CHAPTER 2

SCOPE PROCESS AND PROJECT MANAGEMENT

Introduction ..................................................................................................................2-2
Project Identification/Scope Process ........................................................................2-3
Design Standards .......................................................................................................2-7
  Figure 2-1 Design Standards Flow Chart...............................................................  
Design Exceptions ...................................................................................................2-9
Design Exception Approval Process .........................................................................2-12
Project Management Roles and Responsibilities ....................................................2-15
Project Schedule Changes .......................................................................................2-20
  Table 2-1 Preferred Ready and Letting Dates ......................................................  
  Table 2-2 Project Risk Status .................................................................................  
Project Control Management Framework ...............................................................2-24
  Figure 2-2 Design Change Process.......................................................................  
  Figure 2-3 Quality Control for Plans Preparation .................................................  
  Figure 2-4 Project Management Change Model ....................................................  

2-1
INTRODUCTION

The South Dakota Department of Transportation (SDDOT) is an active member of American Association of State Highway and Transportation Officials (AASHTO) to share common national design standards for the state highway system. The AASHTO Technical Committee on Geometric Design publishes the document *A Policy on Geometric Design of Highways and Streets*. The current edition of *A Policy on Geometric Design of Highways and Streets* and other design guidance as listed below, but not limited to, shall be referenced for design standard guidance when establishing project criteria if this manual does not provide guidance in a particular design area.

- AASHTO - LRFD Bridge Design Specifications
- Highway Capacity Manual
- AASHTO Roadside Design Guide
- Highway Safety Manual
- Manual on Uniform Traffic Control Devices (MUTCD)
- AASHTO - Guide for the Development of Bicycle Facilities
- AASHTO - A Policy on Design Standards—Interstate System
- AASHTO - Roadway Lighting Design Guide
- 23 C.F.R. 625
- Policy Number DOT-P&E-PD-6.0, Definition and Standards for Construction/Reconstruction, Resurfacing, Restoration and Rehabilitation of Highways and Bridges under State Jurisdiction

In order to economize major highway construction projects in South Dakota, a formal process to establish the proper scope for these projects should follow this chapter.

This process addresses the purpose and needs of the highway as well as identifies work centers involved in the design process, maintains consistency across the state, provides more accurate cost estimates, and utilizes the available funding in the most effective manner possible. The process should be applied to all pertinent projects to be entered into the Statewide Transportation Improvement Program (STIP).

The Approved Scope is the resulting detailed document used to describe a project’s type of work, limits of work and the appropriate design standards to complete the project’s construction plans as well as determining the project’s schedule and cost estimate. The scope document is created through the SDDOT “Concept to Contract (C2C)” computer application.
PROJECT IDENTIFICATION/SCOPE PROCESS

The need for a project can be identified by a combination of management systems, department personnel, and public input. The “Concept” of a project should include the proposed project limits, work type, and potential impacts.

Scope Document Details

The scope document will define the purpose and need of the project while outlining the existing characteristics along with projected conditions of roadway elements. If the project is scoped after it has been added to the STIP, the author will verify the project elements.

The Scope will consist of the following:

- Executive Summary – General summary of the project
- Project Characteristics – Notes the project as identified in the STIP, identifies any additional studies or outside resources, environmental impacts, utility impacts, agreements or resolutions needed, survey needs, and construction sequencing.
- Background Information – Old plans, other projects in the STIP, traffic data, crash data, roadway characteristics, structure information, lighting/signal/intersection data, and excluded elements.
- Proposed Project Information – Includes the various types and appropriate design standards for work which may be included in a project such as: ADA, grading, hydraulic, structures, resurfacing/surfacing, roadside development, ROW, safety, and traffic
- Appendix – Location for additional information or reports
- Sign Off – Section of the scope where the scope is signed by the appropriate regions, area, or program.
- Design Exception – If a design exception is determined to be applicable for a project.
Draft Scope

During the development of the Draft Scope or project “Concept”, the recommendations from appropriate managers of the following management systems must be included for analysis:

- Bridge Management
- Pavement Management
- Highway Capacity
- Highway Safety
- Culvert Management
- Roadway Lighting
- Traffic Signals
- Guardrail System
- Planning Studies (normally capacity related)
- Etc.

The purpose of the draft scope is to combine background information on the roadway segment and begin to build the purpose and need of the project. The background information for roadway and elements will be completed along with recommendations from the appropriate management systems. Once this is done, all potential options are listed with pros and cons associated with each option for each need. Typical needs and appropriate improvement types associated with South Dakota highways are listed in the Proposed Project Information tab of the C2C scoping module for each project.

The draft scope may be sent to stakeholders and/or a Project Kick-off meeting may be conducted if the project is anticipated to reconstruct the roadway or for special projects. Their review at this stage is to provide additional possible options before proceeding on to the next step.

Proposed Scope

The proposed scope identifies the purpose and need of the project as identified by the author. The proposed scope will include the background information along with proposed improvements to the roadway facility. The improvements will fit the purpose and need of the project.

