	(Division Manager)
Project Manager	
Roadway Design Lead	
Drainage	
Natural Resources	
Cultural Resources	
HAZMAT	
TIP	
Traffic (Design)	
Traffic (Studies)	
Traffic (Signals)	
Traffic (ITS)	
Planning	
Maintenance	
Utilities Coordinator	
Right-of-way Coordinator	
Intergovernmental	
Communications	
Construction	
Structures	

Design Team	Name
Design Lead	(Consultant Name if applicable)
Roadway	
Drainage	
Traffic	
Structures	
Survey	
Geotechnical	
Constructability	
(Add other roles as needed)	

6. Stakeholders

Is an IGA anticipated?

Stakeholder	Name
(Agency)	
(Property Owner)	
(Business)	

7. QC/QA Staff

Role	Name
QC Review	Design Team
QA Review	
Survey	
Roadway	
Drainage	
Traffic	
Structures	
Construction	
Project Manager	

8. Problem Escalation and Change Management

The project manager and/or team members may escalate issues and changes in scope that need resolution by following a normal escalation process. As illustrated in the following table, the MCDOT Director is the final decision point for escalating issues and scope changes.

Escalation Level	Action
First	Project Manager (Name)
Second	Branch Manager
Third	Division Manager
Fourth	MCDOT Director

9. Scope of Work

(Describe in detail the scope of work and deliverables to complete the scoping phase; identify responsible party to complete task; in-house or consultant)

- A. Project Limits
- B. Design: (describe tasks needed and critical path items)
 - a. Survey
 - b. Roadway
 - c. Drainage
 - d. Geotechnical/Pavement
 - e. Traffic

f. Structures

- C. Environmental: (describe tasks needed and critical path items)
- D. Utilities: (describe tasks needed and critical path items)
- E. Right-of-way: (describe tasks needed and critical path items)
- F. Intergovernmental: (describe tasks needed and critical path items)
- G. Public Relations: (describe tasks needed and critical path items)

The SDR outline is located in **Appendix A**.

(Describe specific items that are out of the project’s scope of work and any known items that will not be address by this project)

10. Matrix of Deliverables

Item	Deliverable	SCOPING PHASE		
		Candidate Alternatives Stage (15%)	Draft Scoping Stage (25%)	Final Scoping Stage (30%)
Scoping and Design Report (SDR)	Report			
Scoping Plans	Plans			
Face Sheet	Plans			
General Notes	Plans			
Summary of Estimated Quantities	Plans			
Geometric Control	Plans			
Typical Section	Plans			
Cross Section	Plans			
Roadway Plan and Profile	Plans			
Structure	Plans			
Traffic Signal	Plans			
Signing and Pavement Marking	Plans			
Cost Estimate	Document			
Alternative Analysis with alternative design	TM			
Traffic Analysis	TM			
Environmental Documentation	(Text, EID, or EIM)			
Drainage Analysis	TM			
Structures Analysis	TM			
Geotechnical and Pavement Design	TM			
Right-of-way Report	TM			
Utilities Report	TM			
Survey	Design Data			
P = Preliminary D = Draft F = Final S = Sealed				

11. Schedule

Milestone	Baseline Schedule
PRC Meeting	
Land Survey Complete	
Design Criteria Approved	
Right-of-entry Permit	
Recommended Alternative Selected	
Draft SDR w/ Draft Scoping Plans	
Geotechnical / Pothole Layout Submittal	
Geotechnical / Pothole Environmental Clearance	
Environmental ID Memo	
Prior Rights Information Obtained	
Final SDR w/ 30% Scoping Plans	
Draft TM (name)	
Final TM (name)	
Scoping Document Approval	

Complete MS Project Schedule and include in **Appendix B**.

12. Anticipated Construction Delivery

(Describe anticipated construction delivery)

13. Scoping Phase Budget

Proposed budget is included in **Appendix C**.



Appendix A:
SDR Outline



Maricopa County
Department of Transportation

Appendix B:
Scoping Phase Detailed Schedule



Maricopa County
Department of Transportation

Appendix C:
Scoping Phase Budget

APPENDIX 7-B

Project Work Plan for Final Design



2901 W. Durango Street
Phoenix, AZ 85009
Phone: 602-506-8600
Fax: 602-506-4750
www.mcdot.maricopa.gov

Project Work Plan For Final Design Phase

Project Number: TTXXX
Project Name: (Title)
Date: XX/XX/20XX
Revision: 0

1. Scoping

(Provide the scoping phase completion date and SharePoint location; provide the recommendations/findings from the scoping)

2. Project Need and Justification

(Provide a description of the project need)

3. Goals and Objectives

(Provide a description of the project goals and objective)

4. Known Risks

Is project within MCDOT Right-of-way? (Fully, Partially, No)

Are there utility prior rights; environmental factors?

Risk	Level of Risk	Mitigation Measure

5. Funding

Is Federal-Aid identified for this project? (Yes, No)

Identify the source, the amount, MCDOT's contribution, and, if applicable, partner's financial responsibility

6. Project Team and Design Team

Design source: (In House, On Call, or Request for Proposal)

Consultant Name and contract number: (As applicable)

MCDOT Project Team	Name
Project Sponsor	(Division Manager)
Project Manager	
Roadway Design Lead	
Drainage	
Natural Resources	
Cultural Resources	
HAZMAT	
TIP	
Traffic (Design)	
Traffic (Studies)	
Traffic (Signals)	
Traffic (ITS)	
Planning	
Maintenance	
Utilities Coordinator	
Right-of-way Coordinator	
Intergovernmental	
Communications	
Construction	
Structures	

Design Team	Name
Design Lead	(Consultant Name if applicable)
Roadway	
Drainage	
Traffic	
Structures	
Survey	
Geotechnical	
Constructability	
(Add other roles as needed)	

7. Stakeholders

Is an IGA completed or anticipated? (Yes, No)

Stakeholder	Name
(Agency)	
(Property Owner)	
(Business)	

8. QC/QA Staff

Role	Name
QC Review	Design Team
QA Review	
Survey	
Roadway	
Drainage	
Traffic	
Structures	
Construction	
Project Manager	

9. Problem Escalation and Change Management

The project manager and/or team members may escalate issues and changes in scope that need resolution by following a normal escalation process. As illustrated in the following table, the MCDOT Director is the final decision point for escalating issues and scope changes.

Escalation Level	Action
First	Project Manager (Name)
Second	Branch Manager
Third	Division Manager
Fourth	MCDOT Director

10. Scope of Work

(Describe in detail the general scope of work and deliverables to complete the Final Design Phase; Identify responsible party to complete task; in-house or consultant)

- A. Project Limits (Project location and Vicinity Map included in Appendix C)
- B. Design: (describe tasks needed and critical path items)
 - a. Survey
 - b. Roadway
 - c. Drainage
 - d. Geotechnical/Pavement
 - e. Traffic

f. Structures

- C. Environmental: (describe tasks needed and critical path items)
- D. Utilities: (describe tasks needed and critical path items)
- E. Right-of-way: (describe tasks needed and critical path items)
- F. Intergovernmental: (describe tasks needed and critical path items)
- G. Public Relations: (describe tasks needed and critical path items)

(Describe specific items that are out of the project's scope of work and any known items that will not be address by this project)

11. Matrix of Deliverables

Item	Deliverable	FINAL DESIGN PHASE			
		60%	95%	100%	Sealed
Survey	Design Data				
Design Plans	Plans				
Face Sheet	Plans				
General Notes	Plans				
Summary of Estimated Quantities	Plans				
Geometric Control	Plans				
Typical Section	Plans				
Roadway Plan and Profile	Plans				
Cross Sections	Plans				
Intersection Detail Sheets	Plans				
Driveway Profiles	Plans				
Storm Drain Plan and Profile	Plans				
Drainage Detail Sheets	Plans				
Structure	Plans				
Traffic Signal	Plans				
ITS Sheets	Plans				
Signing and Pavement Marking	Plans				
Cost Estimate	Document				
Specifications	Document				
Utility Clearance Memo	Clearance				
Right-of-way Clearance Memo	Clearance				
Environmental Documentation	ED, CE, EA				
Environmental Clearance Memo	Clearance				
Drainage Report Update/Amendment	TM				
Structures Request Update/Amendment	TM				
Geotechnical and Pavement Design Update/Amendment	TM				
Right-of-way Report Update/Amendment	TM				
Utilities Report Update/Amendment	TM				
D = Draft F = Final S = Sealed					

12. Schedule

Milestone	Baseline Schedule
PRC Meeting	
Consultant NTP	
TM (name) Update/Amendment	
60% Submittal	
95% Submittal	
Plan in Hand Field Meeting	
100% Submittal	
Sealed Submittal	
Utility Clearance Memo	
Right-of-way Clearance Memo	
Environmental Documentation	
Environmental Clearance Memo	
IGA Signed	
Obligation Package	
Advertise for Bids	
Hand-off Meeting with Construction Staff	
Final Design Process Complete - Signatures Obtained	
Construction Start	
Construction Completion	
Project Close-out	

Complete MS Project Schedule and include in **Appendix A**.

13. Anticipated Construction Delivery

(Describe anticipated construction delivery)

14. Final Design Phase Budget

Proposed budget is included in **Appendix B**.



Appendix A:
Final Design Phase Detailed Schedule



Maricopa County
Department of Transportation

Appendix B:
Final Design Phase Budget



Maricopa County
Department of Transportation

Appendix C:
Project Location and Vicinity Map

APPENDIX 7-C

Work Breakdown Structure (WBS)



Work Breakdown Structure

Tasks	Scoping Tasks P	60% Tasks D	95% Tasks DF	100% Tasks F	Sealed Tasks S
100					
Project Management					
100.1. - Project Work Plan	X	X			
100.2. - Kick-Off Meeting	X	X			
100.4. - Design Criteria	X				
100.5. - Design Exceptions	X				
100.6. - Project Progress Meetings	X	X	X	X	
100.7. - Determine VE Study Request - PMO Manager	X				
100.9. - Field Walk with Project Team	X			X	
100.10. - Project Administration	X	X	X	X	X
200					
Data Acquisition					
200.1. - Project Research / Data Collection	X				
200.2. - Review Acquired Data	X				
200.3. - Identify Additional Information Needs	X	X			
200.4. - Site Visit and Project Research	X	X			
300					
Land Survey					
300.1. - Topographic Survey with Control and Alignment Determination	X				
300.2. - Topographic Survey	X				
300.3. - Supplemental Field Survey		X			
400					
Project Coordination					
400.1. - Stakeholder Meetings	X	X	X	X	
400.2. - Technical Advisory Committee (TAC)	X				
400.3. - Stakeholder Advisory Committee (SAC)	X				
400.4. - Public Involvement	X	X		X	
400.5. - Intergovernmental Agreements (IGA)		X			
500					
Utilities and Railroad					
500.1. - Utility Data Acquisition	X				
500.2. - Utility Identification	X				
500.3. - Utility Coordination	X	X	X	X	
500.4. - Utility Plans		X			
500.5. - Utility Special Provisions		X	X	X	
500.6. - Utility Clearance Letter					X
600					
Environmental					
600.1. - Environmental Requirements and Technical Memorandum	X				
600.2. - Submit Draft Environmental Memo		X			
600.3. - Submit Final Environmental Memo		X			
600.4. - Provide Environmental Clearance for Geotech / Pothole Activities	X				
600.5. - Environmental Clearance - Federal Nexus			X		
600.6. - Environmental Clearance - Non Federal			X		
700					
Alternatives Analysis					
700.1. - Develop Conceptual Alternatives	X				
700.2. - Select Candidate Alternatives	X				
700.3. - Evaluation Criteria Matrix	X				
700.4. - Evaluate Candidate Alternatives	X				
700.5. - Select Recommended Alternative - Project Team	X				
700.6. - Approve Recommended Alternative - Management Committee	X				



Work Breakdown Structure

Tasks	Scoping Tasks P	60% Tasks D	95% Tasks DF	100% Tasks F	Sealed Tasks S
800					
Technical Memoranda and Reports					
800.1. - Technical Memoranda and Reports	X	X			
800.2. - Draft Scoping Document	X				
800.3. - Final Scoping Document	X				
900					
Plans, Specifications and Estimate					
900.1- Conceptual Alternative Plans	X				
900.2- Candidate Alternatives Plans	X				
900.3- Draft Scoping Plans	X				
900.4- Final Scoping Plans	X				
900.5- 60% Plans		X			
900.6- 95% Plans			X		
900.7- 100% Plans				X	
900.8- Seald Plans					X
900.9- Specifications		X	X	X	X
900.10- Estimates	X	X	X	X	X
1000					
Right-of-Way					
1000.1. - Provide Preliminary Right-of-Way Costs	X				
1000.2. - Verify Prior Rights	X				
1000.3. - Provide Right of Entry for Field Work	X				
1000.4. - Right-of-Way and Easement Requirements	X				
1000.5. - Right-of-Way Strip Maps		X			
1000.6. - Right-of-Way Estimate	X	X			
1000.7. - Right-of-Way Title Reports		X			
1000.8. - Legal Descriptions		X	X		
1000.9. - Right-of-Way Plans		X			
1000.10. - Appraisals		X			
1000.11. - Acquisitions		X			
1000.12. - Condemnation		X			
1000.13. - Relocation		X			
1000.14. - AZ State Lands Process		X			
1000.15. - Right-of-Way Clearance					X
1100					
Value Engineering					
1100.1. - Select Value Engineering Team	X				
1100.2. - Value Engineering Study Plan	X				
1100.3. - Value Engineering Meeting Setup	X				
1100.4. - Design Team Presentation	X				
1100.5. - Value Engineering Analysis	X				
1100.6. - Assess Impacts of Value Engineering Recommendations	X				
1100.7. - Initial Dispositions of Value Engineering Recommendations	X				
1100.8. - Draft Value Engineering Study Report	X				
1100.9. - Management Committee Presentation	X				
1100.10. - Final Value Engineering Study Report	X				
1100.11. - Update Draft Scoping Document and Recommended Alternative Plans	X				
1100.12. - Final Dispositions of Value Engineering Recommendations	X				
1100.13. - Implementation	X				
1200					
Submittals					
1200.1. - Conceptual Alternatives Submittal	X				
1200.2. - Candidate Alternatives Plans and Draft TMs Submittal	X				
1200.3. - Draft Scoping Document (with TMs) Submittal	X				
1200.4. - Final Scoping Document - Final Scoping Plans Submittal	X				
1200.5. - 60% PS&E Submittal		X			
1200.6- 95% PS&E Submittal			X		
1200.7- 100% PS&E Submittal				X	
1200.8- Sealed PS&E Submittal					X
1300					
Bidding Phase					
1300.1. - Technical Assistant to Prepare Advertisement					X
1300.2- Pre-Bid Conference					X
1300.3- Preparation of Addenda					X
1300.4- Bid Opening					X
1300.5- BOS Approval					X



Work Breakdown Structure

<i>Tasks</i>	<i>Scoping Tasks P</i>	<i>60% Tasks D</i>	<i>95% Tasks DF</i>	<i>100% Tasks F</i>	<i>Sealed Tasks S</i>
1400 Post Design					
1400.1. - Pre-Construction Conference					X
1400.2. - Requests for Information (RFIs)					X
1400.3. - Begin Construction					X
1400.4. - End Construction					X
1400.5. - Project Administration and Close-Out					X
1500 References					

APPENDIX 7-D

Scope – Template Scope of Services

Scope of Services – Project Specific

Scoping and Final Design

PROJECT NAME: PROJECT LOCATION

Consultant:

Project No: TT0000

Contract No.: XXXX-XXX

Maricopa County
Department of Transportation
2901 W. Durango Street
Phoenix, AZ 85009



MONTH YYYY



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SCOPE OF SERVICES – PROJECT SPECIFIC

Project Overview

Project Location

Identify the location of the project, including the county location, extents and length.

