# Development Design

Development is where the PMs will spend the majority of their project related time. The PM’s primary role is to facilitate the advancement of the project detail from project initiation through the stage deliverables (Stage I – Stage V), and ultimately to advertisement and construction. This is achieved by promoting open and honest communications between designers and stakeholders, and building consensus consistent with the project’s objectives and to achieve ADOT’s objectives via adherence to ADOT policies, guides and procedures.

Many projects will begin with a scoping document. For the purposes of this section, we will assume a scoping document is complete and available. For additional information on Scoping Documents, please reference the Scoping Section of this manual.

# Stage I (15%) Submittal

Stage I is often the first graphical representation of the project limits, footprint and basic features (e.g., alignment and grade, intersections, bridges, etc.).

Stage I development is considered scoping level detail. Please reference the Scoping Section for additional information. The [Stage Deliverables Checklist](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references) will provide guidance of what items are included with this submittal and the minimum level of development for each item. Please note, this document should be completed, signed and submitted by the lead designer to the ADOT PM for approval and signature prior to the distribution of the submittal to the project team and stakeholders.

The Stage I submittal shall include:

1. The project alignment and grade
2. Typical roadway sections
3. Cut and fill limits

For a more detailed description of what should be included with your submittal, please reference the Stage I Deliverables Checklist found on the Project Management Group website. The [Stage Deliverables Checklist](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references) is a guideline. Every submittal item may not strictly adhere to the checklist. In this case, there should be a concise comment explaining any anomaly. Both the designer and ADOT PM will indicate their concurrence by signing the [Stage Deliverables Checklist.](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references)

# Stage II (30%) Submittal

Stage II includes more features and greater detail than Stage I. If an environmental document (e.g., Environmental Assessment or Environmental Impact Statement) is not already approved, the preliminary findings from the environmental research and field investigations should be available for consideration. Initial right of way plans may be available or at least in development.

Stage II development may be defined or determined by a detailed scoping document (e.g., Location/Design Concept Report or L/DCR). Please reference the Scoping Section for additional information relative to L/DCRs. In the absence of a detailed scoping document, a Stage II submittal should include all the items indicated in the [Stage Deliverables Checklist](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references).

The checklist should be completed, signed and submitted by the designer to the ADOT PM for approval and signature prior to the distribution of the submittal to the project team and stakeholders.

The Stage II submittal shall include:

* Plans
* Stored specifications
* Construction estimate
* Relevant technical reports and studies
* Preliminary pavement section

For a more detailed description of what should be included with your submittal, please reference the Stage II Deliverables Checklist found on the Project Management Group website. The [Stage Deliverables Checklist](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references) is a guideline. Every submittal item may not strictly adhere to the checklist. In this case, there should be a concise comment explaining any anomaly. Both the designer and ADOT PM will indicate their concurrence by signing the [Stage Deliverables Checklist.](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references)

# Stage III (60%) Submittal

This step in the Project Development Phase includes incorporating environmental mitigation, right of way acquisition, coordinating permits, coordinating utility relocation, and developing the stage III bid documents (plans, specs & estimate). Typically, the purpose of Design development Stage III (60%) is to layout all design details and features for review, finalize stakeholder’s consensus, and complete the constructability review.

Stage III and Stage IV are the more important stages in the project development process. Stage III and Stage IV Phase activities and deliverables include as a minimum:

* Plans
* Cross Sections
* Special provisions and stored specifications
* Construction estimate
* Construction schedule/duration
* Associated technical reports and studies
* NEPA Approval or Environmental Clearance

The Stage III document development will ensure the design is progressing in accordance with the project need and purpose, criteria, existing site conditions, traffic requirements, etc., and coordination is occurring between the technical sections. Comments received from previous reviews are to be resolved and incorporated into subsequent stage documents, where appropriate.  Special details may only be identified at this stage and may not be completed at his stage. Ideally the design Team would like to have at least three months between Stage III and Stage IV to ensure the technical designer has sufficient time and opportunity to work on the details and stakeholder’s input. Based upon the project’s complexity, project manager and design team, the PM may elect to combine Stage III and Stage IV.

The final right-of-way plans are typically based on the right-of-way requirements contained in the Stage III plans.  Any requests for right-of-way changes after the Stage III Review must be submitted through the design project engineer and approved by the PM.  The project team will evaluate the benefits and costs of the requested change against the project schedule.