The author will review and make recommendations on improvements to the route which meet all pertinent state policy, federal, and design manual requirements. If elements of the roadway facility do not meet design standards, the author should review the feasibility and reasonability of making improvements. If, through their analysis, modifications are neither feasible nor reasonable the author should draft a design exception. If the element which is being excepted is on the NHS and inclusive of the Ten Controlling Criteria, the design exception will require FHWA approval on all Interstate projects and Projects of Division Interest (PODI). The process for developing a design exception is explained under the section of this chapter labeled “Design Exceptions”
The author will determine if a public meeting in accordance with the public involvement policy is needed for the project including, but not limited to, the following:

- Impacts to adjacent properties
- Modification of lane configuration
- Environmental Impacts
- Informal Public Input which could impact the scope of work

**Recommended Scope**

The recommended scope is the “final draft” version of the scope document submitted for the approval of required department personnel. By this point in the scoping process, all scope review comments received from department personnel, public, FHWA and other stakeholders will be addressed.

**Approved Scope**

The approved scope is the final scope document issued by the department. All comments from previous versions of the scope have been addressed and its purpose is to guide the designer. If modifications are needed to the project after the scope has been approved, a scope amendment is to be completed.

**Signing/Approving of Scopes**

The scope will be approved by the appropriate stakeholders during the recommended scope phase. The stakeholders consist of the design offices, areas, and regions. If agreement on the scope cannot be met by any entity, the Planning & Engineering and Operations Division Directors can approve or require modifications on their behalf.

**Distribution of the Scope**

The scope will be sent to all programs within the Division of Planning & Engineering, the appropriate area and region offices, and to the FHWA, on projects environmentally classified as a CE2 or CE3 and all federal Projects of Division Interest (PODI). Each program, area, or region should make the scope available to appropriate personnel within their office to solicit comments.

**Scope Amendment**

A scope amendment is to be issued on an approved scope if, through the design process or development of new information, work has either been revised, added or removed from the project which impacts the purpose and need, cost, schedule, environment, or involved work centers. The scope amendment will be approved by all impacted design offices, area, region, and Project Development.
There are two types of Scope Amendments:

1. Formal Scope Amendments require approval from Scope Approvers and affected offices, examples include:
   a. Addition of work requiring a work center not previously involved based on the Approved Scope; such as adding Structure or RCBC replacement, Signals, Lighting, etc.
   b. Major changes to the project limits; as would be the case if absorbing another segment or project
   c. Changes to the project scope which require rescheduling and change of programmed fiscal years

2. Informational Scope Amendments do not require approval but are shared with Project Stakeholders, examples include:
   a. Clarification of items already included in scope; such as if an Approved Scope referred to replacing most roadway lighting in a segment and reusing a number of light poles, but during Preliminary Design Inspection it is determined to replace all light poles.
   b. Minor changes to project limits; such as excluding a small segment or adding a surfacing exception.
   c. Quite often scope changes will be discussed in meetings involving all Project Stakeholders. In this case Informational Scope Amendments may be used for more major changes when those changes have been discussed and agreed upon in person and/or in a group/meeting format.
DESIGN STANDARDS

The design standards for each project will be dictated by the anticipated improvements. Unless stated otherwise, the standards in the Road Design Manual are for reconstruction or 4R projects. Design criteria for other improvements can be found in DOT policy PE 6.0, as identified in the appendix. If a design criterion is not specifically addressed in the Road Design Manual, reference should be made to the appropriate AASHTO Design Manual as noted in the introduction of this chapter.

The decision tree in Figure 2-1 is intended to guide the author in selecting the appropriate design standards for various improvements.

**Design Speed**

Design Speed is the selected speed used to determine the various geometric design features of the highway. The selected design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use, and the functional classification of the highway. In selection of design speed, every effort should be made to attain a desired combination of safety, mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and social or political impacts. Once the design speed is selected, all of the pertinent highway features should be related to it to obtain a balanced design.

For reconstruction/construction of high-speed (≥ 55 mph) rural and/or urban highways the design speed selected should generally be 5 mph greater than the posted speed (typically 85th percentile of the operating speed). However the design speed may be set equal to the posted speed based on the following.

- **Cost** – If a higher design speed causes extreme excavation or results in significant impacts to adjacent property and increased right-of-way acquisition
- **Environment** – If a higher design speed causes significant impacts to the surrounding environment

For reconstruction/construction of intermediate (45 to 50 mph) and low speed (≤ 40 mph) urban highways the design speed selected may be equal to or 5 mph greater than the posted speed. For example, in areas where it is anticipated that the posted speed will be lowered in the future based on development and increased traffic volumes, the design speed selected may be set equal to the current posted speed.
Figure 2-1 Design Standards Flow Chart

1 Mitigation of roadway elements should meet a minimum of 3R standards

2 SDDOT policy "Definition and Standards for Construction/Reconstruction, Resurfacing, Restoration and Rehabilitation of Highways and Bridges under State Jurisdiction"
DESIGN EXCEPTIONS

Introduction

Designers and engineers are faced with many complex tradeoffs when designing transportation facilities. A good design balances cost; safety; mobility; social, natural and environmental impacts; and the needs of a wide variety of roadway users.

Highway design criteria that have been established through years of practice and research, form the basis by which designers achieve this balance. These criteria are expressed as minimum dimensional values or ranges of values for various elements of the three-dimensional design features of the highway. The criteria are intended to deliver an acceptable, cost-effective level of performance (traffic operations, safety, maintainability, and constructability). The criteria are updated and refined as research and experience increase knowledge in the fields of highway engineering, traffic operations, and safety.