Project Background

Identify the existing conditions of the road based on previous reports or projects performed in the project area.

Project Purpose

Identify the purpose of the project, including design issues to be addressed and specific existing features which contribute to the need of the project.

Length of Services

Identify the estimated contract time.

100.3.3 Matrix of Responsibilities

The **Consultant** shall prepare a chart indicating the division of responsibilities between the **Consultant**, MCDOT, and other involved stakeholders such as sub-consultants, utility providers, etc. The following chart is intended as a quick reference; however, in the event that the written scope and this chart have conflicts, the written scope shall take precedence. The **Consultant** shall use the following table as an example when preparing the responsibilities chart. **Consultant** shall add and remove items as necessary to match the scope of each individual project. When completed, the responsibilities chart shall name a responsible party for each section of the scope of services used on the project. The **Consultant** shall add the full table in an appendix.

Table 1 – Example Matrix of Responsibilities

Scope Section	Item	Consultant	MCDOT	Other (Identify)
300.1	Topographic Survey with Control and Alignment Determination		X	
400.4.1	Public Involvement Plan		X	
400.5.1	Memoranda of Understanding	X		
500.1	Utilities Data Acquisition	X		X (Surveyor Sub)
700.1	Develop Conceptual Alternatives	X		
800.1.5	Environmental Documentation	X		X (Sub-Consultant)
1200.6	Final Scoping Document Submittal	X		

100.3.4 Matrix of Deliverables

The **Consultant** shall identify all deliverables required for each submittal stage of the project. The table below is provided as a basic example and includes the minimum information that shall be required for each submittal. **Consultant** shall add, remove, and modify items as necessary to match the scope of each individual project. The **Consultant** shall state that MicroStation will be used to develop CADD deliverables and will use MCDOT’s CADD Standards. The final table shall provide every document for each submittal stage as well as the name and agency of each person included the submittal.



Table 2 – Example Matrix of Deliverables

Item	Deliverable	SCOPING PHASE		
		Candidate Alternatives Stage (15%)	Draft Scoping Stage (25%)	Final Scoping Stage (30%)
Scoping and Design Report (SDR)	Report			
Scoping Plans	Plans			
Face Sheet	Plans			
General Notes	Plans			
Summary of Estimated Quantities	Plans			
Geometric Control	Plans			
Typical Section	Plans			
Roadway Plan and Profile	Plans			
Structure	Plans			
Traffic Signal	Plans			
Signing and Pavement Marking	Plans			
Cost Estimate	Document			
Alternative Analysis with alternative design	TM			
Traffic Analysis	TM			
Environmental Documentation	(Text, EID, or EIM)			
Drainage Analysis	TM			
Structures Analysis	TM			
Geotechnical and Pavement Design	TM			
Right-of-way Report	TM			
Utilities Report	TM			
Survey	Design Data			
P = Preliminary D = Draft F = Final S = Sealed				

100.3.5 Communication Plan

The **Consultant** shall develop a list of all design team members, their role in the project and their contact information. The **Consultant** shall summarize this information in a contact information table, similar to the example below.



Table 3 – Example Contact Table

Name	Role	Agency	Phone Number	Mailing Address	Email Address
John Doe	Project Manager	MCDOT	XXX-XXX-XXXX	XXXX	John.doe@domain.com
Jane Doe	Lead Designer	Consultant	XXX-XXX-XXXX	XXXX	Jane.doe@domain.com
Jane Smith	Consultant Manager	Consultant	XXX-XXX-XXXX	XXXX	Jane.smith@domain.com

100.4 Design Criteria

The **Consultant** shall prepare a table summarizing the design criteria to be used on the project. Submit the design criteria to MCDOT for approval. The table below shows an example design criteria summary; it is not intended to be a comprehensive list of design criteria requirements for every project.

Table 4 – Example Design Criteria

Criterion	Value	Reference Section
Standard Typical Section	XX	XXXX
Design Year	XX	XXXX
Design Vehicle	XX	XXXX
Design Speed	XX	XXXX
Pavement Design Life	XX	XXXX
Number of Travel Lanes	XX	XXXX
Roadway Width	XX	XXXX
Right-of-Way Requirement	XX	XXXX
Lane Width	XX	XXXX
Clear Zone	XX	XXXX
Median	XX	XXXX
Maximum Superelevation Rate	XX	XXXX
Maximum Grade	XX	XXXX
Terrain	XX	XXXX

400.1 Stakeholder Meetings

Stakeholder meetings shall be held once a month for the duration of the project. An estimated 12 meetings are anticipated based on the project schedule. The meetings shall be held in the **Consultant's** office, located at XXXX address. All meetings shall begin at 9:00 AM and will last approximately two hours. The **Consultant** will have 2 representatives in attendance at each meeting.

1200.1 Project Submittals

The **Consultant** shall prepare a project specific table of project submittals which summarizes all major project submittals. The following table is provided as an example only and shows the basic information that shall be required for the submittals included in the table. **Consultant** shall add, remove, and modify items as necessary to match the scope of each individual project. The final table shall provide the name, agency and number of copies to be received by each person included the submittal.



Table 5 – Example Project Submittals Table

Legend: H# - Number of Hard Copies Requested E - Indicates Electronic Submittal is Requested	First Name, Last Name (Project Manager)	First Name, Last Name (Utility Company Representative)	First Name, Last Name (Stakeholder)	Total Number of Hard Copies
Submittal Document				
Scoping				
Technical Memorandum	E, H1		E	1
Scoping Letter	E, H1		E	1
Scoping Plans	E, H1	H1, E	E	2
MicroStation and In Roads CADD files	E			
60% PS&E				
Plans	E, H1	H1, E	H1	3
Specifications	E, H1		H1	2
Estimate	E, H1		H1	2
MicroStation and In Roads CADD files				
95% PS&E				
Plans	E, H1	H1, E	H1	3
Specifications	E, H1		H1	2
Estimate	E, H1		H1	2
MicroStation and In Roads CADD files				
100% PS&E				
MicroStation and In Roads CADD files				
Plans	E, H1	H1, E	H1	3
Specifications	E, H1		H1	2
Estimate	E, H1		H1	2
Microstation and In Roads CADD files				
Sealed PS&E				
Plans	E, H1	H1, E	H1	3
Specifications	E, H1		H1	2
Estimate	E, H1		H1	2
MicroStation and In Roads CADD files				

APPENDIX 7-E

Schedule – Template Schedules



TTxxx SAMPLE PROJECT Scoping Design Report Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Timeline															
								Half 3rd Quarter	1st Quarter	3rd Quarter													
1	1	TTXXX - MAJOR MILESTONES	475 days	Mon 10/5/15			Fri 7/28/17																
2	1.1	Project Startup	0 days	Mon 10/5/15		26SS	Mon 10/5/15	10/5															
3	1.2	Project Work Plan Complete	0 days	Fri 10/30/15		27	Fri 10/30/15	10/30															
4	1.3	Project Review Committee (PRC) Approval	0 days	Mon 11/9/15		29	Mon 11/9/15	11/9															
5	1.4	Consultant Notice to Proceed (NTP)	0 days	Mon 12/28/15		33	Mon 12/28/15	12/28															
6	1.5	Public and Stakeholder Involvement Complete	0 days	Fri 10/23/15		82	Fri 10/23/15	10/23															
7	1.6	Design Criteria Approved	0 days	Wed 1/27/16		39	Wed 1/27/16	1/27															
8	1.7	Land Survey Complete	0 days	Mon 2/1/16		62,67	Mon 2/1/16	2/1															
9	1.8	Conceptual Alternatives Approved - PM	0 days	Thu 5/5/16		110	Thu 5/5/16	5/5															
10	1.9	Candidate Alternatives Approved - PM	0 days	Thu 6/16/16		115	Thu 6/16/16	6/16															
11	1.10	Recommended Alternative Selected - Project Team	0 days	Tue 11/22/16		130	Tue 11/22/16	11/22															
12	1.11	Environmental Geotech / Pot hole Clearance	0 days	Tue 1/3/17		105	Tue 1/3/17	1/3															
13	1.12	Draft SDR and Scoping Plans Submittal	0 days	Tue 3/28/17		241	Tue 3/28/17	3/28															
14	1.14	Environmental Identification Memorandum (EIM) Submitted	0 days	Thu 6/2/16		141	Thu 6/2/16	6/2															
15	1.15	Prior Rights Information Obtained	0 days	Tue 5/9/17		88	Tue 5/9/17	5/9															
16	1.16	Utility Pot holing Completed	0 days	Tue 1/31/17		102	Tue 1/31/17	1/31															
17	1.17	Right-of-Way Identified	0 days	Tue 4/11/17		183	Tue 4/11/17	4/11															
18	1.18	IGA Need Identified	0 days	Tue 5/16/17		83	Tue 5/16/17	5/16															
19	1.19	Technical Memoranda Complete	0 days	Tue 4/18/17		175,179,183	Tue 4/18/17	4/18															
20	1.20	Final Scoping Document - 30% Scoping Plans Submittal	0 days	Tue 7/18/17		252	Tue 7/18/17	7/18															
21	1.21	Scoping Approved	0 days	Fri 7/28/17		255FF	Fri 7/28/17	7/28															

Project: Sample Project Date: Mon 3/28/16	Task		External Tasks		Manual Task		Finish-only	
	Split		External MileTask		Duration-only		Progress	
	Milestone		Inactive Task		Manual Summary Rollup		Split	
	Summary		Inactive Milestone		Manual Summary			
	Project Summary		Inactive Summary		Start-only			



TTxxx SAMPLE PROJECT Scoping Design Report Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Timeline											
								Half 3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter
22	S	TTXX SCOPING DESIGN REPORT AND SCOPING PLANS	475 days	Mon 10/5/15			Fri 7/28/17	[Gantt bar spanning from Mon 10/5/15 to Fri 7/28/17]											
23	S.100	100 - PROJECT MANAGEMENT	387 days	Mon 10/5/15			Tue 3/28/17	[Gantt bar spanning from Mon 10/5/15 to Tue 3/28/17]											
24	S.100.1	Project Startup	26 days	Mon 10/5/15			Mon 11/9/15	[Gantt bar spanning from Mon 10/5/15 to Mon 11/9/15]											
25	S.100.1.1	Project Work Plan	21 days	Mon 10/5/15			Mon 11/2/15	[Gantt bar spanning from Mon 10/5/15 to Mon 11/2/15]											
26	S.100.1.1.1	Hold Pre-Scoping Meeting With Disipline Representatives	5 days	Mon 10/5/15	27,2SS		Fri 10/9/15	[Gantt bar with resource: Project Team]											
27	S.100.1.1.2	Complete Project Work Plan	15 days	Mon 10/12/15	28,3	26	Fri 10/30/15	[Gantt bar with resource: Project Manager]											
28	S.100.1.1.3	Submit Project Request - PM	1 day	Mon 11/2/15	29	27	Mon 11/2/15	[Gantt bar with resource: Project Manager]											
29	S.100.1.2	Project Approval - PRC	5 days	Tue 11/3/15	4,31,64	28	Mon 11/9/15	[Gantt bar with resource: PIC]											
30	S.100.2	Project initiation	35 days	Tue 11/10/15			Mon 12/28/15	[Gantt bar spanning from Tue 11/10/15 to Mon 12/28/15]											
31	S.100.2.1	Select Consultant	5 days	Tue 11/10/15	32	29	Mon 11/16/15	[Gantt bar with resource: Project Manager]											
32	S.100.2.2	Consultant Scope and Fee Negotiations	20 days	Tue 11/17/15	33	31	Mon 12/14/15	[Gantt bar with resource: Project Manager]											
33	S.100.2.3	Issue Consultant NTP	10 days	Tue 12/15/15	36,52,34,50	32	Mon 12/28/15	[Gantt bar with resource: Project Team]											
34	S.100.3	Kick-Off Meeting	15 days	Tue 12/29/15			Mon 1/18/16	[Gantt bar spanning from Tue 12/29/15 to Mon 1/18/16]											
35	S.100.4	Design Criteria	22 days	Tue 12/29/15			Wed 1/27/16	[Gantt bar spanning from Tue 12/29/15 to Wed 1/27/16]											
36	S.100.4.1	Develop Design Criteria	15 days	Tue 12/29/15	37	33	Mon 1/18/16	[Gantt bar with resource: Design Team]											
37	S.100.4.2	Submit Design Criteria	0 days	Mon 1/18/16	38	36	Mon 1/18/16	[Gantt bar with resource: Design Team]											
38	S.100.4.3	Review Design Criteria	5 days	Tue 1/19/16	39	37	Mon 1/25/16	[Gantt bar with resource: Project Team]											
39	S.100.4.4	Design Criteria Approved	2 days	Tue 1/26/16	7	38	Wed 1/27/16	[Gantt bar with resource: Project Manager]											
40	S.100.5	Design Exceptions	20 days	Mon 8/1/16			Fri 8/26/16	[Gantt bar spanning from Mon 8/1/16 to Fri 8/26/16]											
41	S.100.5.1	Identify Design Exceptions	5 days	Mon 8/1/16	42	198	Fri 8/5/16	[Gantt bar with resource: Design Team]											
42	S.100.5.2	Submit Design Exceptions	5 days	Mon 8/8/16	43	41	Fri 8/12/16	[Gantt bar with resource: Design Manager]											
43	S.100.5.3	Approve Design Exceptions	10 days	Mon 8/15/16	229	42	Fri 8/26/16	[Gantt bar with resource: Project Manager]											
44	S.100.6	Project Progress	1 day	Mon 10/5/15			Mon 10/5/15	[Gantt bar spanning from Mon 10/5/15 to Mon 10/5/15]											
45	S.100.6.1	Progress Meetings	1 day	Mon 10/5/15			Mon 10/5/15	[Gantt bar with resource: Design Manager]											
46	S.100.6.2	Progress Reports	1 day	Mon 10/5/15			Mon 10/5/15	[Gantt bar with resource: Design Manager]											
47	S.100.7	Determine VE Study Recommendation	1 day	Wed 3/22/17		240	Wed 3/22/17	[Gantt bar with resource: PM&C Manager]											
48	S.100.8	Field Walk with Project Team	5 days	Wed 3/22/17	252	240	Tue 3/28/17	[Gantt bar with resource: Project Team]											
49	S.200	200 - DATA ACQUISITION	286 days	Tue 12/29/15			Tue 1/31/17	[Gantt bar spanning from Tue 12/29/15 to Tue 1/31/17]											
50	S.200.1	Project Research / Data Collection	40 days	Tue 12/29/15		33	Mon 2/22/16	[Gantt bar spanning from Tue 12/29/15 to Mon 2/22/16]											
51	S.200.2	Geotechnical Data	286 days	Tue 12/29/15			Tue 1/31/17	[Gantt bar spanning from Tue 12/29/15 to Tue 1/31/17]											
52	S.200.2.1	Preliminary Geotechnical Data	20 days	Tue 12/29/15	55	33	Mon 1/25/16	[Gantt bar with resource: Geotechnical Team]											
53	S.200.2.2	Prepare and Submit Boring Locations and Site Access Plan	5 days	Wed 11/23/16	105	130	Tue 11/29/16	[Gantt bar with resource: Geotechnical Team]											
54	S.200.2.3	Geotechnical Data / Fieldwork	20 days	Wed 1/4/17	171,172	218,105	Tue 1/31/17	[Gantt bar with resource: Geotechnical Team]											