A field review will be performed as a part of the Stage III review for design constructability confirmation.

For a more detailed description of what should be included with your submittal, please reference the Stage III Deliverables Checklist found on the Project Management Group website. The [Stage Submittal Checklist](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references) will provide guidance of what items are included with this submittal and the minimum level of development for each item. Please note, this document should be completed, signed and submitted by the designer to the ADOT PM for approval and signature prior to the distribution of the submittal to the project team and stakeholders.

# Stage IV (95%) Submittal

The purpose of the stage IV 95% submittal is to prepare advanced construction documents including all plan notes. Stg IV (95%) will include everything listed for Stg III (60%), as well as, all items and features intended for final construction. Relevant reports and supplemental documentation will also be developed and submitted in their final forms.

The Stage IV (95%) Submittal activities and deliverables include as a minimum:

* Plans
* Cross Sections
* Special provisions and stored specifications
* Construction estimate
* Construction schedule/duration
* Associated technical reports and studies
* Finding in the public interest (PIF), where necessary
* Environmental Clearance
* Preliminary clearance documents (ROW & U&RR)
* Final Materials Memorandum

The Stage IV (95%) submittal will likely be the last opportunity for the design team to review the project as a whole. Comments received from previous reviews are to be resolved and incorporated in the subsequent stage documents.  Special details should be fully developed and included with the plans.

A field review may be performed as a part of the Stage IV (95%) review for design constructability confirmation.

For a more detailed description of what should be included with your submittal, please reference the Stage IV Deliverables Checklist found on the Project Management Group website. The [Stage Deliverables Checklist](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references) will provide guidance of what items are included with this submittal and the minimum level of development for each item. Please note, this document should be completed, signed and submitted by the designer to the ADOT PM for approval and signature prior to the distribution of the submittal to the project team and stakeholders.

# Stage V (100%) Submittal (aka, Plans, Specifications & Estimate (PS&E))

The Stage V (100%) Submittal should be a complete construction package submitted to C&S by the designer or the PM. Invariably there will be some last minute details (e.g., quantities check, special provision verbiage, etc.) needing attention to improve the bid-ability of the project.

The Stage V (100%) Submittal activities and deliverables include as a minimum:

* Plans
* Cross Sections
* Special provisions
* Construction estimate
* Construction schedule/duration
* Associated technical reports and studies
* Finding in the public interest (PIF), where necessary
* All clearance documents
* Preliminary clearance documents (ROW & U&RR)
* Final Materials Design Report

Note: All documents requiring a seal should be sealed with this submittal.

For a more detailed description of what should be included with your submittal, please reference the Stage V Deliverables Checklist found on the Project Management Group website. The [Stage Deliverables Checklist](https://www.azdot.gov/business/ManagementServices/ProjectManagementGroup/references) will provide guidance of what items are included with this submittal. All relevant items and features should be complete and sealed where appropriate. Please note, this document should be completed, signed and submitted by the designer to the ADOT PM for approval and signature prior to distribution of the submittal to the C&S representative.

Once C&S is satisfied with the submittal, they will forward the Federal Authorization for construction to FMS. FMS reviews the Federal Authorization and forwards the documentation to Federal Highways Administration (FHWA). Upon approval, FHWA will forward an e-mail to the author of the Federal Authorization paperwork and FMS. C&S may now elect to advertise the project.

# Cross Sections

Design development stage III (60%) through stage V (100%) should include cross sections of the project at even stations and at breaks in terrain. These plans are important to support earthwork quantities and drainage profiles, verify adequacy of right-of-way requirements and determine the proposed cover over existing utilities.

# Special Provisions

Your consultant or C&S, for in-house projects, will prepare and compile the draft special provisions, for each submittal after Stage II (30%), using current standard specifications, supplementing them with the necessary additions and revisions to fit the project. This includes collecting and combining special provisions for all roadway, bridge, traffic control, erosion control, roadside development, wetland mitigation, material source sign, signal, illumination, and striping bid items. This may also include preparing special provisions to account for utility relocation issues, potential ROW acquisition holdouts and special city, county, state or federal permit requirements.

All permits, clearances and ROW acquisition activities should be finalized prior to completion of the final special provisions. Any special provisions included in the permit requirements or ROW acquisition holdouts should be incorporated into the final special provisions so they may be reviewed during the final plans review.