Designers are trained to use accepted design criteria throughout the project development process. Striving to meet design criteria is important because it is the primary means by which a high-quality roadway will be produced. A highway or roadway that reflects full compliance with accepted design criteria decreases the probability that safety or traffic operational problems will develop. Thus, using design values that lie within typical ranges provides for a high degree of quality control and reduced risk.

It must be recognized, however, that to achieve the balance described above, it is not always possible or practical to meet design criteria. There are a wide variety of site-specific conditions and constraints that designers encounter. Roadways have a multitude of contexts. Establishing design criteria that cover every possible situation, each with a unique set of constraints and objectives, is not possible. On occasion, designers encounter situations for which the appropriate solution may suggest that using a design value or dimension outside the normal range of practice is necessary. Arriving at this conclusion requires the designer to understand how design criteria affect safety and operations. For many situations, there is sufficient flexibility within the design criteria to achieve a balanced design and still meet minimum values. However, when this is not practical, a design exception should be considered.

The National Highway System

The NHS includes the Interstate system and other routes that are principal arterials serving major travel destinations, highways that provide an important function for national defense, and highways that provide connections to other intermodal transportation facilities.
By federal regulation, FHWA is responsible for establishing design standards on the NHS (23 CFR 625) and has adopted several American Association of State Highway and Transportation Officials (AASHTO) publications as the minimum design criteria for the NHS.

Design exceptions are required on any project on the NHS when design values are used that do not meet the Controlling Criteria. FHWA has developed specific guidance on what constitutes the need for a design exception, and how design exceptions are to be studied, documented, and approved. This guidance addresses FHWA requirements for design exceptions. For additional information on FHWA’s requirements, see the Guidance on NHS Design Standards and Design Exceptions: at http://www.fhwa.dot.gov/design/standards/qa.cfm. An Environmental Impact review is needed for all design exceptions on NHS projects.

Non-NHS Highways

Non-NHS projects are designed, constructed, operated, and maintained in accordance with State laws, regulations, directives, and design and construction standards. Therefore, there is no federal requirement for design exceptions on highways and streets that are not part of the NHS, regardless of funding source. However, States are encouraged to analyze situations and document exceptions on non-NHS routes in a similar fashion when design values are used that do not meet their adopted criteria.

Design Exceptions

Design Exceptions are required when any one of the Ten (10) Controlling Criteria is not met.

1) Design Speed
2) Lane Width
3) Shoulder Width
4) Horizontal Curve Radius
5) Superelevation Rate
6) Maximum Grade
7) Stopping sight distance (SSD)
8) Cross slope
9) Vertical Clearance
10) Design Loading Structural Capacity
Design decision making, and approval authority varies based on ownership of the highway in question and its functional role or classification within the nation’s highway system. Broadly, roads can be considered part of the National Highway System (NHS) or other (non-NHS). Design exceptions on the Interstate and for plans, specifications and estimates, that were designated as PODI under the current Federal Oversight Agreement must be reviewed and approved by the FHWA. On routes that are not designated as PODI, the State will still follow the Design Exception process for any one of the 10 Controlling Criteria. In addition FHWA reduced the number of controlling criteria to two (2) on low speed highways (i.e. non-freeways with <50 mph design speed), however the State will utilize the 10 Controlling Criteria for design exceptions regardless of design speed.

**Design Deviations**

For those design deviations not part of 10 Controlling Criteria (e.g. clear zone, lateral offset) appropriate documentation/justification shall be provided by the Transportation Planning Engineer (TPE) or Design Engineer with approval provided by the office Program Manager. The documentation/justification will be included as part of the scope and/or project document folder. FHWA approval is not needed for design deviations. The design deviations documentation approved by the Program Manager should be sent to the FHWA Operations Engineer for their information on all Interstate projects and PODI.
DESIGN EXCEPTION APPROVAL PROCESS

A design exception is required whenever the minimum standards for the Controlling Criteria specified for the different categories of construction projects (i.e., 4R, 3R, Special Facilities, Road Design Manual, Local Roads Plan, Bicycle Facilities, etc.) are not met.

In order to evaluate whether a design exception is warranted, both the feasibility and reasonability should be reviewed for consideration.

Feasibility is a review of whether modifications can be made to the facility considering the surrounding topography, social and environmental impacts, and future maintenance. The AASHTO Highway Safety Manual should be used to compare the existing and future crash frequency with and without the modifications. Consultation with the department’s Traffic and Safety Engineer should be done to verify crash potential.

Reasonability is based on engineering judgment and cost benefit analysis of modifications outside of the pavement surface. Based on the existing and potential crash frequency, the engineer should consult with the department’s Traffic and Safety Engineer to identify life cycle cost benefit of such modifications. Engineering judgment should be exercised when considering the function of the facility, traffic mix, traffic volume, and route continuity.