Project: Sample Project Date: Mon 3/28/16	Task		External Tasks		Manual Task		Finish-only	
	Split		External MileTask		Duration-only		Progress	
	Milestone		Inactive Task		Manual Summary Rollup		Split	
	Summary		Inactive Milestone		Manual Summary			
	Project Summary		Inactive Summary		Start-only			



TTxxx SAMPLE PROJECT Scoping Design Report Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Half	1st Half	1st Half	1st Half
								3rd Quarter	1st Quarter	3rd Quarter	1st Quarter
174	S.800.1.9.3	Final Geotechnical and Pavement Design Report	10 days	Wed 4/5/17			Tue 4/18/17				
175	S.800.1.9.3.5	Prepare and Submit Sealed Geotechnical and Pavement Design Report	10 days	Wed 4/5/17	19,190	173	Tue 4/18/17				
176	S.800.1.10	Alternatives Analysis	100 days	Wed 11/30/16			Tue 4/18/17				
177	S.800.1.10.1	Prepare and Submit Draft Alternatives Analysis Report	5 days	Wed 11/30/16	186	130,131	Tue 12/6/16				Design Team
178	S.800.1.10.2	MCDOT Review	10 days	Wed 3/22/17	244,179	240	Tue 4/4/17				Project Team
179	S.800.1.10.3	Prepare and Submit Sealed Alternatives Analysis Report	10 days	Wed 4/5/17	19,190	178	Tue 4/18/17				Design Team
180	S.800.1.11	Right-of-Way Requirements	84 days	Thu 12/15/16			Tue 4/11/17				
181	S.800.1.11.1	Prepare and Submit Draft Right-of-Way Requirements Memorandum	10 days	Thu 12/15/16	186	201	Wed 12/28/16				Design Team
182	S.800.1.11.2	MCDOT Review	5 days	Wed 3/22/17	244,183	240	Tue 3/28/17				FWRED
183	S.800.1.11.3	Prepare and Submit Final Right-of-Way Requirements Memorandum	10 days	Wed 3/29/17	7,220,19,190	182	Tue 4/11/17				Design Team
184	S.800.2	Scoping Document	105 days	Wed 2/15/17			Tue 7/11/17				
185	S.800.2.1	Draft Scoping Document	63 days	Wed 2/15/17			Fri 5/12/17				
186	S.800.2.1.1	Provide Input for Draft Scoping Document	5 days	Wed 2/15/17	187,177,181,143		Tue 2/21/17				Project Team
187	S.800.2.1.2	Prepare Draft Scoping Document	15 days	Wed 2/22/17	240	186,130	Tue 3/14/17				Design Team
188	S.800.2.1.3	Update Draft Scoping Document	5 days	Mon 5/8/17		249	Fri 5/12/17				Design Team
189	S.800.2.2	Final Scoping Document	60 days	Wed 4/19/17			Tue 7/11/17				
190	S.800.2.2.1	Prepare Final Scoping Document	60 days	Wed 4/19/17	252,175,179,183		Tue 7/11/17				Design Team
191	S.900	900 - PLANS, SPECIFICATIONS AND ESTIMATE	388 days	Mon 10/5/15			Wed 3/29/17				
192	S.900.1	Plans	385 days	Mon 10/5/15			Fri 3/24/17				
193	S.900.1.1	Conceptual Alternatives	11 days	Tue 3/29/16			Tue 4/12/16				
194	S.900.1.1.1	Typical Sections	1 day	Tue 3/29/16	195	109	Tue 3/29/16				Design Team
195	S.900.1.1.2	Exhibits	10 days	Wed 3/30/16	211,226	194	Tue 4/12/16				Design Team
196	S.900.1.2	Candidate Alternatives Plans	11 days	Fri 7/15/16			Fri 7/29/16				
197	S.900.1.2.1	Typical Sections	1 day	Fri 7/15/16	198	121	Fri 7/15/16				Design Team
198	S.900.1.2.2	Plans	10 days	Mon 7/18/16	41,212	197	Fri 7/29/16				Design Team
199	S.900.1.3	Recommended Alternative Plans	16 days	Wed 11/23/16			Wed 12/14/16				
200	S.900.1.3.1	Typical Sections	1 day	Wed 11/23/16	201	130	Wed 11/23/16				Design Team
201	S.900.1.3.2	Plans	15 days	Thu 11/24/16	213,181	200	Wed 12/14/16				Design Team

Project: Sample Project Date: Mon 3/28/16	Task		External Tasks		Manual Task		Finish-only	
	Split		External MileTask		Duration-only		Progress	
	Milestone		Inactive Task		Manual Summary Rollup		Split	
	Summary		Inactive Milestone		Manual Summary			
	Project Summary		Inactive Summary		Start-only			



TTxxx SAMPLE PROJECT Scoping Design Report Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Timeline											
								Half 3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter	3rd Quarter	1st Quarter
202	S.900.1.4	Scoping Plans	385 days	Mon 10/5/15			Fri 3/24/17	[Gantt bar for Scoping Plans]											
203	S.900.1.4.1	General Sheets	1 day	Mon 10/5/15	204		Mon 10/5/15	[Gantt bar for General Sheets]											
204	S.900.1.4.2	Roadway	15 days	Wed 2/8/17	206,205,207	203,103	Tue 2/28/17	[Gantt bar for Roadway]											
205	S.900.1.4.3	Drainage	15 days	Wed 3/1/17	208	204	Tue 3/21/17	[Gantt bar for Drainage]											
206	S.900.1.4.4	Traffic	5 days	Wed 3/1/17	208	204	Tue 3/7/17	[Gantt bar for Traffic]											
207	S.900.1.4.5	Bridge	15 days	Wed 3/1/17	208	204	Tue 3/21/17	[Gantt bar for Bridge]											
208	S.900.1.4.6	Earthwork	3 days	Wed 3/22/17	214	205,206,207	Fri 3/24/17	[Gantt bar for Earthwork]											
209	S.900.2	Estimates	262 days	Tue 3/29/16			Wed 3/29/17	[Gantt bar for Estimates]											
210	S.900.2.1	Quantities	2 days	Tue 3/29/16	211	109	Wed 3/30/16	[Gantt bar for Quantities]											
211	S.900.2.2	Conceptual Alternatives Estimates	2 days	Wed 4/13/16	226	195,210	Thu 4/14/16	[Gantt bar for Conceptual Alternatives Estimates]											
212	S.900.2.3	Candidate Alternatives Estimates	2 days	Mon 8/1/16	229	198	Tue 8/2/16	[Gantt bar for Candidate Alternatives Estimates]											
213	S.900.2.4	Recommended Alternative Estimates	2 days	Thu 12/15/16	240	201,89	Fri 12/16/16	[Gantt bar for Recommended Alternative Estimates]											
214	S.900.2.5	Scoping Estimates	3 days	Mon 3/27/17		208	Wed 3/29/17	[Gantt bar for Scoping Estimates]											
215	S.1000	1000 - RIGHT-OF-WAY	174 days	Mon 9/5/16			Thu 5/4/17	[Gantt bar for 1000 - RIGHT-OF-WAY]											
216	S.1000.1	Provide Preliminary Right-of-Way Costs	3 days	Thu 10/20/16	124	122	Mon 10/24/16	[Gantt bar for Provide Preliminary Right-of-Way Costs]											
217	S.1000.2	Verify Prior Rights	10 days	Mon 9/5/16	232	229	Fri 9/16/16	[Gantt bar for Verify Prior Rights]											
218	S.1000.3	Provide Right of Entry for Field Work	3 days	Wed 11/23/16	54	130	Fri 11/25/16	[Gantt bar for Provide Right of Entry for Field Work]											
219	S.1000.4	Right-of-Way and Easement Requirements	15 days	Wed 4/12/17			Tue 5/2/17	[Gantt bar for Right-of-Way and Easement Requirements]											
220	S.1000.4.1	Coordination with PWRED	5 days	Wed 4/12/17	221	183	Tue 4/18/17	[Gantt bar for Coordination with PWRED]											
221	S.1000.4.2	Determine Right-of-Way and Easements	10 days	Wed 4/19/17	222	220	Tue 5/2/17	[Gantt bar for Determine Right-of-Way and Easements]											
222	S.1000.4.3	Submit Right-of-Way and Easement Requirements	0 days	Tue 5/2/17	223	221	Tue 5/2/17	[Gantt bar for Submit Right-of-Way and Easement Requirements]											
223	S.1000.5	Right-of-Way Estimate	2 days	Wed 5/3/17		222	Thu 5/4/17	[Gantt bar for Right-of-Way Estimate]											
224	S.1200	1200 - SUBMITTALS	336 days	Fri 4/15/16			Fri 7/28/17	[Gantt bar for 1200 - SUBMITTALS]											
225	S.1200.1	Conceptual Alternatives Submittal	15 days	Fri 4/15/16			Thu 5/5/16	[Gantt bar for Conceptual Alternatives Submittal]											
226	S.1200.1.1	Submit Conceptual Alternatives	5 days	Fri 4/15/16	227	195,211	Thu 4/21/16	[Gantt bar for Submit Conceptual Alternatives]											
227	S.1200.1.2	Review and Recommend Updates - MCDOT	10 days	Fri 4/22/16	110	226	Thu 5/5/16	[Gantt bar for Review and Recommend Updates - MCDOT]											
228	S.1200.2	Candidate Alternative Plans and Draft TMs Submittal	33 days	Mon 8/29/16			Wed 10/12/16	[Gantt bar for Candidate Alternative Plans and Draft TMs Submittal]											
229	S.1200.2.1	Submit Candidate Alternatives Plans and Draft TMs	5 days	Mon 8/29/16	162,169,217	8,43,141,212	Fri 9/2/16	[Gantt bar for Submit Candidate Alternatives Plans and Draft TMs]											
230	S.1200.2.2	Review and Provide Comments - MCDOT	10 days	Mon 9/5/16	232	229	Fri 9/16/16	[Gantt bar for Review and Provide Comments - MCDOT]											
231	S.1200.2.3	Summary of Comments	13 days	Mon 9/19/16			Wed 10/5/16	[Gantt bar for Summary of Comments]											
232	S.1200.2.3.1	Compile Comments	3 days	Mon 9/19/16	233	162,169,217	Wed 9/21/16	[Gantt bar for Compile Comments]											
233	S.1200.2.3.2	Prepare Responses	3 days	Thu 9/22/16	234	232	Mon 9/26/16	[Gantt bar for Prepare Responses]											
234	S.1200.2.3.3	Submit Summary of Comments	0 days	Mon 9/26/16	235	233	Mon 9/26/16	[Gantt bar for Submit Summary of Comments]											

Project: Sample Project Date: Mon 3/28/16	Task		External Tasks		Manual Task		Finish-only	
	Split		External MileTask		Duration-only		Progress	
	Milestone		Inactive Task		Manual Summary Rollup		Split	
	Summary		Inactive Milestone		Manual Summary			
	Project Summary		Inactive Summary		Start-only			



TTxxx SAMPLE PROJECT Scoping Design Report Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Half	1st Half		1st Half		1st Half								
								3rd Quarter	1st Quarter												
								Jul	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Mar	May	Jul	
235	S.1200.2.3.4	Review Summary of Comments - PM	5 days	Tue 9/27/16	236	234	Mon 10/3/16														
236	S.1200.2.3.5	Comment Resolution Meeting	0 days	Mon 10/3/16	237	235	Mon 10/3/16														
237	S.1200.2.3.6	Final Summary of Comments	2 days	Tue 10/4/16	238	236	Wed 10/5/16														
238	S.1200.2.4	Update Candidate Alternative Plans	5 days	Thu 10/6/16	122	237	Wed 10/12/16														
239	S.1200.3	Draft Scoping Documents and Draft Scoping Plans (with TMs) Submittal	43 days	Wed 3/15/17			Fri 5/12/17														
240	S.1200.3.1	Submit Draft Scoping Document and Draft Scoping Plans (with TMs)	5 days	Wed 3/15/17	241,48,81,47	187,213	Tue 3/21/17														
242	S.1200.3.2	Review Draft Scoping Submittal - MCDOT	15 days	Wed 3/29/17	244,83	241	Tue 4/18/17														
243	S.1200.3.3	Summary of Comments	13 days	Wed 4/19/17			Fri 5/5/17														
244	S.1200.3.3.1	Compile Comments	3 days	Wed 4/19/17	245,173,178,182		Fri 4/21/17														
245	S.1200.3.3.2	Prepare Responses	3 days	Mon 4/24/17	246	244	Wed 4/26/17														
246	S.1200.3.3.3	Submit Summary of Comments	0 days	Wed 4/26/17	247	245	Wed 4/26/17														
247	S.1200.3.3.4	Review Summary of Comments - PM	5 days	Thu 4/27/17	248	246	Wed 5/3/17														
248	S.1200.3.3.5	Comment Resolution Meeting	0 days	Wed 5/3/17	249	247	Wed 5/3/17														
249	S.1200.3.3.6	Final Summary of Comments	2 days	Thu 5/4/17	250,188	248	Fri 5/5/17														
250	S.1200.3.4	Update Draft Scoping Plans	5 days	Mon 5/8/17		249	Fri 5/12/17														
241	S.1200.3.5	Submit Draft Scoping Plans to Utility Companies	5 days	Wed 3/22/17	13,242,87	240	Tue 3/28/17														
251	S.1200.6	Final Scoping Document - Final Scoping Plans Submittal	13 days	Wed 7/12/17			Fri 7/28/17														
252	S.1200.6.1	Submit Final Scoping Document - 30% Scoping Plans	5 days	Wed 7/12/17	253,20	190,48,89	Tue 7/18/17														
253	S.1200.6.2	Review for Comment Compliance - PM	3 days	Wed 7/19/17	254	252	Fri 7/21/17														
254	S.1200.6.3	Circulate for signatures	5 days	Mon 7/24/17	255	253	Fri 7/28/17														
255	S.1200.6.4	Scoping Complete	0 days	Fri 7/28/17	21FF	254	Fri 7/28/17														

Project: Sample Project
Date: Mon 3/28/16

Task		External Tasks		Manual Task		Finish-only	
Split		External MileTask		Duration-only		Progress	
Milestone		Inactive Task		Manual Summary Rollup		Split	
Summary		Inactive Milestone		Manual Summary			
Project Summary		Inactive Summary		Start-only			