# Construction Cost Estimates

It is Imperative for the project team to review and revise the preliminary bid items, quantities summary & construction cost estimate at each submittal. The individual technical disciplines should provide updates to their portion of the construction cost estimate as part of developing the Preliminary and Advance Plans. The intent is to add more details in the construction cost estimate as the project design progresses through each development stage. The purpose of updating the construction cost estimate at the Preliminary and Advance phases is to verify that the current estimated cost of construction is consistent with the available funding for the project. It is important for the technical disciplines to prepare itemized cost estimates (not a lump sum) with all calculations based upon the latest design plan and unit prices. These technical calculations will be part of the documents for the construction hand off meeting.

It’s the project manager’s responsibility to monitor for scope creep and cost estimate increase /or decrease. If there is a need to obligate additional funding or even de-obligate funding, the PM is responsible to bring the project before PRB.

# Construction Schedule

The construction schedule reflects major work items and phasing, and durations for each. It should be reviewed and revised by C&S, lead designer, traffic designer and construction staff. It is important to flesh out more details in the construction schedule as the project design progresses. Utilizing reasonable production rates, the construction schedule will be used to determine the contract completion date for the contract special provisions, and confirm the traffic control quantities and costs.

The traffic designer should prepare the itemized cost estimates (not a lump sum) with all calculations based upon the latest traffic control plan and construction phasing plan. These technical calculations will be part of the documents for the construction hand-off meeting and be reviewed by C&S and construction staff no later than stage IV 95% submittal.

# Clearance Documents

All three (3) of the ADOT Clearance documents are required for Advertisement. Both the ROW Clearance and Utility Clearance typically follow the issuance of the Environmental Clearance. The Utility Clearance will follow the ROW Clearance in cases where a utility needs to relocate to new ROW being acquired for the project. Please reference the Development Clearance section of this manual for additional information. Refer to the clearance portion of this manual for more information.

# Materials Design Report

The Materials memo is also required for Advertisement. This document summarizes geotechnical investigation and testing data, and makes recommendations relative to the pavement section(s), shrink/swell factors, pH & resistivity values, etc. Refer to the embedded file within this section for more information about Materials Design Reports.

# Plans Review

A comprehensive review of each submittal package by the project team and others is critical for a complete and integrated design. Reviewers look for errors, omissions, discontinuities and accuracy in the submittal documents.

At each submittal, the construction documents are distributed electronically using the share folder to the project team, district staff, city, county, state & federal agency staff for review. If the documents are too large for distribution or access is prohibitive for some stakeholders, ShareFile may be used to facilitate distribution. It is appropriate for the Project Manager to send out an email regarding project narrative, review comment deadline date and a blank comment form. A typical duration for review after receipt of the plans is 2 weeks. The review includes all appropriate department personnel and any outside agency people who may be involved. The lead designer will collect review comments, solicit feedback from appropriate disciplines and provide a consolidated comments document with initial resolutions indicated.

A comment resolution meeting is scheduled and the initial comment resolution notes are distributed for stakeholder review. In the meeting, the project team will discuss and resolve any significant issues identified during the review. Any significant issue defying consensus should be escalated. The final comment resolution should be distributed to the project team no later than the next submittal.

# Field Review

Stage III 60% design Comment resolution meeting could be combined with field review for constructability review with resident engineer. A constructability review is a review of the preliminary design plan to help identify potential problems that may be encountered in constructing the project. The Constructability Review should take place at a point where the project design has substantially taken shape and design drawings are available for review.

# Construction Handoff Meeting & Constructability Review

A construction handoff meeting should be held with the Stg IV submittal. The purpose of the meeting is to walk through the construction documents, project features, traffic control, phasing and constructability review with the District’s Resident Engineer (RE) and key stakeholders. All errors, omissions, and opportunities for improvement and cost saving should be discussed and documented. Any significant changes need to be brought up and agreed upon at this time. All comments will be documented as any other comment with the Stg IV submittal.

# Escalation Procedure

Escalation should be utilized sparingly, only use this process where consensus cannot be reached. As a general rule escalation should be used within two weeks of unsuccessful discussions and negotiations. The escalating parties should provide a complete review and analysis of the issue/problem, and provide potential solutions, pros and cons for each. This information should be provided to the manager or supervisor of the parties in dispute. The information should be reviewed and resolved within a reasonable timeframe or escalated to the next level until the issue/problem is resolved. The resolution should be documented and distributed to all on the project team.