Exceptions to design standards should be first discussed at project scoping, project team meetings, or during reconnaissance studies. When enough data is available, agreement on standards and from which standards to request exceptions should be reached at these meetings. Requests for design exception require justification. Some considerations which may cause a request for an exception to the design standards are listed below:

- Excessive construction cost or cost/benefit
- Compatibility with adjacent sections
- No plans for improvement of adjacent sections in the foreseeable future
- Proposed improvements or changes in standards for the highway corridor
- Preservation of historic property or scenic value
- Additional right of way requirements
- Environmental impacts
- Low crash history and/or crash potential
- Low traffic volumes

Simply making a request for a design exception is not assurance that the request will be granted. Therefore, early submittal of the request is paramount to a smooth design process.
Design Exceptions for Interstate projects and projects selected as PODI by FHWA shall be submitted to the responsible FHWA Operations Engineer for review and approval, following DOT approvals by the responsible Program Manager or Region Engineer and the Project Development Engineer. Determination of whether a project has been chosen as a PODI by FHWA is possible by looking the project up in C2C software application as shown here:

![C2C Software Application](image1)

or by using [Project Search on SDDOT Intranet](image2) as shown on below:

![Project Search on SDDOT Intranet](image3)

The responsible Program Manager or Region Engineer and Project Development Engineer will review for approval design exception requests for projects without FHWA oversight. The Administration Program Manager will review design exceptions for approval on Local Government projects.

**State or Federal Projects**

For State or Federal Projects, a design exception should be completed as a part of the project scope and reside in the Conception to Construction (C2C) scoping module. If it is determined that a design exception is needed, the TPE shall utilize the Design Exception tab as part of the scoping process. The approval requests are sent via email to the necessary approval parties. FHWA will be emailed a copy of the Design Exception and asked for their approval, if the project is on the Interstate or has been selected by FHWA as a PODI requiring oversight. A copy of their approval or rejection will be retained within the scoping document.
All design exceptions not originating in the C2C module will be added to the module for tracking purposes.

SDDOT Policy DOT-P&E-PD-6.0 *Definition and Standards for Construction/Reconstruction, Resurfacing, Restoration and Rehabilitation of Highways and Bridges under State Jurisdiction*, [http://intranet.dot.sd.gov/policy/detail.asp?pid=537](http://intranet.dot.sd.gov/policy/detail.asp?pid=537) provides design standards for use on construction/reconstruction, resurfacing, restoration, and rehabilitation projects, to address the purpose and need of the facility while promoting safety through effective asset management.

Design exceptions on State or Federal projects need to be signed by the Office of Project Development Program Manager. In addition, design exceptions need to be signed by either:

- The Office of Road Design Program Manager when roadway design exceptions involving deviation from controlling criteria minimums in the AASHTO design specifications, SDDOT Road Design Manual or the above policy,

  or

- The Office of Bridge Design Program Manager for bridge design controlling criteria.

**Local Agency Projects**

Local Agency project design exceptions not on a State Highway or on the NHS follow a slightly different process. The approval of design exceptions is under the authority of the Administration Program Manager, and the intervening steps between the request and approval may differ from the standard design exception process. Designers involved in local agency contracts should contact the Local Government Engineer and review the Local Roads Plan: [https://dot.sd.gov/media/documents/localroadsplan.pdf](https://dot.sd.gov/media/documents/localroadsplan.pdf) for processing design exceptions on local agency projects. Form DOT-701 at [M:\DOT\Common\AllDOTForms\DOTForms401-899\DOT701_DesignExceptionRequest_Local_Government_Agency.doc](M:\DOT\Common\AllDOTForms\DOTForms401-899\DOT701_DesignExceptionRequest_Local_Government_Agency.doc) should be used to process Local Agency design exceptions. The design exceptions need to be reviewed and approved by the Local Agency. The complete documentation for a design exception should be retained permanently in the project file.

Design exceptions for local government projects must be signed by the Administration Program Manager. Structure design exceptions should be co-signed by the Office of Bridge Design Program Manager.

FHWA will be emailed a copy of the Design Exception and asked for their approval, if the project has been selected by FHWA as a PODI.
PROJECT MANAGEMENT ROLES AND RESPONSIBILITIES

SDDOT uses a collaborative effort to manage projects, relying on specialized staff from a variety of Offices to efficiently deliver quality projects through the efforts of the Project Manager, Work Unit Coordinator and Project Team.

Project Management Steps or Components:
1. Initiate the Project
2. Plan the Project
3. Execute the Project
4. Monitor and Control the Project
5. Close the Project

What does a Project Manager manage?
1. Scope
2. Schedule
3. Cost
4. Risk
5. Quality
6. Resources

Project Team Definition and Role

- Project Team includes every person/resource working on the project or involved in completion of the project.
- Team meetings may be held with the affected members.
- Individual team member responsibilities range depending on role. May include completing work tasks, providing information or recommendations, or making decisions regarding the project future.
- Team members will maintain ongoing communication with other project team members on specific project issues.
- The Team meets as needed throughout the design and development of a project; beginning with project scope, through any potential schedule changes or other issues.

Project Manager (PM) Role

- Provide input and participate in setting of initial schedule based on scope and project knowledge.
- Regularly review entire schedule at review points to remain current on project status.
- Participate in reschedule process to ensure changes to project timelines are acceptable.
- Monitors project activities in Primavera to ensure schedule is being met.
• Brings issues affecting project schedule to the attention of management immediately.
• Ensure project and requirements are reviewed.
• Expect and anticipate project changes and adapts to changes as necessary.
• Initiates and follows project control process as needed.
• Ensure any change to scope or schedule is formally reviewed and approved by project team and/or affected work center.
• Ensure needed project personnel are involved in meetings on critical points of the project (e.g. kick-off meeting, review points, scope amendments, etc.) so all parties are involved in and/or aware of project decisions.
• Ensure conflicting resources are addressed and resolved between PM and work center of other projects.
• Communicate modifications to scope, schedule, quality, STIP impacts, and so forth so others are aware and impacted projects can be adjusted if needed.
• Accurately reports project status to work units and management.
• Keeps project and activity date information current in Primavera for own work unit.
• Verify resources are assigned to projects as soon as practical.
• Assesses and manages resource workload for own work unit.
• Ensure overall project quality standards are met.
• Ensure adequate communication between team members and other project teams as needed.
• Recognizes outstanding performance and celebrates accomplishments.
• Documents lessons learned and shares with others.