TTxxx SAMPLE PROJECT Final Design Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessor	Finish	Timeline											
								3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May
1	1	MAJOR MILESTONES	577 days	Wed 11/4/15			Fri 1/19/18												
2	1.1	Project Work Plan Complete	0 days	Wed 11/4/15	25		Wed 11/4/15												
3	1.2	Project Review Committee (PRC) Approval	0 days	Thu 11/12/15	27		Thu 11/12/15												
4	1.3	Consultant Notice to Proceed (NTP)	0 days	Thu 12/31/15	31		Thu 12/31/15												
5	1.5	60% Submittal	0 days	Thu 2/18/16	81		Thu 2/18/16												
6	1.6	Right-of-Way Clearance	0 days	Thu 4/6/17	78		Thu 4/6/17												
7	1.7	95% Submittal	0 days	Thu 4/28/16	91		Thu 4/28/16												
8	1.8	Environmental Clearance	0 days	Thu 3/17/16	63		Thu 3/17/16												
9	1.9	Utility Clearance	0 days	Thu 12/8/16	60		Thu 12/8/16												
10	1.10	Plan-in-Hand Field Meeting	0 days	Fri 4/29/16	36		Fri 4/29/16												
11	1.11	100% Submittal	0 days	Thu 7/21/16	101		Thu 7/21/16												
12	1.4	CLOMR Approved	0 days	Thu 7/21/16	70		Thu 7/21/16												
13	1.12	Sealed Submittal	0 days	Thu 10/6/16	111		Thu 10/6/16												
14	1.13	Signatures Obtained - Final Design Process Complete	0 days	Fri 7/21/17	122FF		Fri 7/21/17												
15	1.14	Advertise for Bids	0 days	Fri 5/12/17	116		Fri 5/12/17												
16	1.15	Construction Hand-off Meeting	0 days	Fri 6/16/17	119		Fri 6/16/17												
17	1.16	Construction Start	0 days	Fri 8/18/17	124		Fri 8/18/17												
18	1.17	Construction Completion	0 days	Fri 12/22/17	125		Fri 12/22/17												
19	1.18	Project Close-out	0 days	Fri 1/19/18	126		Fri 1/19/18												

Project: Sample Project Date: Mon 3/28/16	Task		External MileTask		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Progress	
	External Tasks		Duration-only		Split	



TTxxx SAMPLE PROJECT Final Design Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Timeline											
								3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May						
20	F	FINAL DESIGN	597 days	Thu 10/8/15			Fri 1/19/18												
21	F.100	100 - PROJECT MANAGEMENT	236 days	Thu 10/8/15			Thu 9/1/16												
22	F.100.1	Project Startup	21 days	Thu 10/8/15			Thu 11/5/15												
23	F.100.1.1	Project Work Plan	21 days	Thu 10/8/15			Thu 11/5/15												
24	F.100.1.1.4	Hold Pre-Scoping Meeting With Discipline Represe	5 days	Thu 10/8/15	25		Wed 10/14/15												
25	F.100.1.1.5	Complete Project Work Plan	15 days	Thu 10/15/15	2,26	24	Wed 11/4/15												
26	F.100.1.1.6	Submit Project Request - PM	1 day	Thu 11/5/15	27	25	Thu 11/5/15												
27	F.100.2	Project Approval - PRC	5 days	Fri 11/6/15	3,29	26	Thu 11/12/15												
28	F.100.3	Project Initiation	35 days	Fri 11/13/15			Thu 12/31/15												
29	F.100.3.1	Select Consultant	5 days	Fri 11/13/15	30	27	Thu 11/19/15												
30	F.100.3.2	Consultant Scope and Fee Negotiations	20 days	Fri 11/20/15	31	29	Thu 12/17/15												
31	F.100.3.3	Issue Consultant NTP	10 days	Fri 12/18/15	4,32,73	30	Thu 12/31/15												
32	F.100.4	Kick-Off Meeting	10 days	Fri 1/1/16	40	31	Thu 1/14/16												
33	F.100.5	Project Progress	1 day	Thu 10/8/15			Thu 10/8/15												
34	F.100.5.1	Progress Meetings	1 day	Thu 10/8/15			Thu 10/8/15												
35	F.100.5.2	Progress Reports	1 day	Thu 10/8/15			Thu 10/8/15												
36	F.100.6	Plan-in-Hand Field Meeting	1 day	Fri 4/29/16	10	91	Fri 4/29/16												
37	F.100.7	BOS Bid Solicitation Approval	30 days	Fri 7/22/16		101	Thu 9/1/16												
38	F.300	300 - LAND SURVEY	30 days	Fri 1/15/16			Thu 2/25/16												
39	F.300.1	Supplemental Survey	30 days	Fri 1/15/16			Thu 2/25/16												
40	F.300.1.1	Request Survey	2 days	Fri 1/15/16	41	32	Mon 1/18/16												
41	F.300.1.2	Perform Survey	20 days	Tue 1/19/16	42	40	Mon 2/15/16												

Project: Sample Project Date: Mon 3/28/16	Task		External MileTask		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Progress	
	External Tasks		Duration-only		Split	



TTxxx SAMPLE PROJECT Final Design Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessor:	Finish	Timeline															
								3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May										
42	F.300.1.3	QC/QA Survey	3 days	Tue 2/16/16	43	41	Thu 2/18/16																
43	F.300.1.4	Deliver and Archive Survey	5 days	Fri 2/19/16		42	Thu 2/25/16																
44	F.400	400 - PROJECT COORDINATION	266 days	Thu 10/8/15			Thu 10/13/16																
45	F.400.1	Stakeholder Meetings	1 day	Thu 10/8/15			Thu 10/8/15																
46	F.400.2	Public Involvement	5 days	Fri 10/7/16			Thu 10/13/16																
47	F.400.2.1	Public Outreach Material	5 days	Fri 10/7/16		111	Thu 10/13/16																
48	F.500	500 - UTILITIES AND RAILROAD	306 days	Thu 10/8/15			Thu 12/8/16																
49	F.500.1	Utility Coordination	301 days	Thu 10/8/15			Thu 12/1/16																
50	F.500.1.1	Utility Coordination Meetings	1 day	Thu 10/8/15			Thu 10/8/15																
51	F.500.1.4	Utility Adjustments and Relocations	55 days	Fri 2/19/16			Thu 5/5/16																
52	F.500.1.4.1	Provide Plans to Utility Companies	15 days	Fri 2/19/16	53	81	Thu 3/10/16																
53	F.500.1.4.2	Determine Utility Relocation Right-of-Way	40 days	Fri 3/11/16	54	52	Thu 5/5/16																
54	F.500.1.5	Utility Agreements	60 days	Fri 5/6/16	55	53	Thu 7/28/16																
55	F.500.1.6	Utility Relocation	90 days	Fri 7/29/16	60	54	Thu 12/1/16																
56	F.500.2	Utility Plans	45 days	Thu 10/8/15			Wed 12/9/15																
57	F.500.2.1	Utility Plan Sheets	30 days	Thu 10/8/15	58		Wed 11/18/15																
58	F.500.2.2	Utility Plans Review	15 days	Thu 11/19/15		57	Wed 12/9/15																
59	F.500.3	Establishing Utility Service Connection	5 days	Fri 4/29/16		91	Thu 5/5/16																
60	F.500.4	Utility Clearance Letter	5 days	Fri 12/2/16	9,113	55	Thu 12/8/16																
61	F.600	600- ENVIRONMENTAL	20 days	Fri 2/19/16			Thu 3/17/16																
62	F.600.1	Draft Environmental Clearance Document	5 days	Fri 2/19/16		81	Thu 2/25/16																
63	F.600.2	Environmental Clearance Memo	20 days	Fri 2/19/16	8,113	81	Thu 3/17/16																

Project: Sample Project Date: Mon 3/28/16	Task		External MileTask		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Progress	
	External Tasks		Duration-only		Split	



TTxxx SAMPLE PROJECT Final Design Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Timeline											
								3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May						
64	F.800	800 - TECHNICAL MEMORANDA AND REPORTS	206 days	Thu 10/8/15			Thu 7/21/16												
65	F.800.1	Technical Memoranda and Reports	206 days	Thu 10/8/15			Thu 7/21/16												
66	F.800.1.1	Drainage Report	206 days	Thu 10/8/15			Thu 7/21/16												
67	F.800.1.1.1	Final Drainage Report	20 days	Thu 10/8/15			Wed 11/4/15												
68	F.800.1.1.1.1	Update and Submit Final Drainage Report	15 days	Thu 10/8/15	69		Wed 10/28/15												
69	F.800.1.1.1.2	MCDOT Review	5 days	Thu 10/29/15	71	68	Wed 11/4/15												
70	F.800.1.1.2	Conditional Letter of Map Revision (CLOMR)	206 days	Thu 10/8/15	12		Thu 7/21/16												
71	F.800.1.1.3	Prepare and Submit Sealed Drainage Report	10 days	Thu 11/5/15		69	Wed 11/18/15												
72	F.900	900 - PLANS, SPECIFICATIONS AND ESTIMATE	195 days	Fri 1/1/16			Thu 9/29/16												
73	F.900.1	60% PS&E	30 days	Fri 1/1/16	81	31	Thu 2/11/16												
74	F.900.2	95% PS&E	20 days	Fri 3/25/16	91	89	Thu 4/21/16												
75	F.900.3	100% PS&E	15 days	Fri 6/24/16	101	99	Thu 7/14/16												
76	F.900.4	Sealed PS&E	10 days	Fri 9/16/16	111	109	Thu 9/29/16												
77	F.1000	1000 - RIGHT-OF-WAY	270 days	Fri 3/25/16			Thu 4/6/17												
78	F.1000.1	Right-of-Way Clearance	270 days	Fri 3/25/16	6,113	89	Thu 4/6/17												
79	F.1200	1200 - SUBMITTALS	305 days	Fri 2/12/16			Thu 4/13/17												
80	F.1200.1	60% PS&E Submittal	30 days	Fri 2/12/16			Thu 3/24/16												
81	F.1200.1.1	60% Submittal	5 days	Fri 2/12/16	5,82,52,62,67	73	Thu 2/18/16												

Project: Sample Project Date: Mon 3/28/16	Task		External MileTask		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Progress	
	External Tasks		Duration-only		Split	



TTxxx SAMPLE PROJECT Final Design Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessor	Finish	Timeline															
								3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May										
82	F.1200.1.2	Review 60% Submittal	10 days	Fri 2/19/16	84	81	Thu 3/3/16																
83	F.1200.1.3	Summary of Comments	15 days	Fri 3/4/16			Thu 3/24/16																
84	F.1200.1.3.1	Compile Comments	1 day	Fri 3/4/16	85	82	Fri 3/4/16																
85	F.1200.1.3.2	Prepare Responses	3 days	Mon 3/7/16	86	84	Wed 3/9/16																
86	F.1200.1.3.3	Submit Summary of Comments	0 days	Wed 3/9/16	87	85	Wed 3/9/16																
87	F.1200.1.3.4	Review Summary of Comments - PM	5 days	Thu 3/10/16	88	86	Wed 3/16/16																
88	F.1200.1.3.5	Comment Resolution Meeting	1 day	Thu 3/17/16	89	87	Thu 3/17/16																
89	F.1200.1.3.6	Final Summary of Comments	5 days	Fri 3/18/16	74,78	88	Thu 3/24/16																
90	F.1200.2	95% PS&E Submittal	45 days	Fri 4/22/16			Thu 6/23/16																
91	F.1200.2.1	95% Submittal	5 days	Fri 4/22/16	92,7,59,36	74	Thu 4/28/16																
92	F.1200.2.2	Review 95% Submittal	25 days	Fri 4/29/16	94	91	Thu 6/2/16																
93	F.1200.2.3	Summary of Comments	15 days	Fri 6/3/16			Thu 6/23/16																
94	F.1200.2.3.1	Compile Comments	1 day	Fri 6/3/16	95	92	Fri 6/3/16																
95	F.1200.2.3.2	Prepare Responses	3 days	Mon 6/6/16	96	94	Wed 6/8/16																
96	F.1200.2.3.3	Submit Summary of Comments	0 days	Wed 6/8/16	97	95	Wed 6/8/16																
97	F.1200.2.3.4	Review Summary of Comments - PM	5 days	Thu 6/9/16	98	96	Wed 6/15/16																
98	F.1200.2.3.5	Comment Resolution Meeting	1 day	Thu 6/16/16	99	97	Thu 6/16/16																
99	F.1200.2.3.6	Final Summary of Comments	5 days	Fri 6/17/16	75	98	Thu 6/23/16																
100	F.1200.3	100% PS&E Submittal	45 days	Fri 7/15/16			Thu 9/15/16																
101	F.1200.3.1	100% Submittal	5 days	Fri 7/15/16	102,11,37	75	Thu 7/21/16																
102	F.1200.3.2	Review 100% Submittal	25 days	Fri 7/22/16	104	101	Thu 8/25/16																

Project: Sample Project Date: Mon 3/28/16	Task		External MileTask		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Progress	
	External Tasks		Duration-only		Split	



TTxxx SAMPLE PROJECT Final Design Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessors	Finish	Half	1st Half	1st Half	1st Half
								3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May	3rd Quarter Jul Sep Nov	1st Quarter Jan Mar May
103	F.1200.3.3	Summary of Comments	15 days	Fri 8/26/16			Thu 9/15/16				
104	F.1200.3.3.1	Compile Comments	1 day	Fri 8/26/16	105	102	Fri 8/26/16			Design Team	
105	F.1200.3.3.2	Prepare Responses	3 days	Mon 8/29/16	106	104	Wed 8/31/16			Design Team	
106	F.1200.3.3.3	Submit Summary of Comments	0 days	Wed 8/31/16	107	105	Wed 8/31/16			8/31	
107	F.1200.3.3.4	Review Summary of Comments - PM	5 days	Thu 9/1/16	108	106	Wed 9/7/16			Project Manager	
108	F.1200.3.3.5	Comment Resolution Meeting	1 day	Thu 9/8/16	109	107	Thu 9/8/16			Project Team	
109	F.1200.3.3.6	Final Summary of Comments	5 days	Fri 9/9/16	76	108	Thu 9/15/16			Design Manager	
110	F.1200.4	Sealed PS&E Submittal	140 days	Fri 9/30/16			Thu 4/13/17				
111	F.1200.4.1	Sealed Submittal	5 days	Fri 9/30/16	112,13,47	76	Thu 10/6/16			Design Team	
112	F.1200.4.2	Review for Comment Compliance - PM	2 days	Fri 10/7/16	113	111	Mon 10/10/16			Project Manager	
113	F.1200.4.3	Circulate for Signatures	5 days	Fri 4/7/17	115	112,60,63,78	Thu 4/13/17			Project Manager	
114	F.1300	1300 - BIDDING PHASE	71 days	Fri 4/14/17			Fri 7/21/17				
115	F.1300.1	Prepare Advertisement Package	20 days	Fri 4/14/17	116	113	Thu 5/11/17			Design Team	
116	F.1300.2	Advertise for Bids	1 day	Fri 5/12/17	15,118,117	115	Fri 5/12/17			Design Team	
117	F.1300.3	Pre-Bid Conference	10 days	Mon 5/15/17		116	Fri 5/26/17			Project Team	
118	F.1300.4	Bid Opening	20 days	Mon 5/15/17	120,119	116	Fri 6/9/17			Project Manager	
119	F.1300.5	Construction Hand-off Meeting	5 days	Mon 6/12/17	16	118	Fri 6/16/17				
120	F.1300.6	BOS Meeting	30 days	Mon 6/12/17	121	118	Fri 7/21/17				
121	F.1300.7	BOS Approval	0 days	Fri 7/21/17	122	120	Fri 7/21/17			7/21	
122	F.1300.8	Final Design Process Complete	0 days	Fri 7/21/17	14FF,124	121	Fri 7/21/17			7/21	
123	F.1400	1400 - CONSTRUCTION PHASE	130 days	Mon 7/24/17			Fri 1/19/18				
124	F.1400.1	Construction Start	20 days	Mon 7/24/17	17,125	122	Fri 8/18/17				