**Work Unit Coordinator (WUC) Role**

• Provide input in setting of initial schedule related to knowledge area.
• Expect and anticipate project changes and manage changes for work center activities.
• Assess and manage resource needs for work unit.
• Regularly reviews schedule activities for work unit and remains on top of schedule/date changes.
• Ensures work center quality standards are met.
• Review project portfolios, (e.g. multiple projects or entire Fiscal Year) to identify conflicting work center resources and time commitments and works with work center Program Manager to address and resolve.
• Brings issues affecting project schedule to the attention of work center Program Manager immediately.
• Communicate with PM and other project team members when work center schedule issues are anticipated.
• Review any change to scope or schedule to determine impact to work center activities.
• Participate in project team meetings and come prepared with current project information.
• Assign resources to projects as soon as possible and manage resource workload.
• Anticipate gaps in short-term workload and be proactive in seeking work to fill the gaps.
• Anticipate future workload and resource needs and determine how those needs will be met.
• Reviews durations and labor units assigned to activities and makes recommendations for needed changes at project review points.
• Accurately report project status of said work unit.
• Keeps project and activity date information current in Primavera.
• Recognizes outstanding performance and celebrates accomplishments.
• Ensures adequate communication between team members and other projects. Seeks out information needed and shares information needed by others.

Resource Role

• Complete assigned activities/tasks on a project.
• Maintain ongoing communication with other project team members on specific project issues.
• Keep activity/task status current by entering start and finish dates.
• Communicate with supervisors on existing and future workload, project issues, and priorities.

Project Delivery Engineer Role

• Determine network and set initial project schedule based on a STIP year and scope information.
• Ensure initial project baseline is recorded and future baselines are recorded as needed.
• Provide recommendations on initial and review point schedule changes to assist PM and WUC on schedule adjustments.
• Problem solve schedule issues.
• Review and reschedule projects based on predetermined review points of PM and WUC request.
• Work with project team to manage changes to schedule.
• Work with PM & WUC to ensure any change to scope is reflected in schedule and communicated to other project team members.
• Participates in project team meetings, initiates and facilitates meetings as needed.
• Review project portfolios, (e.g. multiple projects or entire FY) to identify conflicting resources and time commitments and assists project teams to address and resolve by making recommendations.
• Communicates modifications to schedule to project team.
• Modifies schedules in the Primavera system ensuring information is accurate and reliable.
• Document schedule changes in Primavera Notebook.
• Document scheduling lessons learned and share with others.
• Initiate resource allocation discussions with PMs and WUCs.
• Work with Project Development Engineer to identify projects that may need to move in the STIP. This may also include follow up meetings with different project teams.
• Initiate project meetings when a schedule is in danger of falling behind due to seasonal restrictions, etc. This may also include ways to advance projects and ensure proper communication/coordination happens between the necessary offices.

Project Schedule Coordinator Role

• Determine network and set initial project schedule based on a STIP year and scope information.
• Ensure initial project baseline is recorded and future baselines are recorded as needed.
• Provide options on initial and review point schedule changes to assist PM and WC on schedule adjustments.
• Review and reschedule projects based on predetermined review points or PM and WUC request.
• Work with project team to manage changes to schedule.
• Work with PM & WUC to ensure any change to scope is reflected in schedule and communicated to other project team members.
• Participates in project team meetings, initiates and facilitates meetings as needed.
• Review project portfolios, (e.g. multiple projects or entire FY) to identify conflicting resources and time commitments and assists project teams to address and resolve by making recommendations.
• Communicates modifications to schedule to project team.
• Modifies schedules in the Primavera system as directed and ensures information is accurate and reliable.
• Defers schedule change decisions to PM and Change Control Process.
• Document schedule changes in Primavera Notebook.
• Document scheduling lessons learned and share with others.
Transportation Planning Engineer (TPE) Role

- Provide input and participate in setting of initial schedule based on scope and project knowledge.
- Participate in reschedule process, as necessary, to ensure changes to project timelines are acceptable.
- May resolve conflicts between projects, including financial, scheduling, geographical, etc.
- Expect and anticipate project changes and adapts to changes as needed.
- Ensures any change to scope is formally reviewed and approved by PM and WUC.
- May ensure needed project personnel are involved in meetings on critical points of the project that effect the scope (eg. kick-off meeting, scope amendments, etc.) so all parties are involved in and/or aware of project decisions.
- Communicate with team members on modifications to scope & STIP impacts, so others are aware and impacted projects can be adjusted if needed.
- May ensure adequate communication between team members and other project teams as needed.
PROJECT SCHEDULE CHANGES

Project schedule changes may be made at designated points in the project or if deemed necessary for the integrity of the schedule. Coordination will be maintained throughout project schedule review and consideration for any changes to project schedule in Primavera. This includes any changes due to STIP Revisions, Scope Amendments, and any scheduled review point or from special requests for schedule review.

All base networks and schedules are designed with predetermined Review Points built in at specific milestone points of a project's life cycle. Schedules will be reviewed at the predetermined Review Points. If the schedule review will result in changes to the current schedule, the schedule should be reviewed with the PM and any affected WUCs. Schedule changes must be approved by the PM. All schedule changes must be documented in the Project Notebook with date of the change, reason for the change, authority for the change, and scheduler making the change.

Definitions

Base Network Schedule – A project schedule template which includes predecessor and successor activities that may occur on various types of projects and is customized based upon the project scope to develop a project schedule.

Schedule Change – Use the reschedule feature to introduce new data to the schedule and affect schedule dates. Most schedule changes will fall in the routine schedule adjustment category.

Routine Schedule Adjustments: Changes to the schedule that may affect the dates and outcome.

- Adding/deleting activities based on scope or new project information
- Adjusting durations and labor units based on scope or new project information
- Adding constraints for desired results

PM’s and WUC’s must be notified of changes to a project schedule. If the change has a significant impact to the schedule, such as affecting multiple work centers or modification of the risk status, a Team meeting may be warranted.

Schedule Modification: Changes to the schedule that include modification of relationships between activities in the base network. The main intent of schedule modifications is to more closely match a project’s realistic schedule as progress occurs and activities are completed.
Key points to consider regarding Schedule Modifications:

- Schedule Modifications support customizing schedule adaptations to the unique combination of an individual project characteristics and actual progress.
- Coordination and support is necessary from the PM’s and WUC’s.

Preferred Ready Date – The preferred ready date window for a project based on the improvement type

Preferred Letting Date – The preferred letting date window for a project based on the improvement type

<table>
<thead>
<tr>
<th>FY</th>
<th>Grading/Shoulder Widening</th>
<th>Bridge Replacement</th>
<th>Bridge Rehab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preferred Ready Date</td>
<td>Preferred Letting Date</td>
<td>Preferred Ready Date</td>
</tr>
<tr>
<td>FY 2018-2021</td>
<td>May - Sept</td>
<td>Sept - Jan</td>
<td>June - Dec</td>
</tr>
<tr>
<td>FY2024</td>
<td>Jan 2023 - Sept 2023</td>
<td>Aug 2023 - Jan 2024</td>
<td>Feb 2023 - Dec 2023</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FY</th>
<th>Surfacing/Resurfacing</th>
<th>ADA</th>
<th>Pavement Preservation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preferred Ready Date</td>
<td>Preferred Letting Date</td>
<td>Preferred Ready Date</td>
</tr>
</tbody>
</table>

Table 2-1 Preferred Ready and Letting Dates
**Risk Status** – an overall indication of an individual project’s risk measured in red, yellow, or green.

**Green (On Schedule)** – Activities are completed on schedule and project falls within the preferred ready date window.

**Yellow (At Risk)** – The ready date is within 1-3 months of the preferred ready date window.

**Red (Critical)** – The ready date is more than 3 months behind the preferred ready date window. If a project is identified as red, the PM must coordinate resolution to the project schedule with the project team and scheduling personnel.

<table>
<thead>
<tr>
<th>EVALUATION POINTS / MILESTONES</th>
<th>THRESHOLD AT EACH POINT TO DETERMINE STATUS LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&quot;GREEN&quot; = On Schedule, which means Project is within Desired Ready Date for Project Type</td>
</tr>
<tr>
<td>Post Scope Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Post Survey Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Preliminary Design Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Post TS&amp;L Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Public Involvement Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Final Design Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Release to ROW Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Pre-ROW Negotiations Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Post ROW Negotiations Based on Ready Date</td>
<td>X</td>
</tr>
<tr>
<td>Complete Final Plans Based on Ready Date</td>
<td>X</td>
</tr>
</tbody>
</table>

**Table 2-2  Project Risk Status**

**Purpose of Risk Status**

The project risk status is used to aid the PM and act as a communication tool for the delivery of projects. Project risk status can be changed through either a reschedule of a project or the PM or WUC self-identifying a change in risk status, which will then be verified through a reschedule. For example, if a PM identifies a that the release to Right-of-Way date will be missed, they can request a status change on a project. Depending on the planned finished and expected finish dates, the project may move to a yellow or red risk status.
Change in Risk based on a Reschedule

Projects are rescheduled during predetermined project evaluation points based on the schedule. Through this effort, project ready dates can and will move along with other activities in the project schedule. If the project ready date falls out of the preferred ready date window, the risk status will change.
Project controls are used to manage a project throughout the life cycle. Any change to a project after work has begun can have a significant impact in a variety of ways. Changes can affect outcomes, cause rework, effect schedules, impact STIP year as well as other results. One minor change at any stage can affect many other parts of the project. To limit impact, change needs to be managed and intentional. Multiple project change controls have been defined to ensure that when changes are needed or issues arise, processes are followed to ensure project schedules and outcomes are not impacted in unintended ways or without authority.

**Change Control Processes/Policies**

**STIP Revisions:** Refer to the [STIP Revision Checklist/Submittal Form](#).

**Scope Amendments:** Defines when a scope amendment is needed, what is the process to request, what work is involved, what rework may result and what the schedule impact will be. See Scope Amendment section previously discussed in this chapter.