Project: Sample Project Date: Mon 3/28/16	Task		External MileTask		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Progress	
	External Tasks		Duration-only		Split	



TTxxx SAMPLE PROJECT Final Design Schedule

ID	WBS	Task Name	Duration	Start	Successors	Predecessor:	Finish	Half	1st Half			1st Half			1st H					
								3rd Quarter	1st Quarter											
								Jul	Sep	Nov	Jan	Mar	May	Jul	Sep	Nov	Jan	Mar	May	
125	F.1400.2	Construction Completion	90 days	Mon 8/21/17	18,126	124	Fri 12/22/17													
126	F.1400.3	Project Close-out	20 days	Mon 12/25/17	19	125	Fri 1/19/18													



Project: Sample Project Date: Mon 3/28/16	Task		External MileTask		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Progress	
	External Tasks		Duration-only		Split	

APPENDIX 7-F

Consultant Fee Template

DERIVATION OF COST PROPOSAL SUMMARY

(Figures Rounded To The Nearest \$1)

ESTIMATED DIRECT LABOR

<u>CLASSIFICATION</u>	<u>PERSON HOURS</u>	<u>BILLING RATE/HOUR</u>	<u>TOTAL</u>
Project Principal	1	\$ 75.00	\$ 75
Design Manager	1	\$ 70.00	\$ 70
Senior Project Engineer	1	\$ 65.00	\$ 65
Project Engineer	1	\$ 60.00	\$ 60
Engineer / Designer	1	\$ 55.00	\$ 55
Technician	1	\$ 45.00	\$ 45
Administrative	1	\$ 15.00	\$ 15
Clerical	1	\$ 15.00	\$ 15
	8	Hours	
Estimated Labor Cost			\$ 400
Overhead 150%			\$ 600
Subtotal			<u>\$ 1,000</u>

ESTIMATED DIRECT EXPENSES

(Listed By Item At Estimated Actual Cost - NO MARKUP)

Travel	\$ 1	
Plotting	\$ 1.25	
Miscellaneous Expenses	\$ -	
Total Estimated Expenses		<u>\$ 2</u>

ESTIMATED OUTSIDE SERVICES AND CONSULTANTS

Firm	Cost	
Consultant Y	\$ -	
Consultant Z	\$ -	
Total Estimated Outside Services		<u>\$ -</u>

PROFIT (Direct Labor +Overhead) 10% 100.00

TOTAL ESTIMATED FEE \$ 1,102

CONTRACT TIME Calendar Days

 Consultant Firm Signature _____
 Date

ESTIMATE OF DIRECT EXPENSES

Travel

A. Local Mileage at			
\$	0.56		1 miles
Subtotal Travel		\$	1

Plotting

B. Exhibits at	\$	0.25		1 exhibits
			\$	0.25
C. Plots at	\$	1.00		1 plots
			\$	1
D. Plan Submittals				
Half Size Bond Copies at	\$	0.10		1 Copies
Full Size Bond Copies at	\$	1.00		1 Copies
Subtotal Plotting			\$	1.10

Miscellaneous Expenses

C. Other			\$	-
Subtotal Miscellaneous Expenses			\$	-

ESTIMATED OUTSIDE SERVICES & CONSULTANTS

Consultant Y			\$	-
Consultant Z			\$	-
TOTAL ESTIMATED OUTSIDE SERVICES			\$	-

TOTAL ESTIMATED EXPENSES **\$ 2**

APPENDIX 7-G

Scoping Checklists



Scoping Checklist Project Management

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Design and construction references have been checked, are appropriate and specifically identified by date and/or edition number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Issues raised and errors found in the review processes (15%, 25%, 30%) are reconciled and/or corrected in the final documents. Consensus has been reached. Comment Resolution sheets have final dispositions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drainage analysis has been completed and reviewed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bridge Selection Report has been completed and reviewed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The spatial datum (benchmark) has been identified, properly referenced and located in the field, and adjacent existing improvements are referenced to the same datum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Geotechnical Report and Pavement design has been reviewed and approved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The 30% plans have been reviewed for constructability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost Estimate is current and accurate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The IGA requirements have been identified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADOT/FHWA coordination has been conducted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Need for public involvement has been evaluated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30% quality has been verified. Final Scoping Document and 30% Plan assembly has been reviewed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plans have been checked by design team in the field within the previous 60 calendar days prior to issue for bid signatures and any resulting issues have been resolved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Field review completed by the design team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Design Criteria

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Design year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design speed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design vehicle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing and Design year ADT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Type of terrain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Average project elevation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standard typical section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number of travel lanes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ROADWAY DESIGN CRITERIA:	N/A	Yes	No
Roadway width	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lane widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shoulder widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clear zone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maximum and minimum slope rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Median configuration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maximum allowable superelevation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maximum and minimum allowable grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimum allowable horizontal curve radius and length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maximum allowable horizontal deflection without a curve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimum allowable vertical curve length and rates of vertical curvature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maximum allowable vertical grade break without a curve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimum stopping sight distance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intersection stopping sight distances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Barrier runout information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PAVEMENT DESIGN CRITERIA:	N/A	Yes	No
Pavement design life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Design Criteria

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
	N/A	Yes	No
DRAINAGE DESIGN CRITERIA:			
Design storm for roadways, culverts and roadside design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pavement drainage design event	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applicable method for hydrology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimum pipe sizes for roadways and driveways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimum and maximum fill cover for pipes and box culverts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maximum and minimum allowable velocities for the culverts and channels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Erosion and scour protection requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allowable side slopes for channels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Requirements for retention and/or detention basins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Requirements for storm drain systems design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scour criteria for bridge foundation design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TRAFFIC DESIGN CRITERIA:			
Pavement marking requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Signing requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Signal requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITS requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access requirements (driveways and intersections)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Operations requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
STRUCTURES DESIGN CRITERIA:			
Design method and requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Material Properties for steel (tensile strength, yield strength, modulus of elasticity, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Material Properties for concrete (compressive strength, unit weight, modulus of elasticity, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Design Criteria

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
	N/A	Yes	No
RIGHT-OF-WAY DESIGN CRITERIA:	N/A	Yes	No
Minimum R/W requirement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increments for R/W acquisition dimensions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimum distance required from cut/fill line to R/W line	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stationing requirements for R/W breaks (e.g. only at even stations, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct centerline for R/W dimensioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preferences for Drainage Easement or Slope Easement over new R/W	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance requirements around culverts for new R/W	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R/W requirements to account for ponding areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
APPENDICES:	N/A	Yes	No
Summary of the Technical Memorandum that will become part of the SDR section detailing the design criteria. The contents are defined in the SDR guidelines under the design criteria section.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Drainage

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
	N/A	Yes	No
EXISTING DRAINAGE CONDITIONS:	N/A	Yes	No
Discuss existing drainage conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identify the project watershed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identify existing drainage structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Field verify and document existing drainage structure information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Describe the existing drainage patterns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detail all data sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FLOOD ZONE CLASSIFICATION:	N/A	Yes	No
Describe relevant flood zones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Include a map showing relevant flood zones and their classifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discuss impacts, improvement limitations and required mitigation measures, and application processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detail data sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESIGN FLOWS:	N/A	Yes	No
Identify any off-site flows estimated in previous studies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirm current applicable hydraulic design criteria including rainfall source and analytical methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calculate and discuss off-site flows using applicable analytical method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Delineate onsite drainage areas and quantify design peak flows using applicable analytical method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detail all data sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Drainage

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
PROPOSED DRAINAGE CONCEPT:	N/A	Yes	No
Present a proposed drainage concept based on the applicable design criteria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identify and address all assumption and limitation associated with the proposed drainage concept	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identify water quality regulations and the need for corresponding mitigation measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADJACENT IMPACTS:	N/A	Yes	No
Describe all upstream and downstream impacts caused by the proposed drainage improvements and mitigation measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRAINAGE INLETS AND STORM DRAINS:	N/A	Yes	No
Identify the location and sizes of inlets and storm drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document inlets per maximum allowable street flows, collection structure locations, allowable flow spread criteria, and at other critical areas such as roadway intersections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State allowable types of drainage inlets and grates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State the applicable clogging factors when sizing drainage inlets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At on-grade inlets, ensure that bypass flows from larger storms discharge at the designated collection point; otherwise, size the structure to capture the maximum design storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For sump locations, ensure that the elevation difference to the nearest grade break is not less than the water depth used in the inlet analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document the allowable sizes, cover and material of storm drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide discussion related to the hydraulic grade line	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure hydraulic grade line at inlet location is sufficiently below the lip of the gutter for the design storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide the flow velocities and ensure that storm drain flow velocity is within acceptable limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide details of any utility conflict and mitigating design.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document all design procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CULVERT AND CHANNEL DESIGN:	N/A	Yes	No
Describe the proposed culvert and channel improvements with regard to the pavement drainage, off-site drainage, and roadside ditch configuration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Drainage

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
CULVERTS:	N/A	Yes	No
Discuss the design procedure and any deviation from the existing flow paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document the allowable culvert sizes and material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide the minimum cover requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide evaluation of the applicable starting conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document water head details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document culvert design impacts and mitigations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document the backwater impact from the water head at the upstream side of the culvert and ensure that it is properly incorporated in any upstream conveyance element, such as a wash or a side ditch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide the outlet velocities and ensure that they are within allowable limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document the need for and provide adequate scour protection measures at the culvert outlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document that the culvert length, end treatment, and scour protection measures accommodate clear zone requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CHANNELS/ROADSIDE DITCHES:	N/A	Yes	No
Document the roadside design approach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detail the side slopes used in design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document channel velocities and check against the need for appropriate channel lining for scour protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The applied Manning's roughness coefficient are documented and correspond to the type of channel surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document and ensure that the water surface profile meets the design requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State that any applicable lining material accommodates the applicable clear zone requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Drainage

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
STORMWATER STORAGE REQUIREMENTS:	N/A	Yes	No
Identify stormwater storage requirements for retention, detention or water quality/first flush applications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Document design decisions related to R/W and clear zone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detail and ensure the maximum water depth in the basins meets design requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure retention basins are drained within specified time through surface percolation or dry wells, if necessary. Conduct percolation tests to identify applicable discharge rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State the design parameters of the basin and provide related data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SCOUR ANALYSIS:	N/A	Yes	No
Evaluate and document whether drainage structures require scour protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discuss scour protection locations and methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide supporting documentation and calculations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CONCLUSIONS	N/A	Yes	No
List the report's conclusions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REFERENCES	N/A	Yes	No
List the report's references	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
APPENDICES:	N/A	Yes	No
All supporting calculations and technical data used in the design.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excerpts from previous studies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduced copies of plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All Electronic Data used in the report	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
System plan view sheet summarizing the most important drainage calculations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Bridge Plan & Elevation Sheets

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL INFORMATION:	N/A	Yes	No
Use standard MCDOT plan and profile border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compile plan and elevation on the same sheet (exceptions may be granted by MCDOT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow MCDOT CADD and Drafting Guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXISTING PLAN REFERENCES:	N/A	Yes	No
Show existing control information such as section lines, corners, monuments and benchmarks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing features pertaining to pavement, drainage and vegetative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing roadway features such as pavement, driveways, guardrail, signs and signals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing drainage features such as riprap, streams, pipes, culverts and structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing utility features such as poles, lines, utility boxes and structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing contours (at 1' interval) (exceptions may be granted by MCDOT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PROPOSED PLAN DETAILS:	N/A	Yes	No
Show proposed alignments such as mainline and crossroads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show important points such as POB, PC, PI, PT, POE, and station equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed design features pertaining to bridge design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed roadway design features such as pavement, driveways, guardrail and cut/fill limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed drainage design features such as riprap, pipes, culverts, ditches and structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Bridge Plan & Elevation Sheets

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
	N/A	Yes	No
PLAN ANNOTATION AND DIMENSIONING:	N/A	Yes	No
Annotate proposed alignments such as mainline and crossroads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate important points such as POB, PC, PI, PT and POE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide taper rates, begin and end project callouts, tangent length, bearings and station equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show curve data (PI, Δ, D, T, L and R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension bridge, pavement and right-of-way widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate existing and proposed features such as pavement, drainage, driveways, medians and barriers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide match lines with matching station and sheet number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Include North arrow and scale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ELEVATION DETAILS:	N/A	Yes	No
Show existing ground along the roadway centerline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed bridge superstructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed bridge substructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ELEVATION ANNOTATION AND DIMENSIONING:	N/A	Yes	No
Annotate existing ground and proposed deck elevation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show station and elevation at key points, such as begin bridge, pier center line, and end bridge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show wingwalls or other similar features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Denote joint types	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTES:	N/A	Yes	No
Note design flow and water surface elevations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Note bridge length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Note skew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Bridge Typical Section Sheet

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL INFORMATION:	N/A	Yes	No
Use standard MCDOT plan and profile border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow MCDOT CADD and Drafting Guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show bridge typical sections. Include annotation and dimensions of clear roadway, out of bridge, lane configuration, and roadway slope. Sections will include superstructure and substructure (i.e. barriers, deck, girders, piers, columns, drilled shafts, etc.). Annotation must specify type of material and size of individual structures in the typical sections. Must provide control points (alignment locations, etc.) within the typical sections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide general notes that includes but not limited to a general description of construction and design specifications, loads, stresses, and materials. Provide list or table of quantities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide list or table of quantities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Right-of-way

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
	N/A	Yes	No
TYPICAL SECTIONS:	N/A	Yes	No
Develop a new typical section for significant changes in roadway width	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a new typical section for significant changes in drainage design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a new typical section for significant changes in right-of-way width	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show cut and fill sections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show guardrail and barriers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension existing and proposed right-of-way widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension total width of the traveled way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GEOMETRIC CONTROL:	N/A	Yes	No
Show existing and proposed right-of-way with callouts; Dimensions are not needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLAN SHEETS:	N/A	Yes	No
Show existing right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show city and county limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing parcel boundaries and ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTES AND QUANTITIES:	N/A	Yes	No
List item notes in a sequential order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use same item note numbers for a particular item throughout the plan set	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide location and quantity of the removal items in the removal section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide location and quantity of the new construction items in construction section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide legend for symbols used on the plan sheets in the notes section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Signal Design

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Use standard MCDOT sheet border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the signal new or an upgrade?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display existing R/W, county/city jurisdictional limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension existing and any new R/W limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display existing utility features such as poles, OH power lines, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display existing edge of pavement and all driveways near the intersection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display all existing and proposed striping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FOR SIGNAL UPGRADE PLANS :	N/A	Yes	No
Accurately display existing signal poles, mast arms and cabinet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display existing detection loops and advance loops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display location of existing pull boxes and conduit runs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indicate any removals for existing signal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FOR NEW SIGNAL PLANS:	N/A	Yes	No
Accurately display station and offset location of new signal poles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Identify power source	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display alignment of new signal and pedestrian heads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide callout for quantification purposes for new signal items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurately display location of proposed new pullboxes and conduit runs (if known)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SIGNAL PLAN INTERSECTION AND OPERATIONAL ISSUES:	N/A	Yes	No
Will special phasing such as split-phasing be required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the signal head type and alignment match the signal phasing and operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check pavement elevations for rideability through the intersection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If rural intersection, evaluate need for ramps at corners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check corner radii for design vehicle right turning movements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Survey