**Design Changes:** Changes in design occur throughout the life of a project. Some example design changes may include revised grade line, work limits, geometrics, access, drainage, curb & gutter, retaining walls, and foundations. When design changes occur the PMs, WUCs and Resources must identify and communicate with work units affected, what level of notification/discussion is needed with the work units, what work is involved, what rework may result and what the schedule impact will be. Refer to Figure 2-2 for the process of considering when design changes are appropriate.

![Design Change Process Diagram](image)

**Figure 2-2 Design Change Process**
Project Quality Control/Expectations: The quality of plans and specifications have a direct impact on project cost and constructability. Errors or ambiguities in the plans increase the probability of issues arising during construction, often resulting in costly changes and rework.

Variations in the wording of notes, changes in details, and even inconsistencies in line types, can cause uncertainty leading to problems in the bidding and construction of highway features. Information provided on the SDDOT website under Engineering/Design Services is to be utilized in the production of plans.

The Department provides a multitude of manuals, files, specifications, and details for use to allow all stakeholders the ability to produce clear, consistent plans for the contracting community. It is expected that all plans being produced by, or for, the Department will be universally consistent in format and content as outlined in this manual. The information provided by the Department is consistently updated to incorporate changes in policy, Federal or State requirements, and methodologies, and plans must utilize the most current version available.

Although all plans require some unique details, specifications, or notes, the format and content included in the plans must be consistent with other details and notes provided by the Department. The plans must include adequate detail to allow the Contractor/Supplier to bid and construct the item of work to be accomplished. Certain criteria must be met for plans to be accepted by the SDDOT. These criteria include:

- All provisions, specifications, standard plates, details, bid items, and notes must be the current versions available from SDDOT
- Plans must be provided in pdf format
- The pdf document must be flattened before submittal
- All text within the file(s) must be searchable

Construction plans undergo a rigorous review process prior to release to the contracting community. This process begins during the scoping phase and continues at different stages through the release of plans for letting. The plans are reviewed by various office staff for conformance to design criteria, and plans format and content. After final plans are complete, a Department review utilizing the Bluebeam software is accomplished, which allows anyone with internet access the ability to review the plans. All comments from this review must be incorporated or rejected (with notice being provided to the person commenting) without exception. Please refer to the Bluebeam Revu and Vu Manuals regarding this process.

After Department review and incorporation of applicable review comments, the plans will be reviewed by the Quality Management Engineer for any further concerns prior to the release of plans for letting to bids.
There are a number of plans that are not subject to full compliance with the format and content used by the Department, for example City utility projects. Figure 2-3 is provided to help plan preparers determine which criteria must be followed in the production of plans.

![Flowchart](image)

**Figure 2-3** Quality Control for Plans Preparation

**Primavera Schedule Changes:** Define when project schedules will be reviewed and may be modified and identify the authority to authorize schedule changes. See Project Schedule Changes section previously discussed in this chapter.

**Project Management Changes:** The staff or group recommending a process or project change has the initial responsibility to clearly define the issue and the background of the topic. Many positions, programs, or divisions may hear of “complaints” or “suggestions” on a regular basis. No one person has the time to provide adequate consideration to every “complaint” or “suggestion” shared, even if the complaint or suggestions are actually beneficial to a position, program or division.

Transportation projects are identified and programmed based on safety, condition or capacity needs. Project Management changes are identified & committed to based on efficiency gains in dollars, time or human effort.

SDDOT considers a Project Management change as normal daily business in our constant effort to do more work, better than yesterday, faster and more efficiently. This is out of necessity as the list of needs is always increasing and projects continue to get larger and more complex.
Steps for Project Management Change Model

For the purpose of the Project Management Change Model as illustrated in Figure 2-4, the following roles and responsibilities may be considered:

- **The Sponsor** is the person or group recommending a Project Management change.
- **The Executive Sponsor** is the person who has ultimate authority and responsibility for the project or program for which the change is being recommended.
- **Change Coordinator** is the person responsible for the project or program for which the change is recommended.
- **Stakeholder Committee** is the group of people who individually either have insight into the recommended change or involvement in the Project Management process or policy for which change is being sought. Similar in concept to a scope team, in that ALL positions or offices impacted by the recommended change need to be involved.

**Figure 2-4** Project Management Change Model
Communication, coordination and collaboration are required components of successful Project Management. Project Management process changes shall include the following phases and steps as described.

**Identification Phase (Step 1):** The Sponsor has an idea or finds a need for changing a Project Management process. The following criteria & questions must first be reviewed and answered by the Sponsor.

- Concisely define the recommended Project Management change by providing a detailed description of what the key issue is perceived to be.
- Review and define what must be changed; is it a policy, a guideline, or a general practice?
- Define what is to be gained by the recommended change; is it financial, time or human effort?
- Is the Sponsor’s Management on board with recommended change?

Another way to look at the Identification Phase is to think of it as “Creating the Vision”, meaning this is the opportunity for the Sponsor to build a solid case for change by clearly defining the reasons why the change should be made.

**Evaluation Phase (Steps 2-4):** In this phase, all necessary roles and responsibilities will be involved in the process to determine the validity and benefit of the proposed Project Management change. This could be a very iterative process or it could be very quick, depending on the complexity of the process change.