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
FACE SHEET:	N/A	Yes	No
Include as built table with township range and section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GEOMETRIC CONTROL:	N/A	Yes	No
All secondary control shown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stations and Offset to all monuments and alignments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clear designation between construction centerline and monument line when different.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If the construction centerline and monument centerline differ at the beginning or end of the project, dimension bearing and distance tie to each other.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide coordinates of the beginning and ending of the project on construction centerline if not on a physical monument.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate all monuments with point numbers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(GC11) The coordinate table should include and Point Name/Number, Northing, Easting, Elevation and Station and Offset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Include the PLSS corner diagram at point appropriate point.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Right of Way shall be on the same station and offset as the construction centerline.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Utility

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Utility list documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility mapping aquired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility contact list documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potential utility and railroad conflicts identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility prior rights identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potential utility and railroad costs identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility Technical Memorandum complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX 7-H

Final Design Checklists



Final Design Checklist Project Management

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Design and construction references have been checked, are appropriate and specifically identified by date and/or edition number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Issues raised and errors found in the review processes (30%, 60%, 95%, 100%) are reconciled and/or corrected in the final documents. Consensus has been reached. Comment Resolution sheets have final dispositions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drainage report has been completed and reviewed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bridge Selection Report has been completed and reviewed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The spatial datum (benchmark) has been identified, properly referenced and located in the field, and adjacent existing improvements are referenced to the same datum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Geotechnical Report and Pavement design has been reviewed and approved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Certification that the plans have been reviewed for constructability (reviewed by the Construction Manager who will be responsible for the oversight of the construction).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost Estimate is current and accurate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The IGA, if any, has been fully executed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADOT/FHWA obligation letter approving the use of federal funds has been completed and on file. (Federally funded projects only).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possible need for updated public notice or involvement has been evaluated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Design to Construction hand-off meeting completed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PS&E quality has been verified. Plan assembly (PS&E) has been reviewed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plans have been checked by design team in the field within the previous 60 calendar days prior to issue for bid signatures and any resulting issues have been resolved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plan-in-hand review in the field by the design team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specifications are not in conflict with the plans. In those instances where plans need to contain specifications for clarification of the design, IGA, construction, phasing, etc...the project manager will verify the reference is identified with the specifications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Project Management

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

	Reviewer		
	Quality Assurance		
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Bridge Plan & Elevation Sheets

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL INFORMATION:	N/A	Yes	No
Use standard MCDOT plan and profile border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compile plan and elevation on the same sheet (exceptions may be granted by MCDOT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow MCDOT CADD and Drafting Guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXISTING PLAN REFERENCES:	N/A	Yes	No
Show existing control information such as section lines, corners, monuments and benchmarks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing parcel boundaries and ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing features pertaining to pavement, drainage and vegetative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing roadway features such as pavement, driveways, guardrail, signs and signals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing drainage features such as riprap, streams, pipes, culverts and structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing houses and improvements features such as mailboxes, decks, patios, fences, walls and gazebos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing utility features such as poles, lines, utility boxes and structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing contours (at 1' interval) (exceptions may be granted by MCDOT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PROPOSED PLAN DETAILS:	N/A	Yes	No
Show proposed alignments such as mainline and crossroads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show important points such as POB, PC, PI, PT, POE, and station equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed design features pertaining to bridge design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed roadway design features such as pavement, driveways, guardrail and cut/fill limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed drainage design features such as riprap, pipes, culverts, ditches and structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLAN ANNOTATION AND DIMENSIONING:	N/A	Yes	No
Annotate proposed alignments such as mainline and crossroads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate important points such as POB, PC, PI, PT and POE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Bridge Plan & Elevation Sheets

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
Provide taper rates, begin and end project callouts, tangent length, bearings and station equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show curve data (PI, Δ, D, T, L and R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension bridge, pavement and right-of-way widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate existing and proposed features such as pavement, drainage, driveways, medians and barriers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide match lines with matching station and sheet number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Include North arrow and scale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ELEVATION DETAILS:	N/A	Yes	No
Show existing ground along the roadway centerline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed bridge superstructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed bridge substructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ELEVATION ANNOTATION AND DIMENSIONING:	N/A	Yes	No
Annotate existing ground and proposed deck elevation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show station and elevation at key points, such as begin bridge, pier center line, and end bridge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show wingwalls or other similar features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Denote joint types	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTES:	N/A	Yes	No
Note design flow and water surface elevations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Note bridge length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Note skew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist AASHTO Girder Bridge Sheets

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL INFORMATION:	N/A	Yes	No
Use standard MCDOT plan and profile border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow MCDOT CADD and Drafting Guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AASHTO GIRDER BRIDGE CONSTRUCTION DOCUMENTS:	N/A	Yes	No
Key Map and Index of Drawings: Show key map and provide index of drawings. Indicate within the index of sheets any drawings/sheets that are not included in the submittal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Plan and Elevation: Include contours, existing and proposed utilities, alignments, proposed substructure, existing conditions, North arrow, and scale in plan view. Include bearings and annotation for proposed bents, begin and end of bridge, bridge dimensions, bridge alignment, and existing conditions in plan view. Plan and elevation scale to be the same. Provide annotation and dimensions for bridge spans, begin and end bridge, existing conditions, proposed bents, bridge length, bearing distances, and match lines if necessary in elevation view. A profile grade detail may also be included in the plan and elevation sheet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Typical Sections: These sheets detail typical sections from a designated bridge span. The sections include annotation and dimensions of clear roadway, out of bridge, lane configuration, and roadway slope. Sections will include superstructure and substructure (i.e. barriers, deck, girders, piers, columns, drilled shafts, etc.). Annotation must specify type of material and size of individual structures in the typical sections. Must provide control points (alignment locations, etc.) within the typical sections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Notes and Quantities: Provide general notes that includes but not limited to a general description of construction and design specifications, loads, stresses, and materials. Provide list or table of quantities. Provide a legend, abbreviations, and any standards applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Payment Limits: This sheet should provide and include sections of individual structures (typical wing wall, abutments, retaining walls, etc.) that includes limits of structural backfill, structural excavation, and roadway embankment if necessary. Provide notes for any clarification of pay limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Construction Phasing (if needed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist AASHTO Girder Bridge Sheets

Project Name: _____

Project No.: _____

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Project Manager: _____

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	Reviewer		
	Quality Assurance		
<p>Foundation Layout: This sheet includes a plan view of the construction area showing the proposed foundations, proposed and existing alignments, and existing utilities. Dimensions between foundations should be visible as well as descriptions of each type of foundation. Abutments or structures with multiple foundations shall have dimensions associating to the bridge alignment. Bearings of each foundation construction line shall be present. Provide drilled shaft elevation information if necessary</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Foundation Details: Included in this sheet is an elevation view and typical section of the proposed foundation type. The elevation view should include dimensions and annotation for foundation reinforcement. Each foundation type should be accounted for on this sheet. Typical sections should show reinforcement. General notes and foundation load data should be accounted for on this sheet as well</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 1 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #1. In plan view, dimensions shall be provided for girder spacing, total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, width dimensions associated with the centerline bearing of abutment #1. Section callouts shall be provided to reference abutment #1 section and detail sheet. In the elevation view, the construction centerline, abutment step elevations, total abutment length, foundation spacing, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 2 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #2. In plan view, dimensions shall be provided for girder spacing, total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, width dimensions associated with the centerline bearing of abutment #2. Section callouts shall be provided to reference abutment #2 section and detail sheet. In the elevation view, the construction centerline, abutment step elevations, total abutment length, foundation spacing, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist AASHTO Girder Bridge Sheets

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

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Review Date: _____

	Reviewer		
	Quality Assurance		
<p>Abutment 1 and Wing walls Details: This sheet provides typical sections referencing back to Abutment #1 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 2 and Wing walls Details (if different from Abutment 1): This sheet provides typical sections referencing back to Abutment #2 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Pier/s Plan and Elevation sheet/s: Provided on these sheets are plan and elevation views for each Pier. Each pier plan should include the following dimensions and respective annotation: bearing pad and girder spacing, foundation (drilled shaft) and column spacing, width and length of pier. The bridge alignment and bearing centerline of the pier is also needed. Each pier elevation should include the following annotations and/or dimensions: type of foundation, size of column, bridge alignment location, reference callouts for seat elevations, bottom of pier cap elevations, centerline of column, and section callouts. A bearing seat elevations table or list shall be provided on these sheets as well</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Pier Details: Elevation and section views are provided to detail Pier reinforcement. Provide reinforcement callouts for pier elevation view and related section views. Provide detail for reinforcement for stepped pier if necessary. General notes are provided to describe reinforcement in further detail. A shear key detail is provided, if necessary, as well</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist AASHTO Girder Bridge Sheets

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

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 Submittal Date: _____
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	Quality Assurance		
Girder Layout Sheet/s: A plan view is provided showing bridge spans, bridge piers and abutments, and girder placement. Annotation and/or dimensions are provided for girder spacing, centerline of piers and abutments, bridge centerline stationing, edge of deck, and girder lengths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Typical Deck Section: A section is provided for a specific span of the bridge. Reinforcement within the deck is shown. Barriers and girders are also included in the section. Dimensions and/or annotation is provided for reinforcement, barrier type, girder spacing, overhang length, girder type, the slope of deck, and girder length. Superstructure general notes are also provided for descriptions of deck reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deck Layout Sheet/s (including Pouring Sequence): A plan view showing the proposed bridge alignment, proposed bridge line work, approach slab and anchor slab is provided. If necessary, dimensions are provided for additional reinforcement bundles along bridge alignment stationing. Construction centerline of piers and abutments are also visible in the deck plan. A deck pour schedule is also provided in which a plan view of the bridge is shown with callouts and hatching. General notes are also provided to describe the deck pour. A detail showing additional top deck reinforcement at pier locations may also be provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AASHTO Girder Details: A girder elevation, typical section, reinforcing strand data, and girder notes are provided. The girder elevation provides dimensions and/or annotation for reinforcement as well as dimensions of the girder itself. The girder typical section shows reinforcement along with respective callouts and dimensions for the girder are provided. Sections that show strand reinforcement at the ends of the girders and at midspan of the girders are shown. Extended strand details and elevations may also be provided if necessary. Girder insert location details, formed hole location details/sections at intermediate diaphragms and girder ends are also provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist AASHTO Girder Bridge Sheets

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<p>Abutment Diaphragm Sheet: An elevation view and section of the abutment diaphragm is shown. Reinforcement is shown. The bridge deck, barriers, and girders accompany the bridge abutment in the elevation view. Dimensions and annotation is shown for the reinforcement, girder spacing within the elevation. The deck, girders, and abutment is shown in the section view. Reinforcement is also shown in the section view accompanied by annotation</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Intermediate Diaphragm Sheet: An elevation view is provided showing the girder along with the deck and barrier. Reinforcement is shown. Centerline of girders, spacing of reinforcement, and a section callout is provided as well. The section referencing back to the elevation is shown with reinforcement. The intermediate diaphragm reinforcing, width, along with any notes are shown</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Pier Diaphragm Sheet: An elevation view and section view at pier locations is provided. Reinforcement is shown in both the elevation view and section view. Dimensions and/or annotation shall be provided for girders, the deck, reinforcement, diaphragm length, girder spacing, pier cap width, and shear keys. Elevation views consists of girders, the deck, barriers, top of pier cap and diaphragm reinforcement</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Miscellaneous Details (Bearing Pads, Restrainers, Utilities, Parapet and Fence Details, etc.): Restrainer details consists of a fixed restrainer elevation view with applicable callouts and dimensions and an elevation view and section of expansion restrainers, also annotated and dimensioned. Annotations and dimensions are also provided for restrainer top plate and bottom plate details. Restrainer notes are provided as well. Bearing pad details include the following: plan view and section of bearing pads. Dimensions and/or annotation accompany all details, plan views, elevation views, and sections. Bearing pad general notes are also included</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Camber and Screed Elevation Sheet/s: Screed elevation schedules (blank) are provided per span in the bridge screed elevation schedule. Deck sections per span are also provided. Screed elevations are not given or required for scoping plans</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Approach Slab Elevations: Per ADOT standards</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist AASHTO Girder Bridge Sheets

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 Designer: _____
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	Reviewer		
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Foundation Data Sheet/s: Plan view of boring locations and boring logs required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADOT Standard Details: These include, but not limited to, concrete barrier details, approach slab details, anchor slab details, and deck joint assembly details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Post Tension Bridge Sheets

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 Project Manager: _____
 Reviewer: _____

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	Reviewer		
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GENERAL INFORMATION:	N/A	Yes	No
Use standard MCDOT plan and profile border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow MCDOT CADD and Drafting Guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
POST TENSION BOX BEAM BRIDGE CONSTRUCTION DOCUMENTS:	N/A	Yes	No
Key Map and Index of Drawings: Show key map and provide index of drawings. Indicate within the index of sheets any drawings/sheets that are not included in the submittal. Key map should contain proposed conditions and existing conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Plan and Elevation: Include contours, existing and proposed utilities, alignments, proposed substructure, existing conditions, North arrow, scale, and lane configurations, if necessary, in plan view. Include any curve data associated with on/off ramps and bridge alignments, annotation for begin and end of bridge, bridge dimensions, and existing conditions in plan view. Plan and elevation scale to be the same. Provide annotation and dimensions for bridge spans, begin and end bridge, existing conditions, proposed bents, bridge length, bearing distances, and match lines if necessary in elevation view. A profile grade detail may also be included in the plan and elevation sheet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Typical Sections: Proposed bridge superstructure and substructure are shown along with proposed grade. The sections include annotation and dimensions of clear roadway, out to out of bridge, lane configuration, and roadway slope. Sections will include superstructure and substructure (i.e. barriers, deck, utility locations, piers, columns, footings, etc.) without reinforcement. Annotation must specify type of material and size of individual structures in the typical sections. Must provide control points (alignment locations, PGL, etc.) within the typical sections. General notes are included for further descriptions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Notes and Quantities: Provide general notes that includes but not limited to a general description of construction and design specifications, loads, stresses, materials, and standards. Provide list or table of quantities. Provide a legend, abbreviations, and any standards applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Payment Limits: This sheet should provide and include sections of individual structures (typical wing wall, abutments, retaining walls, piers, etc...) that includes limits of structural backfill, structural excavation, engineered fill, and roadway embankment in necessary. Provide notes for any clarification of pay limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation Layout: This sheet includes a plan view of the construction area showing the proposed foundations, proposed and existing alignments, and existing utilities. Dimensions between foundations should be visible as well as descriptions of each type of foundation. Abutments or structures with multiple foundations shall have dimensions associating to the bridge alignment. Bearings of each foundation construction line shall be present. Provide drilled shaft elevation information if necessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation Details: Included in this sheet is an elevation view and typical section of the proposed foundation type. The elevation view should include dimensions and annotation for foundation reinforcement. Each foundation type should be accounted for on this sheet. Typical sections should show reinforcement. General notes and foundation load data should be accounted for on this sheet as well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abutment 1 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #1. In plan view, dimensions shall be provided for total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, and width dimensions associated with the centerline bearing of abutment #1. Section callouts shall be provided to reference abutment #1 section and detail sheet. Any retaining walls acting along the abutment or wing walls shall also be present. In the elevation view, the construction centerline, abutment step elevations (if needed), total abutment length, foundation spacing, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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<p>Abutment 2 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #2. In plan view, dimensions shall be provided for total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, and width dimensions associated with the centerline bearing of abutment #2. Section callouts shall be provided to reference abutment #2 section and detail sheet. Any retaining walls acting along the abutment or wing walls shall also be present. In the elevation view, the construction centerline, abutment step elevations (if needed), total abutment length, foundation spacing, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 1 and Wing walls Details: This sheet provides typical sections referencing back to Abutment #1 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 2 and Wing walls Details (if different from Abutment 1): This sheet provides typical sections referencing back to Abutment #2 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Pier/s Plan and Elevation sheet/s: Provided on these sheets are plan and elevation views for each Pier. Each pier plan should include the following dimensions and respective annotation: bearing pad and column spacing, foundation (drilled shaft or footing), and width and length of pier. The bridge alignment and bearing centerline of the pier is also needed. Each pier elevation should include the following annotations and/or dimensions: size/type of foundation, size/type of column, bridge alignment location, reference callouts for top of column/pier elevations, foundation elevations, centerline of column, and section callouts. A rustication or finishing detail shall be provided on these sheets as well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pier Details: Any details describing pier/column finishes shall be included. A pier elevation view with reinforcement to be included and should include the following annotations and/or dimensions: size/type of foundation, size/type of column, bridge alignment location, reference callouts for top of column/pier elevations, foundation elevations, centerline of column, and	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Framing Plan: A plan view of the bridge top slab is shown along with proposed and existing centerline/alignments, centerline of bents and diaphragms. Length, width, girder spacing, diaphragm spacing, and soffit dimensions are provided. Stationing along proposed/existing alignments are given along with bearing of grade lines, etc. A section showing the soffit at pier or desired location should be included with respective dimensions and annotation. A soffit vent hole detail and diaphragm vent hole detail should be included as well. General notes should be provided for more descriptions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Framing Details: Section views and details are provided on this referencing back to the framing plan. Each section contains dimensions and/or annotation for centerlines/alignments, thickness, of structures or slabs, height and width of soffits or structure edges, fillets, barriers, etc. An acute corner fillet detail may be provided. General notes are also provided for further detail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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<p>Top Slab Reinforcement: A plan view of the top slab is provided. Section/detail callouts are included to reference to the detail sheet. Alignments/centerlines of girders, roads, diaphragms, and bents are provided. Sections provided on this sheet show reinforcement mats and/or webs. Any alignments/centerlines provided in these sections are annotated along with every other item in the section/detail</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Bottom Slab Reinforcement: A plan view of the bottom slab is provided. Section callouts or details are included to reference to the detail sheet. Alignments/centerlines of girders, roads, diaphragms, and bents are provided. Sections provided on this sheet show reinforcement mats and/or webs. Any alignments/centerlines provided in these sections are annotated along with every other item in the section/detail</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Superstructure Typical Section: Sections showing the superstructure with reinforcement is provided. Sections should be shown detailing the ends of the superstructure with barriers. Dimensions and/or annotation is included in the sections detailing the reinforcement. A typical section at exterior web may also be shown on this sheet. Superstructure general notes shall be provided as well</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment Diaphragm Sheet: Abutment sections showing the proposed abutment line work and proposed reinforcement to be provided. A partial elevation and partial plan may also be provided for more detail. Each section and detail should include dimensions and/or annotation for the reinforcement. General notes should be provided for further detail</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Pier Diaphragm Sheet: An elevation view of the pier(s) should be provided along with a section. The elevation and section should contain reinforcement and should contain annotation detailing the reinforcement along with any pier(s) centerline/alignments dimensions</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Web and Intermediate Diaphragm Reinforcement: A web stirrup reinforcement detail is provided. Typical stirrup details at the exterior web connection should be provided as well. Typical interior diaphragm and typical girder reinforcement connection details should also be present. Annotation and/or dimensions should accompany the sections and details</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Prestressing Details: A tendon path diagram is provided on this sheet which shows the tendon from the begin to end of bridge. The diagram also contains the center of gravity of tendon approximate parabolic path with dimensions. A camber diagram of the webs is also included in this sheet. A camber schedule should be included with the necessary information. Camber and screed elevation notes should also be included in this sheet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Construction Sequence and Concrete Pour Details: A box girder pouring sequence diagram should be provided. Pour notes for webs, pour notes for girders, and general pour notes should be included as well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Miscellaneous Details (Bearing Pads, Restrainers, Utilities, Parapet and Fence Details, etc.) Parapet and curb details consists of a plan view and details showing the bridge plan with sections and annotation referring to the sections and parapet and/or curb. The sections should include annotation and dimensions for any reinforcing. Fence details may also be included	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Screed Elevation Sheet/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
False work Elevation Sheet/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approach Slab Elevations and Details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation Data Sheet/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADOT Standard Details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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	Quality Assurance		
GENERAL INFORMATION:	N/A	Yes	No
Use standard MCDOT plan and profile border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow MCDOT CADD and Drafting Guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
STEEL GIRDER BRIDGE CONSTRUCTION DOCUMENTS:	N/A	Yes	No
Key Map and Index of Drawings: Show key map and provide index of drawings. Indicate within the index of sheets any drawings/sheets that are not included in the submittal. The key map should contain proposed and existing conditions in plan view	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Plan and Elevation: Include contours, existing and proposed utilities, alignments, proposed structure line work, existing conditions, North arrow, and a scale in plan view. Include bearings and annotation for proposed bents, begin and end of bridge/deck, bridge/deck dimensions, bridge/slab alignment, and existing conditions in plan view. Plan and elevation scale to be the same. Provide annotation and dimensions for bridge/deck, begin and end bridge/deck, existing conditions, proposed bents, bridge/slab length, bearing distances, vertical clearance, and match lines if necessary in elevation view. Profile grade lines should also be included, with annotation, in the Elevation view	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Typical Sections: These sheets detail typical sections from a designated bridge span. The sections include annotation and dimensions of clear roadway, out of bridge, lane configuration, and roadway slope. Sections will include superstructure and substructure (i.e. barriers, deck, girders, piers, columns, drilled shafts, etc.) without reinforcement. Annotation must specify type of material and size of individual structures in the typical sections. Must provide control points (alignment locations, etc.) within the typical sections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Notes and Quantities: Provide general notes that includes but not limited to a general description of construction and design specifications, loads, stresses, and materials. Provide list or table of quantities. Provide a legend, abbreviations, and any standards applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Payment Limits: This sheet should provide and include sections of individual structures (typical wing wall, abutments, retaining walls, etc.) that includes limits of structural backfill, structural excavation, and roadway embankment in necessary. Provide notes for any clarification of pay limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Construction Phasing (if needed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation Layout: This sheet includes a plan view of the construction area showing the proposed foundations, proposed and existing alignments, and existing utilities. Dimensions between foundations should be visible as well as descriptions of each type of foundation. Abutments or structures with multiple foundations shall have dimensions associating to the bridge alignment. Bearings of each foundation construction line shall be present. Provide drilled shaft elevation information if necessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation Details: Included in this sheet is an elevation view and typical section of the proposed foundation type. The elevation view should include dimensions and annotation for foundation reinforcement. Each foundation type should be accounted for on this sheet. Typical sections should show reinforcement. General notes and foundation load data should be accounted for on this sheet as well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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<p>Abutment 1 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #1. In plan view, dimensions shall be provided for girder spacing, total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, width dimensions associated with the centerline bearing of abutment #1. Section callouts shall be provided to reference abutment #1 section and detail sheet. In the elevation view, the construction centerline, abutment step elevations, total abutment length, foundation spacing, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 2 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #2. In plan view, dimensions shall be provided for girder spacing, total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, width dimensions associated with the centerline bearing of abutment #2. Section callouts shall be provided to reference abutment #2 section and detail sheet. In the elevation view, the construction centerline, abutment step elevations, total abutment length, foundation spacing, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 1 and Wing walls Details: This sheet provides typical sections referencing back to Abutment #1 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Abutment 2 and Wing walls Details (if different from Abutment 1): This sheet provides typical sections referencing back to Abutment #2 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pier/s Plan and Elevation sheet/s: Provided on these sheets are plan and elevation views for each Pier. Each pier plan should include the following dimensions and respective annotation: bearing pad and girder spacing, foundation (drilled shaft) and column spacing, width and length of pier. The bridge alignment and bearing centerline of the pier is also needed. Each pier elevation should include the following annotations and/or dimensions: type of foundation, size of column, bridge alignment location, reference callouts for seat elevations, bottom of pier cap elevations, centerline of column, and section callouts. A bearing seat elevations table or list shall be provided on these sheets as well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pier Details: Provide plan and section showing reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Girder Layout Sheet/s : A plan view is provided showing bridge spans, bridge piers and abutments, and girder placement. Annotation and/or dimensions are provided for girder spacing, centerline of piers and abutments, and bridge centerline stationing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deck Layout Sheet/s (including Pouring Sequence): A plan view showing the proposed bridge alignment, proposed bridge line work, approach slab and anchor slab is provided. If necessary, dimensions are provided for additional reinforcement bundles along bridge alignment stationing. Construction centerline of piers and abutments are also visible in the deck plan. A deck pour schedule is also provided in which a plan view of the bridge is shown with callouts and hatching. General notes are also provided to describe the deck pour. A detail showing additional top deck reinforcement at pier locations may also be provided. Provide construction joint details and barrier open joint at pier as well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Typical Deck Section: A section is provided for a specific span of the bridge. Reinforcement within the deck is shown. Barriers and girders are also included in the section. Dimensions and/or annotation is provided for reinforcement, barrier type, girder spacing, overhang length, girder type, the slope of deck. Superstructure general notes are also provided for descriptions of deck reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Girder Elevation Details A: girder elevation, typical section, additional top and bottom steel plates details, splice plate details, bolts or rivets details, and girder notes are provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Camber Diagram: Provide deflection information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diaphragms Details: Show the size of the steel members, gusset plate details and the connection details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abutment Bearing Details: Provide type of bearing details (expansion or fixed, type of bearing such as elastomeric pads, steel rocker or different kinds)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pier Bearing Details: Provide type of bearing details (expansion or fixed, type of bearing such as elastomeric pads, steel rocker or different kinds)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Miscellaneous Details (Utilities, Parapet and Fence Details, etc.): Update details as necessary. Dimensions and/or annotation accompany all details, plan views, elevation views, and sections. Bearing pad general notes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Screed Elevation Sheet/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approach Slab Elevations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation Data Sheet/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADOT Standard Details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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	Reviewer		
	Quality Assurance		
GENERAL INFORMATION:	N/A	Yes	No
Use standard MCDOT plan and profile border	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow MCDOT CADD and Drafting Guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CONCRETE SLAB BRIDGE CONSTRUCTION DOCUMENTS:	N/A	Yes	No
Key Map and Index of Drawings: Show key map and provide index of drawings. Indicate within the index of sheets any drawings/sheets that are not included in the submittal. The key map should contain proposed and existing conditions in plan view	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Plan and Elevation: Include contours, existing and proposed utilities, alignments, proposed structure line work, existing conditions, North arrow, and a scale in plan view. Include bearings and annotation for proposed bents, begin and end of bridge/slab, bridge/slab dimensions, bridge/slab alignment, and existing conditions in plan view. Plan and elevation scale to be the same. Provide annotation and dimensions for bridge/slab, begin and end bridge/slab, existing conditions, proposed bents, bridge/slab length, bearing distances, vertical clearance, and match lines if necessary in elevation view. Profile grade lines should also be included, with annotation, in the Elevation view	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Typical Sections: This sheet(s) detail typical sections from a designated bridge/slab section. The sections include annotation and dimensions of clear roadway, out to out of bridge/slab, lane configuration, and roadway slope. Sections will include superstructure and substructure (i.e. barriers, deck, piers, columns, drilled shafts, abutments etc.) without reinforcement. Annotation must specify type of material and size of individual structures in the typical sections. Must provide control points (alignment locations, profile grade lines, etc.) within the typical sections. Other items included on this sheet include width of barriers rail, crown or super elevation, and utilities and openings for future utilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Notes and Quantities: Provide general notes that includes but not limited to a general description of construction and design specifications, loads, stresses, and materials. Provide list or table of quantities. Provide a legend, abbreviations, and any standards applicable to the slab bridge design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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<p>Payment Limits: This sheet should provide and include sections of individual Bent structures, or structures requiring excavation, (typical wing wall, abutments, retaining walls, piers etc...) which includes limits of structural backfill, structural excavation, and roadway embankment if necessary. Provide notes for any clarification of pay limits</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Construction Phasing (if needed)</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Foundation Layout/Plan: This sheet includes a plan view of the construction area showing the proposed foundations, proposed and existing alignments, and existing utilities. Dimensions between foundations should be visible as well as descriptions of each type of foundation. Abutments or structures with multiple foundations shall have dimensions associating to the bridge alignment. Stations and bearings of centerline bents and abutments should be included. Provide drilled shaft elevation information if necessary</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Foundation Details: Included in this sheet is an elevation view and typical section of the proposed foundation type. The elevation view should include dimensions and annotation for foundation reinforcement. Each foundation type should be accounted for on this sheet. Typical sections should show reinforcement. General notes and foundation load data should be accounted for on this sheet as well. Layout information shall not be repeated on detail sheets particularly bearings and stations and curve data</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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<p>Abutment 1 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #1. In plan view, dimensions shall be provided for foundation spacing, total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, width dimensions associated with the centerline bearing of abutment #1. Section callouts shall be provided to reference abutment #1 section and detail sheet. In the elevation view, the construction centerline, abutment step elevations, total abutment length, foundation spacing, location of weep holes, elevations of slope paving, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view. Repeated stations or bearings, from the foundation plan, should not be included. Reinforcement is not provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 2 Plan and Elevation: Included on this sheet is a plan view and elevation view of abutment #2. In plan view, dimensions shall be provided for foundation spacing, total length of abutment, distance from alignment to outside edge of abutment, bearing pad spacing, width dimensions associated with the centerline bearing of abutment #2. Section callouts shall be provided to reference abutment #2 section and detail sheet. In the elevation view, the construction centerline, abutment step elevations, total abutment length, foundation spacing, location of weep holes, elevations of slope paving, and notes should be annotated and/or shown as dimensions. The scale of the plan view should match the elevation view. Repeated stations or bearings, from the foundation plan, should not be included. Reinforcement is not provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Abutment 1 and Wing walls Details: This sheet provides typical sections referencing back to Abutment #1 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
Abutment 2 and Wing walls Details (if different from Abutment 1): This sheet provides typical sections referencing back to Abutment #2 plan and elevation sheet. The abutment typical section should show reinforcement, proposed grade, bearing centerline of abutment, dimension for height and width, and annotation for foundation(s) and reinforcement. Wing wall sections provided on this sheet show reinforcement, dimensions of wing walls and abutment, and bearing centerline of abutment. An elevation view of the wing wall showing reinforcement is also provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pier(s)/Bent(s) Plan and Elevation sheet(s): Provided on these sheets are plan and elevation views for each Pier/Bent. Each pier/Bent plan should include the following dimensions and respective annotation: bearing pad spacing, foundation (drilled shaft) and column spacing, width and length of pier. The bridge alignment and bearing centerline of the pier is also needed. Each pier elevation should include the following annotations and/or dimensions: type of foundation, size of column, bridge alignment location, reference callouts for seat elevations, bottom of pier cap elevations, centerline of column, and section callouts. A bearing seat elevations table or list shall be provided on these sheets as well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pier/Bent Details: Dropped bent caps should be fully detailed showing plan, elevation, and section. Reinforcement should be included. The width of stirrups should be indicated for flush caps, and the dropped portion of the bent cap should be terminated 1'-0" from edge of deck. Annotation and/or dimensions should accompany a pier/bent detail. Detail notes may be provided for further pier/bent detail descriptions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slab/Deck Details: A plan view of the top and bottom slab reinforcement should be shown. Annotation and/or dimensions should highlight the length, total number and placement for each main reinforcing bars. Reinforcing overlap lengths, slab dimensions, and alignment/centerlines should also be included in the plan views. Superstructure general notes are also provided for descriptions of deck reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Slab Bridge Sheets