2. Review potential efficiency gain in dollars, time or human effort with the identified Executive Sponsor and Process Change Coordinator.
3. If needed, based on magnitude of Project Management change, work to get a Stakeholder Committee established.
4. Use communication, coordination and collaboration to more intensly review potential efficiency gain in dollars, time or human effort and work on change implementation strategies. This may be an iterative process.

**Commitment Phase (Step 5):** If the Sponsor is successful in getting through the Identification and Evaluation Phases with support from the other process participants, commitment is obtained.

**Execution Phase (Step 6):** In the Execution Phase, the Change Coordinator will take the steps necessary to implement the Project Management change. The Change Coordinator may need to utilize the knowledge, skills and abilities of the Stakeholder Committee to implement the Project Management change.
**Review Phase (Step 7):** For the Review Phase of the Project Management change, the Sponsor, Executive Sponsor and Change Coordinator should collaborate and identify efficiencies gained with the implemented Project Management change. Documentation and communication of results may vary based on the magnitude of the Project Management change, but this evaluation should still be a key concept in the process. The Executive Sponsor and Change Coordinator reviews change successes and lessons learned, possibly to be reported to the Stakeholder Committee and others as needed.

**Example Project Management Change**

An example of a minor Project Management change would be the addition, elimination, or modification of an activity or relationship between activities in Primavera. Major Project Management changes may require more resource and time commitment due to the amount of coordination required and possible impacts to multiple staff, programs or divisions. In the example of changing an activity within Primavera, the following steps would be followed:

**Step 1.** Sponsor (any staff) has an idea or finds a need for Project Management process change. Sponsor will visit with Executive Sponsor (i.e. supervisor and/or program manager) about the suggested Project Management change.

**Step 2.** Sponsor and Executive Sponsor works with the Change Coordinator (i.e. Project Delivery Engineer and/or Project Schedule Coordinator) to determine if this Project Management process change may have value.

**Step 3.** For a major Project Management change, when other staff, programs, or divisions might be affected by the suggested Project Management change, establish a Stakeholder Committee for additional input. This example wouldn’t warrant such efforts.

**Step 4.** Most likely, minor coordination and communication with face to face meetings, phone calls or emails to affected staff will suffice to evaluate the gains in dollars, time or human effort that may result from the Project Management change.

**Step 5.** Collectively, make the determination that the change is a positive impact and commit to the change.

**Step 6.** The Change Coordinator executes the change and informs all affected staff that change has taken place. When necessary, this step includes proper documentation to describe the change.

**Step 7.** Monitor and measure the value of the Project Management change through the next project schedule review point and/or project control meeting.
Tools in place to support the change control processes include:

- Team involvement on developing Initial Schedule
  - All work unit involvement to develop the best possible schedule based on information available.
- Institute a Project Hand-Off meeting between the scope process and prior to design beginning for 3R and 4R projects.
  - PM will determine need and timing of hand-off meeting with TPE and other work units.
- Scheduled Review Points
  - Defined points in a schedule where the actual progress is evaluated and scheduled updated.
- At Risk Status Indicator
  - Flag assigned to each project and updated at scheduled review points to indicate if the project is on schedule or amount of time off schedule. Risk status is based on anticipated ready date alignment with preferred letting dates.
- Project Control Meetings
  - Analyzing needed actions and options on At Risk projects. Also, making decisions on saving or deferring a project.
- Schedule Delay Indicators
  - Identifying the root cause of significant schedule delays or STIP year deferrals.

Project Change Control Process

Project control process will be used to review any change in deliverables during the life of a pre-construction project. Each work unit has a set of deliverables toward final accomplishment of the project. Deliverables are the completed project related work that is passed from one unit to another at a designated point in the process. At certain points of the projects life cycle, the process may change slightly due to the work units impacted by a change. PMs and Program Managers may determine when it is appropriate for a control process step to be bypassed or adjusted.

Office/Program internal project control.
1. Resource identifies:
   a. Issue or concern with a project aspect
   b. Idea for change or improvement to the project
2. Resource discusses with supervisor/lead worker before veering from project plans or standard practice.
3. If minor impact to project plans, schedule, etc. does not affect other work centers or project outcome, WUC makes decision.
4. If impacts to project plans, schedule, etc. affects other work centers, causes rework or has potential to affect project outcome, WUC involves next level supervisor.
5. At this point the issue is referred to the Division/Department Project Control Process.

**Division/Department Project Control Process:**

1. Upon identification of an issue that will affect the project or project schedule, notification is made to the TPE, WUC, PM or Program Manager of the issue. Notification must include what the issue is, why the change is being recommended and other viable options to avoid or minimize the change.

2. The TPE, WUC, or PM coordinates with other affected work units. Provide the same information as above. Discussion with all involved parties to consider each work unit’s impact and the overall project impact.

3. Collective decision on approving the change weighing the significance of the change, the necessity of the change (need to have verses nice to have), impact to the project schedule and STIP year, impact to resources of affected work units.

4. For high profile projects (4R), changes that move a construction year include notification of Division Directors and Project Development Program Manager.

5. STIP year changes are approved by the Project Development Program Manager, Division Directors, Secretary of Transportation, and Transportation Commission.

6. The project schedule will reflect the fiscal year change after the STIP Revision is approved and finalized.