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
Typical Slab Section: A section is provided for a specific span of the bridge/deck. Reinforcement within the deck is shown. Barriers and Bents are also included in the section. Dimensions and/or annotation is provided for reinforcement, barrier type, overhang length, Bent type, the slope of deck, and length. Superstructure general notes are also provided for descriptions of deck reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Miscellaneous Details (Bearing Pads, Utilities, Parapet and Fence Details, etc.): Slab hinge details may be included when a hinge is required. Bearing pad details include the following: plan view of bearing pads at pinned piers, part elevations at pinned piers, part elevations at expansion piers, section view at pinned piers, expansion pad details, pinned bearing pad details, and expansion bearing pad details. Dimensions and/or annotation accompany all details, plan views, elevation views, and sections. Bearing pad general notes are also included. Railing/fence details and notes should also be included and may reference the ADOT standard plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Camber and Screed Elevation Sheet/s: Screed elevations are provided in the bridge screed elevation schedule. Deck sections are also provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approach Slab Elevations and Details: Per ADOT standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foundation Data Sheet/s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADOT Standard Details: These include, but not limited to, concrete barrier details, approach slab details, anchor slab details, and deck joint assembly details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist ITS

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
EXISTING PLAN REFERENCES:	N/A	Yes	No
Show existing right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show city and county limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing roadway features such as pavement and driveways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing traffic markings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing signs, signals, and lighting features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing utility features such as poles, lines, utility boxes and structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXISTING PLAN REFERENCES:	N/A	Yes	No
Show proposed alignments and stationing such as mainline and crossroads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show ITS field equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show pull box locations within right-of-way and with proper spacing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing and new conduit alignment with proper bends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed traffic signal equipment, pavement marking and signs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed drainage infrastructure and underground improvements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show the correct quantity of fiber optic cable slack in each service box	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show locating cable in each conduit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Landscape

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Sight Triangles shown per the RDM, clearly labeled with dimensions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sight Distance lines shown for all signage, clearly labeled with dimensions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing pavement marking and sign symbols SHALL be shown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Only ground cover within the Sight Triangles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the general notes included	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
North Arrow, Road Names, Matchlines, Scale, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Every intersection stationing shown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tic Marks every 20', no construction/ monument centerline shown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stationing every 100'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing/ Proposed roadway edges shown (combined)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing/ Proposed Right-of-Way shown and called out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide Plant Legend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Pavement Marking

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Edge of pavement called out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vertical curb and gutter (or role curb) called out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jurisdictions, City and MCDOT right-of-way identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New striping matches existing striping a minimum of 500' prior to beginning and end of project limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing monument line and 100' stationing marks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Position the 100' monument line marks stationing numbers up out of the new roadway	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show and name all existing side streets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Place the road name up above the road sections in large and heavy text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Call out existing and new driveways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing utility features such as poles, utility boxes and irrigation structures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension all lane widths for entire width of roadway	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension new edge line striping from edge of pavement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
With the exception of lane widths move all text out of the roadway	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show new or existing striping across an intersection and how it aligns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Match lines located outside of an intersection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide match lines with matching stations and sheet numbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide a legend for symbols used on the plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Signing and striping plans to be separate or on a combined set of plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Right-of-way

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
	N/A	Yes	No
TYPICAL SECTIONS:	N/A	Yes	No
Develop a new typical section for significant changes in roadway width	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a new typical section for significant changes in drainage design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a new typical section for significant changes in right-of-way width	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show cut and fill sections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show guardrail and barriers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension existing and proposed right-of-way widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimension total width of the traveled way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GEOMETRIC CONTROL:	N/A	Yes	No
Show existing and proposed right-of-way with callouts; Dimensions are not needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLAN SHEETS:	N/A	Yes	No
Show existing right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show city and county limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show existing parcel boundaries and ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show proposed right-of-way and easements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTES AND QUANTITIES:	N/A	Yes	No
List item notes in a sequential order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use same item note numbers for a particular item throughout the plan set	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide location and quantity of the removal items in the removal section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide location and quantity of the new construction items in construction section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide legend for symbols used on the plan sheets in the notes section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Scoping Checklist Signal Design

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Signal plans are completed as per MCDOT Traffic Signal Design Manual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Signal Design Manual Checklist Items have been accurately completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Sequence of Construction

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Sequence of Construction presented in Specifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sequence of Construction presented in a plan sheet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Precise description for each phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Noted that the Traffic Control Plans SHALL adhere to the MCDOT Traffic Control Manual: Work Zone and Special Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Survey

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
FACE SHEET:	N/A	Yes	No
Include as built table with township range and section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TYPICAL SECTIONS:	N/A	Yes	No
Limit the use of dimensions of "Varies".	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Make a note of transition length (by distance or stationing) per each typical.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GEOMETRIC CONTROL:	N/A	Yes	No
All secondary control shown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stations and Offset to all monuments and alignments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clear designation between construction centerline and monument line when different.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If the construction centerline and monument centerline differ at the beginning or end of the project, dimension bearing and distance tie to each other.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide coordinates of the beginning and ending of the project on construction centerline if not on a physical monument.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate all monuments with point numbers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(GC11) The coordinate table should include and Point Name/Number, Northing, Easting, Elevation and Station and Offset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Include the PLSS corner diagram at point appropriate point.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate the geometry (bearing, distances and curve information) of pavement edge and curb within plan view or in a detail with a reference to the detail by sheet number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Label all PC's, PT's, PRC's, PCC's, etc. with Station, Offset and Grade. This includes but is not limited to Medians, Edge of Roads and Sidewalks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Station, Offset and Grade provided where the beginning and ending of a straight line taper is at the edge of roadway . Geometry (i.e. bearing, distance, and curve data) is not needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Station, Offset and Grade provided when lines and curves maintain a constant offset from the construction centerline. Geometry (i.e. bearing, distance, and curve data) is not needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Right of Way shall be on the same station and offset as the construction centerline.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Survey

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
	N/A	Yes	No
PLAN AND PROFILE:			
Annotated all angle points along the proposed and existing right-of-way with station and offset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate any curves in proposed or existing right-of-way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scale added for 11 x 17 plan set.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate tappers on match lines with station and offset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Make sure to note if annotation is to F/C or B/C.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate all corners TCE, Drainage Easement, Utility easements with Station and Offset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate Cut / Fill transitions with Station.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotation all curve returns, whether pavement or curb and gutter with Station, Offset and Grade.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If ADA ramp(s) are offset provide Station and Offset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Profile vertical curves make sure the correction variable has correct sign (+ or -)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRAINAGE PLAN AND PROFILE:			
Annotate all pipes at both ends with Station, Offset and grade or make a note to see detail and a specific page.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Always provide skew or note it is perpendicular.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRAINAGE CULVERT SHEET:			
Annotate headwall at both ends and angle points with Station and Offset and note which face the Station and Offset is to (up or down flow) or make a note to see detail and a specific page.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate skew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If riprap is not defined by the typical section (i.e. an irregular shaped area), annotate Station, Offset and Grade of all angle points of irregular shaped area and slope of sides.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRAINAGE GRADING PLAN:			
In catch basin details annotate Station, Offset and Invert of the end of all pipes coming in or out.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Survey

Project Name: _____
 Designer: _____
 Project Manager: _____
 Reviewer: _____

Project No.: _____
 Submittal Date: _____
 Review Date: _____

	Reviewer		
	Quality Assurance		
PAVEMENT MARKING SHEETS:	N/A	Yes	No
When not coincident with striping, add construction centerline with annotation to the nearest striping on either side.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SIGNING SHEETS:	N/A	Yes	No
Annotate Offset to sign post locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TRAFFIC SIGNAL SHEET:	N/A	Yes	No
Foundations are identified as protect in place, proposed, or protect foundation and pole is to be replaced.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Add note for contractor to request form grade check before pouring foundation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DRIVEWAY PROFILE SHEET:	N/A	Yes	No
Define skew on all driveways even if perpendicular to construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annotate Station and Offset to edge of wings (45 degree tappers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure that the cover over the Bell housing of pipe in considered in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LIGHTING SHEET:	N/A	Yes	No
Add note for contractor to request form grade check before pouring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Final Design Checklist Utility

Project Name: _____

Project No.: _____

Designer: _____

Project Manager: _____

Submittal Date: _____

Reviewer: _____

Review Date: _____

	Reviewer		
	Quality Assurance		
GENERAL:	N/A	Yes	No
Utility list documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility mapping aquired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility contact list documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potential utility and railroad conflicts identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility prior rights identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potential utility and railroad costs identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Utility Technical Memorandum complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	N/A	Yes	No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX 7-I

Consultant Quality Compliance Form



CONSULTANT QUALITY COMPLIANCE FORM

DATE: _____

TO: _____,
MCDOT Project Manager

RE: QUALITY COMPLIANCE REVIEW - _____ SUBMITTAL

CONTRACT NO.: _____ PROJECT NO.: _____

PROJECT NAME: _____

DESIGN MANAGER: _____

CONSULTANT: _____

SUBCONSULTANT: _____
(If necessary) _____

PROJECT QUALITY VERIFICATION

This is to certify that I have verified the contents of the proper documents and or plans in the submittal by the designer and that they meet the requirements of the project. This quality verification was conducted on _____, ____, 20____, before the project was submitted to the MCDOT Project Manager.

This certificate is issued to document my review and to confirm that submittal documents have been verified for quality. These documents are now ready to be checked for quality assurance by the reviewers, in accordance with the content requirements of the Maricopa County Department of Transportation and the requirements stipulated in the MCDOT Project Development Manual.

SIGNATURE: _____

NAME: _____
Consultant Design Manager

APPENDIX 7-J

Consultant Evaluation Form

**MARICOPA COUNTY
CONSULTANT EVALUATION FORM**

To be filled out by Department

Date _____	
Consultant Name _____	Project Name _____
Project Description _____	
Project Manager _____	Contract Number _____
Type of Review <input type="checkbox"/> Intermediate <input type="checkbox"/> Final	

This form is to be used for design and study contracts.

Rate each of the following using a scale 1 through 5. Mark categories that do not apply N/A (Not Applicable). Use this form at both intermediate and final reviews. Write comments, if any, in the space provided.

1	2	3	4	5
Needs Improvement		Satisfactory		Superior

TIMELINESS	RATING
	1 2 3 4 5
1. Timeliness of scoping and negotiations leading to timely signing of a contract _____ _____ _____	□ □ □ □ □
2. Work accomplished in accordance with the approved/updated schedule _____ _____ _____	□ □ □ □ □
3. Timely response to Department comments _____ _____ _____	□ □ □ □ □
4. Timely billings, billing questions resolved _____ _____ _____	□ □ □ □ □

KNOWLEDGE

1 2 3 4 5

5. Understanding of project objectives/scope of work by project manager/reviewer_____

6. Decision making/guidance by project manager_____

7. Awareness and resolution of criteria or policy changes affecting project outcome_____

8. Adequate coordination to resolve issues beyond the scope of work_____

COOPERATION/COMMUNICATIONS

9. Working relationship between Department staff and consultant_____

10. Communications during this project_____

11. Clarity of decisions or instructions from Department_____

12. Recognition and resolution of unusual or critical problems_____

QUALITY

13. Clarity of contract scope of work_____

14. Clarity of Department standards/expectations for drawings_____

	1	2	3	4	5
15. Clarity of Department standards/expectations for specifications _____ _____	<input type="checkbox"/>				
16. Clarity of review comments _____ _____	<input type="checkbox"/>				
17. Completeness of review comments _____ _____	<input type="checkbox"/>				
18. Appropriateness or relevancy of review comments for level of submittal _____ _____	<input type="checkbox"/>				
19. Maintained adequate and qualified management and review personnel throughout the project _____ _____	<input type="checkbox"/>				

TOTALS **1 2 3 4 5**

How well are we doing? How can we improve?

COMMENTS:

**MARICOPA COUNTY
DEPARTMENT EVALUATION FORM**

To be filled out by Consultant

Date _____	
Consultant Name _____	Project Name _____
Project Description _____	
Project Manager _____	Contract Number _____
Type of Review <input type="checkbox"/> Intermediate <input type="checkbox"/> Final	

This form is to be used for design and study contracts.

Rate each of the following using a scale 1 through 5. Mark categories that do not apply N/A (Not Applicable). Use this form at both intermediate and final reviews. Write comments, if any, in the space provided.

1	2	3	4	5
Needs Improvement	Satisfactory	Satisfactory	Satisfactory	Superior

The consultant may optionally elect to answer all of the categories that apply with comments and not fill out the number rating.

TIMELINESS	RATING
	1 2 3 4 5
20. Timeliness of scoping and negotiations leading to timely signing of a contract _____ _____ _____	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
21. Materials furnished to consultant in a timely fashion _____ _____ _____	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
22. Timely response to consultant questions _____ _____ _____	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
23. Timely reviews (meets schedule) _____ _____ _____	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24. Timely payment of billings, billing questions resolved _____ _____ _____	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

KNOWLEDGE/INNOVATION

1 2 3 4 5

25. Organization of work_____

26. Value Engineering (i.e. savings in cost, design, maintenance)

27. Good understanding of project/scope of work_____

28. Recognition and resolution of unusual or critical problems____

COOPERATION/COMMUNICATIONS

29. Consultant working relationship/communication with Department

30. Consultant working relationship with outside Departments____

31. Compliance with contractual obligations_____

QUALITY

32. Deliverables/submittals complete in accordance with the scope

33. Produced clear, complete and accurate drawings per
Department's standards_____

34. Produced clear, complete and accurate specifications per
Department's standards_____

	1	2	3	4	5
35. Produced clear, complete and accurate design calculations _____ _____	<input type="checkbox"/>				
36. Produced clear, complete and accurate quantity calculations _____ _____	<input type="checkbox"/>				
37. Produced clear, complete and accurate reports _____ _____ _____	<input type="checkbox"/>				
38. Maintained adequate and qualified personnel throughout the project _____ _____ _____	<input type="checkbox"/>				
39. Performed quality control on items prior to submittal for review _____ _____	<input type="checkbox"/>				
40. Complete documentation _____ _____ _____	<input type="checkbox"/>				

TOTALS 1 2 3 4 5

How well are we doing? How can we improve?

COMMENTS:
